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Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.01SA/LLL11

Topic: H.01. History of Neuroscience

Support: Albion College Foundation for Undergraduate Research, Scholarship, and Creative Activity

Title: Left-side bias in depictions of the brain

Authors: *W. J. WILSON, M. J. BAGUZIS, H. R. PAXTON;
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Abstract: Those who teach neuroscience routinely draw brains in their classes. One of us (WJW) noticed during a class that he nearly always draws a brain as if looking at it from its left side. This is the case whether he draws human or nonhuman brains, external views or midsagittal sections. A cursory examination of brain images online suggested that brains were routinely depicted from this perspective. We conducted a more rigorous review of online brain images to determine if there is a laterality bias in depiction of brains.

A Google search for the term "brain" then the selection of Images resulted in 379 recognizable images of brains. We independently coded each image according to three characteristics: was the brain displayed with its anterior pole facing to the viewer's left or right (i.e., as seen from the left or right side), was it oriented with the anterior or posterior pole facing outward, was the dorsal or ventral surface displayed.

We found a strong bias toward displaying the brain from its left side. Using a conservative criterion of agreement among all three raters, 57% of the images faced left, and only 21% faced right ($p < .0001$, chi-square); a less conservative criterion revealed that 61% faced left and 23% faced right ($p < .0001$).

Identifiable photographs of the brain returned in an additional Google search for "brain" and specifying "photo" revealed a similar but weaker bias: 45% of 137 images faced left and only 28% faced right ($p < .05$).

Drawings of brains included in a collection of 42 historical atlases of anatomy (published from 1390 - 1899, maintained by the National Institute of Health and available on their web page) revealed no such bias. A total of 67 brain images appeared; only 16% were facing left while 21% faced right.

An analysis of images returned by Google for the search term "head" also revealed a lack of side bias: 28% of the recognizable 404 head images faced left and 31% faced right.

The reason for this left-facing bias in modern brain images is unclear. The bilateral symmetry of the brain ensures that views from the left and right sides are informationally equivalent, and therefore there is no compelling reason to display one side rather than the other. The bias does not seem to reflect a historical practice. An argument based on the prevalence of right-handed illustrators cannot explain the bias seen in photographs of the brain. Some colleagues have suggested that the bias reflects the left-to-right nature of English writing, but we find this argument less than compelling, especially given the lack of a bias in how the head is represented. We remain hopeful that our colleagues who study laterality might be able to offer an explanation.

Disclosures: **W.J. Wilson:** None. **M.J. Baguzis:** None. **H.R. Paxton:** None.

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.02SA/LLL12

Topic: H.01. History of Neuroscience

Support: Institute for Culture and Society (ICS), University of Navarra

Title: Towards a richer notion of habit in neuroscience

Authors: ***J. BERNACER MARIA**, C. BLANCO, J. I. MURILLO;

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Abstract: The term “habit”, as it is currently used in neuroscience and psychiatry, refers to a motor or cognitive routine. It is considered a fixed pattern of actions which lacks conscious control. Furthermore, it is frequent to oppose “goal-directed” versus “habitual” behavior, stressing the absence of cognitive influences in habits. The source of this notion lies in the work “The principles of Psychology”, by the American psychologist William James (1890): “Who is there that has never (···) taken his latchkey out on arriving at the door-step of a friend?” James wonders, identifying habits with slips-of-actions. In the present research work, we aim to analyze the sources of William James’s notion of habits, comparing it to other interpretations drawn from classical philosophical perspectives, which view habits as acquired dispositions guided by the intellect. We have found the following influences in the work of James: 1) Léon Dumont (1837-1877), French psychologist who studied habits as analogous manifestations of the “natural law” that guided inert matter; 2) William Benjamin Carpenter (1813-1885), English physician who applied the term “habit” to certain parts of the body, rather than to the person as a whole; 3)

Alexander Bain (1818-1903), Scottish philosopher and 4) John Stuart Mill (1806-1873), British philosopher, both of them empiricists and associationists. On the other hand, from an Aristotelian-Thomistic perspective, a habit is a consolidation of one's own actions, which may lead to an improved cognitive control of behavior. In the long run, and regarding the agent as a whole, this approach may lead to an expansion of free will. We believe that this classical account of habits enriches the current notion popularized in neuroscience, and it may result in a better understanding of human beings as agents.

Disclosures: J. Bernacer Maria: None. **C. Blanco:** None. **J.I. Murillo:** None.

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.03SA/LLL13

Topic: H.01. History of Neuroscience

Title: The eponym: Krause - same name, different people

Authors: ***B. W. BAKKUM;**
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Abstract: There are several terms that are commonly used in scientific circles that include the eponym: Krause (krou'zə), but, unlike most scientific terms that include a person's name, not all of them refer to the same individual. Krause is a fairly common Germanic surname, so it should not be too surprising that there are no less than four Drs. Krause with which eponymous medical terms are associated, and two of them are father and son. Karl Friedrich Theodor Krause (1797-1868) was a German physician and anatomist. Most famously his name is associated with the gland of Krause for the conjunctival glands, which are accessory lacrimal glands found in the conjunctival fornices. His name is also associated with a muscle (depressor labii inferioris), a ligament (transverse perineal), and the valve between the lacrimal sac and duct, which is more commonly known as the valve of Béraud. He was one of the first researchers to successfully use a microscope in his anatomical investigations and is credited with describing that heart muscle fibers are transversely striated. Wilhelm Johann Friedrich Krause (1833-1910) was the son of Dr. K. Krause and was also a respected anatomist and physician. Most notably his name is associated with the end-bulb of Krause for the bulboid corpuscle. These are encapsulated nerve endings found in the skin, mucous membranes, and conjunctiva. They are believed to be mechanoreceptors, but there is evidence that they may be cold thermoreceptors. Other terms

bearing his name include a bone (2nd ossification center in the growing acetabulum), the respiratory bundle (tractus solitarius), and a membrane (or line) (better known as the Z disc in striated muscle). Dr. W. Krause was also known for his research in embryology, although some of his work was controversial. Fedor Krause (1857-1937) was a pioneer in the field of neurosurgery. The Hartley-Krause operation, although no longer used, was a novel approach for excision of the trigeminal ganglion and its roots in order to treat trigeminal neuralgia. As a curiosity, Frank Hartley, an American neurosurgeon, and F. Krause, independently developed this intracranial approach to the treatment of tic douloureux in 1892. Hartley ended up publishing his findings a few months before Krause. A type of full thickness skin graft is sometimes known as a Wolfe-Krause graft. Arlington Colton Krause (1896-1980) was an American ophthalmologist. He described cases of what he called congenital encephalo-ophthalmic dysplasia, which is known as Krause's syndrome. Each Dr. Krause made important contributions to his respective profession. Maybe history should do a better job of remembering them individually rather than just by their shared name.

Disclosures: B.W. Bakkum: None.

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.04SA/LLL14

Topic: H.01. History of Neuroscience

Title: Peter Mark Roget,FRS and the 19th century construction of taxonomies in natural science, 'neuroscience' and literature

Authors: *L. KRUGER¹, S. FINGER²;

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Abstract: Peter Mark Roget, author of the venerable, and still widely used *Thesaurus* of the English language, was a central figure in British science in the early 19th century. Following his Edinburgh University medical graduation at the age of 19 his virtuosic career led to lecturing in physiology and the practice of medicine. An imaginative penchant for originality and publishing on a broad variety of subjects led to his invention of the log.log scale (e^x) on a spiral computational device that proved the key technical step in the invention of the slide rule. He also invented a portable pocket chessboard and published chess problems as well as a varied array of

encyclopedia entries. As a politically potent scientist he led royal commissions for solving a prison disease epidemic and the pollution of the London water supply. Most importantly- he was invited to write quite lengthy articles for the *Encyclopaedia Britannica* on “Physiology” and “Cranioscopy”; the latter a serious, but cleverly sarcastic jibe, earning him scornful attacks by the phrenologists and physiognomists who dominated discourse concerning brain function and cerebral localization during this period. An observation concerning visual after-images also earned provocative attention in the early stage of sensory physiology. His scientific magnum opus was the *Bridgewater Treatise* dealing with classification of all plant and animal life in the context of “natural theology”- a commissioned work with a huge prize devoted to the struggle of taxonomy with puzzling extinct fossil remnants and the budding Lamarckian concepts of “use and disuse” evolution that led to the recognition of “natural selection” in the then-current Darwinian revolution. Roget’s inability to reconcile the moment of God’s creation with the process of evolution exposed him to corrosive attacks within the Royal Society and led to his unseating from the powerful position as Secretary after 21 years and to retirement at 65. He indulged his talent and much interest in the semantics and taxonomy of words for the remainder of his 91 years, producing several revised and copyrighted thesaurus editions; a fiscal landmark in publishing history, now more broadly extant in its digital versions.

Disclosures: **L. Kruger:** None. **S. Finger:** None.

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.05SA/LLL15

Topic: H.01. History of Neuroscience

Title: Alfonso Corti and the discovery of the organ of Corti

Authors: *N. E. KINNEY;

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Abstract: Alfonso Corti (1822-1876) was the first to describe the sensory epithelium in what was later termed the “organ of Corti” by his mentor Albert von Kolliker (1817-1905). In the years 1850-51, Corti worked with a bright-field microscope (magnifications of 20-500) in Kolliker’s laboratory at the University of Wurzburg, Germany where he was also the first to describe the major parts of the basilar membrane, the three rows of outer hair cells, the bipolar cells of the spiral ganglion, the tectorial membrane, the pillar cells, and the stria vascularis of the

inner ear. At this time making satisfactory thin slices of the inner ear was not yet feasible, so he isolated tissue samples and studied surface preparations. After fixation of a tissue specimen between two slides he then partly stained it with a carmine solution. He was the first to use carmine for histological staining. His achievements were remarkable given that the relatively poor state of his preparations did not allow him, for example, to ascertain the spatial relationships of the organ elements located on the basilar membrane. His work represented a quantum leap in the current knowledge of the organ of hearing and was widely praised at the time. Many of his interpretations of his anatomical findings remain valid today, while others, understandably, do not. By the time of his death a quarter century later, his contributions had been largely forgotten except for the eponym provided by Kolliker.

Disclosure.DisclosureBlock:

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.06SA/LLL16-DP10

Topic: H.01. History of Neuroscience

Title: The 'protoplasm' as the primary site of general anesthetic action. A contribution to the bicentennial of Claude Bernard's birth

Authors: *M. PEROUANSKY¹, V. V. MATVEEV²;

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Abstract: Claude Bernard has recently been rediscovered as the author of a unified theory of anesthetic mechanisms that served for generations as the unquestioned paradigm for research in this field.¹ In addition to this overarching framework, Claude Bernard also proposed a specific theory of anesthetic action that mirrored the contemporaneous fascination with the mysteries of cell biology. Bernard's observations on visible changes in cell structure that were at the core of his 'protoplasm coagulation' theory of anesthesia was pursued across the ideological divide by scientists in the Soviet Union and the United States into the 1950s. In the East, multiple laboratories pursued a "denaturation theory of excitation, damage and narcosis" of the living cell. This collective endeavor was attributed to the influential authority of D.N. Nasonov.² Nasonov

interpreted visible changes in the protoplasm (termed 'coagulation') as a reversible denaturation affecting the solubility of cellular proteins. Using equilibrium distributions of vital dyes between the cell and its surrounding, Nasonov's school collected a large amount of experimental data that was interpreted as suggesting that different forms of physiological cellular activity (muscle contraction, synaptic transmission, secretion etc.) were accompanied by changes in the state of cytoplasmic proteins similar to (partial) denaturation occurring under conditions of physiological stress.³ A substantially revised version of 'physiologic' protein denaturation has recently been published.⁴

In the West, W. D. Bancroft, G.H Richter (1930s) and later W. Seifriz (1941, 1950) proposed theories that were in essence updated versions of Bernard's coagulation theory. Only the term used to describe the underlying change in optical properties of the cytoplasm differed. Bancroft and Richter vigorously defended the notion that 'flocculation' of the cytoplasm occurred at clinically relevant concentrations of anesthetics especially in electrolyte-containing colloidal solutions. In their opinion the cellular protoplasm was poised in a 'critical' state, hovering on the verge of a reversible phase transition into a coagulated/flocculated state. Seifriz rebranded the same phenomenon into 'gelatinization' and also saw it as underlying anesthesia. In summary, Bernard's idea of reversible 'coagulation' of protoplasm as a physiologic phenomenon proved to be long-lived.

References: 1. Perouansky M. ANESTHESIOLOGY 2012; 2. Nasonov D.N. 1962; 3. Matveev V.V. CELL MOL BIOL. 2005; 4. Matveev V.V. THEOR BIOL MED MODEL. 2010

Disclosures: M. Perouansky: None. V.V. Matveev: None.

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.07SA/LLL17

Topic: H.01. History of Neuroscience

Title: An anti-Rubin vase effect in an old quilting pattern

Authors: *E. SECKEL¹, E. ALTSCHULER²;

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Abstract: Works of art from the past have aesthetic, intrinsic and historical interest. Particularly significant are art works from prior times which contain unappreciated lessons about

neuroscience still relevant for today. We note and discuss that a quilt pattern known as "Delectable Mountains" from the early Twentieth Century is the most clear instance of which we are aware of an "anti-" version of Rubin's vase effect. Rubin's vase (1915) effect consists of a black (or white) drawing of a solid vase on a white (black) background. One can see the drawing as a black vase on a white background, or, interestingly white silhouettes of two people facing each other on a black background. Remarkably it is neigh impossible to see both the vase and the people simultaneously. (Rubin's effect appears in earlier context back at least as far as a 1754 Hogarth engraving.) At a show of Americana red and white quilts at the NY Armory in 2011 we saw a quilt (Figure 1) which can appear as concentric white rectangles containing red triangles with serrated edges or diagonals made up of red rectangles with serrated edges with a white triangle in the middle half of each rectangle. (A version of Delectable Mountains with twelve concentric rectangles won third place in the 1933 Sears quilting contest accompanying that years World's Fair in Chicago. The pattern was originated in New Jersey by the invalid wife of a clergyman.) Interestingly, we are not able to stably focus on only one of these percepts to the exclusion of the other! The perception of one of the alternatives (that is, bringing one perception to the foreground) is unstable and when one tries to do so, the other alternative emerges. This anti-Rubin vase effect from an old quilting pattern merits further examination and study.



Disclosures: E. Seckel: None. E. Altschuler: None.

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.08SA/LLL18

Topic: H.01. History of Neuroscience

Title: Louis Pierre Gratiolet and brain folding patterns in primates

Authors: *A. PARENT;

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Abstract: The Greek anatomist Erasistratus (304-250 BC) was probably the first to draw attention to the complex pattern of cortical folding that he related to intelligence. Later, Galen (129-201 AD) reproved him and proposed that higher brain functions reside in brain ventricles, a notion that dominated medical thoughts for more than 1500 years so that interest in brain convolutions did not re-emerge before early 19th century. Louis Pierre Gratiolet (1815-1865) was one of the first modern anatomists to reassess the importance of cerebral convolutions. He was born in Sainte-Foy-la-Grande (Gironde), a small city that also saw the birth of Paul Broca (1824-1880), another famous brain anatomist. Trained as a medical doctor in Paris (1834-1839), Gratiolet also studied comparative anatomy under the learned mentorship of Henri de Blainville (1777-1850). In 1842, he accepted de Blainville's offer to become his assistant at the nearby *Muséum d'histoire naturelle* and progressively abandoned medicine to embrace comparative anatomy. He first initiated a remarkably wide and detailed study of the brains of human and nonhuman primates. He soon realized that the organisational pattern of cerebral convolutions is so stable and predictable that it may serve as a criterion to classify primate groups. Only the deepest sulci exist in lower primate forms, while the number and complexity of cortical foldings increase markedly in great apes and humans. Gratiolet provided the first cogent description of the lobular organization of primate cerebral hemispheres. He saw the insula as a central lobe around which revolve the frontal, parietal, temporal (temporo-sphenoidal) and occipital lobes. He correctly identified most gyri and sulci that lie on lateral, medial and ventral brain surfaces and introduced the term "*plis de passage*" for some interconnecting gyri. We own him the first description of the optic radiations, which still bare his name. Gratiolet is also to be remembered for his long and tenacious battle during the early 1860s against his prominent fellow-citizen Broca on the issue of brain and intelligence. Although Gratiolet agreed that the brain was the seat of intelligence, he believed that human intelligence was far too ethereal to have any direct relationship with brain weight, as advocated by Broca. He thought that a detailed study of the complex architecture of our brain would be much more useful than Broca's vain speculations about brain weight and intelligence. Despite remarkable scientific achievements and a unique teaching capacity, Gratiolet had to raise his small family in poverty and was unable to secure any academic position until three years before his death in Paris at age 50.

Disclosures: A. Parent: None.

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.09SA/LLL19

Topic: H.01. History of Neuroscience

Title: Changing our minds on neurofeedback? history, efficacy, challenges, and ethical concerns in altering affect

Authors: *A. R. MUÑOZ, E. L. OHAYON, A. LAM;
Green Neurosci. Laboratory, Neurolinx Res. Inst., San Diego, CA

Abstract: Neurofeedback is being increasingly explored as a non-invasive therapy for atypical affective orientations both as an adjunct and an alternative treatment to psychiatric drugs and psychotherapy. This presentation reviews literature on the efficacy of neurofeedback in treating atypical affective orientations and related symptoms. We briefly review underlying physiology and challenges with neurofeedback training, such as: placebo effects, standardization, confounding factors, individuation and possible contraindications. We consider some ethical concerns including issues relating to psychiatric diagnosis of atypical affective orientations (such as clinically diagnosed depression) and stigma related to these diagnoses. We also explore the potential of novel neurofeedback approaches aimed at promoting self-exploration of one's own neural activity as it corresponds to self-described affective orientation during neurofeedback sessions.

Disclosures: A.R. Muñoz: None. E.L. Ohayon: None. A. Lam: None.

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.10SA/LLL20

Topic: H.01. History of Neuroscience

Title: Toward a Neuroanatomical Model of Hypnosis

Authors: *S. SINGH¹, R. CIRIC¹, S. SINGH¹, J. SCOTT², J. SINGH¹;

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Abstract: The hypnotic experience numbers among the oldest techniques recognized to possess psychotherapeutic value (Spiegel, 2013). Despite the longevity of hypnotic therapy, there remains no definitive scientific consensus regarding neural substrates involved during the hypnotic state. In this review, we aggregate extant data collected by neuroimaging techniques (e.g., fMRI, PET, EEG) to develop a theoretical neuroanatomical model. An analysis of data in the context of the large-scale functional network hypothesis (Bressler and Menon, 2010), focusing on changes in excitation, inhibition, and connectivity in and between the default-mode network, central executive network, and salience network in hypnotized and hypnotizable subjects relative to an ordinary resting state and mental imagery follows. We distinguish between "neutral hypnosis", or hypnosis in absence of external suggestion, and hypnosis in conjunction with suggestive or noxious stimuli and account for pitfalls in experimental design that effectively conflate neutral hypnosis with hypnotic suggestion (Mazzoni, Venneri, McGeown, and Kirsch, 2012). A comprehensive analysis of literature suggests the critical role of the frontal cortex, the anterior cingulate cortex, and most regions of the anterior default-mode network, as evidenced by the increased and decreased activity of these anatomical units under the hypnotic state. These findings appear to be consistent with the known functions of these structures and networks. We will discuss the potential implications of extant neuroanatomical data upon the various cognitive state and non-state models of hypnosis.

Disclosures: S. Singh: None. R. Ciric: None. S. Singh: None. J. Scott: None. J. Singh: None.

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.11SA/LLL21

Topic: H.01. History of Neuroscience

Title: Understanding creativity through neuroscience: Conceptual concerns, experimental pitfalls, and social implications

Authors: *P. V. CHU¹, A. R. MUNOZ¹, M. MACDONALD², E. L. OHAYON¹, A. LAM¹;
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Abstract: What is creativity? Can creativity be studied using the neurosciences, and if so, how? Are we seeking to connect two domains that cannot or should not be connected? In the Eighteenth Century a new trend emerged: Art and science, once closely related, began to be increasingly separated with the role of the scientist and the role of the artist understood to be distinct, incongruous occupations. The separation deepened along with quests for optimization, efficiency, control, "normality", dissection, specialization and categorization; these are concepts that are also deeply ingrained in modern day neuroscience. Creativity, in contrast, is often elusive, abstract, autonomous, generative, diverse and closely linked to controversially viewed acts such as risk-taking, "deviance", marginality, rebellion, and defiance. That is, the very same acts and abilities that allow for creativity are behaviors and dispositions pathologized by many neuroscientists. We present a brief overview of how creativity has been studied in psychology and the social studies. We describe some of the challenges encountered in studying creativity in these fields. We inquire whether novel methods used in neuroscience research might reveal something valuable that goes beyond these social and behavioral studies, or, if these reductionist attempts at studying creativity as a biological category negate the very phenomenon. Will attempts to study creativity through neuroscience increase the divide or can new approaches be found to promote an environment that can enrich and reconnect both domains?

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Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.12SA/LLL22

Topic: H.01. History of Neuroscience

Title: The need for quantum processing in the brain

Authors: *S. ZHAO;
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Abstract: It has long been contended that Quantum Effects would not be possible within the “warm, wet, noisy” environment within the human body which would cause decoherence, in turn dampening out any phenomenon associated with an isolated quantum state. In recent years however, new studies have correctly modeled the physical mechanisms of once unexplained functions in biology using Quantum considerations, not just causal classical ones. For example, the Fenna-Matthews-Olson (FMO) complex within leaves during photosynthesis directs photons from satellite-site photon absorbers to the photon reaction center through a process of quantum simulation where the photon’s superpositions probe the possible paths from the two points and pick the “best” possible path in a timeless (unitary) process. If to be viewed in a classical sense, this process would be 99.99% efficient, much more than expected if the photons were modeled as classically random walking towards the reaction center. Other examples include evidence for birds having special optical cells containing a protein called cryptochrome that facilitate quantum entanglement between electrons that detect magnetic fields through perturbations of their quantum spin.

Many more scientists are contending today that Quantum Effects are ubiquitous in biology and applicable to human sensation. “To have a tool at your disposal, and not use it, is not a law of biology.” The binding problem in the visual cortex has been heavily debated, many groups finding causal methods such as neural synchrony as a possible solution. Visual components such as shape, color, and motion are processed in separate brain areas at different times but integrated into unified visual gestalts. Instead of viewing the process classically, this is one area in which a model of Quantum Computation in the brain would lend new insights.

Quantum computation has the unique ability to defy our classical notions of causality.

Epitomized in many experiments such as Wheeler’s delayed choice, it is shown that discreet physical states such as time and experience are not possible until the wave function is fully collapsed. In an extension of the double slit experiment, the experiment showed that a photon would behave as a particle or wave as it passed through the slit depending on the choice of which method the experimenter would use to detect the wave after it had passed through the slits already. This timeless effect would greatly alleviate the strain placed on the binding problem by causality. The visual system could process the input information’s superposition in a series of partial measurements and the unified experience would be explained through the final collapse.

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Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.13SA/LLL23

Topic: H.01. History of Neuroscience

Support: VIEP I/SAL/2013

PIFI-BUAP 2013

Title: The University of Puebla is the base of pharmaceutical sciences including those for the treatment of mental illness

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Abstract: As soon as the Spanish conquerors arrive to México, they discovered that the indigenous groups had some chemical processes, in base on empirical knowledge, to produce different kind of prescriptions to treat several illness including mental ones. During the colonial period the mining and purification of metals, particularly silver, was an important area of development that promote the teaching in the chemical sciences. However, another area of rapid development was botany because indigenous groups in Mexico has several plants, bushes and trees that offer new treatments to different ailments and were added to pharmaceutical occidental treatments that arrived with the Spaniards. The San Pedro Hospital in Puebla, Mexico was an important place for the development of allopathic medicine, with strong scientific basis, and since the beginning this hospital fixed up a botanic garden in order to obtain the necessary substances for the medical prescriptions and to teach the new experts in pharmaceutical science and botany. The formal pharmaceutical formation started in the XIX century with the establishment of Antonio de la Cal who came from Burgos, Spain as the principal pharmacist at San Pedro Hospital. He begins a relationship with Ignacio Rodríguez de Alconedo and sets the first half-bred pharmaceuticals. In 1824 the Academy of Medicine and Surgery of Puebla was founded including botany, physics, chemist and pharmaceuticals divisions that clearly improved the treatment of several illness including the mental ones. In 1832, the medical sciences were formally founded in Puebla, before Mexico City did, and the San Pedro Hospital and its garden was the space where the professors and students learn the entire practical works that they need for an adequate treatment of different kind of pathologies including central nervous system illness and de la Cal was an important factor for the development of pharmaceutical sciences in Puebla. So, Antonio de la Cal was the founder of pharmaceuticals as a profession. In that sense he participated in the first vaccination program against smallpox in 1798, and also fight against cholera who finally kill him in 1833. In 1877, the pharmaceutical school was founded and Joaquín Ibañez was the first director, he was a very active researcher and created a new mixture of metals in a cream that was very effective for treatment of syphilis, which was even exported to

Europe. Nowadays Pharmacy school is an important part of the development of research and teaching at the University of Puebla and each year around fifty students obtain their Mayor diploma on Pharmacy with a strong impact for the treatment of the illness that affect the brain and spinal cord.

Disclosures: **J. Eguibar:** None. **M. Cortes:** None. **A. Huerta-Jaramillo:** None.

Theme H Poster

20. History of Neuroscience

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Topic: H.01. History of Neuroscience

Support: Intnal Group of Neuroscience

Title: Thermal circuit analogs in the brain and "friendly" stimulation during sleep rhythms: Modulation of TMS/TES

Authors: ***J. F. GOMEZ-MOLINA**^{1,3}, L. F. BOTERO³, J.-D. CIRO³, A. L. GOMEZ-MOLINA²;

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Abstract: INTRODUCTION. (1) A long-term goal of neural engineering has been to be able to modify friendly the brain during sleep. For instance, TMS and TES have been applied at specific phases of sleep rhythms in order to induce plasticity. (2) Heat injection can reduce the stability of the perineural and neural networks, making them more plastic. (3)There are small spatial and temporal patterns in the brain temperature (BT). With all of this in mind, we present historical details, models and social issues around these area.

METHODS. Pubmed search. Conceptual analysis. Neural-Engineering approaches.

RESULTS. (1) Yudkowsky introduced the term "Friendly artificial intelligence" in 2008. (2) Technical issues: BT and heat are ubiquitous signals affected by external temperature, biochemical reactions, fluid motion (blood and CSF) and tissue movement. In turn, ionic-channel-open probability, intra/extra-cellular conductivity and field effects are affected by BT. A summary of the thermal circuit of the brain is presented using an electric analog (Fig. 1). The spatial and temporal patterns of temperature indicate where and when the brain architecture is

National Institutes of Health

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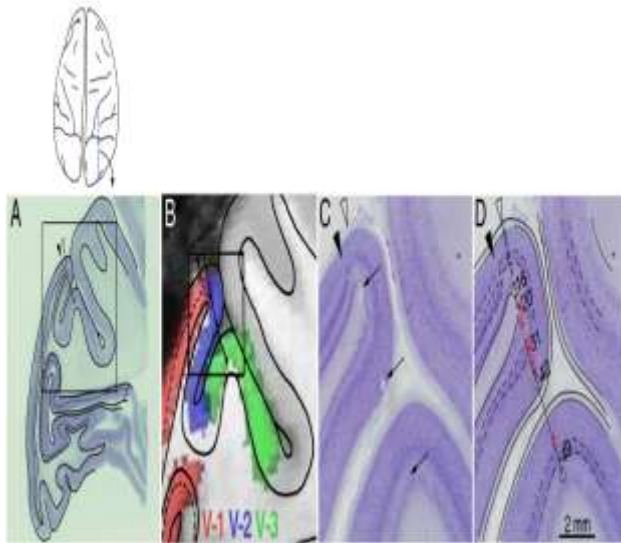
Title: Binocular stereoscopy in visual areas V-2, V-3 and V-3A of the macaque monkey: A contemporary analysis of Hubel and Wiesel's unpublished recordings of cells sensitive to binocular depth

Authors: *B. R. CONWAY¹, E. M. YEAGLE², R. LAFER-SOUSA², T. N. WIESEL³, D. H. HUBEL⁴;

¹Neurosci., Wellesley Col., WELLESLEY, MA; ²Wellesley Col., Wellesley, MA; ³The Rockefeller Univ., New York, NY; ⁴Harvard Med. Sch., Boston, MA

Abstract: Over forty years ago Hubel & Wiesel gave the first account of cells in monkey cortex selective for binocular disparity (1970, Nature 225, 41-42). The paper included a single figure showing responses from one example neuron. The cells described in the preliminary report were located outside of V-1, within a region referred to then as "area 18". A full-length manuscript never followed because the demarcation of the visual areas within this region had not been fully worked out. Functional subdivisions have since become clear using various techniques, including fMRI. Here we aligned the original histological sections containing the electrode penetrations (e.g. panel A) with a contemporary atlas (B). Using detailed experimental notes of the location along each electrode penetration at which neurons were recorded (guided by electrolytic lesions, arrows C), we identified the most likely areas in which the recordings were made (stereo-tuned cells shown in red, panel D). Over 600 neurons were recorded from 31 penetrations in 21 monkeys. While many stereo-tuned cells resided in V-2, the area now synonymous with area 18, a higher fraction of neurons in V-3/V-3A were stereotuned (42% (131/313) compared to 22% (55/245); Chi-Square $p=0.0005$). These results anticipate the discovery of a specialization for stereopsis in macaque V-3/V-3A by several groups including Poggio, Zeki, Tsao and DeAngelis. The neurophysiological results uncovered several features of stereo-tuned neurons: that they often required stimulation of both eyes to elicit responses (providing evidence for functional specialization); were biased for near disparities (a neural correlate of a psychophysical bias); tended to prefer vertical orientations (as predicted by computational models); and clustered by disparity preference (extending columnar organization to a new domain). Although these experiments were described only in a brief report, they were widely discussed and inspired a generation of neurophysiologists interested in the mechanisms of depth perception. The

importance of this work can now be more fully



evaluated.

Disclosures: B.R. Conway: None. E.M. Yeagle: None. R. Lafer-Sousa: None. T.N. Wiesel: None. D.H. Hubel: None.

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.16SA/LLL26

Topic: H.01. History of Neuroscience

Title: Animal models & clinical neuroscience: Improving or not?

Authors: *S. SNODGRASS;

Dept Neurol & Pediatrics, Harbor UCLA Med. Cntr, TORRANCE, CA

Abstract: Experimental science relies on animal studies and in vitro studies of cultured cells and tissues. Translational research promises clinical benefits. However, new stroke treatments from animal studies have repeatedly failed in clinical trials.

I review animal models of stroke, Alzheimer's disease and autism. John Ioannidis says that "Almost everything seems to work in animals, and then almost nothing works in humans." He advises simple remedies, including larger sample sizes, reporting all results and exclusions, and better statistical analyses. Is that enough?

Stroke models: Pulsinelli noted an animal/clinical studies mismatch in 1989. Molinari blamed clinicians and their methods, while Wiebers thought animal trials superfluous. Papers lamenting stroke model disappointments increased. Gladstone outlined 9 animal study pitfalls; Woodruff (2011) urged new treatments affecting multiple targets and diverse cell loci. Thrombolytic therapy (TPA) is relatively effective, but reaches few patients. Rehabilitation results have improved. Stroke incidence has decreased. There is some progress.

Alzheimer's disease: Cholinesterase inhibitors and the NMDA antagonist memantine offer temporary symptomatic benefit; no disease modifying treatment exists. Many treatments are being tested; the FDA plans to relax standards for licensing drugs in early Alzheimer's. This helps drug companies and drug development but will increase costs and may lead to approval of minimally effective medications analogous to Riluzole for amyotrophic lateral sclerosis.

Exercise programs for early cognitive impairment may delay progression, this remains uncertain.

Autism spectrum disorders: The FDA approved antipsychotic drugs risperidone and aripiprazole may reduce irritability as may other psychoactive drugs. No drug treatment addresses core problems. Animal social behavior is not easily translated to human social impairment. Animal models of ASD are most problematic; nondrug educational treatments are effective but not well defined or scalable to all forms/severity of ASD. DSM keeps changing ASD definitions.

Nature Reviews Neuroscience reviewed the small sample size and statistical power of many neuroscience papers (Button, et al, 2013). Much knowledge, but very few cures have appeared since 1960. Do we understand **the cycle of hype and oversimplification affecting stroke and Alzheimer disease** and near in ASD? The current emphasis on cures, fast tracking, patentable treatments and spectacle in neuroscience and in general medicine is misplaced. The hype cycle favors the trendy and well connected.

Disclosures: S. Snodgrass: None.

Theme H Poster

20. History of Neuroscience

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 20.17SA/LLL27

Topic: H.01. History of Neuroscience

Title: Overcoming resistance to change in organizations and among consumers: The roles of Lateral prefrontal and Frontopolar Cortices in the initiation of new behaviors

Authors: *S. CURTIS;

True North, LLC, Bloomington, IN

Abstract: Curtis and Goodlett (1998) observed that the contiguity-based learning proposed by Watson (1930) and Guthrie (1953) could be predicted by Hebb's Law, i.e., synapses and neural nets increase in efficiency with repetition thereby favoring repetitive thoughts and behaviors. It was then proposed that this bias for the expression of efficient neural nets and repetition could be modulated by cortical blood flow dynamics secondary to sympathetic arousal. That is, sympathetic arousal appears to contribute to cortical vascular tone that would be predicted to delimit the 'flow-follows-function' rule, a condition which would result in episodes of inadequate cortical perfusion, hypoxic stress, and an increased bias for the expression of metabolically efficient neural nets, i.e., 1) sympathetic arousal results in increases in repetitive thoughts and behaviors, and, 2) reducing sympathetic arousal increases the likelihood of new thoughts and behaviors.

Since these proposals, fMRI studies on humans by Koechlin (2007) have revealed that the lateral prefrontal cortex (Lpc) appears to be involved in directing 'everyday' choosing among variably well-practiced behaviors. Although degree of practice/repetition predictably biases behavioral choice, it has also been found that new, unpracticed behaviors can be expressed and sustained if those behaviors are presented as necessary for obtaining a larger, ideal outcome, a condition associated with increased activity in the Frontopolar cortex (FPC). That is, new behaviors associated with a large, positive ideal, and FPC arousal, can override the natural tendency of the Lpc to reject such 'risky', unproven options.

In support of this hypothesis, this author has (2012) described his findings in clinical, wellness, and education settings, that, in combination with reduced sympathetic arousal, the inclusion of a large, ideal goal, i.e., a goal that would activate the FPC, is an effective impetus for new behaviors. In this report, the author presents similar findings from organizational performance and consumer behavior settings, where, again, the promise of a large, ideal goal is effective in motivating new behaviors.

In view of these findings, it can be predicted that new group behavior and new product adoption are more likely if those new behaviors are consistently presented 1) in conditions of reduced sympathetic arousal, and 2) as necessary for the attainment of some larger, ideal goal.

Disclosures: S. Curtis: None.

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Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.01SA/LLL28

Topic: H.02. Teaching of Neuroscience

Support: IDeA Network of Biomedical Research Excellence

Title: Alaska institutional development award (idea) network of biomedical research excellence (inbre): Environmental agents and disease

Authors: *C. A. FRYE;

Dept. of Chemistry, IDeA Network of Biomed. Excellence (INBRE), Ualaska-Fairbanks, Fairbanks, AK

Abstract: Alaska (AK) has traditionally had a very small biomedical research footprint, and investment in research infrastructure in AK has a significant impact based on this starting point. There have been major successes of the AK Institutional Development Award (IDeA) Network of Biomedical Research Excellence (INBRE) program for strengthening and expanding biomedical research and training. The AK biomedical research network that was built in INBRE1 on college and university campuses, including University of Alaska (UA) Anchorage (UAA), UA Fairbanks (UAF), and UA Southeast (UAS), was expanded and the research proposed in INBRE2 has been focused on the interface of the environment and disease. The successes of AK INBRE2 are as follows. The 1st specific aim was to enhance and expand the multi-disciplinary research network. Support was provided for both newly-hired and current faculty with biomedical-relevant research programs. Personnel and equipment in shared research cores, including bioinformatics, was supported. Student research awards were awarded, seminars were supported, and administrative research services to students and faculty were provided. The 2nd specific aim was to support faculty, postdoctoral fellows, and graduate students. Six new faculty members were recruited, and are receiving multi-year start-up funding provided by INBRE and the hiring institutions. Seed grants to support research development and student research, as well as graduate student fellowships (n=29), were provided. Travel support for conferences and technical training for students, faculty, and staff was provided. The 3rd specific aim was to provide undergraduate research opportunities and support the pipeline leading toward health careers. Undergraduate research awards (n=47) at UAA, UAF, and UAS were given. A partnership was formed with AK BioPREP to provide pre-college science initiatives. High school and college programs supported both urban and rural students, with an emphasis on AK Natives. The 4th specific aim was to enhance science and technology knowledge of the workforce. Faculty outreach to communities for education and research partnerships was supported. A shared faculty position (50:50) with the State Virology Lab was created. Partnerships and internship opportunities with school districts and clinical institutions were developed. The 5th specific aim was to build regional collaborations for research and training. The INBRE program grew and strengthened strong regional partnerships with the western

INBRE states, and University of New Mexico and University of Washington. AK INBRE has had a dramatic effect on the biomedical research enterprise in AK.

Disclosures: C.A. Frye: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.02SA/LLL29

Topic: H.02. Teaching of Neuroscience

Support: Hunter College

University at Albany, University of Alaska

Northeastern University New England Consortium for Undergraduate Science Education.

Simmons College

Quinnipiac

NIH (MH60282; MH39167)

NSF (IOS0957148),

Title: The 24th Northeast Under/graduate Research Organization for Neuroscience (NEURON) conference and 41st Hunter College Psychology Convention

Authors: *A. A. WALF¹, C. A. FRYE², J. YOUNG³;

¹Cognitive Sci. Dept, Rensselaer Polytechnic Institute,, Troy, NY; ²Chem. Dept., IDeA Network of Biomed. Excellence, UAlbany & UAlaska-Fairbanks, Fairbanks, AK; ³Psychology Dept, CUNY-Hunter, New York, NY

Abstract: The 24th NorthEast Under/graduate Research Organization for Neuroscience (NEURON) conference and 41st Hunter College Psychology Convention was held on April 21, 2013, at Hunter College in New York, N.Y. NEURON has been providing educational opportunities and minority outreach to trainees across the northeast for 16 years. The Annual Psychology Convention at Hunter College is an exciting one-day event sponsored by the Psychology Collective at CUNY. Throughout the day, students and faculty from all major New

York City Universities have the opportunity to share exciting new advancements in psychology research with the rest of the scientific community. This integrated conference represents an ideal learning and educational environment for young scientists making their first impressions in an academic setting and for enhancing their professional development. This year's conference hosted a variety of workshops, guests, and lectures that provided young trainees with support, information, and many opportunities for networking and engagement. The keynote address entitled, "The Vulnerable Brain: Understanding the Neurobiology of Addiction Risk" was given by Dr. Yasmin Hurd, PhD, Director of the MD/PhD Program Ichan School of Medicine at Mount Sinai. Her presentation was engaging and enjoyed by individuals from diverse academic backgrounds. There were forty-two posters presented by trainees in two sessions, and several workshops and symposia at the meeting. There was a NEURON-sponsored talk by Dr. Adrienne Betz (Quinnipiac University) entitled, "Exploring Environmental Toxins: Prenatal Exposure to Phthalates and Postnatal Outcome in Rodents." There was a NEURON-sponsored workshop by Dr. Alicia Walf (RPI) entitled, "How to Give an Effective Poster Presentation." This event is a venue that with continued support ensures that trainees from all backgrounds receive superlative neuroscience education, training, and access to resources.

Disclosures: **A.A. Walf:** None. **C.A. Frye:** None. **J. Young:** None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.03SA/LLL30

Topic: H.02. Teaching of Neuroscience

Title: A model for teaching advanced neuroscience methods to graduate students: a student-run seminar to increase practical understanding and confidence

Authors: ***T. HARRISON**¹, C. R. K. CHING², M. C. EINSTEIN³, S. L. BONANNO³, A. M. ANDREWS¹, M. LEVINE¹;

¹Semel Inst. for Neurosci. and Human Behavior, ²Neurol., ³Neurosci. Interdepartmental Program, UCLA, Los Angeles, CA

Abstract: *Rationale:*

Neuroscience graduate students must master specific techniques and approaches to complete their thesis work (hands-on learning). Due to the highly interdisciplinary nature of the field, learning the practical aspects of diverse methodologies through literature surveys and

coursework is also necessary for a student's success (hands-off learning). Yet, traditional neuroscience coursework stresses what is known about the nervous system with relatively little emphasis on how this knowledge was obtained. Furthermore, hands-off learning can be difficult due to lack of detail in methods sections of primary articles, subfield-specific jargon and unclear experimental design rationale. We designed a student-taught course to help students overcome difficulties in hands-off learning by introducing a new approach to reading and presenting primary research articles that focuses on methodology. Based on student feedback, the course is an important addition to the UCLA graduate neuroscience core curriculum.

Goals:

1. Expose first year graduate students to a wide range of neuroscience methods.
2. Promote collaboration between 1st year and advanced graduate students, especially for learning new methods.
3. Encourage practical considerations of experimental design with focus on the advantages and limitations of each method.
4. Build students' confidence in their ability to prepare and present material outside their areas of expertise.

Design:

In this 10 week literature review seminar, 1st year neuroscience graduate students were required to present on the history, development, application and interpretation of diverse neuroscientific techniques (from optogenetics to diffusion-weighted imaging). At each weekly session, two assigned readings were discussed: one review article describing the method of interest and an experimental paper that employed that method. Students were encouraged to present on a method with which they had no hands-on experience. To facilitate discussions, "experts" were invited to every class session. Experts were advanced graduate students who were actively engaged in using the method being covered that week and served as co-leaders of discussion.

Assessment:

A questionnaire was used to assess each student's confidence with discussing research and methods outside of their primary research expertise. These questionnaires were administered on the first and last day of class and analysis of the results revealed that the course significantly increased the students' confidence in reading, presenting and discussing a wide range of advanced neuroscience methods ($P < 0.05$).

Disclosures: T. Harrison: None. C.R.K. Ching: None. M.C. Einstein: None. S.L. Bonanno: None. A.M. Andrews: None. M. Levine: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.04SA/LLL31

Topic: H.02. Teaching of Neuroscience

Title: Life science education: Updates of the Virtual Physiology series

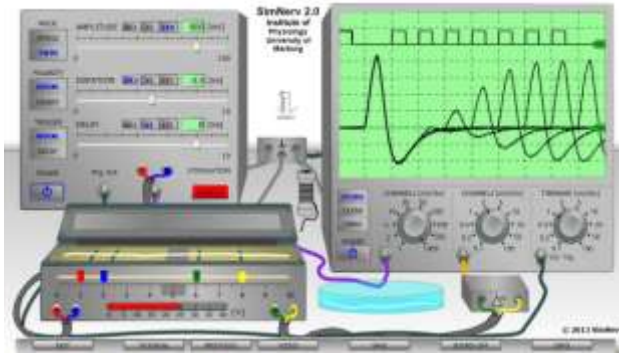
Authors: *H. A. BRAUN¹, A. TCHAPTCHET¹, H. SCHNEIDER², S. POSTNOVA³, J. SCHWABEDAL⁴;

¹Univ. Marburg, Marburg D-35037, Germany; ²DAQ-Solutions, Nehren, Germany; ³Univ. of Sydney, Sydney, Australia; ⁴Harvard Univ., Cambridge, MA

Abstract: Increasing computational power and the availability of easier to handle programming tools has led to the development of a large number of computer-based tools in life-science research and also for education. Still, among the most widely used educational tools worldwide is the Virtual Physiology series (SimNerv, SimPatch, etc.) although developed more than 15 years ago. Since recently, previous developers, together with experts from other institutes and with the help of digital media companies, are reprogramming these teaching tools as platform and resolution independent versions with new features.

The principle didactic strategy, learning by doing, is retained. The programs are providing realistically appearing laboratories on the computer screen. The figure, as an example, shows the SimNerv laboratory which is designed to perform classical experiments on the frog sciatic nerve. All parameters of the stimulus and recording devices are freely adjustable. Mathematical algorithms guarantee for the appropriate reaction of the preparations, also considering their biological diversity. Hence, no student will get exactly the same results as another one which allows automated individual control.

Supplementary to SimNerv, where students learn to deal with particular, clinically most relevant features of compound action potential recordings on extracellular stimulation, the Virtual Physiology series comprises two more neurophysiology labs, SimNeuron and SimPatch. These virtual laboratories are designed for current-clamp and voltage- /patch-clamp experiments that usually are unfeasible to be physically carried out in students' introductory courses but can be realized in silico with a user-friendly interface. Fully functioning demo versions of all educational tools of the Virtual Physiology series can be downloaded via www.virtual-physiology.com.



Disclosures: **H.A. Braun:** E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); Co-owner of the company BM&T GbR which is producing parts of the Virtual Physiology series. **A. Tchaptchet:** None. **H. Schneider:** E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); Owner of the company DAQ-Solutions which is producing SimPatch. **S. Postnova:** None. **J. Schwabedal:** None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.05SA/LLL32

Topic: H.02. Teaching of Neuroscience

Title: Assays of acetylcholinesterase activity in drugs and disease: An undergraduate opportunity to reproduce established work and produce novel data

Authors: *V. QUINAN, D. E. BAUER;
Wellesley Col., Wellesley, MA

Abstract: This laboratory module was designed as part of an undergraduate intermediate-level neuroscience course. The established goals were to introduce students to neurochemical methods by exploring acetylcholinesterase (AChE) enzyme activity and to develop a fundamental understanding of enzyme kinetics. The first lab followed a five-part sequence of labs where students explored the Lurcher mouse motor mutant from behavior to genetics. A review of the literature revealed only one paper investigating AChE activity in the Lurcher mouse model. By performing the biochemical assays in these mice the students were able to 1) assess the distribution of AChE in four regions of the mouse brain and 2) compare the AChE activity in the

Lurcher mutant mouse and its wild-type control. The second lab examined the effects of galantamine on enzyme activity and asked the students to determine whether galantamine is a competitive or non-competitive inhibitor. The laboratory series concluded with a workshop where each pair of students gave an oral presentation on a relevant scientific paper. For the final assignment, the students were asked to write a literature-style lab report on either laboratory exercise one or two. Students exhibited great enthusiasm during the first lab in this series due to their ability to produce novel scientific data.

Disclosures: V. Quinan: None. D.E. Bauer: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.06SA/LLL33

Topic: H.02. Teaching of Neuroscience

Title: Measuring long term potentiation in acute hippocampal slices: A laboratory module for undergraduates

Authors: *D. BAUER¹, E. B. BOURGEOIS², V. C. QUINAN¹, K. HAWKINS¹;
¹Wellesley Col., Wellesley, MA; ²Pathology, Brigham and Women's Hospital-Harvard Med. Sch., Boston, MA

Abstract: Long term potentiation (LTP) is thought to be a critical mechanism underlying learning and memory. Neuroscience students at Wellesley College read extensively about long term potentiation, but it is rare for undergraduates to have the opportunity to perform the experiments themselves. Here we describe a series of 3 laboratories in which upper level students learn how to perform LTP experiments in acute hippocampal slices from wild type mice. In laboratory 1, students practice the techniques necessary to set up the experiments. These techniques include making and checking solutions, pulling glass electrodes, euthanasia, brain removal, and slice preparation using a vibratome. For laboratory 2, slices are prepared by the instructors. Students record LTP by stimulating the Schaffer collateral axons and recording the postsynaptic field potential response in the apical dendritic region of area CA1. Students perform an input-output curve to determine stimulus strength by finding half maximum response. They then stimulate the hippocampus to record baseline responses, induce LTP with tetanic stimulation, and evoke potentiated responses after tetanus. In laboratory 3, students perform analyses on the data they collected in laboratory 2. Students measure the initial slopes of 20 field

potentials for each of the following conditions: before tetanic stimulation, 5 minutes after tetanic stimulation, and 30 minutes after tetanic stimulation. They then perform t-tests to determine whether potentiation occurred at 5 minutes and at 30 minutes. Out of 3 groups of students, all three measured field potentials upon stimulation of the Schaffer collaterals. Two groups measured short term potentiation, and one group measured long term potentiation lasting at least 30 minutes. These lab experiences provide a unique opportunity for students to gain an appreciation for the techniques that are fundamental to studies of neural electrophysiology.

Disclosures: **D. Bauer:** None. **V.C. Quinan:** None. **E.B. Bourgeois:** None. **K. Hawkins:** None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.07SA/LLL34

Topic: H.02. Teaching of Neuroscience

Title: Learning about one's own learning in an undergraduate learning and memory course

Authors: ***M. L. LINDEN;**
Neurosci., Brown Univ., Providence, RI

Abstract: As the concepts we present in our courses become more complex and nuanced, it becomes necessary to teach our students how to learn to learn (Wirth and Perkins, 2007). To facilitate this process, I explicitly included a reflective learning component within the curriculum of Neurobiology of Learning and Memory, an intermediate-level lecture course. Approximately one-quarter to one-third of in-class time was devoted to this topic, including lectures, in-class activities, and time for reflective surveys. Lecture topics included discussions of current research in reflective practices and metacognition, including studies of both cognitive and neurobiological aspects of metacognition, meditation and mindfulness, and studies related to student performance. Activities included watching videos on student learning techniques, participating in memory experiments, and engaging in deep listening. Reflective surveys included pre-semester, mid-semester, and post-semester reflections as well as quiz and exam reflections. Students also completed a paper assignment linking techniques to improve undergraduate student learning to the neurobiological mechanisms supporting those techniques. This reflective learning experience allowed the students to become more cognizant of their own learning and allowed them to have a first-person perspective while considering the neurobiological mechanisms of learning and memory.

Wirth, K. R., & Perkins, D (2007). Learning to learn. Retrieved from:
www.macalester.edu/geology/wirth/CourseMaterials.html

Disclosures: M.L. Linden: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.08SA/LLL35

Topic: H.02. Teaching of Neuroscience

Title: The "Neurotransmitter Notebook": a tool for educating pharmacy students

Authors: *A. V. BUHLER, P. A. CAWLEY, L. L. DEVAUD;
Sch. of Pharm., Pacific Univ., HILLSBORO, OR

Abstract: First-year Pharmacy students generally come with little or no background in neurophysiology and the effects of neurotransmitter (NT) systems. While able to memorize the physiological effects of individual drug classes, students tend to have a difficult time thinking in terms of synergistic side effects and drug-drug interactions between drugs based on the affected NT system. The Neurotransmitter Notebook was designed to assist students to predict the general clinical effects of drug manipulations of key NT and neuropeptide systems: ACh, DA, 5HT, NE, GABA, Glu, opioids, histamine, cannabinoids, and purines. A document was created consisting of two pages for each NT: on the right, a list of Pro-NT effects, and on the left, a list of Anti-NT effects. These effects are very general and designed to provide an overview of the pathways affected by drugs acting on those NT systems. This notebook was used in 6 courses: Intro Pharmacodynamics, Central Nervous System (CNS)1, CNS2, Cardiovascular, Pulmonary, and GI. Students were asked to appropriately fill in the example drugs and mechanism, as they were covered.

By the end of these blocks, students appeared to have a more global and applicable understanding of the interactions between agents both within a NT system and between opposing or synergistic systems. They were able to predict likely side effects for hypothetical drugs given an activity profile: (eg. Drug X= H₂ antagonist, a 5HT agonist, and muscarinic antagonist), and were also able to predict which drugs would have counteracting or synergistic effects. This tool appeared to be successful in helping students develop a broader, more conceptual understanding of the effects and interactions of CNS agents. It is hoped that this will allow them to predict areas

of potential drug-drug interactions, and to predict the physiological activity of newly developed agents as they come onto market.

Dopamine*			DOPAMINERGIC RECEPTORS (D1, D2, D3, D4)		
Possible effects			Possible effects		
Depression/Dysphoria			Increased Mood		
Low motivation			Reward/ Addiction		
EPS (incl. drug induced PD/TD)			Increased movement		
Increased gastric motility			Inhibit gastric motility		
Increase prolactin			Decrease prolactin		
Anti-nausea			Nausea		
Anti-psychotic			Psychosis		
Receptor Type	Effect	Pharmacological Action	Receptor Type	Effect	Pharmacological Action
D1	Inhibition	Inhibits dopamine release	D1	Depression	Block DA transmission
D2	Inhibition	Inhibits dopamine release	D2	Psychosis	Block DA transmission
D3	Inhibition	Inhibits dopamine release	D3	Psychosis	Block DA transmission
D4	Inhibition	Inhibits dopamine release	D4	Psychosis	Block DA transmission
D5	Inhibition	Inhibits dopamine release	D5	Psychosis	Block DA transmission

Disclosures: A.V. Buhler: None. L.L. Devaud: None. P.A. Cawley: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.09SA/LLL36

Topic: H.02. Teaching of Neuroscience

Title: Teaching neurotoxicity using animated illustrations: a demonstration of lead toxicity at the synapse

Authors: *D. BUSSELBERG¹, J. TABAN², E. VARGHESE¹, B. ALOST³, S. MORENO³, A. FLOREA⁴;

¹Weill Cornell Med. Col. In Qatar, Doha, Qatar; ²Univ. of Konstanz, Konstanz, Germany; ³Texas Tech. Univ. Hlth. Sci. Ctr., Texas, TX; ⁴Univ. Trier, Trier, Germany

Abstract: The introduction of computers and electronic media has changed our learning environment and the way material is accessed and memorized. Nowadays, knowledge is no longer obtained from a highly condensed scientific textbook, but has moved to computer based media which are open to a wider audience. As an example we choose metal based toxicity as an example to demonstrate how lead interferes with the neuronal communication. As heavy metals are ubiquitously distributed in the environment, they can interfere with homeostasis of the body

especially the neuronal function. This example gives important insights to some basic mechanisms of neurotoxicity. Though many people are aware of the lead contamination and its toxicity the scientific principles are easily ignored.

Here we analyze how lead interferes with different functions (pre- and post-synaptic) and divide those functions to a series of figures (total of 16). As a regular text book diagram does not emphasize the sequence of the interactions of the metal ion, each of these figures was animated. For comparison and to understand the full interaction of lead we decided to generate a series of animations which show the situation under normal (“lead free”) conditions. The animations cover the entire synaptic transmission, starting with the inhibition of pre synaptic voltage gated calcium channel to impaired neuro transmitter vesicle fusion with plasma membrane and post synaptically the generation of inhibitory and excitatory synaptic potentials up to the generation of action potentials. Overall, this animated teaching sequence highlights how Pb^{2+} mimics the functioning of calcium and there by interfere with synaptic transmission.

This poster with the animations will make it easy to understand the main principles of lead interactions at the synapsis and the mechanism of lead toxicity. In general, integrating animated visuals for education will give a better understanding to a wider audience with less effort. The level of comprehension and interpretation of the principles and mechanisms is achieved more efficiently compared to conventional methods. This poster emphasizes how the use of power point animations improves learning.

Online access of such animated illustration considerably promotes education in neuroscience and attracts potential researchers to the field. We believe this poster gives a meaningful presentation on teaching lead neurotoxicity as well as create a public awareness on environmental pollution by lead. A set of the full manuscript including the animations can be down loaded from: <http://www.authorsqscience.com/custom-assets/custom-enriched-articles/jlghs.2013.4-Animations.pdf>

Disclosures: D. Busselberg: None. J. Taban: None. E. Varghese: None. B. Alost: None. S. Moreno: None. A. Florea: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.10SA/LLL37

Topic: H.02. Teaching of Neuroscience

Title: Helping medical students think like scientists: Enhancing the journal club experience

Authors: *B. GRAFSTEIN¹, T. A. MILNER²;

¹Physiol. & Biophysics, ²Brain and Mind Res. Inst., Weill Cornell Med. Coll., NEW YORK, NY

Abstract: The Journal Club, in which primary scientific papers are discussed, is an important instrument in medical education (Linzer, Postgraduate Med. J. 1987). Its aim is to foster an understanding of the process for advancing medical knowledge (Biswas, Indian J. Community Med 2011). Each paper studied requires active student participation in analyzing the experimental design, confronting the raw data, and drawing inferences about the conclusions and significance of the study. Challenges in teaching journal club include imparting a body of knowledge that is not addressed in other components of the course, promoting student interest and participation, and maintaining consistency in the dissemination of knowledge among journal club groups. In “Brain and Mind”, a second year medical school course, we have made some innovative changes to address these challenges. Although student enthusiasm for the journal club experience is often low, it was rated highly by the students in this course.

- All sessions were based on a single theme, “Supporting cells of the nervous system”, a topic not covered in other sessions in the course.
- Selected papers were short, had a clear message and were taken from high-end journals (e.g., Science, Nature Neuroscience);
- Each paper was accompanied by “News and Views” articles, preferably from the current lay press, to highlight the significance of the research.
- Students received a “Schema” with strategies for reading journal club articles and a “Student brief” for each paper giving: “Clinical Significance” -- a case vignette highlighting the practical significance of the study; “Background Review” -- terms used in the paper that might be unfamiliar to the student; “Summary of Experimental Procedures” -- methodologies, so that students could concentrate on results and implications of the paper; “References” -- relevant text citations and further reading.
- Postdoctoral fellows or graduate students served as preceptors.
- Preceptors were provided with “Tutor guides” that included: 1) “What the students have already been taught” 2) “Paper summary” - including a description of the figures in detail; 3) “Points for Discussion” -- follow-up experiments and clinical relevance of the paper; and 4) “Take home messages”.
- Preparation of the preceptors consisted of briefing sessions that summarized the paper and gave suggestions for discussion topics.
- Questions about the papers were included in the periodic quizzes on the course material.

Disclosures: B. Grafstein: None. T.A. Milner: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.11SA/LLL38

Topic: H.02. Teaching of Neuroscience

Title: Evaluation of a group of medical students in physiology class at the school of medicine in University of Tamaulipas, México about clinical cases discussion as a teaching technique (clinical reasoning applied to neurophysiology)

Authors: *M. T. CASTANEDA¹, H. RODRIGUEZ², M. D. DE LEON², E. D. LOPEZ², H. E. RODRIGUEZ², N. E. FERNANDEZ³;

¹Univ. of Tamaulipas, Matamoros Tamaulipas, Mexico; ²Biomed. Sci. Department., Univ. of Texas at Brownsville, Brownsville, TX; ³Univ. Autonoma de Nuevo Leon, Monterrey Nuevo León, Mexico

Abstract: Objective: To know the evaluation of a group of medical students about the usage of the discussion of clinical cases applied to neurophysiology as a method of increase learning in the neurophysiology class.

Material and methods: Cross-sectional study, semi-quantitative; a questionnaire was made for this purpose. The study was acquired from January 2013 to April 2013. A group of 60 undergraduate students of the Physiology class from University of Tamaulipas, Mexico, Facultad de Medicina e Ingeniería en Sistemas Computacionales. The study included a questionnaire and the detailed instructions for answering it. The questionnaire was given to the students after completing the area of Neurosciences. The majority of the questions are related to the betterment of learning using clinical reasoning by using clinical cases' discussions. The Likert Scale was used to make a quantitative evaluation of the students' answers on the questionnaire as follows: Strongly Agree (5 points), Agree (4 points), Undecided (3 points), Disagree (2 points), Strongly Disagree (1 point.)

Results: The average response of the 10 questions evaluated was between 4 and 5 points. The majority of students (90%) stated that the application of the clinical reasoning in the terms of the field of neuroscience was:

1. Beneficial to understanding the basic concepts of the neurophysiology course.
2. The discussion of clinical cases generated interest in the study of the course.
3. That the discussion of clinical cases was better than when other systems were only didactic lectures were involved.

Conclusion

The students had a positive general opinion in regards to the clinical reasoning applied to the basic sciences as a didactic resource in the neurophysiology class.

Disclosures: M.T. Castaneda: None. H. Rodriguez: None. M.D. De Leon: None. E.D. Lopez: None. H.E. Rodriguez: None. N.E. Fernandez: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.12SA/LLL39

Topic: H.02. Teaching of Neuroscience

Title: Flexner++: Enhanced basic science education promoting lifelong learning for medical practice

Authors: *D. GARDNER;

Physiol. & Biophysics, Weill Cornell Med. Col., NEW YORK, NY

Abstract: Undergraduate medical education should prepare for a lifetime of practice, but basic science coursework delivers only a snapshot of current knowledge. Such education is inevitably incomplete, given future changes in biomedical understanding, translational relevance, and standards of practice. I and Weill Cornell colleagues propose transcending this static model by developing students' *informed receptivity*: the ability to efficiently learn and incorporate future advances--both evolutionary and revolutionary--that will become understood during the course of a career and that will modify the future practice of medicine. These are not now known, so their content can't be taught now. To prepare medical students for the inevitable emergence of these future findings, students can be taught to be *adaptive physicians*: informed, critical, and enabled to evolve both understanding and knowledge base as neuroscience and the other biomedical sciences advance. To this end, we have designed Lifelong Learning--Educating Adaptive Physicians (LLEAP).

A new Adaptive Foundational Science Advisory Committee (AFSCAC), faculty selected for teaching excellence, has identified new curricular modalities needed to equip students with the methods and skills to anticipate, monitor, evaluate, and appreciate new findings with real clinical-translational significance, and to appropriately and selectively put this new material into practice:

- *Transformative case studies* of paradigm-shifting findings,
- *Explorations of the unknown*, examining processes consistent with diseases of uncertain etiology, and projecting the translational relevance,
- *Hypotheticals*, asking how sample paradigm shifts might affect patient stratification,

differential diagnoses, or treatments,

- *FutureCasts*, emphasizing potential consequences of future advances, and

- *Image/report dyads*: evolving image content of radiologists' reports.

To slot these appropriately throughout the basic sciences curriculum, we are reviewing year 1 and 2 and advanced basic science courses to match subject areas, current content, and new modalities with implementation, integration, and testing to follow. New content concepts will be needed, drawn from genomics, Bayesian statistics, the physical sciences, bioinformatics, databases, and structural biology; these must be carefully designed, given the traditional knowledge base presented by entering students.

Our learning objectives and modalities are designed to instill in students a readiness to appreciate new advances, to place findings in context, and evaluate effects on medical practice. Such a curriculum is ideal preparation for subsequent CME.

Disclosure.DisclosureBlock:

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.13SA/LLL40

Topic: H.02. Teaching of Neuroscience

Title: Introduction of bio-behavioral concepts during the first year of medical school within active learning group sessions

Authors: ***B. D. FISCHER**, C. C. CAGANDE, A. MOOKERJEE, V. RAJPUT;
Cooper Med. Sch. of Rowan Univ., Camden, NJ

Abstract: The curriculum at an increasing number of medical schools includes active learning group (ALG) discussions as a method of disseminating learning objectives related to the neurosciences. Further, as the integration of behavioral and social science into clinical practice improves health outcomes across the life stages, these concepts are increasingly being integrated earlier in medical education. We developed and delivered a four week course titled 'Life Stages' to first year medical students. The learning objectives of the bio-behavioral and social science principles along with the cultural, economic, political, and ethical parameters were integrated across the lifespan in the curriculum matrix. Here, learning objectives were designed with focus

on the report “Behavioral and social science foundation for future physicians” by the Association of American Medical Colleges (AAMC; 2011). We focused on the following domains: Cognitive and behavioral development; Sexuality including LGBTQ; Stressors and coping skills; Sleep; Substance Use; Mobility and injuries; Perception of pain; Domestic and institutional abuse; and Goals of care during end of life. Collaboration from Internal Medicine, Psychiatry, Pediatrics, Women’s Health, Geriatrics, and Neuroscience led to dynamic and robust delivery of course content. Together, ALG sessions allowed for active learning and teaching of bio-behavioral concepts within the group; and fostered collaboration, interpersonal and communication skills, and professionalism.

Disclosures: **B.D. Fischer:** None. **C.C. Cagande:** None. **A. Mookerjee:** None. **V. Rajput:** None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.14SA/LLL41

Topic: H.02. Teaching of Neuroscience

Support: Coordination for Enhancement of Higher Education Personnel (Capes)

Title: Process evaluation of an extension course in applied neuroeconomics for junior consultants in economics and management

Authors: ***K. R. VIACAVA**, L. BIZARRO;

Inst. of Psychology, Federal Univ. of Rio Grande Do Sul - UFRGS, Porto Alegre, Brazil

Abstract: Objective: To evaluate the implementation of a five-week (15-hour) extension course in Applied Neuroeconomics, taken by 27 undergraduates (89% from economics and members of a junior consulting firm) at the *Universidade Federal do Rio Grande do Sul* (Brazil), and to identify their perception of the adequacy and applicability of the course content for consulting purposes. The aim of the course was to develop the use of behavioral metrics as a support for the practice of evidence-based economics and management consulting. The course consisted of five modules: (1) introduction to neuroeconomics (preferences, intertemporal decision-making, risk and uncertainty); (2) planning (applications and design); (3) developing (programming computerized behavioral tasks); (4) monitoring (review and adjustments); and (5) results (group oral presentation). Students were required to attend a minimum of 75% of the total course, to

present a consulting intervention proposal, and to run a pilot project (metrics for: pension plan, webpage design and management, personal finance plan, and recruitment and selection).

Methods: At the end of each class, students evaluated the current module by responding to a 10-item questionnaire using a 5-point scale, based on the Kirkpatrick's (1996) four-level evaluation model: reaction, learning, behavior, and results. For data analysis, Pearson's chi-squared test was used. To attend the criteria of the test, the extreme categories of the 5-point scale were collapsed into a 3-point scale, thus leaving three categories (Very weak/Weak, Neutral and Good/Excellent). The Clopper-Pearson (Exact) method was used to estimate the confidence interval for the Good/Excellent response proportion. The SAS (Statistical Analysis System) version 9.3 was used, and a significance level of 5% was adopted.

Results: The results of the adherence analyses suggested an association between the educational intervention and the student's perception of the adequacy and applicability of the course for all the four-levels of the questionnaire and for all the five modules ($p < 0.001$). Regarding the applicability, by the end of each class, students considered they could easily transfer the acquired knowledge to the consulting practice ($p < 0.001$). In the fifth (and last) module, the response proportion in the Good/Excellent category for the results was equal to 82% (CI 95%: 56,7 - 96,2).

Conclusion: Taken all together, this process evaluation shows that the Applied Neuroeconomics extension course was well structured and provided neuroscientific content of both practical and theoretical value for students planning a career in economics and management consulting.

Disclosures: **K.R. Viacava:** None. **L. Bizarro:** None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.15SA/LLL42

Topic: H.02. Teaching of Neuroscience

Support: NIH 1RC4NS073008-01

Title: Using GNU make to teach undergraduates neuroimaging workflow

Authors: ***T. MADHYASTHA**¹, **Z. MESTRE**², **E. COLLINS**², **T. GRABOWSKI**²;

¹Psychiatry and Behavioral Sci., ²Integrated Brain Imaging Ctr., Univ. of Washington, Seattle, WA

Abstract: The study of human neuroscience using neuroimaging approaches attracts undergraduates who are interested in research from a variety of disciplines, including psychology, biology, computer science and engineering. However, much of the work involved in neuroimaging workflow requires many varied skills, including facility with the Linux operating system (the platform used at IBIC), bash shell scripting and python, and the science of the different neuroimaging pipelines in the context of human anatomy and function. From a practical point of view, parallelism is a key technical concept that is necessary to use multiple computers simultaneously to reduce wall-clock processing time. Although some students may enter with basic programming skills in Java, most have little relevant technical background.

To simplify the programming skills and cognitive load required to conduct, build, and comprehend neuroimaging workflows, we use GNU Make, a freeware utility that allows one to specify how to create files from other files if they do not exist or are out of date. “Recipes” for creating files are written in bash shell with some additional specific variables. Although parallelizing for-loops is notoriously subtly difficult, parallelism in make is implicit because dependencies are clearly stated, and make can use nodes in a single workstation or a cluster. Students can execute workflows for each study without concern for the specific syntax of the varied utilities used or study-specific parameters (e.g., “make skullstrip” will run FSL’s bet, “make freesurfer” will run cortical thickness analysis and allow students to check and edit results, keeping track of what has been done). Because each recipe can be executed individually, as students gain familiarity with the details of the workflows, they can use make to debug subjects with workflow failures. Error recovery is automatic; the workflow will pick up where it left off when stopped or recreate what has been deleted. Students can write recipes for commands they can execute, melding tools from different neuroimaging packages, with only the additional concepts of variables and syntactic rules.

We provide a manual for teaching and using make for basic neuroimaging workflows, available at www.ibic.washington.edu.

Disclosures: **T. Madhyastha:** None. **Z. Mestre:** None. **T. Grabowski:** None. **E. Collins:** None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.16SA/LLL43

Topic: H.02. Teaching of Neuroscience

Support: NIH/NIGMS IRACDA Grant K12

Title: Inquiry based activities for undergraduate neuroscience

Authors: *K. K. O'TOOLE;

Neurosci., Tufts Univ. Sch. of Med., Boston, MA

Abstract: Inquiry based lessons are a powerful tool, because they require that students work together in groups and importantly put the onus of learning on the student. Here I present two inquiry based lessons that were used to introduce concepts of Neurobiology in a large (60 students) undergraduate classroom at the University of Massachusetts, Boston. The first lesson was a Process Oriented Guided Inquiry Learning (POGIL) activity to introduce neuroanatomy. In small groups, students generated brain “road maps” and anatomical “driving” directions to gain a better understanding of connectivity and the relationship between conserved brain structures and their functions. POGIL provides a high degree of structure to introduce students to group work and inquiry learning. The goal is to achieve self- and peer-instruction with minimal instructor facilitation. Student feedback showed that they found the group activity helpful as an icebreaker to get to know their classmates, and also found that they could better learn the content by working together. The second activity was an extended case study introducing mental illness, through analysis of the life of the artist Vincent Van Gogh. Students were presented with a patient brief including a police report, personal letters, and physician observations. In groups they used these materials to diagnose the patient. Groups were then assigned a different mental illness to research and present in a round-robin style poster symposium. A follow up quiz showed that peer instruction was an effective teaching tool. Student feedback and test scores showed that an inquiry based approach was used effectively to present new information and vary the teaching style throughout the semester.

Disclosure.DisclosureBlock:

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.17SA/LLL44

Topic: H.02. Teaching of Neuroscience

Support: SJSU Professional Development Funds

Title: How the San Jose State University technology enabled 'Incubator Classroom' improved my teaching of vertebrate neurophysiology

Authors: *K. A. WILKINSON;
Biol. Sci., San Jose State Univ., San Jose, CA

Abstract: The Spring 2013 section of the upper level undergraduate elective Vertebrate Neurophysiology at San José State University (27 students) was taught in the Incubator Classroom (IC). This poster will describe some of the instructional activities this classroom facilitated as well as anonymous student responses to a survey given about the IC. The IC contains movable furniture for up to 50 students, 2 Smart Boards, central projector screen, whiteboards on all walls of the classroom, 60 laptops, and lecture recording ability. In contrast, the course was taught to 43 students in a normal lecture classroom in the fall of 2012 that had one chalkboard at the front of the class and a projector. The flexible furniture in the IC was arranged so that students sat in tables of 4. This was more conducive to group work than the traditional classroom, where students would move their individual seats into oddly shaped groups that made it difficult for all students to participate. The majority of students (7 of 11) noted in a survey that this group seating was either a favorite component of the IC or something that improved their learning. The laptops were used to run 5 tutorials from the Neurons in Action 2 software and a 3 week virtual lab on central pattern generators (Swimmy Lab). There is no laboratory component to the class, but these virtual labs helped to give the students an idea of how neurons act in the body. Students also worked in groups to answer discussion questions and present primary research articles. The laptop cart enabled us to run proprietary software (Neurons in Action 2) without having students buy their own copy and to have all students work on the freely available Swimmy Lab in one room (as opposed to two rooms the previous semester). The lecture and PowerPoint slides were recorded using WebEx for students to re-watch outside of class, a feature 8 of 11 students reported as something they appreciated when studying for the class. The only drawback to the classroom was that we often had technical difficulties with the Smart Board and lecture recording system, something 10 of 11 students noted in their survey. Student opinions of the IC were very favorable, with all students stating that having the course in the IC was better or much better than a traditional classroom. Overall, the IC allowed for a more active class that included a significant amount of group work and virtual labs.

Disclosures: K.A. Wilkinson: A. Employment/Salary (full or part-time):: San Jose State University.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.18SA/LLL45

Topic: H.02. Teaching of Neuroscience

Title: An interdisciplinary, experiential, one-month course on the neuroscience of meditation

Authors: *L. E. OLSON;

Biol. Dept., Univ. of Redlands, Redlands, CA

Abstract: The University of Redlands May term is designed for immersive and experiential learning. In May 2012, I taught a course called Topics in Biology: The Neuroscience of Meditation. Students learned how meditation affects the brain and the body in three ways: 1) by learning from themselves by participating in various meditation practices and observing how they responded; 2) by learning from each other by using experimental methodology to measure their classmates' physiological and neurological parameters, and participating in class discussions; and 3) by learning from scholars by listening to lectures and reading what scientists had published about the neuroscience of meditation, the stress response, and basic functional neuroanatomy. The course had no prerequisites and was capped at 18 students. Students enrolled from a variety of majors, most with a major in a non-science field. The required text was Buddha's Brain: The Practical Neuroscience of Happiness, Love, and Wisdom by Rick Hanson (2009), although contemplative practices were not limited to the Buddhist tradition. Students were evaluated by a reflective meditation log, responses to ten scientific journal articles, an exam, a laboratory notebook, and overall participation. Students were required to meditate a total of 15 times during the term, approximately 4 - 5 sessions per week. Various options were provided including body scan, breath, mindfulness, walking, Zazen, and lovingkindness meditation. Laboratory activities included the dissection of the sheep brain, measuring blood pressure, heart rate, respiration rate, galvanic skin response, EEG, and salivary cortisol. Student comments from course evaluations support that they found it exciting to take a course that merged two disciplines, and that the scientific content was challenging but approachable.

Disclosures: L.E. Olson: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.19SA/LLL46

Topic: H.02. Teaching of Neuroscience

Support: Cornell University, Neurobiology and Behavior

American Physiological Society

ADInstruments, Inc.

Title: CrawFly: A laboratory workshop promoting investigative neuroethology education with invertebrate model organisms

Authors: W. COLGAN, III¹, S. R. PULVER², R. A. WYTTENBACH³, R. R. HOY³, *B. R. JOHNSON⁴;

¹Educ. Products, ADInstruments, Inc., Colorado Springs, CO; ²Janelia Farms Res. Campus, Howard Hughes Med. Res. Inst., Asburn, VA; ³Neurobio. and Behavior, ⁴Cornell Univ., ITHACA, NY

Abstract: CrawFly is an annual workshop for neuroscience educators offering training and review of principles of genetics, cellular and network neurophysiology, ethology and physiology data acquisition and analysis. Participants learn how to adapt cutting-edge research techniques in invertebrate neuroscience for use in teaching laboratories. The workshop is sponsored by ADInstruments and Cornell University, and taught by scientists from academic and research institutions as well as ADInstruments staff. The 5 day workshop is divided into two tracks with complimentary approaches to teaching integrative neuroscience. In the first half, participants learn principles of extracellular and intracellular neurophysiology using crayfish preparations created as part of the Crawdad program. The second half focuses on using modern neurogenetic tools in *Drosophila melanogaster*. Participants examine neuronal morphology with genetically encoded fluorophores, quantify behavioral phenotypes in mutant and transgenic animals, and use optogenetic and thermogenetic techniques to remotely control identified synapses and neural circuits in semi-intact preparations and freely behaving animals. Throughout both sections, we discuss methods for minimizing costs and maximizing accessibility of these teaching preparations for a wide range of educators. Past participants have included a rich mix of established senior educators, physiology lab coordinators, beginning faculty and post-docs interested in teaching. Participant evaluations of our previous CrawFly workshops demonstrate their success in promoting new teaching directions at participants' home institutions, and provide constructive feedback for workshop improvement. In response to feedback, competitive tuition scholarships are now available, especially for young investigators and societal groups under-represented in neuroscience who are interested in neuroscience teaching. The CrawFly course and scholarship program are part of an ongoing effort to build a community of neuroscience educators dedicated to neuroscience laboratory teaching. Hands-on experience with live animals in teaching laboratories continues to be an effective way to learn practical methods in

neuroethology. Invertebrate model preparations offer a diverse array of possible student experiments that illustrate basic concepts of nervous system function. The CrawFly course demonstrates how these student experiments can be performed inexpensively and without the constraints required for exercises with vertebrate preparations.

Disclosures: **W. Colgan:** A. Employment/Salary (full or part-time); ADInstruments, Inc.. **S.R. Pulver:** None. **R.A. Wytttenbach:** None. **R.R. Hoy:** None. **B.R. Johnson:** None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.20SA/LLL47

Topic: H.02. Teaching of Neuroscience

Title: Using published personal accounts of drug therapy to supplement an undergraduate psychopharmacology course

Authors: ***R. E. GRAHN**, R. GUNTLI;
Psychology, Connecticut Col., New London, CT

Abstract: Psychopharmacology courses are often composed of Neuroscience and Psychology majors, who may have different levels of experience with the process of drug therapy for mental illness. Often a pharmacology textbook provides the information regarding neurobiological processes and a laboratory component focuses on application of these topics through animal models. A strategy for further engaging students is to read published personal accounts. These memoirs provide vivid and relevant views of the drug therapy experience. They help further the understanding of treatment individualization, and provide examples of the role of relationship conflicts, side effects, and drug interactions. As part of graduate coursework, the second author read three personal accounts: two memoirs (one of bipolar disorder and a second of depression with suicidal ideation) and a personal account by the mother of a schizophrenic. An excerpt from each was sent to undergraduates in the same course, and the books were reviewed and discussed at a later date. Special attention was paid to the unique expressions of the illnesses, their progressions, and the individual struggles against the medications. These accounts were particularly helpful in furthering the dialogue on issues outside of the central topics of pharmacological texts, including reasons for non-compliance and the unanticipated consequences of using drugs to treat mental illness. In the future, undergraduate students could benefit from personally selecting memoirs and tailoring presentations to highlight their interests, including

involuntary medication, the role of stigma in delaying treatment, or the pharmacotherapy vs. psychotherapy debate.

Disclosures: R.E. Grahn: None. R. Guntli: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.21SA/LLL48

Topic: H.02. Teaching of Neuroscience

Support: UIC Graduate Program in Neuroscience

Title: Lessons learned in the development of a primary literature-based undergraduate neuroscience course

Authors: *E. C. CHURCH¹, I. RIVERO-COVELO¹, D. J. BRAUN¹, M. R. FETTIPLACE², J. J. CONE¹, P. M. BAKER¹, M. H. ALPERT¹;

¹Grad. Program in Neurosci., ²Med. Scientist Training Program, Univ. of Illinois At Chicago, Chicago, IL

Abstract: Rationale: Neuroscience graduate students sought to capitalize on the general interest in Neuroscience amongst undergraduate science majors to teach critical thinking and reading skills using primary neuroscience literature. Given that teaching is a necessary skill in academia (Adams, 2002) this course provided graduate students with the opportunity to coordinate, plan and teach an upper level neuroscience course for undergraduates focused on critical evaluation of scientific literature.

Goal: Using a combination of primary articles and feedback-based-discussion, we aimed to teach students how to read, understand and critically evaluate current neuroscience research.

Method: In the first lecture, students learned how to read a research article. Subsequent lectures were paired by topic of general interest (e.g. Neuroscience of Sex; Anesthesia & Consciousness), with each instructor tackling one topic. Lecturers were encouraged to employ an active (as opposed to passive) teaching paradigm (Handelsman, Miller, & Pfund, 2007) including group problem solving. In the first lecture of the pair (Week1), the instructor assigned a recent review article on the topic, and covered the background material necessary to read, understand, and critically evaluate the primary research article assigned for the second lecture of the pair (Week2). Focus was placed on explaining experimental methods and techniques found in the

primary article. In Week2, students were called on to explain figures from the article to the class. In preparation for the discussion of a primary research article (Week2) students turned in three typed questions about the article, the topic, or the techniques to facilitate discussion. After the discussion of each primary research article, students wrote a one-paragraph proposal for a follow-up study improving or extending the scope of the discussed paper. Students were assigned grades based on homework, class participation, and comprehension of the material. Instructors met multiple times throughout the semester to discuss strategies to combat problems encountered.

Primary Outcomes: Students self-reported a highly improved ability in all three tiers of the course goal (a. read = 7, b. understand = 6.75, c. critically evaluate = 7.63; 10-point scale). Instructors learned how to develop a course *de novo* and tailor teaching content to their audience using an active learning method.

Disclosures: E.C. Church: None. I. Rivero-Covelo: None. D.J. Braun: None. M.R. Fettiplace: None. J.J. Cone: None. P.M. Baker: None. M.H. Alpert: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.22SA/LLL49

Topic: H.02. Teaching of Neuroscience

Title: Mythbusters: A neuroeconomics course for undecided freshman- The neuroscientist's perspective

Authors: *C. L. FRANSSEN¹, G. S. LOWRY³, A. FRANSSEN²;

¹Biol., ²Biol. and Envrn. Sci., Longwood Univ., Farmville, VA; ³Econ. and Business, Randolph-Macon Col., Ashland, VA

Abstract: In this presentation, authors will describe the neuroscience taught in an entry-level, non-majors course on neuroeconomics; the methods used to integrate neuroscience with behavioral economics; and the use of neuroeconomics and neuroscience as a platform for teaching a variety of skills appropriate for freshman-level college students of varying potential majors. Basic neuroanatomy and physiology was first approached from a gross perspective, drawing on readings in cognitive neuroscience which highlighted particular brain regions and neurotransmitters. Introductory activities included a brain dissection and laboratory exercises on sensation, perception, and reflexes. Next, both neuroanatomy and physiology were approached

from a cellular perspective, gradually broadening to a systems level to circle back to the original starting point. Skill-building was essential to this course as a First Year Experience (FYE) course, and the lessons of cognitive neuroscience were interwoven with application as students worked both individually and in groups of varying size, read scientific literature for comprehension, conducted library research, designed and conducted experiments, analyzed and graphed results, and learned the basics of writing a scientific paper. As a culminating experience, students applied what they had learned about multi-sensory information delivery, learning strategies, memory limitations, memory triggers, and decision-making abilities to design a final presentation describing their own research in neuroeconomics. In conclusion, we will discuss the burgeoning field of neuroeconomics and the benefits of combining natural and social sciences to help students integrate and apply knowledge across disciplines.

Disclosures: C.L. Franssen: None. G.S. Lowry: None. A. Franssen: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.23SA/LLL50

Topic: H.02. Teaching of Neuroscience

Title: Mythbusters: A neuroeconomics course for undecided freshman - The behavioral economist's perspective

Authors: G. S. LOWRY¹, C. L. FRANSSEN², *A. FRANSSEN²;

¹Econ. and Business, Randolph-Macon Col., Ashland, VA; ²Biol. and Envrn. Sci., Longwood Univ., Farmville, VA

Abstract: In this presentation, authors will describe the behavioral economics taught in an entry-level, non-majors course on neuroeconomics and the methods of integrating behavioral economics with neuroscience. Further, authors will expand on the use of neuroscience in a business/economics education. Throughout the course, students explored some of the classical decision making models underpinning current economic theory through readings and applied experimentation. One key topic of investigation included the psychology of financial investing where the junction of rationality and intuition were explained in behavioral and biological ways. While the field of neuroeconomics is dominated by neuroscientists, studies of the brain in economic choice settings call into question some of the long-held beliefs in economic theories of how people make decisions. Such results have inspired a greater level of participation by

decision theorists, which in turn has contributed to the expanding field of neuroeconomics. By introducing decision theory to first year college students in a neuroeconomics course, we found that combining a study of natural science with social science helped students develop a better understanding of behavioral economics as an experimental science. We conclude that students in the social sciences (i.e. business and economics) may be better-served by gaining a broader education that includes explanations provided by neuroscience.

Disclosures: G.S. Lowry: None. C.L. Franssen: None. A. Franssen: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.24SA/LLL51

Topic: H.02. Teaching of Neuroscience

Support: Dept of Psych, MSU Denver

Title: Teaching research methods and debunking neuromyths: Two birds with one stone

Authors: *C. A. ERICKSON, B. E. TAYLOR, Z. S. TAYLOR, J. K. WILLIAMSON-JONES, M. WOLF, A. R. ZAVILLA, C. B. WALTERS;

Psychology, Metropolitan State Univ. of Denver, Denver, CO

Abstract: From brain-training video games to neuron enhancing supplements, there is no shortage of people trying to cash in on the desire to be smarter. One such company makes a cognitive enhancing drink that allegedly “supports mental focus and performance.” This statement comes with an asterisk indicating it has not been evaluated by the FDA. The potential cognitive enhancing effects of the drink seem to hinge on the ratio of caffeine to L-Theanine, an amino acid commonly found in tea leaves that have shown to increase levels of GABA and dopamine (DA) in the brain. In this class project, six students tested the claims made by this company. The students each chose a cognitive task for their part of the project. The tasks included the Donders reaction time task, the Stroop task, the Raven’s Progressive Matrices, a short-term memory span test, the Rey-Osterrieth Complex Figure Test and a simple measure of prefrontal EEG activity. Simple and choice reaction times were measured with the Donders task. Cognitive flexibility was measured with the Stroop task. Problem solving ability was measured with the Raven’s Progressive Matrix task. Visual-spatial memory was measured with the Rey-Osterrieth Complex figure test. This task involves having participants copy then recall a complex

2-dimensional geometric figure. Short-term memory was measured using a letter span task. The prefrontal EEG was measured using an inexpensive neurofeedback system. Participants were randomly assigned to an experimental or control drink. The experimental group received the putative cognitive enhancing drink and the control group received a placebo drink which was very similar in color and taste. The two drinks shared no active ingredients. With the exception of the prefrontal EEG measure, performance on all tasks was the same for both the experimental and control drinks. Results are discussed in regard to implications for consumers as well as further research into supplements and their ability to improve cognitive performance. Each student presented his/her results at a university-wide research conference. This project provided a rich experience in which students had the opportunity to carry out a research project from conception to presentation.

Disclosures: C.A. Erickson: None. B.E. Taylor: None. Z.S. Taylor: None. J.K. Williamson-Jones: None. M. Wolf: None. A.R. Zavilla: None. C.B. Walters: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.25SA/LLL52

Topic: H.02. Teaching of Neuroscience

Title: Web-based technology: A dynamic approach to student engagement and learning

Authors: *M. K. JARVINEN¹, L. JARVINEN², B. SILVEIRA¹;

¹Emmanuel Col., Boston, MA; ²Mount Holyoke Col., South Hadley, MA

Abstract: Undergraduate students today are immersed in a variety of web-based technologies that are commonplace in social media sites. There is currently a vibrant initiative to extend web-based technology to undergraduate education and use it as a bridge to the classroom. However, it remains unclear to what extent teachers are able to utilize this dimension of student life as a pedagogical tool that enhances student performance. Recently, we documented large increases in student learning of neurotransmission and other complex science concepts using student-created digital videos. The utility of this approach is that it utilizes video-making freeware that is readily accessible and user-friendly. Any student with a background in using PowerPoint will find this freeware very straightforward. We have extended this initiative and offer it as a three-fold approach to teaching. First, students are assigned (or choose) a topic that is the source of a 4-5 page research paper. They research their topic using web sources, primary literature, and applied

experiences. Second, they create short digital videos using video-making freeware incorporating text, images, animation, and music. The video covers the same topic content, but it requires that the flow of ideas and evidence be streamlined. Third, students contribute to their peer group by introducing their video in a formal “film festival” wherein their peers experience the video in much the same way as they would a “sneak preview” of an upcoming movie. Audience members for the film festival evaluate the video using a number of criteria including depth of content, creativity, and flow/construction of video clips. Together, these three factors provide a dynamic approach to teaching/learning where a student is first responsible for their own learning (research paper), then optimize their material for social consumption by others (video-making); ultimately sharing ideas, content, and learning strategies with their peers (film festival) in a way that adds breadth to the class. We have used this strategy with success now with students from diverse majors, and at all levels of their education from first-years to seniors. Pedagogically, we note significantly greater levels of student engagement while progressing through several levels of Bloom’s revised taxonomy. It is clear that technology has modified how students communicate. This, in turn, has affected the way in which today’s undergraduates respond to incoming information. Our approach offers significant advantages as teachers try to best engage this generation in the classroom and optimize learning.

Disclosures: **M.K. Jarvinen:** None. **L. Jarvinen:** None. **B. Silveira:** None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.26SA/LLL53

Topic: H.02. Teaching of Neuroscience

Title: An inexpensive insect locomotion tracker: Construction and teaching applications

Authors: *S. A. HAUPTMAN, K. DU BOIS, H. W. HORCH;
Bowdoin Coll, Brunswick, ME

Abstract: Behavioral study of insect locomotion is usually accomplished with expensive and technically complex instrumentation and software which largely limits the accurate tracking of insect movement to research applications. Insects could provide robust and inexpensive preparations for teaching students quantitative measures of animal behavior if less costly and complex tools were available. Here we describe the construction of an insect locomotion tracker built from readily available inexpensive components. An optical sensor manufactured for use in a

computer mouse tracks both the direction and velocity of locomotion as the insect freely moves on a Styrofoam ball floating on a cushion of air. Directional movement is translated by the optical sensor into a series of x-y coordinates that are sent to a personal computer through an Arduino microcontroller interface. The animal's movement is recorded and displayed in real time using an intuitively compiled software routine. Specific proposed teaching applications include student study of cricket phonotaxis and cockroach escape behavior. Students can also use the tracker to complement sensory physiology experiments as it allows them to compare the behavioral and electrophysiological responses to auditory or mechanical stimuli.

Disclosures: S.A. Hauptman: None. H.W. Horch: None. K. Du Bois: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.27SA/LLL54

Topic: H.02. Teaching of Neuroscience

Title: Basic neuron model electrical equivalent circuit: An undergraduate laboratory exercise

Authors: *K. DABROWSKI, D. CASTAÑO, J. TARTAR;
Nova Southeastern Univ., Fort Lauderdale, FL

Abstract: Neurons have electrical properties, similar to electrical circuits, that determine how current flows. To observe these properties, we developed a laboratory exercise for undergraduate students in order to facilitate the comprehension and application of these fundamental neuroscience concepts. We show how a simple resistor-capacitor (RC) circuit, with the neuron membrane represented as a capacitor, can be used to demonstrate current flow through a membrane and how it depends on the opening and closing of ion channels. The circuit also demonstrates how the time-constant depends on the resistance of a neuron. This simple laboratory activity serves as a "hands-on" activity to demonstrate the electrical circuit components that resemble neuron components. It also shows the ease of constructing an electrical equivalent circuit as a basic neuron model. We illustrate the methods for creating the equivalent circuit and how to observe different neuron properties through altering the structure of the circuit. At the conclusion of this laboratory exercise, undergraduate students can apply the principle of Ohm's law, cable theory, the functions of resistance and capacitance, and other fundamental aspects of neuroscience.

Disclosures: K. Dabrowski: None. D. Castaño: None. J. Tartar: None.

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.28SA/LLL55

Topic: H.02. Teaching of Neuroscience

Support: Simmons College

Title: An undergraduate animal behavior course investigating the effects of omega-3 fish oil on memory

Authors: *R. L. GALLI;

Psychology, Simmons College, Boston, MA

Abstract:

Simmons College includes a single-sex undergraduate college where the science programs emphasize mentoring and participation in research. In an upper level elective, behavioral neuroscience course, students design, complete and present their own experiments. Following theoretical and methodological training, this year students investigated if there were changes in the spatial learning and memory of juvenile Fischer 344 rats given an Omega-3 fish oil supplemented diet for 3 weeks.

Recent studies have found that long-term potentiation, memory and learning may benefit from dietary Omega-3 fatty acids. However, a daily dose of 216mg DHA and 324mg EPA did not affect performance in the Morris water maze on days 15 or 21 of supplementation. Working in self-directed, collaborative groups supported by the instructor and an undergraduate assistant, students participated in all phases of conducting research. Special attention was given to promoting skills in statistical analysis as well as career preparedness. Details of course design and student projects will be presented.

Goals of these activities include encouraging student engagement with, mastery of, and participation in science. Although women earn roughly half of the advanced degrees in neuroscience related fields, they account for a far smaller percentage of the highest ranks of the profession. Womens Colleges may be successful in educating women for leadership roles in the neurosciences, as they have been for many traditionally male fields.

Disclosure.DisclosureBlock:

Theme H Poster

21. Neuroscience Courses for Undergraduates, Graduates, and Professional Students

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 21.29SA/LLL56

Topic: H.02. Teaching of Neuroscience

Support: DFG Grant #IGK1247

Title: The interdisciplinary research training program CINACS

Authors: *J. ZHANG;

FB Informatik, TAMS, Univ. of Hamburg, Hamburg, Germany

Abstract: Natural cognitive systems benefit from combining the input of the different sensory systems not only because each modality provides information about different aspects of the world but also because the different senses can jointly encode particular aspects of events, e.g. the location or meaning of an event. Since each modality uses specific representations, information needs to be transferred into codes that permit the different senses to interact. Corresponding problems arise in human communication when information about one topic is expressed using combinations of different formats such as written or spoken language and graphics.

CINACS (Cross-modal Interaction of Artificial and Natural Cognitive Systems) is an interdisciplinary research training program between University of Hamburg, Germany and Tsinghua University, China. Within CINACS, we investigate and teach the principles of cross-modal processes in natural cognitive systems as well as in artificial systems, in particular focusing on phenomena of dynamics, learning, memory and communication. These principles of cross-modal processing are central to making further progress on understanding and building new cross-modal intelligent systems. Furthermore, we investigate and teach principles for designing and realizing multi-modal environments for human-computer and human-robot interaction.

The research programme aims at understanding the biological mechanisms of cross-modal processing, its role in perception and behavioural control and the use of multi-modal representations in communication and problem solving. Additionally, our goal is to design models, implement algorithms and investigate architectures for robust artificial multi-modal systems which facilitate a smooth and efficient cooperation and communication between humans

and artificial systems.

CINACS combines the relevant methods, in particular behavioural techniques including EEG, MEG, fMRI, cognitive and computational simulation, artefact construction, computer and robot experiments. This combination of approaches is possible because CINACS comprises the disciplines of neuroscience, bio-engineering, psychology, linguistics, computer science and robotics. The cooperation of the CINACS PhD projects is strengthened by focusing on the following thematic areas: top-down control of cross-modal processing, cross-modal binding, adaptivity of cross-modal processes, cross-modal representations, multi-modal communication, multi-modal BCI, cross-modal decision making and executive control.

Disclosure.DisclosureBlock:

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Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.01SA/LLL57

Topic: H.02. Teaching of Neuroscience

Title: Baldwin Wallace University - the Society for Neuroscience's undergraduate neuroscience program of the year (2012)

Authors: *G. A. MICKLEY^{1,2}, M. M. ROGERS¹, R. ZACHARIAS¹, C. TURNER¹;
¹Neurosci., Baldwin Wallace Univ., Berea, OH; ²Nu Rho Psi, Spartansburg, SC

Abstract: The Society for Neuroscience recognized Baldwin Wallace University's undergraduate neuroscience program as their *Program of the Year* for 2012. This award acknowledges the "accomplishments of a neuroscience department or program for excellence in educating neuroscientists and providing innovative models to which other programs can aspire." Our Neuroscience major is research-intensive, and all students are required to produce an empirically-based senior thesis. This requirement challenges program resources, and the demand for faculty attention is high. We have developed an intentional 3-step peer mentoring system that encourages our students to collaborate with and learn from, not only faculty, but each other. *Peer mentoring and the curriculum:* In our courses, students may work in small teams to review the relevant literature and then design, conduct, and report their own empirical studies. Peer mentoring is provided by more-senior students who have completed these courses and serve as

lab assistants. Students are also paired with senior neuroscience majors who have developed particular lab skills and may be called upon to act as supplementary mentors. *Peer mentoring and work in faculty labs*: Within a highly structured tiered training system, more-experienced students, who have worked in a faculty laboratory and met strict competency criteria serve as coaches and supervisors of new students. *Peer mentoring and Senior Theses*: Neuroscience students working on their senior theses are paired with more-junior undergraduates. The students performing their thesis research benefit from having an extra set of hands and the mentored younger students learn new lab skills - techniques that will be used later as they perform their own thesis research. When our students were anonymously surveyed about the effectiveness of our peer mentoring initiative, all respondents indicated that they “strongly agreed” with the statement that the supervision and training they received “was appropriate and of high quality.” Further, 100% of our students “agreed” or “strongly agreed” with statements indicating that their “peer mentorship was excellent”, “helped them gain confidence”, and “allowed them to be more successful in their research.”

Disclosures: G.A. Mickley: None. M.M. Rogers: None. R. Zacharias: None. C. Turner: None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.02SA/LLL58

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant NS080687

Title: ENDURE-Neuroscience research opportunity to increase diversity: A research-with-purpose approach

Authors: *I. E. VEGA¹, N. M. ORTIZ-VEGA², G. J. AYALA-SEPULVEDA², J. RODRIGUEZ-ADAMES², M. SANCHEZ-CESARIO²;

¹Biol., Univ. of Puerto Rico-Rio Piedras Campus, San Juan, Puerto Rico; ²Ctr. for Evaluation & Sociomedical Res. and Grad. Sch. of Publ. Hlth., Univ. of Puerto Rico-Medical Sci. Campus, San Juan, PR

Abstract: Neuroscience Research Opportunity to Increase Diversity (NeuroID) from the University of Puerto Rico-Río Piedras Campus (UPR) is an NIH-ENDURE program with the

objective to increase the opportunities available for undergraduate students in the area of Neurosciences. The main goal of the program is to increase the number of Hispanic scientists in the Neurosciences by establishing a cohort of interested students that receive academic and professional training in neuroscience-related research and career development. The core of the program is a comprehensive research experience for undergraduate students based on three teaching philosophies: student-citizen, service-learning and research-with-purpose. The training program consists of three major components: (1) **Research Experience** - an intense research experience during the academic year and a summer experience in a laboratory at an institution in the mainland that have active T32 training grants in neuroscience and/or excellent track record in recruiting and training underrepresented minorities. (2) **Academic training** - participation in seminars, workshops and selected courses to enhanced their knowledge in neurobiology and understanding of a research career. (3) **Community Outreach** - participants are involved in outreach activities to enhance their understanding of the social impact of science and transmit the acquired scientific knowledge to the general population. The proposed training activities, together with an established mentoring program with members of the Neuroscience community, contributes to increase the student competitiveness and enhance their interest in continuing a research career in neuroscience. The first graduating class consists of five participants: two were accepted in Neuroscience Graduate Programs (WashU and Utah), one was accepted at a post-baccalaureate program (Yale) and two were accepted at Medical School (UPR-MSU). 100% (16 participants) of the students reported that their understanding of a research career and scientific skills increased due to the training activities. 87.5% of the participants reported that community outreach activities *increase* or *increase a lot* their willingness to pursue a neuroscience career. These assessment outcomes and others illustrate that the training approach used is contributing to achieve the main objectives proposed, which will increase the number of well-trained and socially responsible neuroscientists from underrepresented ethnic groups.

Disclosures: I.E. Vega: None. **N.M. Ortiz-Vega:** None. **G.J. Ayala-Sepulveda:** None. **J. Rodriguez-Adames:** None. **M. Sanchez-Cesario:** None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.03SA/LLL59

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant GM097636

Title: BP-ENDURE Atlanta: Engaging undergraduates in neuroscience research

Authors: ***K. J. FRANTZ**¹, C. T. GOODE², J. L. LARIMORE³, E. A. BUFFALO⁴, Y. SMITH⁴, K. BRAKKE⁵, T. MCKLIN⁶;

²Psychology, ¹Georgia State Univ., Atlanta, GA; ³Biol., Agnes Scott Col., Decatur, GA;

⁴Neurol., Emory Univ., Atlanta, GA; ⁵Psychology, Spelman Col., Atlanta, GA; ⁶The Findings Group, Decatur, GA

Abstract: Undergraduate students can be attracted to science by engaging in research. A summer experience as an apprentice in a scientist's laboratory or clinic may be effective in this regard, but a short-term project may fail to provide the preparation necessary to progress into PhD programs in fields such as neuroscience. Our project including Georgia State University (GSU) Agnes Scott College (ASC), Emory University, and Spelman College, is one of five federally-funded BP-ENDURE programs that aim to provide in-depth and long-term research experiences for students from demographic groups currently underrepresented in science. Known locally as Atlanta's Neuroscience Education & Training Program (NET/work), BP-ENDURE Atlanta has five major components: 1) a research immersion in Atlanta's well-established BRAIN summer research program; 2) a Research Assistantship in the first academic year, during which research at GSU or Emory integrates with coursework and other responsibilities at the home institution; 3) a Travel Assistantship to conduct research at a partner T32 training program in the second summer; 4) a Capstone Research Assistantship during the second academic year; and 5) an intensive professional development workshop series on scientific communication, research ethics, and graduate school. Our program evaluation conducted in collaboration with The Findings Group analyzes the effects of research training coupled with intensive professional development workshops on participant communication skills, confidence with research abilities, science anxiety, science identity, and intentions to persist in science, as well as mentor assessment of research skills. We also track formative evaluation of program elements. We predict that more of our program participants will matriculate into PhD programs and/or integrate research into their careers than matched controls who participate only in our summer program, BRAIN. Identification of a reliable approach to developing the skills and confidence necessary to progress into PhD programs will enable more students from various backgrounds to pursue their interests in science, and will ultimately increase diversity in the US scientific workforce.

Disclosures: **K.J. Frantz:** None. **C.T. Goode:** None. **J.L. Larimore:** None. **E.A. Buffalo:** None. **Y. Smith:** None. **K. Brakke:** None. **T. McKlin:** None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.04SA/LLL60

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant R25NS080686

Title: Hunter-nyu bp-endure program

Authors: V. QUINONES-JENAB¹, *R. MIRANDA¹, C. AOKI²;

¹Psychology, Hunter College, City Univ. of New York, New York, NY; ²New York Univ., New York, NY

Abstract: Diverse racial and ethnic groups, individuals with disabilities, and socially, economically, and educationally disadvantaged backgrounds are underrepresented in neuroscience. Hunter College of the City University of New York (CUNY) and New York University recognize that increasing the representation of these populations in neuroscience research is integral to our future as academic and research institutions. BP-ENDURE at Hunter is one of five federally funded BP-ENDURE programs in the U.S. Our program seeks to encourage and prepare students from diverse backgrounds to enter into and succeed in neuroscience Ph.D. programs. To achieve this goal, Hunter, in collaboration with New York University - has developed a partnership with three T32-awarded universities_Brown University, University of Michigan, and Vanderbilt University. This partnership exposes approximately 12 undergraduate trainees per year (8 from Hunter, 4 from NYU) to a research-intensive curriculum and to active research during 10 weeks of the summer and 9 months of the academic year. We are pursuing the following aims: (1) Developing an outstanding group of undergraduate students with diverse backgrounds dedicated to neuroscience research; (2) Providing research experiences to our trainees through research placement with actively funded neuroscientists; (3) Developing academic and curriculum enhancement activities rooted in students' research activities; (4) Maintaining an effective Administrative Core to support our students' needs and development; and (5) Developing rubrics to assess learning. Measurable outcomes include: (1) Acceptance of trainees to neuroscience-related graduate programs; and (2) improvement of students' quantitative, scientific writing, and oral presentation skills. The latter are assessed through repeated measurements, including one assessment that occurs at the beginning of a course. Since our program began in August of 2010, we have had 15 students graduate from the program and 12 of those apply to doctoral programs. Of these, 10 have been accepted to Ph.D. programs and one to an MD/MSCR program, and 3 students are taking gap years to participate in neuroscience

research laboratories. Two of our students have won NSF pre-doctoral fellowships. Finally, 2 additional students left the program before completion due to medical reasons or change in career path to medicine. Overall, the 92% acceptance rate into doctoral programs among students who apply indicates that our BP-ENDURE program has substantially increased the rate of entry of underrepresented groups into neuroscience. This program is supported by NIH Grant # R25NS080686.

Disclosures: V. Quinones-Jenab: None. R. Miranda: None. C. Aoki: None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.05SA/LLL61

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant NS080684

Title: BP-ENDURE San Antonio: south texas advanced research training - undergraduate program (start-up)

Authors: *A. FRAZER¹, D. WEISS², D. MORILAK¹, B. REID¹;

¹Dept Pharmacol, ²Dept Physiol., UTHSCSA, San Antonio, TX

Abstract: The goal of our NIH-funded Program is to prepare and encourage junior and senior undergraduate underrepresented minorities (defined on the basis of ethnicity, socioeconomic status and/or disability) from the San Antonio and South Texas Region to enter doctoral programs in neuroscience, to complete them successfully, and to become well-trained and competitive neuroscientists. To accomplish this, a comprehensive program has been developed involving extensive research experience in the laboratories of successful neuroscientists, and opportunities to develop and improve writing, speaking, and time management skills. Since the research experiences for the students occur throughout the year, we are limited to recruiting students from the San Antonio area. Consequently, our students are recruited from five partner institutions: Our Lady of the Lake University, St. Mary's University, Trinity University, University of the Incarnate Word, and The University of Texas, San Antonio. In addition to the opportunity to work in the laboratories of the 39 mentoring neuroscientists, selected from nine departments at our health science center, the students may also carry out summer research at any of our partnering institutions across the country that have T32 training programs, e.g., University

of Michigan, University of Miami School of Medicine, University of Pittsburgh, Stanford University. Initially, laboratory projects are designed that are “doable” by the students to enable them to gain confidence in their research abilities. In addition to their laboratory research, the students also attend seminars and a journal club (specifically developed for them) and research retreats. They all receive instruction on the responsible conduct of research and ethics and take two “courses” during the summer, one dealing with “Techniques” and the other “Biological Bases of Brain Function,” designed specifically for undergraduates. Programs such as this should enable students from diverse backgrounds to determine if they like neuroscience and have the ability to become neuroscientists.

Disclosures: A. Frazer: None. D. Weiss: None. D. Morilak: None. B. Reid: None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.06SA/LLL62

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant R25GM097633

Title: Building Research Achievement in Neuroscience (BRAiN): A university partnership for broadening participation in neuroscience in the Rocky Mountain and Rio Grande regions

Authors: *S. T. BLAND¹, E. SALCEDO², V. B. KNIGHT⁴, W. PATERSON³, D. RAMIREZ-GORDILLO⁴, T. F. WRIGHT⁴, D. RESTREPO², E. E. SERRANO⁴;

¹Dept of Psychology, ²Cell and Developmental Biol., ³Sch. of Educ. & Human Develop., Univ. of Colorado, Denver, Denver, CO; ⁴Biol., New Mexico State Univ., Las Cruces, NM

Abstract: The Building Research Achievement in Neuroscience (BRAiN) program is a partnership between the University of Colorado Denver and New Mexico State University, a Hispanic-serving minority institution. The program goal is mandated by the NIH BP-ENDURE initiative: to provide intensive disciplinary training that prepares undergraduate students from underrepresented populations (STEM underrepresented racial and ethnic groups; students with disabilities; students from economically, educationally, or socially disadvantaged backgrounds) for entry to neuroscience and biobehavioral graduate programs. BRAiN implements an extended network model that crosses state boundaries to provide students with cutting edge neuroscience research experiences at the Anschutz Medical Campus Research facilities in Aurora, Colorado

(home to a T32-funded Neuroscience PhD program), and their home campuses in downtown Denver, Colorado Springs or Las Cruces, New Mexico. During the summer, the cohorts from both campuses complete a full-time, eight-week summer research internship at the AMC campus and receive an introduction to neuroscience. During the academic year, BRAiN students engage in up to 15 hours/week of mentored research on their home campus. In addition to research, students attend workshops, seminars, and Honors courses focused on neuroscience, academic, and professional development topics throughout the year. Students attend and present research at the BP-ENDURE, SFN, SACNAS, ABRCMS, and Rocky Mountain SFN Chapter conferences and are expected to complete a thesis prior to graduation. External evaluators provide formative and summative assessments that are used to guide programmatic practices. Program outcomes demonstrate that BRAiN has successfully promoted graduate school entry by participants who have earned undergraduate degrees since program inception in September 2010. As expected, BRAiN has forged research ties between mentors at partner institutions and is building program leadership expertise by including junior faculty and graduate research education assistants in the leadership team. BRAiN is currently evaluating mentorship practices and aims to provide enhanced mentor training during the coming year.

Disclosures: **S.T. Bland:** None. **E. Salcedo:** None. **V.B. Knight:** None. **W. Paterson:** None. **D. Ramirez-Gordillo:** None. **T.F. Wright:** None. **D. Restrepo:** None. **E.E. Serrano:** None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.07SA/LLL63

Topic: H.02. Teaching of Neuroscience

Support: NIH (NIGMS IRACDA GM081259)

Title: Teaching undergraduate students to think like neuroscientists without entering the laboratory

Authors: ***S. F. FRAUSTO**^{1,3}, **C. N. SUNNEN**^{3,2};

¹Div. of Neurol. and the Pediatric Regional Epilepsy Program, ²Neurol., Children's Hosp. of Philadelphia, Philadelphia, PA; ³Biomed. Postdoctoral Programs, Univ. of Pennsylvania, Philadelphia, PA

Abstract: A major challenge in teaching undergraduate neuroscience is how to get students to appreciate the experimental design and data interpretation essential to research, without ever setting foot into a laboratory. In essence, how do we train students to think and act like neuroscientists? We designed an upper-level undergraduate Biology Special Topics course (Translational Neuroscience) at Rutgers, The State University of New Jersey-Camden Campus under the auspices of the University of Pennsylvania Postdoctoral Opportunities in Research and Teaching (PENN-PORT) program to address this question. Students explored the etiology of different neurological disorders and diseases, spanning from neurodegenerative disorders such as Alzheimer's and Parkinson's Diseases, to addiction and substance abuse, and the epilepsies through traditional lectures and discussions. Students also learned about the techniques, methods and applications used to make advances in neuroscience research. Additionally, students learned basic scientific skills that included understanding the scientific method, scientific integrity and ethics. This course incorporated the use of cutting-edge pedagogical techniques and technologies to achieve three primary learning objectives: (1) critically read and interpret scientific literature, (2) form hypotheses, design testable experiments and research plans based upon previously read/discussed scientific literature, and (3) communicate scientific information in traditional scientific forums, including written abstracts and oral presentations (i.e. journal clubs). We structured our course around the primary scientific literature, and used a combination of discussion (both online through Facebook and in class), group work, case studies, rubric-assessed written and oral assignments, traditional lecture formats, and Skype interviews with the authors of assigned research articles. Based upon student grades and evaluations, along with our own reflections, we will report which teaching techniques worked well for attaining each objective, which didn't, and ideas for improvement.

Disclosures: S.F. Frausto: None. C.N. Sunnen: None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.08SA/LLL64

Topic: H.02. Teaching of Neuroscience

Title: A decade of the journal IMPULSE: Growth and impact

Authors: *L. S. JONES, C. CARLAY, D. COBB, M. COOK, C. ESTER, A. ROSSI, D. RUSSELL, K. SASSER, D. WOODARD;
Honors Col., Appalachian State Univ., Boone, NC

Abstract: The journal IMPULSE was started by four undergraduate students and one faculty member in the spring of 2003. The first issue was posted in 2004, and a total of nine issues have been archived annually, the tenth is the current, 2013 issue. The journal has evolved from a once-per-year posting reviewed by students at a single institution, to rolling review and posting by students worldwide representing nine institutions. The first issue was reviewed by 14 students from three countries and two continents with a single Faculty Advisor and Reviewer Training Site (RTS). The 2012 issue posted with over 100 student reviewers representing 24 institutions in six countries and four continents. There were seven RTSs, each with their own Faculty Advisor, and one of those was in South Africa. An eighth RTS in Spain was added in the spring of 2013. An average of 3.4 papers per year have been published by the journal, with slightly less than twice that being submitted each year, some being reviewed but not returned with revisions, others not reviewed due to inappropriateness of topic. The journal has been presented at 10 SfN meetings, three FENS conferences, and two IBRO meetings, in addition to having two articles published in JUNE on the impact of the journal experience on undergraduate neuroscience teaching. As the first cohort of students has now moved at least 6-8 years into their post-baccalaureate careers, the impact on editors, reviewers, and authors can begin to be assessed. Anecdotal evidence has long supported the positive influence of the experience on career-path choice and success. Survey evidence from participant self-report will be presented examining this claim.

Disclosures: L.S. Jones: None. C. Carlay: None. D. Cobb: None. M. Cook: None. C. Ester: None. A. Rossi: None. D. Russell: None. K. Sasser: None. D. Woodard: None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.09SA/MMM1

Topic: H.02. Teaching of Neuroscience

Support: Associated Students of the University of California (ASUC) Berkeley

Title: The Undergraduate Journal of Psychology at Berkeley - an Associated Students of the University of California Berkeley sponsored journal

Authors: *F. D. UQUILLAS^{1,2}, A. S. KOHANTEB¹, K. M. WOOD¹, L. M. SOUDI^{1,2};
¹UC Berkeley, Berkeley, CA; ²Helen Wills Neurosci. Inst., Berkeley, CA

Abstract: The Undergraduate Journal of Psychology at Berkeley (UJPB) encourages undergraduate participation in the broader academic community by promoting sophisticated undergraduate research and active involvement with other aspiring researchers. The seminar format of the journal allows for group collaboration and discussion, providing an environment that facilitates research-oriented cooperation and conversation among the next generation of psychological theorists and researchers. Students gain insight and skill in critical reading of research articles, a strong foundation in and familiarity with APA style, and considerable experience evaluating and editing psychological research articles with a special focus on the original research of their peers. The annual publication is the product of a variety of undergraduates from across the nation, and stands as a celebration of the ingenuity of undergraduates and their dedication to celebrating the works of aspiring students. By providing authors with a platform on which to publish their research, we hope that their work will motivate each reader to discover the true potential for excellence and creativity that lies within each budding undergraduate professional.

<http://ujpb.weebly.com>

<http://www.decal.org/courses/UJPB>



Disclosures: F.D. Uquillas: None. A.S. Kohanteb: None. K.M. Wood: None. L.M. Soudi: None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.10SA/MMM2

Topic: H.02. Teaching of Neuroscience

Title: Free online resource for neuroscience educators: Journal of Undergraduate Neuroscience Education (JUNE) <http://www.funjournal.org/>

Authors: E. P. WIERTELAK¹, B. JOHNSON², G. DUNBAR³, *W. E. GRISHAM⁴;
¹Psychology, Macalester Col., Saint Paul, MN; ²Neurobio. and Behavior, Cornell Univ., Ithaca, NY; ³Psychology, Central Michigan Univ., Mount Pleasant, MI; ⁴Dept Psychol, UCLA, Los Angeles, CA

Abstract: The Journal of Undergraduate Neuroscience Education (JUNE) is focused on advancing undergraduate neuroscience pedagogy and is a free online, open access resource. JUNE features peer-reviewed articles on novel laboratory and classroom techniques, curricular considerations, letters to the editor, as well as reviews of textbooks, curricula, equipment, and media. JUNE is published under the auspices of the Faculty for Undergraduate Neuroscience (FUN) and has two regular issues per year with additional special issues. Recent laboratory articles included teaching somatosensory inhibition, and modeling neural degeneration. Other articles described having students contribute to Wikipedia or create videos as means of instruction, creating capstone courses as well as a course in consciousness and mind, and using renaissance art in teaching neuroscience. A special issue featured offerings from a FUN conference at Pomona College in summer 2011, and included articles on instituting cross-disciplinary and interdisciplinary courses, mentoring, diversity in neuroscience education, partnerships in neuroscience, and designing teaching spaces. Articles discussing curricular considerations, core competencies, and overall program recommendations consistent with AAAS and NSF's Vision and Change report were also included. Other articles suggested innovative course strategies such as such as utilizing writing and service components as well as strategies to incorporate student-centered activities within lectures. Laboratory-based articles included capitalizing on the genetic diversity of *Drosophila* in labs as well as examining their electroretinograms, computer-based methods of teaching neurophysiology, explorations of autonomic nervous system activity, sensory neuroscience linked to phenomena, low-cost neurophysiology instruments, and teaching neuroinformatics with web-based tools. JUNE attracts both regular as well as a growing number of new readers. Last year, JUNE was visited 8,145 times by 5,066 unique visitors, indicating both a growing and a dedicated readership. June is indexed in PubMed, Psych Info, the National Science Digital Library, the Directory of Open Access Journals, and SCOPUS. JUNE invites submissions relating to undergraduate neuroscience pedagogy. Submission information can be found on the home page at <http://www.funjournal.org/> .

Disclosures: E.P. Wiertelak: None. B. Johnson: None. G. Dunbar: None. W.E. Grisham: None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.11SA/MMM3

Topic: H.02. Teaching of Neuroscience

Support: NSF Grant TUES 1043553

Title: ERIN: Resources to enhance the teaching of neuroscience

Authors: ***R. F. OLIVO**¹, J. R. BURDO², R. CALIN-JAGEMAN³, W. E. GRISHAM⁴, M. L. LINDEN⁵, R. L. ROSENBERG⁶, L. L. SYMONDS⁷, J. E. THORNTON⁸;

¹Biol. Sci., Smith Col., Northampton, MA; ²Boston Col., Chestnut Hill, MA; ³Dominican Univ., River Forest, IL; ⁴UCLA, Los Angeles, CA; ⁵Brown Univ., Providence, RI; ⁶Earlham Col., Richmond, IN; ⁷Michigan State Univ., East Lansing, MI; ⁸Oberlin Col., Oberlin, OH

Abstract: The explosive growth of knowledge in neuroscience in the last half-century has made it increasingly difficult for faculty to find appropriate current resources to enhance their teaching. Yet the pace of new discoveries creates a constant need to update the content of courses and to teach beyond the material in textbooks. In addition, “millennial” students routinely expect to encounter online exercises, images, videos, and other resources, which can be difficult for faculty to find and evaluate.

ERIN (Educational Resources in Neuroscience, <http://erin.sfn.org>) is a new website hosted by the Society for Neuroscience that catalogs and reviews educational resources for undergraduate and graduate education. Faculty can use ERIN to search for and evaluate over 600 educational resources in neuroscience, all curated, reviewed, and tagged by resource type, educational level, and topic. Moreover, SfN members can easily nominate new resources and review existing resources. Thus, ERIN enables the crowd-sourcing of high-quality educational materials across the entire SfN membership.

ERIN's Board of Editors, the authors of this poster, will describe some of the top resources they have cataloged for ERIN, and discuss the many benefits of searching the free ERIN website for pedagogically useful materials. We can also help you submit or review resources you value in your own teaching, thereby spreading the word about the resources you currently use and love. Stop by to see how ERIN can help you become a more effective instructor.

Disclosures: **R.F. Olivo:** F. Consulting Fees (e.g., advisory boards); Society for Neuroscience. **J.R. Burdo:** None. **R. Calin-Jageman:** None. **W.E. Grisham:** None. **M.L. Linden:** None. **R.L. Rosenberg:** None. **L.L. Symonds:** None. **J.E. Thornton:** None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.12SA/MMM4

Topic: H.02. Teaching of Neuroscience

Title: Faculty for Undergraduate Neuroscience (FUN): Multiple mechanisms for supporting the development of undergraduate students and faculty in the neurosciences

Authors: *N. J. SANDSTROM¹, J. S. SMITH², E. R. REYNOLDS³;

¹Williams Col., Williamstown, MA; ²Hlth. Sci., Saginaw Valley State Univ., University Center, MI; ³Biol. and Neurosci., Lafayette Col., Easton, PA

Abstract: Faculty for Undergraduate Neuroscience (FUN) is the international society devoted to neuroscience education and research at the undergraduate level (www.funfaculty.org). This presentation will provide an overview of our organization, highlighting the work we have done over the past year focusing on undergraduate neuroscience. 1. Since 1992, FUN, in collaboration with its sponsors, has granted travel awards for undergraduate researchers to attend the annual SfN meeting and present their research. We will list the names, sponsors, and the location of the posters being presented by the 2013 travel award recipients. 2. FUN coordinates an equipment loan program, providing researchers with the opportunity to borrow state of the art equipment from associated vendors. 3. FUN supports the online, peer-reviewed Journal of Undergraduate Neuroscience Education (JUNE), which is devoted to neuroscience instruction and the dissemination of laboratory techniques for use in undergraduate neuroscience curricula and was recently indexed in PubMed. 4. FUN collaborates with Nu Rho Psi, the national honor society in neuroscience. 5. FUN holds a triennial faculty development workshop that brings together educators to develop and share teaching best practices. The next meeting will be held at Ithaca College in the summer of 2014. 6. FUN supports regional undergraduate neuroscience meetings such as “MidBrains”, “SYNAPSE”, “NEURON”, and “mGluRs”. 7. FUN recognizes exceptional accomplishments in neuroscience education, mentorship, and service. 8. Finally, FUN supports communication and networking among its members through a rejuvenated Newsletter and listserv. FUN members and others interested in undergraduate neuroscience education are encouraged to attend our annual business meeting and the FUN Social and Poster Session held during the 2013 SfN meeting. The time and location of these events will be listed on the poster. At the FUN Social, well over 100 undergraduate researchers and their mentors will

present their work in a poster session. We will also honor the 2013 FUN Student Travel Award winners and sponsors as well as any Educator, Mentor, and Service Award winners.

Disclosures: **N.J. Sandstrom:** None. **J.S. Smith:** None. **E.R. Reynolds:** None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.13SA/MMM5

Topic: H.02. Teaching of Neuroscience

Support: Quinnipiac University

Bristol-Myers Squibb Center for Science Teaching and Learning

Title: The 23rd northeast under/graduate research organization for neuroscience (NEURON) held at Quinnipiac University in Hamden, CT

Authors: ***A. J. BETZ**¹, T. AHERN¹, C. FRYE²;

¹Psychology, Quinnipiac Univ., Hamden, CT; ²Dept. of Chem., Univ. of Alaska INBRE, Fairbanks, AK

Abstract: The 23rd NEURON conference was held April 7th, 2013 at Quinnipiac University's RockyTop Student Center on the York Hill campus. Quinnipiac now hosts the website (www.quinnipiac.edu/neuron) for the NEURON conferences which includes registration, abstract submission, archives of previous talks, resource links and image galleries. The keynote speaker was Marina Picciotto, the Charles Murphy Professor of Psychiatry, Neurobiology and Pharmacology at Yale University. Professor Picciotto's talk was titled "From Molecules to Behavior: Role of Nicotinic Acetylcholine Receptors in Nicotine Addiction, Food Intake and Depression". Here, she discussed her research program on molecular genetic and pharmacological approaches to link the biochemical, cellular, and anatomical levels of investigation to behavior. One of her primary interests is the role of nicotinic acetylcholine receptors in brain function and development. Students and faculty had five workshops to choose from hosted by local and extended faculty with deep expertise in their fields. These workshops included: How People Learn: Teaching So That Students Learn With Understanding, There's an App for that: Teaching and Lecturing Effectively with an iPad, Neurobiology of Delusions, Pipeline for Becoming a Prescription Drug, Careers in Science Panel. The Erskine and Tieman

awards were given to a young faculty member and 2 students to honor their extraordinary talent as teachers and future neuroscientists. In addition, the conference doubled in size with over 80 posters representing 38 different institutions. With continued local and regional support from faculty dedicated to student outreach and mentorship, NEURON has continued to expand beyond its original Boston locations to include greater representation from the northeast region.

Disclosures: **A.J. Betz:** None. **T. Ahern:** None. **C. Frye:** None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.14SA/MMM6

Topic: H.02. Teaching of Neuroscience

Title: Years of change and progress: The midbrains undergraduate neuroscience conference

Authors: ***E. P. WIERTELAK**¹, J. NEIWORTH², S. DICKINSON⁴, J. DEMAS⁵, J. LOEBACH⁴, S. MEERTS², G. MUIR⁴, C. OHNESORGE², J. STRAND², L. WICHLINSKI², J. WOLFF³;

¹Neurosci. Studies, Macalester Col., Saint Paul, MN; ²Psychology, ³Biol., Carleton Col., Northfield, MN; ⁴Psychology, ⁵Physics, St. Olaf Col., Northfield, MN

Abstract: The years 2012 and 2013 are years of change for the annual MidBrains Neuroscience conference, as the schedule has now shifted from its historic Spring-time presence to a Fall conference. The annual MidBrains Undergraduate Neuroscience Conference -MidBrains 2012- was held at Carleton College in Northfield, Minnesota, on Saturday, October 6th, 2012. This annual conference provides a forum for undergraduate students in the Midwest to present research findings, as well as opportunities to attend research lectures and special panels, and to meet other undergraduate students interested in the neurosciences. As in previous years, representatives from several major research universities were also present at the 2012 conference to present their respective programs and discuss graduate school opportunities. The keynote address “Flicker, move, cut: Perceiving movies in the mind and brain” was delivered by Jeffrey Zacks of Washington University of St. Louis. There were 44 student and faculty poster and paper presentations across all areas of the neurosciences with more than 120 attendees from 15 universities, colleges and other institutions. The highlights of both the 2012 conference and MidBrains 2013, held October 5, 2013 at Carleton College are discussed.

Disclosures: E.P. Wiertelak: None. J. Neiworth: None. S. Dickinson: None. J. Demas: None. J. Loebach: None. S. Meerts: None. G. Muir: None. C. Ohnesorge: None. J. Strand: None. L. Wichlinski: None. J. Wolff: None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.15SA/MMM7

Topic: H.02. Teaching of Neuroscience

Title: Nu rho psi, the national honor society in neuroscience

Authors: *L. ACHOR¹, A. MICKLEY², E. P. WIERTELAK³;

¹Dept. of Psychology and Neurosci., Baylor Univ., Waco, TX; ²Baldwin Wallace Univ., Berea, OH; ³Macalester, St. Paul, MN

Abstract: *Nu Rho Psi*, The National Honor Society in Neuroscience, was established by the Faculty for Undergraduate Neuroscience (FUN) in 2006 and has since become an independent non-profit organization. With 31 chapters across the United States and over 1500 members, *Nu Rho Psi* is a dynamic organization that aims to support the professional growth of its members. Most of our members are invited to join *Nu Rho Psi* during their undergraduate training, but qualified graduate students, faculty, and alumni are also welcome to join. Membership in *Nu Rho Psi* is granted through chartered *Nu Rho Psi* chapters. Schools wishing to foster a chapter of *Nu Rho Psi* may contact the National Office located at Baldwin Wallace University (nurhopsi@bw.edu) and apply for a charter.

Nu Rho Psi has become a vibrant contributor to the neuroscience community through: (1) encouragement of professional interest and excellence in neuroscience, (2) recognition of outstanding scholarship, (3) advancement of the discipline of neuroscience, (4) encouragement of intellectual and social interaction between students, faculty, and professionals, (5) promotion of career development in neuroscience and related fields, (6) increased public awareness of neuroscience and its benefits for society, and (7) encouragement of service to the community. Going beyond providing recognition of excellence in neuroscience scholarship and research, *Nu Rho Psi* also offers its members the opportunity to apply for travel grants to the annual Society for Neuroscience convention. We have recently established an endowment fund that will eventually allow us to provide research grants to our members. We are developing additional online resources (e.g., "How-to Guide for Graduate school in Neuroscience," *Nu Rho Psi*

Newsletter, etc.) aimed at the professional development of our members.

For more information, see our web page (<http://www.nurhopsi.org/drupal/>) or visit our booth on the exhibitor floor (next to the Faculty for Undergraduate Neuroscience booth). Plan to attend the *Nu Rho Psi* meeting, 11:00-12:00 noon, 10 November, 2013; Horton Grand Hotel, 311 Island Ave., San Diego, CA; Regal Room "A."

Disclosures: L. Achor: None. A. Mickley: None. E.P. Wiertelak: None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.16SA/MMM8

Topic: H.02. Teaching of Neuroscience

Support: UAA CCEL Mini-grant

Title: Alaska's Brain Bee: a service learning opportunity for upper division biological science undergraduates

Authors: S. M. COSTELLO¹, *C. WILSON²;

¹Univ. of Alaska Anchorage, Anchorage, AK; ²Biol., Univ. of Alaska, Anchorage, Anchorage, AK

Abstract: The University of Alaska Anchorage (UAA) has been recognized by the Carnegie Foundation for the Advancement of Teaching as a "Community Engaged Institution" since 2006. But few science courses at UAA feature an outreach or service-learning component. UAA's Center for Community Engagement and Learning (CCEL) sponsors faculty mini-grants to support in-class service learning projects. CCEL also provides tuition waivers for undergraduate Community Engagement Student Assistants (CESAs) who help oversee the projects. In 2012, a new upper-division Biological Sciences course in Neurophysiology and Neuroanatomy was designed to include a service component. The main goals of this service component were to challenge the local Anchorage community to think more about science and to encourage UAA students to become science education advocates. To meet these goals, a community partnership was formed between UAA and the local Anchorage School District to organize Alaska's first ever Brain Bee competition. The inaugural Alaska Brain Bee in 2012 was organized and run by the UAA students. They also prepared and presented posters on neuroscience research after the event. Feedback from the 2012 course suggested an increase in the service component and the

2013 course offered students multiple service opportunities. Half the students participated in the 2nd Brain Bee and led high school participants and their parents in activities exploring sensory feedback, cognitive processing, and neuroplasticity. Also thanks to UAA support, the winner of the UAA Brain Bee, Blake Endres, represented Alaska for the first time at the National Brain Bee in Baltimore. The remaining students worked with young children at the UAA Creative Activities Fair, developed a poster for the library for Brain Awareness Week, or led classroom tours of the Brain Lab. Course participants also hosted local high school students during a visit to the WWAMI Medical School cadaver brain collection. Students were graded on their participation, the development of an activity or poster, and a reflective essay on the service experience. 93% of the 2013 UAA students reported the service experience was worthwhile and enhanced their understanding of the material. Service learning and community-centered science outreach in undergraduate neuroscience programming serves to both increase public interest in neuroscience research and to provide undergraduate students meaningful community interactions.

Disclosures: S.M. Costello: None. C. Wilson: None.

Theme H Poster

22. Undergraduate Neuroscience Programs and Resources

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 22.17SA/MMM9

Topic: H.02. Teaching of Neuroscience

Title: How to design group projects that successfully foster collaborative learning

Authors: *L. L. MCGREW;

Dept Biol, Belmont Univ., Nashville, TN

Abstract: Assigning projects to groups of students is a popular strategy for fostering collaborative learning. This pedagogical approach has been shown to improve grades, particularly for lower performing students. However, students frequently divide the tasks, complete them individually and only work together at the last minute to assemble the end product. This process all but eliminates the collaboration intended by the instructor to deepen the students' understanding. A second and arguably worse scenario involves one student -typically the highest performing student- completing the entire project herself because she "wants a good grade" and doesn't trust the other members of her group to do high quality work. How, then, can educators design assignments to promote collaboration? Scientific discovery is, afterall, a

collaborative endeavor. Some approaches include limiting the number of students in a group, avoiding substantial differences in student's abilities within groups and requiring group members to rate each other's performance in completing the project.

Disclosure.DisclosureBlock:

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Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.01SA/MMM10

Topic: H.02. Teaching of Neuroscience

Support: Gerstacker Foundation

Title: Bridging the gap between undergraduate laboratory coursework and independent research: developmental genetics of hindbrain development in *Xenopus tropicalis*

Authors: *N. HIRSCH¹, C. M. CONSTANCE², J. MAXSON², C. MARQUES²;
²Biol., ¹Hiram Col., Hiram, OH

Abstract: One of the chief goals in any undergraduate laboratory course is to familiarize students with correct laboratory tools and procedures, and, in upper-level courses, to prepare them to begin a career of independent research. Generally, lab coursework does not give students an opportunity to engage in ongoing novel research with its need for experimental design, protocol optimization, and data analysis. We find that many students fail to find a connection between the static, managed environment of most lab coursework and the continuous, often frustrating world of independent research until they contribute to research in faculty labs in their junior or senior year. For the last four years, in an effort to help make that connection early in their college career, we have been incorporating a faculty research project, gene expression studies in the *Xenopus tropicalis* hindbrain, into the labs of two courses. In the Molecular & Cellular Biology course, which is typically enrolled by sophomores in their fall semester, students identify putative hindbrain *X. tropicalis* genes in a database, design PCR primers to amplify conserved regions, and subclone the resulting PCR products in order to create probes for in situ hybridization. Students enrolled in Developmental Biology then study gene expression by making RNA probes via in vitro transcription and using whole-mount in situ hybridization to

visualize gene expression in early *X. tropicalis* embryos. Many of the students who take these courses continue this work as part of their independent research experience, which results in their capstone projects. By continuing this involvement of undergraduates in research early in their college years, we are increasing the number of students who understand how research truly works and we hope to increase the number of undergraduates who become interested in, and actively pursue, a full-time research career.

Disclosures: **N. Hirsch:** None. **C.M. Constance:** None. **J. Maxson:** None. **C. Marques:** None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.02SA/MMM11

Topic: H.02. Teaching of Neuroscience

Support: NIH Neuroscience Blueprint HHSN271200800035C via NIDA

Title: Training data scientists of the future through the Neuroscience Information Framework

Authors: ***J. S. GRETHE**, A. BANDROWSKI, J. CACHAT, A. GUPTA, S. LARSON, M. E. MARTONE, N. I. F. CONSORTIUM;
Ctr. for Res. in Biol. Systems, UCSD, La Jolla, CA

Abstract: Biological science is an “information” science and neuroscience is perhaps the most information-rich of all biological sciences. The web has provided a unique platform for searching and using neuroscience data. This era of “Big Data” requires new skills and tools for managing, analyzing and navigating this complex collection of resources and data.

Despite the power of search engines such as Google, assembling comprehensive information about a nervous system structure or concept remains challenging. The chief reason for this is that information is scattered across papers, images, web pages, databases and lab records. Even if it is in a database, it may not be structured in a way that allows a search engine to find it and link it to other relevant information. The Neuroscience Information Framework (NIF; <http://neuinfo.org>) is a biological search engine that allows students to navigate the Big Data landscape by searching the contents of 200+ data resources relevant to neuroscience - providing a platform that can be used to pull together information about the nervous system.

In addition to tools such as NIF, existing training programs need to be enhanced with courses and project opportunities that allow students to learn appropriate skills that will strengthen their

data-awareness. To that end, we recently incorporated the NIF into a graduate class on neuroanatomy. Underlying the NIF system is the Neurolex knowledge base. Neurolex seeks to define the major concepts of neuroscience, e.g., brain regions, cell types, in a way that is understandable to a machine. Rather than having students write term papers on a particular brain region, we asked them to edit or create an entry in the Neurolex, where they provided a standardized set of information for each brain region. Points were awarded for the most edits and for the completeness of the entry. This project not only allowed students to track down information on brain structures from the primary literature and other available resources, but also provided instruction on structuring of anatomy information for use with information systems like NIF.



Disclosures: J.S. Grethe: None. A. Bandrowski: None. J. Cachat: None. A. Gupta: None. S. Larson: None. M.E. Martone: None. N.I.F. Consortium: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.03SA/MMM12

Topic: H.02. Teaching of Neuroscience

Support: NIH Contract N02-EB-6-4281

Title: The three NITRC's: Software, data and cloud computing for neuroscience

Authors: *D. N. KENNEDY;
Psychiatry, U. Massachusetts Med., Worcester, MA

Abstract: Background:

Initiated in October 2006 through the NIH Blueprint for Neuroscience Research, the Neuroimaging Informatics Tools and Resources Clearinghouse (NITRC) has embarked on a mission is to foster a user-friendly knowledge environment for educating the neuroimaging community about resources and computation. By continuing to identify existing software tools and resources valuable to this community, NITRC's goal is to support its researchers dedicated to training, enhancing, adopting, distributing, and contributing to the evolution of neuroimaging analysis tools and resources.

Methods:

Over the years, the scope of NITRC (<http://www.nitrc.org>) resources has grown to include resources to support MR, PET/SPECT, CT, EEG/MEG, optical imaging and now clinical neuroinformatics and imaging genomics. NITRC has also expanded its capabilities to support image data sharing and computation. In support of enhanced data sharing, NITRC provides an Image Repository, NITRC-IR (<http://www.nitrc.org/ir/>), which is built upon XNAT and supports both NIfTI and DICOM images. In this era of ever-mounting shared data resources, neuroimaging scientists and dementia researchers are becoming more challenged to secure sufficient computational resources to execute complex computational analysis on these large data resources. Using AWS EC2, and leveraging NeuroDebian, we produced and released the NITRC Computational Environment (NITRC-CE) via the Amazon Marketplace. NITRC-CE is an on-demand, cloud based computational virtual machine pre-installed with popular NITRC neuroimaging tools. A public Amazon Machine Instance (AMI) is also available.

Results:

NITRC facilitates access to an ever growing number of neuroinformatics tools and resources (590 to date) and averages monthly 17,000 visits and 82,000 pageviews. The NITRC-IR offers 4,764 subjects, and 4,779 MR Imaging Sessions searchable across six projects to promote re-use and integration of these valuable shared data. The NITRC-CE provides simplified deployment of cloud-based computation that supports FreeSurfer, FSL, AFNI and many other software resources.

Conclusions:

In summary, NITRC is now an established knowledge and training environment for the neuroimaging community where tools and resources are presented in a coherent and synergistic environment. We encourage the community to continue providing design and content feedback and to utilize these resources in support of data sharing requirements, software dissemination and cost-effective computational performance.

Disclosure.DisclosureBlock:

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.04SA/MMM13

Topic: H.02. Teaching of Neuroscience

Support: AU MCR Grant

Title: Exploring virtual worlds in behavioural neuroscience education

Authors: *T. H. GILBERT, *T. H. GILBERT;
Athabasca Univ., Athabasca, AB, Canada

Abstract: Science educators often struggle with means to effectively present content to optimize student understanding of difficult concepts. This holds true for typical classroom-based instruction, but especially so when it involves online instruction. Although students may have access to quality course materials and instruction, it can still be difficult for learners to understand essential concepts. A large body of research has identified the value of visualization, graphics, and digital animations in learning. It has been shown that the use of well-designed visual tools can help learners digest large amounts of information in relatively brief time periods, and learners can construct a personal visualization of a specific process or concept. The use of online interactive tools has potential to encourage more active learning and increase learner motivation, acting to ultimately enhance student learning outcomes.

>>The virtual world known as Second Life (SL), the most advanced virtual space, has attracted an increasingly large number of educators worldwide who are actively using SL to achieve a variety of educational objectives. SL provides an immersive environment in real time, allowing for interactions between both objects and avatars, creating a sense of reality that doesn't exist in the traditional distance education setting. In order to complement student understanding of essential neuroscience concepts and methods, we have developed the Virtual Behavioural Neuroscience Laboratory (VBNL) within SL. We have previously reported positive levels of satisfaction with this learning environment, and we are pleased to showcase the recently renovated VBNL with its new additions and features. Demonstrations will be provided. For a

video tour of an earlier version of the VBNL, please visit:
<http://www.youtube.com/watch?v=W4mnD85rQ3M>.

Disclosures: T.H. Gilbert: None. T.H. Gilbert: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.05SA/MMM14

Topic: H.02. Teaching of Neuroscience

Support: Organização Ciências e Cognição

FAPERJ

PROEXT - MEC/Sesu

PR-5 UFRJ

DESPERTA

Title: The use of exergames during teach-learning process and neuroscience outreach activities

Authors: *A. SHOLL-FRANCO^{1,2}, T. S. ASSIS^{2,3}, T. MAIA^{1,2}, G. ARANHA²;

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Abstract: Exergames promote a powerful cognitive work through virtual reality mechanisms during motor tasks execution. In this way, the aim of this study was to report the organization and application of an exergame workshop, performed along three years (2011-13) of neuroscience outreach events in Rio de Janeiro state, Brazil. In addition, we evaluate the contributions of this kind of teach-learning tool in formal and non-formal educational environments. The “Brain Day” is a monthly event of scientific outreach and neurosciences teaching that take place in public and private schools, where the project “Neuroscience Itinerant Museum” have developed several activities related to brain awareness and science outreach. This project performed almost 20 visits along three years of activity, with the presence of almost 15.000 participants. Several practices-based activities have been made approaching senses,

movement, memories, learning, and language. During the activity “Memory in Motion”, we analyze aspects of the operational memory (OM) and movement using the exergame “Dance Dance Revolution” (DDR). In this game the subject need to step at the arrows of a dance platform following correct sequential signs. The workshop has at least two coordinators and three volunteers, which are responsible to explain the approached contents, as well as to apply the game. Volunteers were previously trained regarding all neuroscientific content related to the workshop. During each session (20 per event) the same basic level music was used. After the first round, the number of errors and “combos” were registered. The participants were invited to play again, but during this second time with the presence of distracters, since beyond watching the arrows to execute the movement sequences, the player should perform at the same time specific tasks (spell words, perform math calculations or recognize facial expressions). The multitasks work was used to demonstrate the importance of attention during the performance of tasks, and as result we could observe a significant increase in the number of errors and the decrease rate of combos during the second and multitask actions. It was also observed that exergames stimulated participants and all public to join the workshop. In conclusion, games are important tools to be explored during teach-learning processes, acting through social and affective ways to contribute with cognitive improvement. So, the use of the exergame in this workshop: (i) explored the ludic component of the activity; (ii) contributed to the diffusion of specific knowledge (OM and sensorimotor integration); (iii) allowed the association of these contents with everyday tasks and action.

Disclosures: A. Sholl-Franco: None. T.S. Assis: None. T. Maia: None. G. Aranha: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.06SA/MMM15

Topic: H.02. Teaching of Neuroscience

Support: Organização Ciências e Cognição

FAPERJ

MEC

Title: Art-Science Clubs: Teaching neuroscience through art program

Authors: *G. ARANHA^{1,2}, T. ASSIS⁴, A. SHOLL-FRANCO³;

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⁴Secretaria de Educação do Estado do Rio de Janeiro, Rio de Janeiro, Brazil

Abstract: This work describes the establishment and maintenance of Art-Science Clubs as useful tools for neuroscience teaching to K-12 and high school students. Art production and appreciation were used to expose contents about the mechanisms of perception, motor control, cognitive physiology, and others neuroscience contents, which have figured in the development of these activities to children, youth and lay public. In this way, the Art-Science Clubs propose a work based on artistic process of transforming the neuroscience contents into a public form so that they can edit and shared with others. The initial aim of the Clubs was to create a group of artistic workshops by the students involving the following themes: cognitive physiology, sensorimotor integration, perception, memory, attention, language, creativity, and others. Activities were supervised by undergraduate volunteers and school teachers, which follow an agenda designed by a central coordination. Groups of students were formed, and specific themes selected. Participants can choose among four artistic expressions to develop their artistic projects: 1) visual art (drawing, painting, sculpture, printmaking, design, crafts, photography, video, filmmaking), 2) literature (narrative poetry), 3) performing art (music, dance, magic, theatre), 4) new media art (digital storytelling, digital art, computer graphics, computer animation, virtual art, Internet art, interactive art, video games). They were oriented to organize the production on five steps: (1) Plan a program of creation: finding ideas for their work (books, publications, and websites); realizing a brain storming. For youth and adults, the teacher explained the principles of theme, indicating mediums they are familiar. For children, teacher exercised the concept of 'pretend' as a means to facilitate progress as a performer.(2) Identify the major components to the work: here they need to decide what kind of materials they will to use in their works. (3) Scope out local spaces for the work: groups were encouraged to realize meetings even off Art-Science Clubs encounters. It is important to engagement. (4) Exhibit competition: all groups have a meeting when their work are presented, the best work of each encounters have been chosen for a public exhibits at the annual meeting “Arts with Science”. The coordinator of each Art-Science Club needs to define the standard age, avoiding mixing very young children with teenagers when determining the age brackets. The results of this experience demonstrate that Art-Science Clubs can be a powerful tool to promote the engagement of students and teachers establishing communities of learning.

Disclosures: G. Aranha: None. T. Assis: None. A. Sholl-Franco: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.07SA/MMM16

Topic: H.02. Teaching of Neuroscience

Support: T32NS041231

Title: Collaborative student-faculty curricular design and teaching: Summer course and bootcamp

Authors: *P. A. FORCELLI^{1,2}, B. QUEENAN², C. TAYLOR², C. LEONARD², L. ULLRICH²;

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Abstract: The Interdisciplinary Program in Neuroscience (IPN) at Georgetown University was one of 15 neuroscience programs to participate in the Carnegie Initiative on the Doctorate (CID) from 2003-2005. Participation in the CID was a transformative experience for the IPN, particularly with respect to the involvement of students in curricular reform and teaching. Neuroscience is a relatively young academic discipline, and as a consequence few current faculty members have received formal neuroscience training. Student-faculty collaborations in curricular design and teaching have therefore become an integral portion of the IPN, through which the broad expertise of the faculty can be effectively deployed for the purposes of the 21st century neuroscientist. Here we describe a summer course for incoming Ph.D. students that was generated and is currently run through a student-faculty collaboration. The course, which has run in various permutations since 2004, ensures that our students, who enter with diverse backgrounds, are prepared for their first-year curriculum, which is team-taught by faculty from diverse backgrounds. In six weeks, the summer course provides a cell-to-system overview of the fundamentals of neuroscience, emphasizing the core concepts of single-cell neurobiology (biochemistry and cell biology), the common themes in nervous system development and organization, and the functional circuits which underlie human sensation and behavior. The formalized coursework is supported by neuroanatomy labs, during which students have exposure to both human and comparative neuroanatomy. Capping the course are a series of hands-on "bootcamp" days during which students run experiments in molecular biology, electrophysiology, receptor pharmacology, and human imaging. The series of one-day sessions serves as groundwork for the coursework during the fall and spring semesters. Aside from the educational benefits for our incoming students, our summer course has provided our senior students with unique opportunities for professional development, ranging from teaching experience to educational refreshers to curricular design. A remarkable aspect of this course is the joint ownership and direction of the course by faculty and students, providing our students

with academic leadership opportunities and promoting peer-level interactions between faculty and students. Student involvement in shaping didactic coursework has become a staple of the IPN and has established a tone of student-faculty collaboration which has permeated all aspects of our research community.

Disclosures: P.A. Forcelli: None. B. Queenan: None. C. Taylor: None. C. Leonard: None. L. Ullrich: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.08SA/MMM17

Topic: H.02. Teaching of Neuroscience

Support: T32NS041231

Title: Additional training opportunities for PhD students: Student representation on admissions committee

Authors: *V. L. DARCEY¹, C. WINLAND¹, S. MILES¹, K. GALE²;

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Abstract: Developing a professional identity became a core component of predoctoral training in the Interdisciplinary Program in Neuroscience at Georgetown University as a result of the program's partnership with the Carnegie Initiative on the Doctorate. Initial efforts focused on student governance and leadership in arenas such as teaching and curriculum reform. Students also elected representatives to serve on program committees. In addition to providing valuable student input into program governance and direction, this gives the students experience and insights into committee-based faculty decision making processes. Student participation on program committees provides early exposure to faculty responsibilities, group dynamics, consensus building, and the challenges of implementing policy. Here we describe the student experience serving on the Admissions Committee.

Because of the interdisciplinary nature of the program, the graduate admissions committee is comprised of a highly diverse group of faculty, representing several different departments spanning clinical, basic biomedical science, and the undergraduate college. Consequently, members differ considerably in their own training and perspectives. Committee meetings offer

lessons in the dynamics of balancing and integrating disparate judgments and interests, both individual and programmatic. They also provide insight into the complexities of the evaluation and selection process based on grades, scores, research experience, letters, interviews with faculty, and interactions with students.

Student representatives were responsible for collecting and presenting student feedback and were privy to all committee deliberations. Especially enlightening was the way faculty members considered their own interests at the level of their laboratory or specialty area, while simultaneously working to benefit the program as a whole, generating considerable discussion aimed at balancing collective program objectives and needs of individual faculty members. Equally fascinating was the process of weighing the various key attributes of the applicants according to objective and subjective criteria such as academic achievement, research accomplishments, diversity, leadership, interpersonal skills, and research interests. The students gained a unique behind-the-scenes look at complex selections and multi-party negotiations, while at the same time influenced the selection process. This was a highly effective partnership with faculty in helping to shape the program, as well as an effective way to instill professional identity and skills important to success in future scholarly careers.

Disclosures: V.L. Darcey: None. C. Winland: None. S. Miles: None. K. Gale: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.09SA/MMM18

Topic: H.02. Teaching of Neuroscience

Title: Emotions and the body's theater: A workshop for neuroscience outreach and teaching

Authors: *I. L. SILVA¹, E. DIAS JR.², F. B. CARDOSO³, S. B. NASCIMENTO³, A. SHOLL-FRANCO⁴;

¹Laboratório de Desenvolvimento e Regeneração Neural, Univ. Federal Fluminense, Niterói, Brazil; ²Ciências e Cognição - Núcleo de Divulgação Científica e Ensino de Neurociências (CeC-NuDCEN/), ³Inst. de Biofísica Carlos Chagas, ⁴Instituto de Biofísica Carlos Chagas, Univ. Federal do Rio de Janeiro, Rio de Janeiro, Brazil

Abstract: As part of a neuroscience outreach and scientific literacy project developed by "Science and Cognition" - Center for Scientific Outreach and Neuroscience Teaching - (CeC - NuDCEN) in the Rio de Janeiro city,

Brazil, a group of workshops focusing some aspects of emotions was designed for neuroscience outreach, as a way for contextualize emotions as important tools in the brain sciences-based teaching-learning processes. In this way, we create the workshop "Emotions and the Body's Theater". The aim of this workshop was to demonstrate the role of emotion as an adaptive and automatic response that integrates homeostatic mechanisms as well as promotes specific behavioral reactions throughout life. A transparent box full of cockroaches was used as source of emotional stimulus. This box had a plastic lateral hand entry and a removable cover. Participants were instructed to putting your hand into side entrance, while the box was covered. Then the cover was removed, and the emotional reactions were registered using (i) video camera, (ii) mindwave mobile, (iii) blood pressure and (iv) heart frequency monitors. The results were analyzed after the measurement of the following body language (BL) parameters: blood pressure (BP), heart frequency (HF), facial and body expressions, and prefrontal cerebral cortical activity. More than 100 children and adults that experienced the workshop could observe the registered BL parameters after the emotional stimulus and these results demonstrated that most of the participant: a) expressed body changes characterized as one of the three primary emotions: surprise, fear or disgust; b) increased BP rate; c) increased HF rate; d) changed cortical brainwave pattern, showing prevalence of beta waves in the moment of the stimulus. In conclusion, this workshop contributed to neuroscience outreach and to enlarge the knowledge of the participants about how the nervous system coordinate emotions reactions that impact the human affective behavior.

Disclosures: I.L. Silva: None. E. Dias Jr.: None. F.B. Cardoso: None. S.B. Nascimento: None. A. Sholl-franco: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.10SA/MMM19

Topic: H.02. Teaching of Neuroscience

Support: NIH/NIGMS IRACDA Grant K12

Title: Preparing for academic careers through the Tufts TEACRS Program

Authors: K. O'TOOLE¹, *D. CANTU¹, C. MOORE², M. MCVEY³;
¹Neurosci., ²Microbiology, ³Biol., Tufts Univ. Sch. of Med., Boston, MA

Abstract: The Training in Education and Critical Research Skills (TEACRS) program is based at Tufts University in Boston, MA. The goal of TEACRS is to provide talented postdoctoral trainees with the career skills needed to succeed in an academic research environment. TEACRS fellows receive up to four years of salary support and a yearly travel and supply allowance. On average 75% of the time is spent in research and the remainder in teaching and career-building activities. TEACRS scholars complete our program ready to manage a successful research program, teach, and balance the multi-faceted demands inherent in a career as an academic scientist.

Research

Opportunities in a wide range of biomedical areas at Tufts provide the trainee with research tools and a body of research accomplishments sufficient to launch an independent career. TEACRS fellows conduct research in a variety of disciplines, including biomedical engineering, genetics, microbiology, cell and developmental biology, neuroscience, nutrition, and physiology. In addition to one-on-one mentoring by a Tufts faculty member, trainees assemble a research advisory committee that meets twice a year, give a yearly research seminar to the Tufts community, and present their findings at conferences in their respective fields.

Teaching

Another important goal of TEACRS is to enhance the capacity of our partner minority-serving institutions to deliver exciting science curriculum and increase accessibility of students at these institutions to biomedical research. Our partners are Pine Manor College, a four-year women's liberal arts college; University of Massachusetts, Boston, a four-year public university; and Bunker Hill Community College, a two year college offering Associate degrees in Science and Arts. Each trainee teaches a full semester course at one of these sites and is mentored by distinguished faculty on these campuses. TEACRS has brought new research-oriented courses to our partner campuses, stimulated curriculum redesign, and increased the number of students from the partner schools participating in undergraduate research at Tufts.

Career Development

Other activities, such as workshops on specific teaching methodologies, scientific writing and presentations, grantsmanship, lab management, mentoring, encouraging diversity, responsible conduct of research, and obtaining a faculty position are offered throughout the training period. These experiences are tailored to the needs and interests of each trainee.

Funding

TEACRS is supported through an Institutional Research and Career Development Award from NIGMS. There are currently 17 programs similar to TEACRS across the United States.

Disclosures: **K. O'Toole:** None. **D. Cantu:** None. **C. Moore:** None. **M. McVey:** None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.11SA/MMM20

Topic: H.02. Teaching of Neuroscience

Title: PhD Career-Land, the game: A creative approach to professional development

Authors: *S. AZMA¹, V. L. DARCEY¹, L. J. GAMBLE², H. S. GREENWALD³;
¹Georgetown Univ., Washington, DC; ²Perioperative Med., Natl. Inst. of Health, Clin. Ctr., Bethesda, MD; ³The MITRE Corp., McLean, VA

Abstract: Career panels are an informative way to disseminate first-hand experiences with specific career paths. Panelists often share information about their present jobs, undergraduate and graduate studies, and experiences that influenced their career paths. As an alternative to the traditional career panel format where panelists take turns responding to the same questions, the Professional Development Committee of the Society for Neuroscience Washington, DC Metro Area Chapter developed a board game for career panelists to play. The purpose of the board game, titled "PhD Career Land", was to serve as a professional development platform through which chapter members could learn about non-academic career paths. The objectives of "PhD Career-Land" were: 1) to expose chapter members to jobs outside of academia, 2) identify the career steps necessary to obtain such jobs, and 3) foster networking opportunities among chapter members and panelists. The game board, which was specially designed for the panel, was modeled after the popular children's board game Candyland. The panel was comprised of six scientists working in the nonprofit, government, and science policy fields. Panelists took turns rolling dice to advance their game pieces through regions of the board corresponding to college, graduate school, postdoctoral fellowships, and beyond. On each turn, they were asked specific questions associated with the space upon which they landed and provided timed responses about different stages of their careers. The game engaged the panelists and audience. Everyone watched as the dice were rolled, cheering or groaning depending on the results. Feedback from panelists concerning the format of the event indicated that while most had attended and/or participated in similar panel events, all remarked that the current format was a unique and interesting way to conduct a panel. The PhD Career Land game is a fun and engaging way to present career development information and could be a useful model for other types of panel discussions.

Disclosures: S. Azma: None. V.L. Darcey: None. L.J. Gamble: None. H.S. Greenwald: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.12SA/MMM21

Topic: H.02. Teaching of Neuroscience

Support: SfN Chapter Grant

Title: Neuroscience in the North: Rural outreach and distance education in Alaska using the Backyard Brains platform

Authors: A. ELLISON¹, M. HOFFMAN², B. TAYLOR², *M. B. HARRIS²;
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Abstract: Alaska comprises 6.63 million square miles, which is an area 2.5 times larger than Texas, and has over 150 communities accessible only by air travel. This very real logistical limitation hampers outreach activities to many rural areas and is a significant barrier to rural students studying at the 12 rural college campuses and through distance education. With the help of a Chapter grant from the Society for Neuroscience and support from our good friends at Backyard Brains, we are working to change all that. We have developed an easily transportable “jump kit” containing all equipment and materials necessary to independently conduct what we would normally perform as an outreach activity in a local classroom. Furthermore, we are adapting this kit to facilitate independent, inquiry-based activities that meet University of Alaska core curriculum requirements for an introductory undergraduate “laboratory” experience. By duplicating this kit and lending it to rural and homeschool students as an outreach activity, we hope to enhance enthusiasm for STEM education in this underserved population. In addition, we are using this technology to develop a distance education course that furthers our ability to provide comprehensive education to rural students. Supported by SfN Chapter Grant.

Disclosures: A. Ellison: None. M. Hoffman: None. B. Taylor: None. M.B. Harris: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.13SA/MMM22

Topic: H.03. Public Awareness of Neuroscience

Support: NSF ADVANCE PAID 0930126

Title: Career training for aspiring neuroscientists

Authors: *D. P. BALUCH, S. KAVUMA, L. HARRIS, A. GONZALES;
Sch. of Life Sci., Arizona State Univ., Tempe, AZ

Abstract: To obtain a successful career in neuroscience or other STEM (science, technology, engineering and mathematics) field requires not only a great education but also extensive training and preparation with dedicated and enthusiastic mentors and role models. To promote this level of preparation, initiatives by NSF, NIH and other funding institutions now require that post-doctoral mentoring plans be incorporated into funded research proposals to maintain a pipeline of future professionals. Women, minorities and those with disabilities are especially affected by low rates of career advancement. Although a similar number of women obtain high-level degrees as compared to men, statistics show that women do not continue within academia in proportion to their male contemporaries; such that, significantly fewer women occupy higher ranked, tenured and tenure-track positions. The 2013 National Science Foundation (NSF) biennial report; “Women, Minorities, and Persons with Disabilities in Science and Engineering,” reported that of those with a science or engineering degree, 51% white men, 18% white women, 13% Asian men and less than 5% for each of the remaining groups occupy a STEM based career. In an effort to improve the success of all individuals who are pursuing post-secondary education within STEM fields, such as neuroscience, the Central Arizona Chapter of the Association for Women in Science (AWIS), based at Arizona State University, and in collaboration with colleagues from George Washington, Gallaudet and Ottawa Universities, has developed a program to help prepare graduate students, post docs and early faculty to obtain and become successful in a STEM career. This NSF ADVANCE PAID funded program especially focuses on the problem of low career advancement of women, minorities and those with disabilities by hosting a series of career development seminars and workshops to provide training, mentoring and networking opportunities. Such career training programs that include mentoring and networking will help address the complex problem encountered by underrepresented groups and thus will aid in creating a pipeline of diverse STEM professionals.

Disclosures: D.P. Baluch: None. S. Kavuma: None. L. Harris: None. A. Gonzales: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.14SA/MMM23

Topic: H.02. Teaching of Neuroscience

Title: Exploring the brain for fun: Teaching activities for teenagers

Authors: *H. SANCHEZ-CASTILLO¹, A. RUIZ-GARCIA¹, I. ROSEMBERG¹, O. HURTADO LAGUERENN¹, D. B. PAZ-TREJO¹, P. ZARATE-GONZALEZ², J. VAZQUEZ-RAMIREZ², D. SOLTERO DE LA ROSA², K. DELGADO SALTIJERAL²;

¹Neuropsychopharm. and Timing Lab., Univ. Nacional Autonoma De Mexico. Fac Psicologia, Mexico, Mexico; ²401, Amsterdam 288. Col. Condesa, Clave Consultora Para La Ciudadania, Mexico DF, Mexico

Abstract: The activities related to the Brain Awareness Week that have been organized by Clave Consultora para la Ciudadania, A. C. were held on February 28th of 2013. The setting was the Thomas Alva Edison Middle School with an attendance of 234 students from 7th to 9th grade and 11 teachers of different subjects. The main objective of these activities was to spread among students and teachers a general approach to neurosciences and its application in different areas of knowledge and daily life. The first stand was dedicated to an introductory approach to the brain and its structures. In the second stand the students view some examples of different techniques to study the brain. In the third stand students participated in series of perceptual exercises that promoted expressions and reactions of surprise and fun. The fourth stand was dedicated to emotions as processes of adaptive reactions to the environment. In the fifth stand it was used material from de National Institute on Drug Abuse (NIDA) specifically designed to be used with teen population in subjects related to prevention of drug abuse and neural mechanisms of addiction. The final stand was planned to be the landing of the precedent five stands allowing attendants to picture in their minds the specific contributions of neuroscience in daily life situations and objects, for example the role on the field in developing technology that fits utility, design and ergonomics. For the organizing staff participation in activities of the Brain Awareness Week was a grateful experience. From de beginning of the process of planning the team pictured what the outcome to reach with these activities was. The goal was to spread the knowledge of the field, letting young people know that there are other ways besides the traditional majors to develop in as a professional. The team wanted to share a little of the enthusiasm of being a neuroscience professional, either in the clinic, laboratory, classroom or elsewhere, with some young brains growing and asking themselves which path to take in their professional aspirations.

Disclosures: H. Sanchez-Castillo: None. A. Ruiz-Garcia: None. I. Rosemberg: None. O. Hurtado Laguerenn: None. D.B. Paz-Trejo: None. P. Zarate-Gonzalez: None. J. Vazquez-Ramirez: None. D. Soltero de la Rosa: None. K. Delgado Saltijeral: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.15SA/MMM24

Topic: H.02. Teaching of Neuroscience

Support: School of Life Sciences ASU

School of Earth and Space Exploration ASU

CLAS ASU

OKED ASU

Dissability Resource Center ASU

Title: Tactile images help students visualize STEM concepts

Authors: *A. N. GONZALES, L. HARRIS, B. MARTINEZ, E. HASPER, T. HEDGPETH, R. A. WINDHORST, D. P. BALUCH;
Arizona State Univ., Tempe, AZ

Abstract: Statistics show that over 21.5 million people in the United States are visually impaired and from the population of individuals who have science, technology, engineering and mathematics (STEM) careers, less than 5% will be held by those who have some form of vision disability. It is not known the specific reason for this poor attrition rate but many believe that the image rich content found within STEM disciplines may be a significant contributor. Researchers at Arizona State University have developed a method to convert 2D images into a 3D tactile format to help students physically visualize images and improve their understanding of image rich material used to teach STEM concepts. Pilot classes and participation studies of both sighted and visually impaired students were conducted to evaluate the effectiveness of using haptic tools in teaching STEM concepts and to compare and define the content found within a 2D image as compared to what is interpretable from the converted 3D tactile format. Visually impaired participants had up to a 60% improvement in their performance of assigned tasks when using this haptic technology which is similar to the improvement found with sighted students within the same activity. Through visual perception the brain typically generates an image of a whole object instead of an assembly of individual components which saves time and energy when processing information, but when this system of information interpretation becomes routine some visual data, which is readily available and in clear sight, will become dismissed. When evaluating the

amount of information contained within the same 2D image versus its 3D image format, such as viewing images of coronal brain atlas sections or the anatomical distribution of brain regions, sighted students were able to identify more details such as finer structures, textures, symmetry, proportions and localization that were not recognized in the 2D printed image. Further evaluation of participant responses confirmed that both sighted and visually impaired students using 3D tactile images found the exercises more interesting and helped with their understanding of the assigned tasks. Although the cause of low participation in STEM courses by the visually impaired is not known, efforts to improve accessibility and the quality of tactile tools appear to improve performance and interest of these students and will be the continued focus of further studies.

Disclosures: A.N. Gonzales: None. L. Harris: None. B. Martinez: None. E. Hasper: None. T. Hedgpeth: None. R.A. Windhorst: None. D.P. Baluch: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.16SA/MMM25

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant 1R43MH093334-02

Title: Portable neuron conduction velocity experiments using earthworms for the university and high school neuroscience teaching lab

Authors: *K. M. SHANNON¹, G. GAGE², J. W. WILSON³, T. MARZULLO²;
¹Backyard Brains Inc, San Diego, CA; ²Backyard Brains Inc, Ann Arbor, MI; ³Albion Col., Albion, MI

Abstract: The earthworm is ideal for studying conduction velocity in a classroom setting, as the simple linear anatomy allows easy axon length measurements, and the worm's sparse coding allows single action potentials to be easily identified. Moreover, the earthworm has two fiber systems (the Lateral Giant Fibers and Medial Giant Fiber) with different conduction velocities that can be easily measured by manipulating the electrode placement and tactile stimulus. We here present a portable and robust set of experiments that allow students to perform conduction velocity measurements within 30 minute - 1 hour lab sessions. Our chief improvements over this well-known preparation are the use of tactile stimuli (avoiding electrical microstimulation that

requires additional equipment and electrodes, potentially confusing students) and our invention of minimal, low-cost, portable equipment.

Disclosures: **K.M. Shannon:** A. Employment/Salary (full or part-time); Kyle is a full time employee at Backyard Brains.. C. Other Research Support (receipt of drugs, supplies, equipment or other in-kind support); Products used in this research (the SpikerBox) is developed, produced and sold by Backyard Brains, for which Kyle is a full time employee. **G. Gage:** A. Employment/Salary (full or part-time); Gregory is a full time employee of Backyard Brains.. E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); Gregory is a cofounder and owner of Backyard Brains Inc. He is also a co inventor of the SpikerBox, used in this research. **J.W. Wilson:** C. Other Research Support (receipt of drugs, supplies, equipment or other in-kind support); Jeff Wilson occasionally receives products, including our SpikerBox, from us to test and use in both an academic and research setting. **T. Marzullo:** A. Employment/Salary (full or part-time); Timothy is a full time employee of Backyard Brains.. E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); Timothy is a cofounder and owner of Backyard Brains Inc. He is also a co inventor of the SpikerBox, used in this research..

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.17SA/MMM26

Topic: H.02. Teaching of Neuroscience

Title: Brain Busters: Proposing a training program to debunk neuromyths and build neuroscientific literacy skills in educators

Authors: *S. F. SASSE, L. N. SCHNOLL, S. E. SMILEY, G. M. ABESAMIS;
Harvard Univ., Cambridge, MA

Abstract: Members of the scientific and journalism communities have recently begun to shine a light on the prevalence of “neuromyths”, or pseudoscientific claims about the brain, in educational settings. Due in part to a lack of regulation, these unfounded claims are often spread and reinforced through successful training programs, classroom curricula, and popular media. The result is a population of curious and well-intended educators adopting such fallacies as “Left and Right Brain Dominance” or “Brain-Based Gender Differences” into their teaching practices.

To investigate the spread of such claims, an empirically-informed, six-point rating scale was developed to evaluate several existing web-based training programs. Rating points were designed to assess such characteristics as “content quality,” “skill development,” and “user interface design”. Through a survey of popular programs, we found a pattern of inconsistent content quality, a lack of self-evaluative measures to assess program quality, and a lack of focus on research consumption skill development. To address these needs in educational communities, we are presenting “Brain Busters,” a web-based outreach program that will be freely available to the general public. The program uses information visualization techniques, the historical roots of how claims developed into popularly accepted knowledge, interviews with respected researchers and educators, and triangulated content from peer-reviewed journals to deconstruct twelve of the most common neuroscientific claims relevant to education. Importantly, rather than limiting the program to presenting new information, “Brain Busters” uses applied activities, skill-building frameworks, engagement with expert insights, and real-world models to coach the user on the skills necessary to responsibly evaluate neuroscientific claims. Additionally, to foster a collaborative relationship between neuroscience and education, opportunities are provided to explore and practice informed engagement with relevant research. “Brain Busters” is a distinct outreach and training program designed to not only correct prevalent misinformation, but to prepare educators to critically consume, confidently evaluate, and conscientiously apply neuroscientific research in the future.

Disclosures: S.F. Sasse: None. L.N. Schnoll: None. S.E. Smiley: None. G.M. Abesamis: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.18SA/MMM27

Topic: H.02. Teaching of Neuroscience

Title: Effects of a neurobiological explanation of sexual orientation on student attitudes towards lesbian, gay and transgender people

Authors: *K. EDMISTON;
Psychology, Vanderbilt Univ., Nashville, TN

Abstract: Prejudice against lesbian, gay, bisexual and transgender (LGBT) people is a significant social problem (Harper and Schneider, 2003). Despite the stigma and violence that

LGBT individuals experience at interpersonal and institutional levels, little research has investigated what interventions are effective in reducing biases against LGBT people. Existing neuroscience literature suggests that there is evidence for regional neurobiological markers of sexual partner preference in non-human mammals (Roselli et al., 2004) and of sexual orientation in humans (Swaab, 2008). This literature has inspired arguments in popular media and press that human sexual orientation is an innate characteristic. However, it is unclear if such arguments are effective in changing prejudicial attitudes towards LGBT people.

A sample of undergraduate students (n=93) attended a lecture on the neurobiological basis of sexual orientation as part of an introductory neuroscience course. Students completed identical versions of the Situational Attitude Survey and the Transphobia Scale, surveys designed to measure student attitudes towards gay men, lesbian women, and transgender people, both before and after the lecture intervention. Paired t-test analyses were conducted to determine significant main effects of time on survey scores.

Survey scores pre-intervention suggest moderate anti-lesbian and gay bias and extreme anti-transgender bias in our sample. Results indicate that, in the overall sample, the lecture-based intervention had no effect on student attitudes towards lesbian, gay, or transgender people. However, post hoc analyses revealed that in the most biased twenty-five percent of students pre-intervention, there was a statistically significant reduction in bias against gay and lesbian people post intervention ($p < 0.005$). There were no significant effects of intervention on attitudes towards transgender people.

These results indicate that neurobiological explanations of sexual orientation may reduce prejudice against lesbian and gay people among students who have strong pre-existing biases. In our sample, the neurobiological intervention was a less effective in changing attitudes towards transgender people. This may be due to the tendency of biological frameworks to reaffirm dimorphic and essentialist notions of sexual and gender identity among people with pre-existing prejudices (Boysen, 2011). Future studies should compare the effectiveness of differing intervention strategies across time in reducing anti-LGBT bias.

Disclosure.DisclosureBlock:

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.19SA/MMM28

Topic: H.02. Teaching of Neuroscience

Title: Street Workshop for improving executive functions in children's social context in downtown of Guadalajara

Authors: *C. A. CATAÑEDA NAVARRETE, SR;
Univ. of Guadalajara, Guadalajara, Mexico

Abstract: Introduction: Children in street social context, these is infants who spend most of the daylight hours in the avenues of the city and threatens the development of executive functions such as inhibition of behavior, social problems, school failure, situation that has not been studied systematically in the town on a timely intervention.

Objective: To evaluate the effect of "Street Workshop" in the executive functions of children in a marginal context of the city of Guadalajara.

Methods: The study design was quasi-experimental control group. Executive functions are valued BANFE battery before starting the workshop, at the end and after three months. 20 children participated in the workshop with games to control behaviors, educational advice and interventions neuropsychological. We evaluated 20 other children who did not participate in the workshop to determine the effect of the intervention. The results are expected with a significant improvement in mental abilities essential to carry out an effective and socially acceptable behavior according to the cognitive neuropsychological theory.

Results and Discussion: So far the study is preliminary pending.

Disclosures: C.A. Catañeda Navarrete: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.20SA/MMM29

Topic: H.02. Teaching of Neuroscience

Title: Anticipation of learning to relax provokes stress

Authors: *J. C. NEILL;
Psychology, Long Island Univ., Greenvale, NY

Abstract: Undergraduates flock to courses about stress. It is useful to conduct exercises that demonstrate the effects of stress *in vivo* and to teach a method to relax, in a non-aversive way. In

a prior sfn teaching poster, I presented an easy method to accomplish these goals. The present poster further refines this method with new procedures to teach students how to perform a valsalva maneuver, data and an interesting anomalous issue. In the valsalva maneuver, one basically takes a deep breath and holds it forcefully for a few seconds. We performed this three times for maximum effect. Method: 15 undergraduates were asked to count off in twos to provide a pseudo-random assignment to either the valsalva group or a control group. Three students did not follow directions and were omitted. Students were instructed that both groups would take their own heart rates for one minute, write them down, and then take them again for another minute. Those in the valsalva group would also be asked to engage in a valsalva maneuver in between the two recordings of heart rates. The control group was to sit quietly without doing a valsalva. Results: An anomalous finding was that the students who anticipated having to do the valsalva showed significantly higher baseline heart rates than the control group (valsalva group: mean=84 bpm, beats per minute, vs control=64 bpm, two-sample $t(9)=3.68$, $p=.005$). After the pause, the groups again showed a significant difference in heart rates, with the valsalva group higher (valsalva group: mean=79 bpm vs control 65 bpm, two-sample $t(9) 2.93$, $p=.019$). Each individual's change score was calculated by subtracting the baseline score from the post score, and the result was significant again, with the valsalva group showing the greater reduction in heart rate (valsalva mean= - 5.7 vs control mean= 1.83, two sample $t(9)= 3.75$, $p<.01$). While students are eager to perform a new task in a classroom setting, the group that anticipated having to perform a valsalva maneuver had more stress, as illustrated by their higher heart rates, than the group which was instructed to just relax during the pause. Fortunately, they did also show a greater reduction in heart rate than the control group, when using each subject as her own control (change score). Future attempts will attempt to present the task in a new way to reduce the reactivity of the experimental group.

Disclosure.DisclosureBlock:

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.21SA/MMM30

Topic: H.03. Public Awareness of Neuroscience

Title: VideoPanels: A new form of scientific communication

Authors: *A. V. SAMSONOVICH;

Krasnow Inst. Adv Study, George Mason Univ., Fairfax, VA

Abstract: VideoPanels is an ongoing international seminar implemented as a multipoint videoconference. Panelists engage in discussion while sitting at their personal computers at work or at home. Audience can join over a phone line. The event is moderated by one host who is also providing technical support. The session is recorded and then archived for open access as a videoclip that is linked to the VideoPanels web site, where additional information is posted for each session (<http://bicasociety.org/vp/>, <http://bicasociety.org/videos/vp.html>). In addition, VideoPanels are linked to the journal Biologically Inspired Cognitive Architectures (or BICA: <http://www.sciencedirect.com/science/journal/aip/2212683X>) started by Elsevier in June of 2012. Selected papers of the journal are associated with VideoPanels via cross-hyperlinks. In the associated VideoPanels authors defend their views presented in the papers. VideoPanels originated in the Spring of 2011 as a virtual extension of the BICA annual conference (<http://bicasociety.org/meetings/>). It became clear then that the value of VideoPanels is in promotion of emergent new promising fields of science and in general scientific education (e.g., see the VideoPanel with Stephen Kosslyn: the Figure and <http://vimeo.com/64271516>). Indeed, this and other VideoPanels were created as a part of a course taught at George Mason University. In the field of BICA, VideoPanels continue to help in development of a roadmap toward solving the BICA Challenge. Formats of VideoPanels include panel discussions and paper presentations. Participation is open to all researchers, is entirely voluntary and free, as are the posted videos. In the future, we expect to establish more connections between VideoPanels and new scientific journals. This approach will allow us to expand VideoPanels into other domains of Neuroscience, in addition to cognitive and neural modeling that lately dominated topics of VideoPanels. This new trend may eventually change the way how we read and publish research papers. Support: BICA Society (<http://bicasociety.org>).



Disclosure.DisclosureBlock:

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.22SA/MMM31

Topic: H.03. Public Awareness of Neuroscience

Title: Neuroscience Direct: A user-driven, online guide to Open Access neuroscience

Authors: *M. P. COLEMAN;

Lab. of Mol. Signalling, The Babraham Inst., Cambridge, United Kingdom

Abstract: With the worldwide move towards Open Access publishing, a wealth of scientific information is becoming freely available to the public. However, most research articles are written in a language intended for other research scientists. Despite the high level of interest in neuroscience across large sectors of the public, the heavy use of technical terms, coupled with the difficulty of finding the most relevant articles for those not familiar with the literature, limits the value of the Open Access model.

The underlying philosophy of Neuroscience Direct is that any intelligent lay reader can understand the latest neuroscience research, given a brief explanation, a glossary of technical terms and pointers to the relevant articles. This project provides users with a brief overview of frequently requested topics and links them directly via the web to the original research, and sometimes to specific data.

The target audience includes patients, their relatives, carers and friends, fund-raising charities, young people considering a neuroscience career, journalists and lay readers motivated by general interest.

User requests drive the choice of topics, and interest among other neuroscientists at any career stage will be essential to scale up the project.

<http://www.neurosciencedirect.co.uk/>

Disclosures: M.P. Coleman: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.23SA/MMM32

Topic: H.02. Teaching of Neuroscience

Title: Multiple intelligence theory in a science classroom

Authors: *A. KODRA¹, I. SALAME²;

¹Chem. - MR1224, ²Chem., The City Col. of New York, New York, NY

Abstract: Current trends in the sciences include the integration of Gardner's Multiple Intelligences Theory into the curricula. Teaching, particularly in the sciences, needs to integrate various "intelligences" (linguistic, logical-mathematical, bodily-kinesthetic, spatial-visual, interpersonal, and intrapersonal) to serve an increasing population of students who are not able to obtain the one-to-one individual attention. A blend of Peer Led Team Learning (PLTL), online homework, laboratory, and lecture based learning was studied to determine whether students benefit from a multi-modal approach to learning. The participants in this study included 140 City College of New York students that were enrolled in General Chemistry II class. Overall positive trends were seen, with students learning better and retaining the information when studying through different modalities, particularly in online learning and peer-led workshops.

Disclosures: A. Kodra: None. I. Salame: None.

Theme H Poster

23. Professional Skills Development and Neuroscience Outreach

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 23.24SA/MMM33

Topic: H.03. Public Awareness of Neuroscience

Title: Children with rare diseases: Social vision (on materials of Association for assistance to Rett syndrome patients)

Authors: *O. V. TIMUTSA, ESQ^{1,2}, L. MURTAZINA, specialist¹, V. MENDELEVICH, MD²;
¹124, Assn. For Assistance To Rettsyndrome Patients, Kazan, Russian Federation; ²Dept. of social work, Kazan state medical university, Russia, Kazan, Russian Federation

Abstract: The amount of patients with rare diseases is increasing annually in the world. RTT is a rare genetic disorder. The general features of people with RTT are multiple violations of movement, breath, mental capacity caused by genetic mutations that lead to a full and continuous dependence in all areas of daily life. RTT is the result of a mutation in the gene MECP2 located in X-chromosome. It is common among members of different social classes, races, cultures. The long-existing problems with diagnosis, rehabilitation and training of girls with RTT were

uncovered in many countries. Early diagnosis of RTT is extremely important, because further treatment has the best effect only when it is detected early. Today all the researches show that even damaged brain continues to grow after the regression and it is not subjected to early degenerative process. RTT is compatible with long and active life, the individual is able to have long-term interests, emotional communication, though often without ability to speak. Connection of RTT with autism was discussed a lot in the last decade because of stereotyped and regressive episodes that may occur in both cases. However mixing up RTT with autism is unfair for patients with both syndromes. Scientists have a doubt in the fact that «dementia» is an appropriate interpretation of the mental problems of patients with RTT. The hypothesis that RTT is a developmental disorder was confirmed. This is an unusual disorder that primarily affects the nervous system. Today, 104 children with RTT were registered by the Association in RF. Only children who live in big cities such as Moscow and others receive regular help in the rehabilitation. At the same time the majority of parents who have children with RTT are being in prolonged shock after the diagnosis of the child and need psychological help and rehabilitation themselves. 65 parents participated in the questionnaire. It was noted that 24 children did not have confirmation of the diagnosis due to the fact that «the analysis can be done only in Moscow, but it is very far from the place where the family lives» and the diagnosis was made only by external criteria. Reanalysis of «Molecular study of unbalanced chromosomal micro anomalies by comparative genomic hybridization (array CGH) - molecular karyotyping» was made for 12 girls in Moscow Research Institute of Pediat. & Ped.Surgery. Russian parent survey results show that it is necessary to create a federal registry of patients with RTT to found a center in Moscow to control the functional status of children and adults with RTT and to develop treatment and rehabilitation standards for the children with RTT.

Disclosures: **O.V. Timutsa:** A. Employment/Salary (full or part-time); full. **L. Murtazina:** Other; translator. **V. Mendelevich:** F. Consulting Fees (e.g., advisory boards); scientific consultant.

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Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.01SU/MMM34

Topic: H.02. Teaching of Neuroscience

Support: Private Contributions

Title: The 2013 international brain bee championship

Authors: F. WEI¹, J. MCCALL², *N. R. MYSLINSKI¹;

¹Neural and Pain Sciences, 8th floor, Univ. Maryland Sch. Dent., Baltimore, MD;

²Interdisciplinary Ctr. for Neurosciences, Heidelberg Univ., Heidelberg, Germany

Abstract: Future neuroscientists from around the world will have met in Vienna, Austria to compete in the Fifteenth International Brain Bee (IBB) Championship on September 21-23, 2013. The Brain Bee is a neuroscience competition for high school students. The Chairman of the IBB Championship Organizing Committee is Julianne McCall, and it will be held in conjunction with the World Congress of Neurology. Worldwide there are about 150 local competitions, each one involving many schools. The winners then compete in their respective national championships to earn the right to represent their countries in the International Championship. They are tested on their knowledge of the human brain with oral and written tests, a neuroanatomy exam, a patient diagnosis component with student actors, a neurohistology exam, and interpretation of MRI brain images. The countries competing were not known at press time, but the 16 countries that competed last year and their National Coordinators include: Linda Richards (Australia), Seema Raghunathan (India), Cristian Gurzu (Romania), Louise Nicholson (New Zealand), Judy Shedden (Canada), Julianne R McCall (Germany), Polycarp Nwoha (Nigeria), Elzbieta Malgorzata Pyza (Poland), Sathy Parvathy (United Arab Emirates), Seong-Whan Lee (Korea), P. Paolo Battaglini (Italy), Nchafatso Gikenyi (Kenya), Jafri Malin Abdullah (Malaysia), S. Thameen Dheen (Singapore) Norbert Myslinski (United States) and Vanessa Davies (Wales). Ukraine and Turkey also had national champions. The IBB's purpose is to motivate young men and women to learn about the human brain, and to inspire them to enter careers in the basic and clinical brain sciences. Dr. Norbert Myslinski founded the IBB in 1998 with 12 local chapters in North America. It has now grown to more than 30 countries and 6 continents. An estimated thirty thousand students compete annually. More than a hundred newspapers, radio and television stations cover the IBB and the student competitors, and about 50 web sites are devoted to IBB chapters. Winners have been recognized by Presidents and Ambassadors and other public officials. Many former competitors are now working in neuroscience, neurology, psychology and related fields. The Brain Bee is building better brains to fight brain disorders. We encourage neuroscientists and educators around the world to start a Brain Bee competition in their cities. The 2014 IBB Championship will be on August 7-10 in Washington, DC. The IBB is a program of Mankind for International Neuroscience Development, Inc. (MIND). For more information please contact germanbrainbee@googlemail.com OR brainbee@gmail.com.

Disclosures: F. Wei: None. J. McCall: None. N.R. Myslinski: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.02SU/MMM35

Topic: H.02. Teaching of Neuroscience

Title: The 2013 USA national brain bee

Authors: ***D. SEMINOWICZ**¹, **N. MYSLINSKI**²;

¹Dept of Neural & Pain Sci., Univ. of Maryland, Baltimore, Baltimore, MD; ²Neural and Pain Sci., Univ. of Maryland Sch. of Dent., Baltimore, MD

Abstract: After intense competition, the 2013 USA National Brain Bee Champion is Emily Ruan. The Sixth USA National Brain Bee Championship was held in Baltimore on March 2, 3 and 4, 2013. The Brain Bee is a neuroscience competition for high school students. Winners from a record 45 regional competitions in 29 states (AK, AL, AR, AZ, CA, CT, DC, DE, FL, GA, IA, IL, IN, KS, MA, MD, MI, MN, MO, NC, NJ, NY, OH, PA, RI, TX, VA, VT, WA) came to test their knowledge of the human brain including such topics as intelligence, emotions, memory, sleep, vision, hearing, sensations, Alzheimer's disease, Parkinson's disease, schizophrenia, addictions and brain research. The competition involved orals, a neuroanatomy laboratory practical with real human brains, neurohistology with microscopes, brain imaging identification and patient diagnosis with nurse actors. The material tested is estimated to be comparable to that of a second year medical student. The first and second days were held at the University of Maryland Dental and Medical Schools. The third was at the Baltimore Convention Center in conjunction with the Annual USCA Pathology Convention. The USA Champion will represent the United States in the International Championship that will be held in conjunction with the World Neurology Congress in Vienna, Austria in September. Currently there are 150 Brain Bee Chapters in 30 countries in 6 continents. Dr. Norbert Myslinski founded the International Brain Bee fifteen years ago and says "Its purpose is to motivate young students to learn about the brain and inspire them to seek careers in the basic and clinical neurosciences to help treat and cure diseases of the brain and nervous system. The Brain Bee builds better brains to fight brain disorders." Dr. Myslinski is on the faculty of the University of Maryland Department of Neural and Pain Sciences in Baltimore. To advance to the USA Championship, Emily had to win her local Brain Bee competition in Minneapolis, MN coordinated by John Paton and Janet Lynn Fitzakerly, and sponsored by the University of Minnesota. She goes to Mounds View High School. For more information please contact brainbee@gmail.com or nmyslinski@umaryland.edu, or visit www.internationalbrainbee.com.

Disclosures: **D. Seminowicz:** None. **N. Myslinski:** None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.03SU/MMM36

Topic: H.02. Teaching of Neuroscience

Support: Union City Board of Education

Office of the Vice President for Research at UMDNJ

NJMS Hispanic Center of Excellence, The Health Resources and Service Administration
Grant # D34HP16048

Title: Inspiring students from disadvantaged urban centers through mentoring and tutoring for the Brain Bee competition

Authors: *A. CHAUDHARI¹, N. MAKAR⁵, S. W. LEVISON², T. NORMENT³, M. SOTO-GREENE¹, D. PALMERI⁴;

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⁵Sci. Supervisor, Union City High Sch., Union City, NJ

Abstract: A fundamental mission of the University of Medicine and Dentistry of New Jersey is to increase public awareness and education through community service and outreach programs. Through the Northern New Jersey Regional Brain Bee, we identified an opportunity to reach out to highly motivated, disadvantaged students. Here, we present how a partnership between the New Jersey Medical School (NJMS), the Hispanic Center of Excellence (HCOE) and the Union City High School, allowed us to establish a strong mentoring relationship designed to educate, guide and inspire students now and throughout their careers. We developed a program that offered nine bi-monthly one-and-half hour tutoring sessions to students preparing for the Brain Bee. 10 students from Union City High School, as well as a student from the NJMS-HCOE Summer Youth Scholars Program, registered for the extracurricular activity. Using the Society for Neuroscience's book, *Brain Facts*, we not only introduced them to cutting-edge neuroscience topics, but also encouraged thoughtful, philosophical discussions. All 11 students voluntarily maintained attendance throughout the program and, by the end, we had actually increased our recruitment by one student. 50% of the students in the tutoring/mentoring program participated in the Northern New Jersey Regional Brain Bee. Following the competition, we met with the

group of students, their parents, and high school administrators to discuss their experiences and devise ways to keep our relationship intact. We were delighted to find that they were universally impressed with the exposure and insight this program offered, not only to basic neuroscience knowledge, but also to the general medical and research community as well. By the end of our discussion, they had created a strategy for the development of a Science Club for Union City High School that rested on two pillars: a non-competitive sector for increasing awareness about neuroscience, and a competitive sector designed for training committed students for the Brain Bee, thus demonstrating a strong interest in continued involvement in the Brain Bee. We had undertaken this program in hopes of inspiring high school students to take an active interest in medical neuroscience. Our expectations were surpassed when our students not only excelled in learning the material, but also became motivated to share this knowledge and make a difference in their community.

Disclosures: **A. Chaudhari:** None. **N. Makar:** None. **S.W. Levison:** None. **T. Norment:** None. **M. Soto-Greene:** None. **D. Palmeri:** None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.04SU/MMM37

Topic: H.02. Teaching of Neuroscience

Support: SfN Chapter Start up funds

Title: New Hampshire Chapter of the Society for Neuroscience connects local high school students to the field of neuroscience through the Upper Valley Brain Bee

Authors: ***M. A. SAMA**^{1,2}, **M. M. ONAKOMAIYA**³, **A. C. BENDER**⁴, **H. H. YEH**⁵;
¹Physiol. and Neurobio., Dartmouth Med. Sch., Lebanon, NH; ²Neurosci. Ctr. at Dartmouth, Lebanon, NH; ³Physiol. and Neurobio., Geisel Sch. of Med. at Dartmouth, Hanover, NH; ⁴Neurol., ⁵Physiol. and Neurobio., Geisel Sch. of Med. at Dartmouth, Lebanon, NH

Abstract: The first annual Upper Valley Brain Bee was held on May 11th 2013 on the Dartmouth College Campus in Hanover, NH. The event was organized by the SfN NH Chapter and the Neuroscience Center at Dartmouth. It was the first outreach event of it's kind in the Upper Valley, targeted at an audience that is not usually exposed to the field in this context - high school students. The Brain Bee is a neuroscience competition for high school students that

began in 1996. It has since grown to several regional competitions in different cities and states around the USA and the world. The aim is to connect with students at the high school level to get them thinking about the brain and get them interested in brain research. Our secondary aim was to make neuroscience and neuroscientists more approachable to the community by incorporating activities for all audience members.

To set it up, we contacted the International Brain Bee to get more information. Lisa Bernadin, the organizer of the Brain Bee at the University of Vermont provided valuable information. We used their program format as a model for our competition. In particular we included an educational talk during lunch by neurologist, Stephen Lee, MD, PhD on Parkinson's disease. To recruit, we advertised the event in local newspapers, Dartmouth College outreach office announcements, and directly reached out to science teachers at the local schools. Twenty-nine students from six high schools in the Upper Valley registered for the event.

To prepare students for the Brain Bee, the Brain Facts book was distributed and made available on our Brain Bee website. Dartmouth Graduate students also went to schools to instruct training sessions described as "Brain Boot Camps." These camps included an introduction to the basics of neuroscience, a hands-on neuroanatomy section with real and model brains provided by the Anatomy Department at the medical school and an oral quiz with sample questions. The boot camps engendered enthusiasm from the students who gained confidence in their abilities and motivation to prepare for the competition. At the Brain Bee, there was also a mini- neuroscience fair ranging from activity stations like "The Human Brain" with real human brains to information stations like "Undergraduate Admissions" for students thinking about applying to college. A feedback survey was distributed to competitors and visitors at the event to gain information to help with improving the event in coming years.

Overall the Upper Valley Brain Bee was a worthwhile endeavor on both ends. It was a good way for the neuroscience programs at Dartmouth and the SfN NH chapter to engage the community through an educational and entertaining forum.

Disclosures: M.A. Sama: None. M.M. Onakomaiya: None. A.C. Bender: None. H.H. Yeh: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.05SU/MMM38

Topic: H.02. Teaching of Neuroscience

Support: UCLA Brain Research Institute

UCLA Campus Programs Committee

UCLA Graduate Student Association

UCLA Biological Sciences Council

UCLA Neuroscience Interdepartmental Graduate Program

UCLA Undergraduate Neuroscience Program

M DESALVO is supported by the Philip Whitcome Pre-doctoral Training Program in Molecular Biology

Title: Neuroscience outreach at local schools: Project brainstorm

Authors: *M. DESALVO¹, R. ROMERO-CALDERON², D. ALEXANDER³, S. K. MADSEN⁴, A. ATTAR^{4,5}, N. A. SUTHANA⁶, C. A. GHIANI⁷, W. GE⁵, C. E. EVANS^{5,7}, J. B. WATSON^{5,7}, E. M. CARPENTER^{5,7};

¹UCLA Biol. Chem., ²Molecular, Cell. & Developmental Biol, ³Neurosurg., ⁴Neurol., ⁵Brain Res. Inst., ⁶Psychology, ⁷Psychiatry and Biobehavioral Sci., UCLA, Los Angeles, CA

Abstract: Project Brainstorm is an outreach course offered to 3rd and 4th year undergraduate majors in neuroscience at UCLA. The course offers an opportunity to design and implement a classroom lesson on neuroscience and to develop a hands-on teaching activity for K-12 students. In the first part of the course, students select a topic and develop and hone their presentations in front of their peers. Students incorporate materials of their choice, including 3D models, schematic diagrams, and video clips into their presentations. After a dress rehearsal before a group of faculty, staff, and graduate students, the undergraduates are then invited into classrooms in local Title 1 K-12 schools in the Los Angeles area, to present their lesson plans and to engage elementary, middle, and high school students in a variety of interactive neuroscience activities. Lesson plans are developed with the objective of providing K-12 students a framework in neuroscience, including brain structure, features of a neuron, and basic principles of synaptic communication. Each lesson plan is then customized to present a specific topic. This year's topics included learning and memory, optical illusions, brain injury, the five senses, and circadian rhythms. At the end of the classroom presentation, K-12 students are divided into groups that rotate through a series of stations providing hands-on activities including brain structure using human and animal brains, brain injury models, and topic-specific activities such as memory challenges.

Assessment of the program is made on two levels. Enrolled undergraduates are assessed on their ability to develop a teaching topic and to engage a specific group of local K-12 students. The undergraduates receive feedback from their peers and from graduate and faculty teaching staff prior to entering a K-12 classroom. After their classroom presentation, the undergraduates

undergo a self-assessment of the strengths and weaknesses of their presentation, and are assessed by their peers. Presentations are tailored to a specific grade level, and the learning of the students in the K-12 classrooms is assessed by a pre- and post-evaluation. Pre-evaluations are distributed prior to the classroom visit, and post-evaluations are completed after the classroom visit.

Preliminary analysis suggests that Project Brainstorm produces a modest improvement in K-12 student attitudes toward science and toward attending college.

Project Brainstorm helps undergraduates to develop their speaking skills and refines their ability to tailor complex neuroscience concepts to a naïve audience. In turn, classroom visits provide exposure to neuroscience in the local community.

Disclosures: **M. Desalvo:** None. **R. Romero-Calderon:** None. **D. Alexander:** None. **S.K. Madsen:** None. **A. Attar:** None. **N.A. Suthana:** None. **C.A. Ghiani:** None. **W. Ge:** None. **C.E. Evans:** None. **J.B. Watson:** None. **E.M. Carpenter:** None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.06SU/MMM39

Topic: H.02. Teaching of Neuroscience

Title: Grow My Brain with Ned the Neuron introduces elementary age children to a range of behaviors promoting brain health and growth

Authors: ***E. WARP**, T. MCGINN;
Kizoom, Emeryville, CA

Abstract: Brain training platforms that strengthen executive functions such as memory, attention and speed are popular amongst adults and supported by research on neuroplasticity. Though these platforms can have great benefits, there are many other behaviors that promote brain health and growth. For example, being active and eating well results in a healthy and higher performing brain, and engaging in creative activities builds new connections in the brain and increases problem solving capabilities. We have developed a games and activities platform, Grow My Brain with Ned the Neuron, which encourages a broad range of behaviors in children, including executive brain training, in order to establish good brain growing habits at an early age. The platform is populated with fun neuron characters that embody different ways to grow the brain as well as games and activities that are good for the brain in and of themselves and support the themes of brain growth and plasticity in their messaging. Early testing indicates that use of the

platform increases brain awareness in children while they have fun, providing “digital nutrition” that both parents and kids can get behind.



Disclosures: **E. Warp:** E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); Kizoom, Inc. **T. McGinn:** E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); Kizoom, Inc..

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.07SU/MMM40

Topic: H.02. Teaching of Neuroscience

Title: Map your own homunculus! An interactive graphical twist to a popular psychophysics experiment

Authors: ***R. J. CORLEW**, T. WALKER;

Functional Architecture and Develop. of Cerebral Cortex, Max Planck Florida Inst., Jupiter, FL

Abstract: Two-point discrimination testing is a psychophysics experiment that is performed in K-16 classrooms, research settings, and even doctors' offices. In the classroom, it gives students a tangible demonstration of how our senses are mapped out in our brains. It is a hands-on experiment that collects real data about the human brain. One twist on this experiment is to draw a homunculus to visualize the test results. When a homunculus is drawn, the experiment becomes much more intuitive and instructive. But, making a homunculus accurately is fairly complicated and takes a higher-level understanding of math and fine motor control for accurate drawing. For these reasons, the homunculus drawing component is rarely used in K-12 settings or in classes where there is not significant time to devote to the experiment. We have thus created the web based “Homunculus Mapper”. With this tool, students can enter in data they have collected by traditional two-point discrimination experimental technique and watch as the computer program morphs their avatar into an accurate model of their own personal homunculus. The tool is

designed to be used with either simple, fast measurements (5min), or with exhaustively detailed data collection. The tool can be used with kindergarteners to college psychophysics labs, and even with large groups of adults at public Brain Awareness Week events. Other educational sites can link to the tool and write their own unique directions to make the experiment their own. Neuroscience for Kids has instructions that are aimed toward younger children <http://faculty.washington.edu/chudler/chtouch.html> while Backyard Brains has used the tool to target a slightly older group <http://backyardbrains.com/>. We appreciate your suggestions for the Homunculus Mapper and collaborations that encourage its use.

Disclosures: **R.J. Corlew:** None. **T. Walker:** None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.08SU/MMM41

Topic: H.02. Teaching of Neuroscience

Support: Heidelberg University Hartmut-Hofmann Berling International Graduate School of Molecular and Cellular Biology

Heidelberg University CellNetworks Research Cluster

Title: Graduate school community outreach programs in neuroscience: Classroom workshops and an annual national science competition

Authors: ***J. MCCALL;**
Spinal Cord Injury Ctr., Heidelberg, Germany

Abstract: Progressive scientific research is dependent upon positive public awareness and support as well as continuous generations of talented, enthusiastic students, and topics such as sensory systems, plasticity, and development lend excellent teaching opportunities for young students and members of the public to engage with neuroscience. Organized by PhD students of the Heidelberg University Hartmut-Hoffmann Berling International Graduate School of Molecular and Cellular Biology in Germany, Heidelberg Neuroscience Outreach is a graduate student-led initiative with additional sponsorship from Heidelberg CellNetworks Research Cluster and local biotechnology companies. The organization, conducted in both English and German, aims to better connect the public with current scientific knowledge relevant to human

health and well-being, educate high school students about approaches to neuroscience questions, and foster respect for advances in human biology understanding. These aims are met through two avenues of community engagement: 1. Graduate students conduct hands-on workshops for high school classes, whereby students are led through activities that demonstrate elements of the following sensory systems: vision, taste, touch, temperature, olfaction, vestibular, and audition. In addition, a visiomotor learning activity shows in real time the quickness of neural plasticity. 2. Annually, graduate students also host the national neuroscience competition, the German Brain Bee, an officially sanctioned branch of the International Brain Bee program. High school students from around the country gather for a one-day event composed of contest modules in neuroanatomy, patient diagnosis, and general neuroscience knowledge, for which they have prepared by studying the freely available "Neuroscience: Science of the Brain" booklet published by IBRO. Alongside the competition, neuroscientists, medical doctors, and graduate students interact with the students to answer career-related questions. Participants of the German Brain Bee may stay active in the Heidelberg Neuroscience Outreach community by social media and an annual survey to follow their interests in scientific careers. Additionally, many students are coached to pursue internships in scientific research labs and medical clinics. Occasional school assembly and extended classroom presentations typically address the placebo effect, adolescent neurodevelopment, and ethics. These activities together serve as an attempt to motivate youths to learn about the brain, foster scientific imagination, and inspire students to consider careers in brain research and medical practice.

Disclosures: J. McCall: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.09SU/MMM42

Topic: H.02. Teaching of Neuroscience

Support: Future Fund of the Republic of Austria, through the Jerusalem Foundation

BMUKK, Austrian Federal Ministry for Education and Culture, through the Jerusalem Foundation

Title: Similar brains: An interactive joint program for Jewish and Arab teenagers at the Bloomfield science museum Jerusalem

Authors: *A. STARK-INBAR¹, V. GUR BEN SHITRIT²;

¹Psychology, Univ. of California, Berkeley, Berkeley, CA; ²Bloomfield Sci. Museum Jerusalem, Jerusalem, Israel

Abstract: The Bloomfield Science Museum Jerusalem is an informal cultural and educational institution that presents interactive exhibits on subjects of science and technology and integrates these exhibits into a context through a wide range of educational activities. Science is a common language that disregards physical borders, cultural, and religious differences, and therefore enables dialogues and promotes co-existence. All graphic content in the museum appears in three languages, Hebrew, Arabic and English, and museum guides represent the range of population sectors in Israel (Arab and Jewish, religious and secular). The museum hosts approximately 250,000 visitors annually, a third of who arrive on organized school trips, and a third of these are from Arab communities. The brain is a subject well handled in the museum, with various exhibits and programs, including exhibitions themed on illusions, current neuroscience research in Israel, and neuroscapes, accompanied with café scientific & SciCinema talks, and researchers' night activities, all in collaboration with the Hebrew University of Jerusalem. Consistent with its mission to organize encounters between Jewish and Arab groups, and with its belief in brain research as an interesting and relevant topic area, we developed a programme that focuses on the subject of the brain through innovative activities for Jewish and Arab teenagers. The program is planned to operate over the next three years. The first, current, year focuses on developing the program and testing it on two pilot groups. Pilot groups include 60 ninth-grade pupils from two Jewish schools and one Arab school. Pupils were divided into two mixed groups of Jews and Arabs, boys and girls. Two experienced guides from the museum's professional staff, one Arab and one Jewish, co-guide each mixed group of pupils. All communications, both oral and written, between the guides and the pupils are bilingual. The program is structured of 15 sessions, 2 hours each, presenting a combination of activities at the museum, visits to the Hebrew University, project sessions co-guided with neuroscience graduates, and a celebratory final event. Each of the weekly sessions has three parts: a social activity, an activity relating to brain research, and a tour in a museum exhibition. All scientific demonstrations are interactive, combining various group sizes and forcing pupils to cooperate and communicate despite the language barrier. On-going feedback from the guides is used to improve the program after each session. The program is evaluated by questionnaires to the participants, interviews and observations, and by an external advisor for issues related to co-existence.

Disclosures: A. Stark-Inbar: None. V. Gur Ben Shitrit: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.10SU/MMM43

Topic: H.02. Teaching of Neuroscience

Title: A neuroscience pull-out gifted program in a high school in Hong Kong: Connection of neurodegenerative diseases and traditional Chinese medicine in research-based learning

Authors: *K. SUEN¹, M. LI¹, W. CHAN¹, R. C. CHANG²;

¹Dept. of Biol. and Biotech., Po Leung Kuk Laws Fndn. Col., Hong Kong, China; ²Dept. of Anat., The Univ. of Hong Kong, Hong Kong, China

Abstract: In 2010, we reported the development of a school-based neuroscience curriculum in a Hong Kong's high school (Suen et. al. 2010). The curriculum highlighted brain cell culture and research-based learning as effective learning activities (Suen et. al. 2008; Suen et. al. 2007). In recent years, we have started developing a neuroscience pull-out program for the students who are scientifically gifted in science (Suen et. al. 2013). In the present report, we describe and evaluate how the gifted students learn neuroscience and develop scientific literacy through doing a scientific research in which neurodegenerative diseases and traditional Chinese medicine are connected. Learning areas related to neurodegenerative diseases may include brain structure, brain functions, structure of neurons, communication between neurons, mechanisms of neuronal cell death and some physiological basis of the diseases. Yet, neurodegenerative diseases are not mentioned in high-school science curricula (integrated science in junior forms and biology in senior forms) in Hong Kong. While traditional Chinese medicine is not unfamiliar in our city, students have rare opportunities in school to conduct learning activities about Chinese herbs. In our neuroscience pull-out gifted program, we aim to develop research-based learning activities in which neurodegenerative diseases and traditional Chinese medicine are introduced and connected. Four scientifically gifted students aged 14-15 were invited to join this pull-out program. They carried out the following tasks in 4 cycles within 6 months: doing literature research on neurodegenerative diseases, studying the common neuroprotective effects of some traditional Chinese medicine, looking for any traditional Chinese medicine which may be potentially neuroprotective against neurodegenerative diseases, setting up experimental models and carrying out the experiments to study the neuroprotective effects of traditional Chinese medicine and acquiring laboratory skills to do cell culture and extract ingredients from the herbal medicine. Peer's assessment among students, teacher's observation on each of the above tasks, practical skills assessment and paper-and-pencil tests about basic neurobiology and nature of science indicated that scientifically gifted students can further develop their scientific literacy and acquire neuroscience knowledge through doing a 6-month scientific research in which neurodegenerative diseases and traditional Chinese medicine were highlighted and connected.

Disclosures: K. Suen: None. M. Li: None. W. Chan: None. R.C. Chang: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.11SU/MMM44

Topic: H.02. Teaching of Neuroscience

Support: NSF GK-12 STEM Fellows, Awarded to Maarten Chrispeels

Title: From neurons to perception: Using art to elucidate the visual system

Authors: ***A. L. JUAVINETT**¹, **A. WOLFE**²;

¹SNL-C, Callaway Lab., The Salk Inst. for Biol. Studies, San Diego, CA; ²Grossmont High Sch., San Diego, CA

Abstract: With an innovative, inquiry-based approach to neuroscience education, this lesson plan aims to engage high school level students with the organization and complexity of the brain's visual system. Using art as an analogy for visual perception, this interdisciplinary activity starts with fundamental details about brain organization, neuron function, and the visual system, and ultimately aims to translate the problem of vision into real terms that students can appreciate, understand, and model. Students begin by exploring visual system anatomy, and the role of neurons as feature detectors. They then work as specific feature-detecting neurons in a circuit to reconstruct a scene, emphasizing the parallel and hierarchical organization of the visual system. As a summative activity, students complete a weeklong project in which they investigate a visual illusion and explain its mechanistic underpinnings, allowing students to extend and present their newly gained knowledge. Multiple groups of biology and art students in San Diego area high schools completed this activity as part of an NSF GK-12 Stem Fellows program, and the lesson plan underwent a series of revisions based on student and teacher feedback. Several additional lessons were designed, including an "Evolutionary Brains" lesson, in which the students observe various mammalian, reptilian, and avian brains and make predictions about their evolutionary relationships, and a "What's Going On In There?" neuroscientific investigation, in which students examine anatomical and behavioral evidence to diagnose a neurological disorder. This series of curricula is an interactive and inquiry-based way for students to understand experimental approaches in neuroscience, identify key motifs in brain organization, and ultimately model processing in the visual cortex, providing a bridge between current neuroscience, art, and high school education standards.

Disclosures: **A.L. Juavinett:** None. **A. Wolfe:** None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.12SU/MMM45

Topic: H.02. Teaching of Neuroscience

Title: Neuroscience education through student-led investigations in an extracurricular setting

Authors: M. A. LU¹, *A. PARSEGHIAN², M. C. FIELDS¹;

¹Sidwell Friends Sch., Washington, DC; ²Med. Univ. of South Carolina, Ann Arbor, MI

Abstract: The BRAIN Club (Biological Research And Investigations in Neuroscience) at Sidwell Friends is an extracurricular activity that allows students to develop, maintain, and analyze in-depth biological experiments, specifically in neuroscience. The club also gives students the opportunity to attend local and national biology conferences.

One experiment studied color-based and numerical shoaling preferences in *Danio rerio* (zebrafish), a model organism due to easy maintenance, a fully-sequenced genome, and large clutch size. Shoaling is a behavior where fish group together for increased reproductive success and protection from predators. We separated a tank into three compartments with Plexiglass, with test fish in the middle compartment and groups of fish in the side compartments. Test fish were raised in groups of identical coloring, either the same color as the test fish or a different color. One side compartment contained the color of fish that test fish were raised with. The other compartment contained any of the two remaining colors. The time spent by the test fish with each group was recorded. After cycling through many different combinations of fish, the data showed that fish have a preference toward the color of fish they were raised with and normally choose a larger number of fish. The experiment suggests that zebrafish are capable of discerning between colors, leading to shoaling preference. Zebrafish form decisions based upon upbringing rather than genetic predisposition to a certain color.

Two other experiments examined zebrafish. One experiment tested the effects of exposure to 329-290 nm UVB radiation for 5 minutes at the 90% epiboly stage and four somite stage. Results included a decreased hatch rate and tail deformities in exposed groups. The other experiment on *Danio Rerio* tested the effects of light on hair cell regeneration. Zebrafish hair cells sense movement in water, providing spatial awareness. Hair cells of the embryos were destroyed using neomycin sulfate, and groups were then subject to different durations of light exposure. It was expected that there would be an inverse correlation between light exposure time and hair cell regeneration rates.

One experiment was performed on Chara corallina, a green algae composed of nodal and internodal cells. Action potentials of internodal chara cells were measured in hypertonic and hypotonic solutions in regard to CaCl₂ levels. The results showed varied action potentials among cells depending upon the ion concentrations they were placed in, and that action potentials stopped cytoplasmic streaming within the cell after passing a necessary intensity.

Disclosures: M.A. Lu: None. A. Parsegian: None. M.C. Fields: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.13SU/MMM46

Topic: H.02. Teaching of Neuroscience

Title: Hands on science event focuses on brain awareness

Authors: *L. HARRIS, A. GONZALES, S. KAVUMA, R. BRUBAKER, J. J. FAUST, D. P. BALUCH;
Arizona State Univ., Tempe, AZ

Abstract: The annual Hands on Science/Brain Awareness event at Arizona State encourages young scientists to pursue a career in STEM fields such as neuroscience by giving them the opportunity to experience cutting edge research in a welcoming university environment. During this one day event, students tour various labs at ASU and participate in hands on activities ranging from gram staining microbial slides, investigating sample crime scenes, engaging in alternative energy experiments using anaerobic chambers, observing insect behavior studies, viewing meteorites and images taken by the Lunar Reconnaissance Orbiter camera to scanning images of neurons with laser based microscopes. In conjunction with the Society for Neuroscience and the DANA Alliance, the W.M. Keck Bioimaging lab, housed in the School of Life Sciences at ASU, hosts the Brain Awareness portion of the event. Students rotate through various stations giving them the opportunity to obtain first-hand learning experience at how image based neurobiology materials can be made accessible to the visually impaired, how behavioral neuroscientists trace neurons to observe changes in plasticity in response to stress, and how fluorescently labeled brain sections and neural cultures are imaged using instrumentation such as the laser scanning confocal microscope. Students are invited to share their images on the ASU Hands on Science Facebook page

(www.facebook.com/ASUhandsonscience) which gives them the opportunity to share their experience with friends and a portal for ongoing education.

Disclosures: **L. Harris:** None. **A. Gonzales:** None. **S. Kavuma:** None. **R. Brubaker:** None. **J.J. Faust:** None. **D.P. Baluch:** None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.14SU/NNN1

Topic: H.02. Teaching of Neuroscience

Support: Northwestern University TGS Community Building Grant

Title: The Northwestern University Brain Awareness Outreach organization takes a multi-faceted approach to bring neuroscience to Chicago area public schools

Authors: ***S. HATTORI**, M. SCHROEDER, J. WILSON, D. SCHEENWEIS;
Interdepartmental Neurosci. Program, Northwestern Univ., Chicago, IL

Abstract: In 2010, graduate students of the Northwestern University Interdepartmental Neuroscience PhD Program founded the Northwestern University Brain Awareness Outreach (NUBAO) organization, a group dedicated to inspiring in Chicago area youths excitement about the nervous system and an understanding of the importance and benefits of neuroscience research. Since its inception, NUBAO has grown into a large and diverse organization consisting of some 70 graduate students, undergraduate students, post-doctorate fellows, and faculty/staff from a range of departments and scientific disciplines at Northwestern University. Through close collaboration with public schools and science education programs in the Chicago area, NUBAO organizes hands-on learning activities, workshops, and open-house style events covering a variety of neuroscience topics for students of all ages. NUBAO has taken a multi-faceted approach to bring neuroscience into Chicago area classrooms. At the core of our efforts are three programs: 1) Annual Brain Awareness Fair, an open-house style event held in partnership with Nettelhorst Elementary School featuring hands-on activities for the general public; 2) Brain Awareness Teachers Workshop, organized in partnership with the Chicago SfN Chapter, and aimed at introducing Chicago area educators to various neuroscience teaching activities and resources that they can bring into their own classrooms; and 3) Neuroscience of Superheroes Workshop Series, a 6-week discussion and demonstration program, held at local, underserved

middle schools, that uses the paradigm of super heroes to engage sixth through eighth grade students in learning about the brain. We have found that this three component approach has been tremendously successful in reaching students of all socioeconomic backgrounds from widespread areas of Chicago. All of our events have been extremely well received and post-event surveys have consistently shown increased interest in science among participants. Furthermore, we have noticed a dramatic shift in the number of our volunteers, especially PhD students, who are interested in pursuing career paths involving science education. Volunteers have also commented that these volunteer opportunities help strengthen their communication skills - skills they assert are invaluable for any career path. We hope to continue building upon our success and further advance NUBAO's mission for many years to come.

Disclosures: **S. Hattori:** None. **M. Schroeder:** None. **J. Wilson:** None. **D. Scheenweis:** None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.15SU/NNN2

Topic: H.02. Teaching of Neuroscience

Support: NSF EEC-102875

Title: Competitive EMG-based gaming platform as a demonstration of the principles of sensorimotor neural engineering

Authors: ***J. D. WANDER**¹, D. SARMA¹, V. PARAMASIVAM²;
¹Bioengineering, ²Computer Sci., Univ. of Washington, Seattle, WA

Abstract: In an effort to develop an engaging platform to demonstrate the concepts of sensorimotor neural engineering, and in conjunction with the Center for Sensorimotor Neural Engineering's Tech Sandbox competition, we developed an interactive and competitive virtual arm wrestling game, called WrestleBrainia. This system is robust and mobile, and has thus been used in multiple outreach events, providing hands-on biosignal experiences for over 1000 students, demonstrating how biosignals are recorded and how they can be processed to control external devices.

WrestleBrainia provides an excellent educational example of an end-to-end engineering solution based on real-time recording of neural signals. It has potential to teach students about peripheral motor control, biosignal capture, digital signal processing, microcontroller programming,

mechatronics, and the possible therapeutic benefits of applied biosignal modulation. Though the system currently uses research-class biosignal acquisition hardware, this could be readily replaced with numerous consumer class devices; the remainder of the system is an inexpensive, Arduino-based mechatronic device. It leverages differential surface electromyography (EMG), recorded from arbitrary muscle sites on the two users. The difference of normalized EMG between these users is then mapped directly on to a pair of robotic arms that virtually replicate the arm-wrestling match. EMG is an excellent signal for this and other similar applications as it can be immediately volitionally modulated by users, allowing for an enjoyable and engaging experience. However, WrestleBrainia is built to be biosignal agnostic and all of the concepts and methods learned in the processing of EMG signals can be transferred directly to analysis of other biosignals (e.g. electroencephalography), thus providing users of the system with an engaging introduction to the principles of neural engineering.

Disclosures: **J.D. Wander:** None. **D. Sarma:** None. **V. Paramasivam:** None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.16SU/NNN3

Topic: H.02. Teaching of Neuroscience

Title: Growing neuroscientists: Sparking an interest in elementary students

Authors: ***J. J. QUINN**, I. DAMAS-VANNUCCHI, K. MARTIN, L. POWERS, S. E. PULLINS, M. RENDA, K. M. RESER, R. RONAU, M. SCHAEFER, R. A. SKIPPER, J. WILBER, B. WILKINS, M. WINFIELD;
Psychology, Miami Univ., Oxford, OH

Abstract: Education in STEM disciplines (science, technology, engineering and math) is receiving increased attention because of the widening gap between empirical research findings and public knowledge. The statistic indicating that only 28% of U.S. adults are scientifically literate is alarming (Miller, 2010). The problem has been attributed to a decline in K-12 science education in conjunction with poor communication between scientists and the community. To help bridge this gap, federal agencies (e.g., NSF) as well as professional associations (e.g., Dana Foundation, NuRhoPsi, Faculty for Undergraduate Neuroscience) are strongly encouraging scientists to participate in educational community outreach activities. It is essential to train new generations of neuroscientists to become effective communicators - allowing them to bridge the

current gap between scientists and non-scientists. Participation in outreach activities develops communication skills, personal confidence, and mastery of subject material for both the presenter(s) and their audience. In a recent senior capstone seminar offered at Miami University, we piloted a program that provided university students with an opportunity to distill advanced Neuroscience material to an accessible level for elementary school students. We began by exploring a number of techniques used in elementary science education. We then selected from these techniques to develop classroom activities (e.g., games, demonstrations) for children in grades K-5 related to one of the Neuroscience Core Concepts, in accordance with the Ohio Core Content Standards in science. For each grade level, we developed learning objectives, a classroom activity along with formal lesson plan and pre-/post-assessments of the learning objectives. In designing these materials, we initiated partnerships with two local elementary schools where we initially observed their classroom environments and later presented our activities. Despite the challenges we encountered in presenting intrinsically complicated material to this age group, our assessments indicate positive gains in knowledge and enthusiasm for Neuroscience among K-5 students. We believe that this provides a valuable model for future forays into Neuroscience outreach with young children.

Disclosures: J.J. Quinn: None. I. Damas-Vannucchi: None. K. Martin: None. L. Powers: None. S.E. Pullins: None. M. Renda: None. K.M. Reser: None. R. Ronau: None. M. Schaefer: None. R.A. Skipper: None. J. Wilber: None. B. Wilkins: None. M. Winfield: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.17SU/NNN4

Topic: H.03. Public Awareness of Neuroscience

Title: Bringing Neuroscience to K-12 students in the higher San Diego area

Authors: *O. NATERA, S. ALFONSO, T. SPRAGUE, A. PETERS, R. TSUNEMOTO, M. LAU, E. KAESTNER, A. E. GOETZ, S. LEINWAND, J. KIGGINS; Neurosciences Dept., Univ. of California- San Diego, La Jolla, CA

Abstract: UCSD Neuroscience Outreach program is a graduate student organization dedicated to sharing our enthusiasm for neuroscience by teaching students from elementary, middle, and high schools about brain anatomy and function. Through regular school visits and specialized science events, we teach young students how neurons function, how neuronal circuits are

formed, specific functions of different brain regions, and current topics of neuroscience research. Our hands-on activities include handling sheep brains and differentiating brains from various animal species. While our main interest is to cultivate awareness of and interest in neuroscience, we focus on visiting schools in the Sweetwater Union High School district, where the majority of students are underrepresented minorities. Reaching out to these students is particularly important because many of them might otherwise not have the opportunity to learn about neuroscience directly from scientists. In addition, we encourage them to pursue careers in science, which might in the long-term help increase the diversity of the scientific community. Our Neuroscience outreach program has become famous in the San Diego area not only because of our school visits, but also because of its participation in various specialized events, including the San Diego Festival of Science and Engineering, Biosciences Day at the Reuben H. Fleet Science Museum in Balboa Park, among others.

Disclosures: **O. Natera:** None. **S. Alfonso:** None. **T. Sprague:** None. **A. Peters:** None. **A.E. Goetz:** None. **E. Kaestner:** None. **R. Tsunemoto:** None. **M. Lau:** None. **J. Kiggins:** None. **S. Leinwand:** None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.18SU/NNN5

Topic: H.02. Teaching of Neuroscience

Support: INCT Incemaq

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AASDAP

Title: The Scientist of the Future Program: integrating neuroscience and education

Authors: **R. SAVOLDI**¹, **R. FUENTES**¹, **M. A. L. NICOLELIS**^{1,3,4,5,6}, ***E. MORYA**²;

¹Neuroengineering Grad. Program, ²Neurosci., Edmond and Lily Safra Intl. Inst. of Neurosci. of

Natal, Natal, Brazil; ³Dept. of Neurobio, ⁴Biomed. Engin., ⁵Ctr. for Neuroengineering, ⁶Dept. of Psychology and Neurosci, Duke Univ., Durham, NC

Abstract: The Program Scientists of the Future is an educational program for public high school students that uses neuroscience as a tool for social transformation. The students are gradually integrated into the production of scientific knowledge through daily research activities carried out at the Edmond and Lily Safra International Institute of Neuroscience of Natal (ELS-IINN). Sixteen students from the Alfredo J. Monteverde School attend workshops in the ELS-IINN twice a week, either morning or afternoon. The workshops enrich the experience of the students with basic science concepts and questions through of practices in neurosciences. Experiments cover topics such as selection of behavior and learning, behavior neurophysiology and psychophysiology of perception, integrated into the construction process of a research project. Group dynamics, discussion videos, cognitive games are used to stimulate creativity and neuroscience procedures to solve problems in each workshop topic. Specific activities involve training in technology for neuroscience research, such as analysis of stained slices with light and confocal microscopy, scanning of microscope slides, 3-D printer training, handling of EEG and haptic interfaces, building cognitive games and anatomic models. All workshops keep students active participants in the learning process. The students demonstrated high skills in the activities as a function of their individual characteristics. Furthermore, all students were stimulated to develop the skills of each workshop, and to use science as a basic tool for improving education and social transformation

Disclosures: R. Savoldi: None. R. Fuentes: None. M.A.L. Nicolelis: None. E. Morya: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.19SU/NNN6

Topic: H.02. Teaching of Neuroscience

Support: NIDA 1 R25 DA028796-01

Title: Moving a university neuropharmacology class into high schools

Authors: *L. E. MARTIN-MORRIS¹, H. T. BUCKLAND², A. S. RAINWATER³, S. L. CUNNINGHAM², S. L. VAN ALSTYNE⁴;

¹Biol. Dept., ²Sch. of Nursing, Univ. of Washington, Seattle, WA; ³Biol., Bothell High Sch., Bothell, WA; ⁴Puget Sound Educational Service District, Renton, WA

Abstract: The Online Neuroscience Education about Drug Addiction program (NIDA 1 R25 DA028796-01) is a 4-year project that will ultimately offer college-level education on the neuroscience of addiction as a distance-learning course for both high school and undergraduate students. As we build and test the curriculum, we are working with Washington State high school teachers to bring it to high school students in their classrooms. Our teachers are using the online course materials as their teachers' guides. Approximately 350 high school students in 10 high schools are taking the neuropharmacology course for dual (high school and university) credit through UW in the High School. Like many dual enrollment courses, our course has orchestrated teacher training, social media networking, and school visits, in order to help aspiring, young neuroscientists appreciate the complex science of psychoactive drugs. We speculate that ultimately, science-based drug education will help adolescents to developing an appreciation for the impact of drugs and addiction on their personal decisions. Additionally, this curriculum has the objective of helping them as citizen scientists become aware of local, state, and federal policy decisions that relate to this complex topic. This course may also prepare high school students to enter university science curriculum through fostering critical thinking and collaborative, proactive study habits. We will present how the course material has been transferred to teacher- and student-accessible courseware and how off-campus communities have been networked with university personnel to support course implementation. We will offer two data sets: one pertaining to social media networking for professional development of our teachers and the other pertaining to course efficacy. For this, we will present how our on-campus learners compare to the high school learners at our off-campus sites with regard to pre-post course survey questions.

Disclosures: L.E. Martin-Morris: None. H.T. Buckland: None. A.S. Rainwater: None. S.L. Cunningham: None. S.L. Van Alstyne: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.20SU/NNN7

Topic: H.02. Teaching of Neuroscience

Support: INCT Incemaq

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Title: Teaching brain morphology by immunohistochemical staining methods for high school students

Authors: P. F. CAVALCANTI^{1,2}, P. M. I. SCHNEIDER^{2,4}, *T. FAGGION VINHOLO^{3,5}, R. SAVOLDI², A. C. B. KUNICKI², E. MORYA², R. FUENTES², M. A. L. NICOLELIS^{2,6,7,8,9}, M. A. FREIRE²;

¹Biomedicine, UFRN, Natal, Brazil; ²Neuroengineering Grad. Program, ³Edmond and Lily Safra Intl. Inst. of Neurosci. of Natal, Natal, Brazil; ⁴Physiotherapy, Mauricio de Nassau Fac., Natal, Brazil; ⁶Biomed. Engin., ⁷Ctr. for Neuroengineering, ⁸Dept. of Neurobio, ⁹Dept. of Psychology and Neurosci, ⁵Duke Univ., Durham, NC

Abstract: The immunohistochemistry technique has been used in search for cell or tissue antigens ranging from amino acids to specific cellular populations. The great advantage as a methodological tool for neurosciences studies is that it allows identification of structures in histological sections of the nervous system, maintaining the morphology of the tissue. Basically, this technique comprises several ordered phases slide preparation (specimen fixation and tissue processing) and stages evolved for the reaction (in order: antigen retrieval, non-specific site block, endogenous peroxidase block, primary antibody incubation, and the employment of systems of detection, revealing and counterstaining and also slide mounting and storage); and interpretation and quantification of the obtained expression. Scientists of the Future Program is a Brazilian scientific educational program for public high school students from Alfredo J. Monteverde school that aims at fundamental concepts in neuroscience, and the immunohistochemistry technique showed to be a very enthusiastic brain morphology hands on. The students attended workshops on morphology of the nervous system at Edmond & Lily Safra International Institute of Neuroscience of Natal (ELS-IINN) twice a week, starting on theoretical discussions of the method, and reaching details of indirect immunohistochemistry fluorescence to identification of neurons and glial cells. Guided by a teacher and a default protocol, students cut rat brain slices (50 microm) through a cryostat (Zeiss, automatic and manual mode), mounted the slides, and stored at -80o C. The slides were removed from the freezer, washed in phosphate buffered saline (PBS) and detergent, and then incubated overnight with goat serum to block nonspecific sites to secondary antibody. The next day the slides were washed again with PBS and detergent, and then incubated in a secondary antibody solution, added to the fluorophore, kept in for as long as needed (accordingly the results of each hands on session). The antibodies used were anti NeuN and anti-GFAP to study the morphology of neuron and glia, respectively. For safety reason, all processes that involved hazardous substances were performed by the

supervisor. The slides were scanned in a confocal microscope (LSM 710 Zeiss), and the images generated of each brain area were used to make a virtual brain to study its morphology. This workshop showed to be very effective to get students involved in learning brain morphology and advanced staining methods.

Disclosures: **P.F. Cavalcanti:** None. **T. Faggion Vinholo:** None. **R. Savoldi:** None. **P.M.I. Schneider:** None. **A.C.B. Kunicki:** None. **E. Morya:** None. **R. Fuentes:** None. **M.A.L. Nicoletis:** None. **M.A. Freire:** None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.21SU/NNN8

Topic: H.02. Teaching of Neuroscience

Support: HHMI Grant

Title: A high school laboratory course to investigate the effects of alcohol on *C. elegans*

Authors: ***S. W. LEE**, D. A. DEROSA, P. A. LIPTON;
Boston Univ., Boston, MA

Abstract: Introduction to Neuroscience: Unplugged is a 12-week course for high school students, which meets two hours a week after school held at Boston University. This course is designed to introduce students to the field of neuroscience and use it as a vehicle to teach students how to design their own experiments. The overall theme of the course revolves around how alcohol affects the function of the brain and alters the behavior of worms. Topics that are covered in this course include the effects of alcohol on food seeking and learning and memory in worms as well as how the body processes alcohol. Previous labs designed to investigate the effects of alcohol on locomotive behavior in worms have typically recorded video of thrashing behavior. Unfortunately, this requires video recording of the worms for each student's experiments. Here, we base our experiment design on a 2010 paper by Mitchell et al. published in Plos One. The food race assay consists of pipetting worms onto one of side of the plate and the bacteria (food source) on the opposite side. Plates are treated with water or ethanol, and students collect data at 10-minute intervals and quantify how many worms have reached the bacteria. Subsequent experiments utilize the food race assay but with manipulations to alcohol-relevant genes by using different strains of worms or RNAi bacteria to see how specific genes play role in

the response to ethanol. Students also learn techniques applicable in other scientific disciplines, including genomic DNA extraction and PCR. The last few weeks of the course are open-ended, and students design their own experiments to answer remaining questions about how alcohol affects other aspects of worm behavior such as egg laying or lifespan. An emphasis is placed on hands-on learning through a variety of group activities, experiments, and class discussions. This course enables students to do science by engaging in scientific practices to seek explanations over an extended period. Lesson plans from this curriculum can be easily be used as single modules to supplement science courses.

Disclosures: S.W. Lee: None. D.A. DeRosa: None. P.A. Lipton: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.22SU/NNN9

Topic: H.02. Teaching of Neuroscience

Support: R25 RR025999

3R25RR025999-03S1

Title: How understanding neuroscience impacts teachers' pedagogical beliefs

Authors: S. GUZEY¹, G. ROEHRIG¹, *J. M. DUBINSKY²;

¹STEM Educ. Ctr., ²Dept Neurosci, Univ. of Minnesota, Minneapolis, MN

Abstract: K-12 science teachers do not commonly have formal professional training in neuroscience. While teacher education programs offer a variety of courses on learning theories, styles and environments, these usually do not mention the biological processes involved in learning. Therefore, most teachers have an uncertain knowledge about the brain and the neurobiological underpinnings of learning (Hurculano-Houzel, 2002). However, teachers need to know about neuroscience (Brandt, 1999) since a better understanding of brain and learning contribute to teacher practices (Dubinsky, 2010) and quality classroom practices result in better student learning (Wenglinsky, 2001).

This qualitative study explores the beliefs of 12 teachers about teaching and learning before and after the BrainU teacher professional development program on neuroscience. Data were collected through semi-structured interviews. The analysis of interviews demonstrated that teachers'

beliefs about teaching and learning were impacted at different levels. No correlation was found among the degree of change in beliefs, years of teaching experience, and teaching subject. Teachers' beliefs about student learning were clustered in more instructive and transitional categories and learning about brain plasticity had positive effects on teachers' beliefs and classroom practices. Contextual factors such as mandated district curriculum were found to have strong influences on teachers' beliefs and instructional decisions they make. The findings of this study contribute to the understanding of the effects of learning of neuroscience on teachers' beliefs about teaching and learning.

Brandt, R. (1999) Educators Need to Know About the Human Brain. *Phi Delta Kappan* 81, 235.

Dubinsky, J. M. (2010) Neuroscience education of preK-12 teachers. *J Neurosci* 30:8957-60.

Herculano-Houzel, S. (2002) Do you know your brain? A survey on public neuroscience literacy at the closing of the decade of the brain. *Neuroscientist* 8, 98-110.

Wenglinsky, H. (2001) *Teacher Classroom Practices and Student Performance: How Schools Can Make a Difference*. Princeton, NJ: Educational Testing Service.

Disclosures: S. Guzey: None. J.M. Dubinsky: None. G. Roehrig: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.23SU/NNN10

Topic: H.02. Teaching of Neuroscience

Title: How 'I feel you' depends on how I feel: Influence of affective state and personality on ratings of vocal emotion

Authors: *M. D. MULLANE¹, M. DIFLEY², A. CHIBA²;

¹Cognitive Sci. & Psychology, UCSD, La Jolla, CA; ²Univ. of California San Diego, La Jolla, CA

Abstract: Visual emotional information has been shown to affect human cognition and behavior, but little is known about the influence that auditory emotional information might have on these processes. To investigate this, we developed an inventory of 651 spontaneous, non-verbal vocalizations of emotion, the Multidimensional Affective Ratings Inventory (MARI), which were extracted from YouTube videos and recordings of actors simulating dramatic events and standardized for length and amplitude before being rated by participants on the dimensions of valence, arousal, and dominance.

Immediately after rating the sounds, participants submitted extensive demographical information, along with self-assessments of mood, empathy, mental states and a Jungian personality type profile, which among other things measures extroversion. Analysis showed differences in the impact of others' emotive vocalizations varied depending on perceivers' mental and emotional states, self-reported empathy and their personality types. These findings may have implications for educational practices in special needs populations, as well as for classroom learning in general.

Disclosures: M.D. Mullane: None. M. Difley: None. A. Chiba: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.24SU/NNN11

Topic: H.03. Public Awareness of Neuroscience

Title: Sensory integration in socio-cultural development and education of children with pervasive developmental disorder

Authors: *E. DIAS, JR¹, B. FONSECA², E. FREITAS⁴, G. ARANHA⁵, A. SHOLL-FRANCO³;

¹Inst. de Biofísica Carlos Chagas Filho, Univ. Federal Do Rio De Janeiro, Rio De Janeiro, Brazil;

³Inst. de Biofísica Carlos Chagas Filho, ²Univ. Federal do Rio de Janeiro, Rio de Janeiro, Brazil;

⁴APPA, Nova Iguaçu, Brazil; ⁵Organização Ciências e Cognição, Rio de Janeiro, Brazil

Abstract: The sensory integration is a process by which the central nervous system organizes various sensory stimuli that provide adaptive responses to environmental demands. However, pervasive developmental disorder (PDD) can lead to disruption of the interaction and lost adaptive responses to environmental changes. According to the United Nations, as a criterion that considers only those with PDD, six in every thousand children have this disorder in the world. It is estimated that in Brazil, about 2 million children have PDD at some level. Generally, this child has disturbances in reciprocal social interactions, which often manifest themselves in the first five years of life, characterized by repetitive and stereotyped patterns of communication and strengthen the interests and activities. The PDD includes different autism spectrum disorders, childhood psychosis, Asperger, Kanner and Rett syndromes. They express language difficulties as the body in initiating and maintaining a conversation, avoid eye contact, and show aversion to touch, isolating themselves.

Variations in attention, concentration and motor coordination, possibly also can be observed. Normally, they can make contact through nonverbal behaviors and to play, prefer to stick to objects instead of moving with the other children. Scientists have shown that the somatosensory and vestibular systems together to promote the overall development of behaviors and that stimulation through sensory activities contextualized produces neurophysiological changes in the activation pattern of neural networks, which records and organizes the different inputs to more adaptive responses. The aim of this study was to evaluate the effect of one cultural workshop and multisensory integration developed by the Association of Support for Autistic Person (APPA), Nova Iguaçu, Rio de Janeiro, Brazil, and applied to 20 children of both sexes aged between 5 and 10 years, diagnosed with PDD. This workshop stimulated sensory integration for children exposing PDD in an enriched somatosensory environment. We performed behavioral observation and records how they reacted to this enriched environment. Children were presented to these stimuli, in Tijuca Forest in Rio de Janeiro, Brazil. Observed behavior: desire to remain in the environment, expression of smiles or cries of excitement and finger-pointing, body and facial expressions as positive, since they do not have verbal language. These behaviors suggest that initiatives like this can stimulate attention span, intrasensorial discrimination of children with PDD, with difficulty in performing simple tasks and / or requiring a complex perceptual-motor skill.

Disclosures: E. Dias: None. B. Fonseca: None. E. Freitas: None. G. Aranha: None. A. Sholl-Franco: None.

Theme H Poster

24. Neuroscience for K-12

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 24.25SU/NNN12

Topic: H.02. Teaching of Neuroscience

Title: Making an easier mirror visual feedback setup for rehabilitation of pediatric and other patients with hemiparesis

Authors: S. J. PFEIFER¹, *E. L. ALTSCHULER²;

¹East High Sch., Denver, CO; ²Physical Med. & Rehab, New Jersey Med. Sch., Newark, NJ

Abstract: MIRROR therapy was introduced by Ramachandran for amputees with pain associated with a poorly mobile or spasming phantom limb: For example, an amputee with pain from a spasming right phantom hand that will not open, places their left hand on the reflecting side of a

plane mirror placed parasagittally in the same position as the spasming right hand (clenched fist) which is "placed" on the other side of the mirror. Visual feedback of the left hand opening then looks like the right hand opening. This is very often helpful in getting the right phantom hand to open and relieving the pain from the phantom hand. Subsequently one of us (ELA et al., & VSR, Lancet, 1999) described this mirror therapy for patients with hemiparesis following stroke. Quite a number of studies and cases have found benefit of mirror therapy for phantom limb pain, hemiparesis as well as other movement problems such as painful movement in patients with reflex sympathetic dystrophy (RSD) (complex regional pain syndrome (CRPS)) and poor movement after an orthopaedic injury. One difficulty which often arises when using mirror therapy for stroke or RSD/CRPS patients is that it can be hard to position the affected arm on one side of the mirror--typically mounted on a table with the patient seated abutted to the table--and the unaffected arm on the other side of the mirror and then be able to see only the reflection of the unaffected arm. Also, especially for pediatric patients mirror therapy should be as fun as possible to do. For a science fair project one of us (SFJ) under the direction of the other used an iterative design process to design a mirror visual feedback set up to overcome these difficulties in utilizing mirror feedback for stroke (and other) patients. We describe this design process. We think the resulting design--a thin lightweight piece of plastic cut into an oval shape (slightly pinched in the middle) with reflecting surfaces worn with a shoulder harness--should allow easier positioning of the paretic arm and be more fun for pediatric (and other) patients to use than a mirror mounted on a table. This new mirror setup should also allow a great variety of positions of the arm to be trained. We are now teaching and learning about the importance and design of clinical studies and are working to set one up of the new mirror design.

Disclosures: S.J. Pfeifer: None. E.L. Altschuler: None.

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Theme H Poster

25. Brain Awareness Week Activities

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 25.01SU/NNN13

Topic: H.03. Public Awareness of Neuroscience

Title: Brain Awareness Week activities expand city-wide across multiple institutions and groups with minimal organization

Authors: *K. REMOLE¹, H. MCKELLAR², H. BOWLING², C. CAIN³, P. CROXSON⁴, L. FRIEDMAN⁴, A. HILL¹, A. KALMBACH¹, C. MELENDEZ-VASQUEZ³, J. GARBARINO⁵,

W. YU¹;

¹Columbia Univ., New York, NY; ²NYU Sch. of Med., New York, NY; ³Hunter Col., New York, NY; ⁴Icahn Sch. of Med. at Mount Sinai, New York, NY; ⁵The Rockefeller Univ., New York, NY

Abstract: In celebration of Brain Awareness Week 2013, diverse academic and cultural institutions across New York City jointly hosted 20 loosely coordinated events, up from no coordinated events in previous years. This group effort, entitled braiNY, was organized through the Greater New York City chapter of the Society for Neuroscience, with the support of the Dana Foundation, the Dana Alliance for Brain Initiatives, and numerous partners. In total, 11 groups, including 5 academic institutions and one museum collectively sponsored 20 new or ongoing events that reached close to 3000 people of all ages. The benefits of the loose organizational structure were evident in many ways. Individuals and groups who may not have felt qualified to host their own events were bolstered by the support and resources of the Chapter. Shared resources included event ideas, cross-institutional access to volunteers, and funding support for events. All events benefited from the cross-publicity of the braiNY social media campaign that included a central website, Facebook page and Twitter hashtag. Additionally, braiNY fliers distributed throughout New York City enhanced publicity and encouraged people to attend multiple events. Cultural groups joined in the campaign by making their regularly scheduled events brain-themed. By becoming partners, the groups had access to scientists and volunteers in the braiNY network and a platform for publicity. We propose braiNY as a model for how individual groups or institutions offering smaller or no Brain Awareness Week programs can coalesce with minimal planning and oversight into a multi-institutional, city-wide celebration of brain science. While New York City has a particularly high concentration of institutions with neuroscience programs that could contribute to these events, lessons learned from braiNY's grassroots efforts would apply to many cities and regions who wish to synergize cross-institutional organizational efforts for Brain Awareness Week.

Disclosures: **K. Remole:** None. **H. McKellar:** None. **A. Hill:** None. **A. Kalmbach:** None. **W. Yu:** None. **H. Bowling:** None. **C. Melendez-Vasquez:** None. **C. Cain:** None. **P. Croxson:** None. **L. Friedman:** None. **J. Garbarino:** None.

Theme H Poster

25. Brain Awareness Week Activities

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 25.02SU/NNN14

Topic: H.03. Public Awareness of Neuroscience

Support: FAPESP-Cinapce

PROEX-CAPES

FAPERJ

Title: A national campaign of brain awareness week in Brazil

Authors: *M. M. FROES¹, C. H. BUCK², N. GARCIA-CAIRASCO⁴, J. QUILLFELDT⁵, C. HEDIN-PEREIRA³;

¹Fed Univ. Rio de Janeiro, Rio de Janeiro, Brazil; ²Sci. and Culture Forum, ³Inst. of Biophysics Carlos Chagas Filho, Federal Univ. of Rio de Janeiro, Rio de Janeiro, Brazil; ⁴Fac. of Med. of Ribeirão Preto, State Univ. of São Paulo, Ribeirão Preto, Brazil; ⁵Inst. of Biosci., Federal Univ. of Rio Grande do Sul, Porto Alegre, Brazil

Abstract: Here is a summary of the Brazilian I National Brain Awareness Week (I NBAW) results. Local and regional initiatives have been developed in previous years in the country, through partnerships with the Dana Alliance or independently, and proceed in 2013. A growing team of colleagues of the national Brazilian committee have conducted in the last two years the 1st and 2nd NBAW, both aimed to a national cover. Promoted by the Brazilian Society of Neuroscience and Behavior (SNBeC), in partnership with Rio Society for Neuroscience Chapter (Rio SfN Chapter), the I NBAW - 2012 - counted with 44 initiatives distributed over the country. Actions were categorized according to the nature of events, organizing bodies and target audience and individualized according to public heterogeneity criteria. Although numerically concentrated in South and Southeast, excellent results were reported the North and Northeast of the country. A significant fraction of activities were based in inner cities. Universities figured as principal organizing poles. The vast majority of our audience was nonacademic, confirming the general scope of popularization of scientific knowledge. The success of our I NBAW reaffirms the opening of the contemporary neuroscientist to the benefits of popularization of the scientific knowledge. Issues once confined to academic networks were adapted to lay language and 'friendly' formats, allowing sharing of our complex knowledge with society in general.

Disclosures: M.M. Froes: None. C. Hedin-Pereira: None. N. Garcia-Cairasco: None. C.H. Buck: None. J. Quillfeldt: None.

Theme H Poster

25. Brain Awareness Week Activities

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 25.03SU/NNN15

Topic: H.03. Public Awareness of Neuroscience

Support: UCLA Brain Research Institute

UCLA Campus Programs Committee

UCLA Graduate Student Association

UCLA Biological Sciences Council

SfN Chapter Grant

Title: UCLA's brain awareness week 2013: An analysis of its impact on K-12 students

Authors: D. ALEXANDER¹, M. DESALVO¹, S. K. MADSEN¹, A. ATTAR¹, N. SUTHANA², C. A. GHIANI¹, W. GE¹, R. ROMERO-CALDERON², C. E. EVANS², J. B. WATSON², *E. M. CARPENTER³;

¹Interdepartmental Program in Neurosci., ²Brain Res. Inst., UCLA, Los Angeles, CA; ³Dept. of Psychiatry and Biobehavioral Sci., UCLA Sch. Med., Los Angeles, CA

Abstract: UCLA's Brain Awareness Week (BAW) is an annual event that brings students from underserved Los Angeles (LA) schools to campus for a day of neuroscience-related activities. The goal of BAW is to teach neuroscience to elementary, middle, and high school students and to inspire an interest in science. The event is organized by graduate students from the Neuroscience Interdepartmental Ph.D. program. This year, over 60 volunteers from the graduate and undergraduate neuroscience programs, the David Geffen School of Medicine, and UCLA faculty participated. Over the course of the week, we hosted 300 students from 4th to 12th grade from five LA schools. Each day began with the visiting students rotating through six interactive stations: 1) Brain anatomy, 2) Visual illusions and senses, 3) Vision-altering goggles, 4) Human brain specimens, 5) Animal brain specimens and evolution, and 6) Brain injury. A seventh station, "Addiction and the Brain", was added this year for high school students only. To introduce the students to a career in neuroscience, UCLA faculty gave lab tours that included hands-on demonstrations, such as extracting DNA from cheek cells and working with *aplysia*, *drosophila*, and glow worms. Students then took a campus tour to gain a glimpse of college life and participated one of two grade-specific activities. High school students participated in a career panel/mentoring session. The goal of this session was twofold: 1) to answer questions about careers in science and 2) to provide practical tools for navigating the college application process, including applying for financial aid. This is especially important because many of the students would be the first in their family to attend college. Elementary and middle school students participated in an arts and crafts project that culminated in a large paper "brain" with individually

designed neurons to display in their classroom. To evaluate the efficacy of BAW in increasing neuroscience knowledge and igniting an interest in science, we administered pre- and post-evaluation forms to the students. Preliminary data analysis indicates that students, across all age groups, knew significantly more basic neuroscience after their BAW experience than before. Furthermore, many students indicated a more positive attitude toward science after their visit. Overall, through BAW at UCLA, we accomplished our objective to communicate neuroscience to elementary, middle and high school students while simultaneously exposing them to science as a career path.

Disclosures: **D. Alexander:** None. **M. DeSalvo:** None. **S.K. Madsen:** None. **A. Attar:** None. **N. Suthana:** None. **C.A. Ghiani:** None. **W. Ge:** None. **R. Romero-Calderon:** None. **C.E. Evans:** None. **J.B. Watson:** None. **E.M. Carpenter:** None.

Theme H Poster

25. Brain Awareness Week Activities

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 25.04SU/NNN16

Topic: H.03. Public Awareness of Neuroscience

Support: FAPESP

CAPES - PROEX

CInAPCe - FAPESP

CNPq

FAEPA

Title: From three through ninety three: The brain awareness week experience in brazil

Authors: ***A. FERNANDES**¹, P. BERTTI¹, E. H. L. UMEOKA², P. D. PEREIRA², J. TEJADA³, M. L. DAL-CÓL¹, J. A. CORTES DE OLIVEIRA¹, F. DEL VECCHIO¹, N. GARCIA-CAIRASCO^{1,2}, J. C. SANTOS¹;

¹Physiol., ²Neurosciences and Behavioral Sci., ³Physics, Univ. of São Paulo, Ribeirão Preto, Brazil

Abstract: Human beings are curious animals and throughout the ages the brain has intrigued us, from the first trepanations to “release demons”, to the 3D imaging we have nowadays to help us seeing the brain structures and their functions.

Brazil has achieved a lot of progress in eradicating poverty and analphabetism but we are yet far from the ideal scenario. Despite the lack of scientific information our population face, this does not make us less curious about the nature of daily occurring events and understanding how the human body works, especially the brain and its related diseases is a hot topic.

Ribeirão Preto is a medium to large city in the State of São Paulo, holds the second biggest Campus of the University of São Paulo and is one of the major academic and scientific centers in our country. However there is an invisible barrier between the University and the population and the scientific discoveries usually take a long time to be disseminated to the Society.

To help the approximation between the University and Society, initiatives such as The Brain Awareness Week (BAW), promoted by the Dana Foundation, are certainly of great value and our Neurophysiology and Experimental Neuroethology Laboratory (LNNE), under the Direction of Prof. Norberto Garcia-Cairasco, has devoted a great effort to translate Neuroscience to the community. Since 2010 we have participated on the BAW promoting an increasing number of events over the years.

This year the LNNE strongly contributed to the promotion of the II National Brain Week, with the organization of the Brazilian Society for Neuroscience and Behavior (SBNeC) in coordination with the international BAW. As a country we organized 84 events and more than 10 only in Ribeirão Preto, in which the LNNE participated actively.

The activities included discussions and other activities at our University Campus, at a Clinic for elderly, at a High School and 2 other Universities, even in a Bar. In all these places we and the community talked about the Brain, Epilepsy, Depression, Alzheimer’s, Parkinson’s, Drugs of Abuse, Neuroscience and the Arts, Ageing and so on. To close the Week we promoted a great event in an open public place we called “S.O.S.: the Brain in the Park” that gathered hundreds of people, from three years old children through a 93 years old man who was one of the most curious we met, to see real and schematic human brain specimens and talk with our Medical School Students, to do Arts and to discuss to Undergraduate and Graduate Students about all the subjects related to the Brain.

Disclosures: **A. Fernandes:** None. **P. Bertti:** None. **E.H.L. Umeoka:** None. **P.D. Pereira:** None. **J. Tejada:** None. **M.L. Dal-Cól:** None. **J.A. Cortes de Oliveira:** None. **F. Del Vecchio:** None. **N. Garcia-Cairasco:** None. **J.C. Santos:** None.

Theme H Poster

25. Brain Awareness Week Activities

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 25.05SU/NNN17

Topic: H.03. Public Awareness of Neuroscience

Support: Castle Foundation

Title: Utah brain awareness week 2013: making waves

Authors: *J. M. CAHOON^{1,2,3}, J. T. YARCH¹, M. BIJANZADEH¹, H. XU¹, S. N. REDMON², T. DAHL², A. HAACK², B. J. CURTIS², F. FURMANOV², A. DAVIS⁴;

¹Ophthalmology and Visual Sci., ²Interdepartmental Program in Neurosci., ³MD/PhD Program, ⁴Brain Inst., Univ. of Utah, Salt Lake City, UT

Abstract: For Brain Awareness Week (BAW) 2013 our Brain Awareness Team adopted a 'Making Waves' theme, corresponding to the electrophysiological signals brains create. This year, prior to BAW, we were able to bring together BAW teams from universities across Utah, including BYU, Weber St., and the University of Utah in order to share BAW ideas and resources. Each Brain Alliance team demonstrated their most effective modules and techniques to an audience of eager learners followed by a hands on workshop thereafter. Our Brain Alliance event proved to be an effective platform for communication amongst like-minded BAW people. This year we visited over 750 students; with a focus on students from disadvantaged backgrounds. In addition, we held our weekend public event at The Leonardo, a contemporary museum of science, technology, and art. The Leonardo was an outstanding success with over 650 community members and families perusing and participating in all of our activities. In addition to the U of U BAW modules, we were once again exhilarated to have the Ripple company generously donate their time and Brain Ball interactive mind station.

New to this year's activities was a combination module in which we blended our Drugs and the Brain presentation with our Intoxication Goggles activity. This module allowed students to get an understanding of how the neurons in their brains can be affected by drugs, and how drugs (such as alcohol) can affect their perception and locomotion. Our Spiker Box electrophysiology module was further refined this year. We were able to output action potential responses to a video monitor for students to visualize. We were also able to stimulate cockroach legs with auditory output, in effect making a leg 'dance' to music and thus demonstrating how electrical impulses drive muscle contractions. We augmented our Sensory Systems module this year by adding a hands-on motion perception visual illusions. Each committee member composed or edited an existing Module Summary Sheet which gives a basic overview of how the module can be executed and was charged with demonstrating their module to attendees at the Brain Alliance gathering, and in addition were responsible for training all volunteers for BAW.

Overall, we had another highly successful BAW for 2013 reaching approximately 1400 members of the Salt Lake City community.

Disclosures: J.M. Cahoon: None. J.T. Yarch: None. M. Bijanzadeh: None. H. Xu: None. S.N. Redmon: None. T. Dahl: None. A. Haack: None. B.J. Curtis: None. F. Furmanov: None. A. Davis: None.

Theme H Poster

25. Brain Awareness Week Activities

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 25.06SU/NNN18

Topic: H.03. Public Awareness of Neuroscience

Support: Bloomsburg University Curricular Enhancement Grant

Title: Bloomsburg University's brain awareness week: Outreach to preschool, elementary, middle, high school, and university students in central Pennsylvania

Authors: *J. A. JOHNSON¹, L. E. GILL², K. M. HANAWAY²;
¹Psychology, Bloomsburg Univ., Bloomsburg, PA; ²Psychology, Bloomsburg Univ. of PA, Bloomsburg, PA

Abstract: Bloomsburg University has participated in the Brain Awareness Week (BAW) campaign since Spring of 2011. This year we organized several events for students on and off-campus between the dates of March 5th and March 15th. On-campus events included two keynote lectures; one about the role of the fusiform gyrus in reading comprehension and the other about the use of optogenetics in addiction research. 103 students attended the first keynote and on average rated their enjoyment 8.2 out of 10. 137 students attended the second keynote (average enjoyment rating of 9.3).

Off-campus events included a total 75 undergraduate Psychology students volunteering their time to present interactive activities about the brain to a total of 322 local students in the Bloomsburg community. At one of the outreach events 11 Psychology majors taught 22 preschool students about helmet safety, taste and smell, the interaction of the senses, as well as the lobes of the brain. The volunteers rated their experience of teaching the preschool children very highly (9.5 enjoyment).

A total of 22 Psychology majors taught 106 Elementary school students (2 schools) the preschool activities with more detail. The Psychology volunteers and Elementary children both rated their experience very highly (9.7 and 9.6 enjoyment respectively). Elementary school children noted learning about the four main lobes of the brain and how cerebrospinal fluid helps to protect the brain.

A total of 25 Psychology majors taught 160 Middle school students (2 different schools) the Elementary school activities, but added some high school-level activities as well (brain adaptation, communication skills, and smell). Again, both volunteers (9.7 enjoyment) and students (9.2 enjoyment) rated the program highly. Students noted learning similar things as the Elementary school students.

Finally, 17 Psychology majors taught 36 high school students about communication skills, brain adaptation, neural communication, and smell. While the high school students rated the program very highly (9.4 enjoyment), some of the volunteers showed slightly lower enjoyment (8.7 enjoyment) perhaps because some of the high school students seemed less responsive to the interactive activities.

Overall, we were pleased with the outcomes of Bloomsburg University's BAW. We more than doubled the number of students that we reached through our program. Our Psychology majors appreciate the service-learning opportunity, and local students in the community seem to enjoy learning about the brain. In the future, we hope to bring BAW events to older adults in assisted living communities as well.

Disclosures: J.A. Johnson: None. K.M. Hanaway: None. L.E. Gill: None.

Theme H Poster

25. Brain Awareness Week Activities

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 25.07SU/NNN19

Topic: H.03. Public Awareness of Neuroscience

Support: Society for Neuroscience Chapter Grant

Carleton University Neuroscience Department

Carleton University Office of the Vice-President (Research and International)

Donation from Dr. Jane Stewart

Title: Art, science, and hockey: Carleton university's brain awareness week

Authors: *H. A. MACKAY, Z. R. PATTERSON, V. ST-ONGE, A. ABIZAID, R. GABRYS, R. MCQUAID, O. MCINNIS, N. RUSTOM, T. RODRIGUES, S. HANEA, S. HUDSON, S. J. KING, R. COMBA, S. CAHILL, B. C. WARTMAN, T. PARNO, F. AL-YAWER, C. RUDYK,

C. SMITH, M. WELLMAN;
Carleton Univ., Ottawa, ON, Canada

Abstract: This year the Ottawa Chapter of the Society for Neuroscience expanded on its successful annual “Brain and Mental Health Art Show.” Held at a trendy downtown coffee shop, this art show saw submissions from students at all levels from elementary school to graduate school, professors and medical doctors, and members of the community. This year we doubled the number of submissions we received to 80, and our silent auction of donated art pieces raised over \$2000 for the local Mental Health Crisis Line. By bringing people from a diverse variety of backgrounds together, this event did a great deal to stimulate discussion and raise awareness about issues related to the brain and mental health. We also continued our successful BAW campaign giving over 80 presentations and reaching over 2500 students in local elementary and high schools. At the conclusion of BAW, our society hosted a talk by hockey legend and brain injury survivor Doug Smith. This inspirational event was open to the public and fused contemporary neuroscience research with personal stories of survival and recovery from brain injury. We also hosted the second annual Ottawa Brain Bee, bringing together 8 students from local high schools for a brain trivia competition. The winner of our Brain Bee in 2012 went on to represent Ottawa at the national level, winning second place. Over the course of our many successful events, our primary goal has been to bring the research community and the public sector together, thereby raising awareness about neuroscience research, mental health, and the beauty that we see in the brain.

Disclosures: H.A. Mackay: None. Z.R. Patterson: None. V. St-Onge: None. A. Abizaid: None. R. Gabrys: None. R. McQuaid: None. O. McInnis: None. N. Rustom: None. T. Rodrigues: None. S. Hanea: None. S. Hudson: None. S.J. King: None. R. Comba: None. S. Cahill: None. B.C. Wartman: None. T. Parno: None. F. Al-Yawer: None. C. Rudyk: None. C. Smith: None. M. Wellman: None.

Theme H Poster

25. Brain Awareness Week Activities

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 25.08SU/NNN20

Topic: H.03. Public Awareness of Neuroscience

Support: NIH Grant R15DA015351

Dana Foundation

Society for Neuroscience

National Institute of Health

College of Science & Technology, Morehead State University

Title: 2013 regional brain awareness program in eastern Kentucky

Authors: *I. M. WHITE, K. HAURIS, W. WHITE;
Psychology, Morehead State Univ., Morehead, KY

Abstract: The primary goal of our program in Eastern Kentucky is to enhance public awareness of brain research and to educate a range of audiences about brain health/disease, research, and drug abuse and addiction. Our program is a year-round venture with a focus on community outreach through lectures, presentations, and dissemination of science information. This year's goal was to target over 1000 people in Eastern Kentucky through visits to high schools (9th-12th) in several counties, a brain drawing contest (K-12), and visits to senior homes/centers. We greatly exceeded our goal. High school visits included lectures on the effects of drugs on the brain and behavior. Educational materials on brain health and brain research were distributed to high school students and senior citizens. The Brain Drawing Contest is to enhance brain awareness among students (K-12th). This year, we received nearly 1000 entries from several counties. Drawing themes specific to each grade was judged based on originality, scientific accuracy, and overall design. Judges were twelve students, eight faculty members, and a community representative. Participation in and support for the program has significantly increased over the years. We have seen an increase in the interest high school students have in brain research, in student participation (K-12th), and in collaborative efforts among members of the community--parents, teachers and administrators, and senior citizens. Within the university, collaboration has increased among faculty and students and across different disciplines.

Disclosures: I.M. White: None. K. Hauris: None. W. White: None.

Theme H Poster

25. Brain Awareness Week Activities

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 25.09SU/NNN21

Topic: H.03. Public Awareness of Neuroscience

Support: Yale Pathways to Science Program

Yale Graduate Student Association

Title: Brain education day at yale: A celebration of brain awareness week

Authors: *C. A. CALARCO¹, S. R. TAYLOR¹, N. K. WOODWARD²;

¹Dept. of Mol. Psychiatry, ²Dept. of Neurobio., Yale Univ. Sch. of Med., New Haven, CT

Abstract: Four years ago, graduate students in the Yale Interdepartmental Neuroscience Program designed and ran the first Brain Education Day at Yale in March to celebrate the Dana Foundation's Brain Awareness Week. Since then, Brain Education Day has grown to be one of the favorite events of the year for both the graduate students and participants. This one-day event is organized by the neuroscience graduate students in collaboration with the Yale Diversity Office, the Yale Office of Science Outreach and the Yale Pathways to Science program. The participants in this event are recruited through the Pathways program, which provides science-themed activities and support for students from New Haven public schools, grades 6-12, that have shown an interest in science. Brain Education Day begins with a keynote address to both students and parents by a Yale faculty member about their research. From there, parents are encouraged to stay for an information session about preparing their child for higher education while students are ushered to the first of their four activity stations. This year the stations included sheep brain dissections, neuroanatomy and physiology, sensory and perception, and a tour of the Yale medical library and Cushing Center. During the sheep brain dissections, students were taught the functional roles of the different areas of the brain. In the neuroanatomy and physiology station, students compared the preserved brains of multiple animal species, observed fluorescent transgenic model organisms, and were able to record electrical activity produced by their own muscles. In the sensory and perception station students learned about synesthesia, finding the blind spot of their retina and how retronasal olfaction influences taste perception. The Yale Cushing Center houses the brain specimen collection, patient records, and photographs of Dr. Harvey Cushing, the father of neurosurgery. This museum serves to illustrate how careful, continued observation and record-keeping improved medical practice in the 20th century. We provide lunch for all participants and encourage informal discussion between Pathways students and graduate students, post-docs and faculty members about working in science and the attainability of advanced degrees in science. Brain Education Day has been a huge success at Yale, and some of the activities and demonstrations organized for this day are used throughout the year as the graduate students visit local schools and present to individual science classes.

Disclosures: C.A. Calarco: None. S.R. Taylor: None. N.K. Woodward: None.

Theme H Poster

25. Brain Awareness Week Activities

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 25.10SU/NNN22

Topic: H.03. Public Awareness of Neuroscience

Support: UC Irvine Dept. of Neurobiology & Behavior

UCI MIND - Institute for Memory Impairments and Neurological Disorders at UC Irvine

Center for the Neurobiology of Learning and Memory at UC Irvine

ASCUI Dean's Fund

ASCUI Student Funding Programming Board

Title: The Brain Awareness Conference (BAC) to promote the history and future progress of neuroscience research

Authors: I. TRANG, A. HU, K. Y. TAHARA, S. TRAN, D. MING-HAI LAN, *K. M. BIESZCZAD;
Neurobio. & Behavior, UC Irvine, Irvine, CA

Abstract: With over one billion people worldwide battling neurological disorders and President Obama's recent push for the "Brain Mapping Initiative", it becomes increasingly important for the general population to learn about neuroscience. Brain Awareness Conference (BAC) aims to address the issue with primary goals to: 1) educate a wide variety of people about neuroscience research, including high school students, fellow UC Irvine and other college students, and the general Irvine community and 2) train undergraduates to meaningfully communicate the importance of their research to the general public. Nu Rho Psi Beta (the UC Irvine chapter of the National Honor Society in Neuroscience) hosts the inaugural BAC on May 20th, 2013. Our event features two keynote talks from UC Irvine's Department of Neurobiology and Behavior, Professor Larry Cahill and Assistant Professor Kim Green, and a poster presentation session by undergraduate students from UC Irvine and UC Riverside. Audience members will be asked to participate in an optional survey regarding BAC for entry into a raffle for prizes that promote neuroscience and Nu Rho Psi National Honor Society (e.g., books and mugs). The survey aims to assess the impact of BAC and provides feedback for planning BAC in 2014 regarding demographics, education level, interest, and event marketing. Ultimately, BAC will encourage dialogue between community and academic researchers at all stages of their careers in order to establish connections for education, mentorship and collaboration in the neurosciences. In addition, BAC will bring up to date progress and current issues in neuroscience to its audience

and offer UC Irvine as a prominent center and liaison for learning about neuroscience. We encourage the spread of the Nu Rho Psi National Honor Society in Neuroscience across West Coast universities to begin their own chapters and invite all to next year's BAC - we hope to showcase presenters from across Southern California and expand our target audience from the city of Irvine to Southern California and beyond. Next year's BAC theme is: "Neuroscience Across Levels: From Molecules to the Cortex".

Disclosures: **I. Trang:** None. **A. Hu:** None. **K.Y. Tahara:** None. **S. Tran:** None. **D. Ming-Hai Lan:** None. **K.M. Bieszczad:** None.

Theme H Poster

25. Brain Awareness Week Activities

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 25.11SU/NNN23

Topic: H.03. Public Awareness of Neuroscience

Support: NIH 2P60AA011605-11

Title: Building the brain: interactive exhibit for brain awareness week and the North Carolina science festival

Authors: ***D. L. ROBINSON**, K. K. SULIK, S. K. O'LEARY-MOORE;
Bowles Ctr. for Alcohol Studies, Univ. of North Carolina, Chapel Hill, NC

Abstract: The UNC Bowles Center for Alcohol Studies sponsored an interactive exhibit targeting families and designed to educate and increase enthusiasm about the brain and also to deliver important public health messages. The "Building the Brain!" exhibit focused on brain development and the cells that make up the brain. This program was first presented during Brain Awareness Week at the North Carolina Museum of Life and Science (<http://www.ncmls.org/>) in a hands-on laboratory exhibit area. To illustrate the developing brain, embryonic, fetal and adult animal brain specimens (shark, pig, mouse) and fetal and adult human skull models were available for viewing. Visitors were asked to guess from what animals the brain specimens came, which stimulated lively conversations and questions. A human brain was also available that visitors could touch (with gloves) and functional and anatomical areas were noted. Cross-species similarities and differences among the brains were explored. To facilitate education regarding the various types of cells that make up the brain, laminated pictures of prototypical neurons and glia were provided and visitors could draw their favorite neuron or glia on black scratch-art paper as

a keepsake of their visit. Just outside the lab space, laptops running a virtual microscope allowed visitors to visualize Nissl- and Golgi-stained brain tissue up close (<http://science-learning.com/demo/>). These stations led into discussions of the public health messages of wearing a helmet to protect the brain during sports and cycling, as well as the importance of eating healthy food and protecting our brains from drugs and alcohol (or excessive alcohol in the case of adults). The exhibit was staffed by UNC scientists and students as well as community professionals. Approximately 650 visitors came through the exhibit over 5 days. Feedback from visitors was solicited on wall-mounted posters where questions like, “What was your favorite part of the Brain lab?” were asked. Comments from scientist volunteers were also obtained to evaluate the event and to gather suggestions for improvement. These activities were streamlined and adapted to an outdoor table-top exhibit for the UNC Science Expo during the North Carolina Science Festival (<http://www.ncsciencefestival.org/>). Funded by the Education Core of the UNC Alcohol Research Center (National Institute of Alcohol Abuse and Alcoholism, 2P60AA011605-11, “Molecular and Cellular Pathogenesis in Alcoholism: Education Core”, PI: Fulton T. Crews).

Disclosures: **D.L. Robinson:** None. **K.K. Sulik:** None. **S.K. O'Leary-Moore:** None.

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Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.01SU/NNN24

Topic: H.03. Public Awareness of Neuroscience

Title: Developing return-to-academics protocol after suffering a concussion in student-athletes: A neuroscientific evidence based approach to improve education and awareness

Authors: ***E. HALL**¹, C. KETCHAM¹, M. BAKER², J. MCCONNELL², K. PATEL², C. CRENSHAW², D. KLOSSNER³, B. HAINLINE³;

¹Exercise Sci., ²Athletics, Elon University, Elon, NC; ³NCAA, Indianapolis, IN

Abstract: Concussions are occurring at alarming rates in US and have become a public health concern. In 2010, the NCAA mandated that all members create a concussion management plan to outline return-to-play (RTP) process. However, one thing that was missing was what academic accommodations may need to be made. Many of the signs and symptoms of concussions can have adverse effects on both the playing field and in the classroom. Therefore, an evidence based return-to-classroom (RTC) management plan was developed and integrated into the RTP

management plan and proposed to the administration. Furthermore, educational tools for student-athletes (SAs), coaches and faculty were developed so the importance of implementation and compliance of this plan was understood. It is estimated that 80-90% of those with a concussion will have no symptoms after 7-10 days. Initially following a concussion, a neurometabolic cascade occurs which causes an energy imbalance with the brain needing more glucose but having a decrease in blood flow to supply. As a result, a common recommendation is that 2-3 days of cognitive rest are prescribed to allow for initial recovery. At this time, sports medicine staff should consult with academic advisors to keep the SA out of the classroom (and playing field). We recommend after this initial cognitive rest, the SAS should undergo appropriate neuropsychological assessment. If any decrements are shown than the SA should be held out of all activities up to another 8 days and re-tested on neuropsychological tests. If decrements are still present, the academic advisor should work with disability services to begin making appropriate accommodations for RTC. At this stage, SAs may be thought to have Persistent Post Concussion Syndrome and some evidence suggests that some mental and physical activity may stimulate BDNF and assist with recovery. This mental and physical activity should be gradual and if the SA reports any additional symptoms arising should be taken back to previous stage. Throughout this whole process, the sports medicine staff and academic advising should be in contact with the SA and faculty to educate them about what is occurring and why it is necessary. This is a comprehensive and evidence-based approach to support the well-being of a SA and increase awareness of the impact of concussions.

Disclosures: E. Hall: None. C. Ketcham: None. M. Baker: None. J. McConnell: None. K. Patel: None. C. Crenshaw: None. D. Klossner: None. B. Hainline: None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.02SU/NNN25

Topic: H.03. Public Awareness of Neuroscience

Title: Elon BrainCARE: Concussion education and outreach program for high school athletes

Authors: *C. J. KETCHAM¹, E. E. HALL¹, S. E. FOLGER², W. R. BIXBY¹, P. C. MILLER¹, S. VALLABHAJOSULA², K. P. BARNES¹;

¹Exercise Sci., ²Physical Therapy Educ., Elon Univ., Elon, NC

Abstract: Concussions have long been thought to just be a part of football, where the temporary effects are watched and both players and coaches have a goal of getting back in the game quickly. Recently both the academic and medical communities have an understanding that this mild to severe form of a closed head injury can have both temporary and long term effects. The governing bodies of sport are now requiring a protocol for return to play. For collegiate athletes, the resources are in place although the long term consequences are still not understood. For high school athletic programs the knowledge and resources are scarce in some places, and the consequences both on the playing field and in the classroom for athletes could be great. The goal of the Elon BrainCARE outreach project is to support local high school athletic programs by providing baseline and post-concussion assessment for athletes and their team physician. Furthermore, to provide concussion education for the athletes, coaches, families and the community in regards to the signs, symptoms and consequences of concussions. In the summer of 2012, 103 high school football athletes (14-17yrs) were transported to Elon University and given 2 baseline assessments: 1)ImPACT (Immediate Post-Concussion Assessment and Cognitive Testing), a neurocognitive assessment test; and 2)Clinical Test of Sensory Integration of Balance (mCTSIB), Biodex Balance Assessment. In addition athletes and coaches attended a 30-minute concussion education presentation. This concussion outreach program will be expanded in the summer of 2013 to offer a highly encouraged education and baseline assessment to all high school football teams in the Alamance-Burlington School District. The opportunity will also be opened to other high risk sports as well in this school district at the coaches' request. Also, Elon BrainCARE will facilitate educational additional opportunities for the community through a speaker series involving experts in concussion awareness. This along with the development and access to online materials will serve as a continued resource for the local community in the area of concussion education and awareness.

Disclosures: C.J. Ketcham: None. E.E. Hall: None. S.E. Folger: None. W.R. Bixby: None. P.C. Miller: None. S. Vallabhajosula: None. K.P. Barnes: None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.03SU/NNN26

Topic: H.03. Public Awareness of Neuroscience

Support: DePaul University College of Science & Health

Sports Legacy Institute

Chicago Concussion Coalition

Title: Concussion education as an undergraduate student organization at DePaul University

Authors: *D. A. KOZLOWSKI, F. BRAND, T. GREIF;
Biol., DePaul Univ., Chicago, IL

Abstract: Concussions have received significant media attention lately due to the rise in reports about the devastating effects of repeat concussion in contact sports and in the military. Sports Legacy Institute (SLI) is a non profit whose goal has been to educate the community about concussions and how to play sports safer. One mechanism by which this is done is through concussion education presentations to elementary, middle and high school students. These presentations were first conducted by medical students in Boston who created SLICE - Sports Legacy Institute Community Educators. DePaul University in Chicago became the first institution outside of Boston to develop a chapter of SLICE. Undergraduates in the College of Science and Health developed a student organization, recognized by the university, and together with SLI marketed the presentations to Chicago area schools. This is an entirely student-run organization with a faculty sponsor. The students go through a concussion education training, which may or may not result in academic credit. They learn how to give the presentations and then they travel the city offering 30-40 minute presentations to schools. In addition they have events on campus both for students and the general public about concussions and have a network of students that are passionate about neuroscience and health education. All together SLICE has reached over 1000 students in one year. This is an easy to implement, student run, educational program in Neuroscience that increases public awareness of a public health epidemic- brain injury.

Disclosures: D.A. Kozlowski: None. F. Brand: None. T. Greif: None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.04SU/NNN27

Topic: H.03. Public Awareness of Neuroscience

Support: Association for Psychological Science, APS Fund for Teaching and Understanding of Psychological Science

Title: Cross-institutional collaboration in neuroscience outreach: Undergraduates, graduates, middle and high schoolers get together to learn about the brain

Authors: *W. GRIESAR¹, E. SHAW², K. LEHMAN², M. RUDOLPH², J. LEAKE³;
¹Psychology, Washington State Univ. Vancouver, Vancouver, WA; ²Portland State Univ., Portland, OR; ³Multnomah Educational Sch. District, Portland, OR

Abstract: In metropolitan areas there are often several universities with thriving research and education programs in neuroscience, along with schools teaching science to students in kindergarten through 12th grade. Yet despite a strong shared interest, students in these separate programs and age groups rarely interact.

There are many positive reasons to get them together. Sometimes graduate students are isolated, because their institution lacks undergraduate programs, as in the case of Oregon Health & Science University (OHSU) in Portland, Oregon. This reduces opportunities graduate students have to gain teaching experience, and share their work with a broader audience. It also diminishes their competitiveness for jobs that require classroom expertise.

Undergraduates are often curious about further opportunities in neuroscience, including graduate options, which may be scarce (or non-existent) at their own university. They have questions about what research entails, what experience they need to acquire before applying to a program, and what specific studies are underway. Opportunities to learn directly from graduate students improves their appreciation of graduate options, and directly exposes them to students involved in ongoing research. Outreach also benefits undergraduates by reinforcing neuroscience concepts learned in class.

In addition, studies suggest that, in middle and high school, students are excited by science, or discouraged. Fostering enthusiasm for inquiry into the mechanics of the natural world, including the structure and function of the nervous system, can enhance interest in science. Efforts to reach a broader public about scientific discovery contributes to fascination, understanding and support for research and education about behavior, and the brain. Integrating art projects into outreach efforts extends outreach further, as students create objects they can talk about with family and friends.

Here we describe a successful effort to deliver courses that brought together graduate students from OHSU, and Washington State University in Vancouver (WSU-V), who participated in a supervised teaching practicum, with undergraduates from the Psychology departments at Portland State University and WSU-V.

The undergraduates enrolled in “Advanced Physiological Psychology,” and received exposure to neuroscience concepts and techniques before working with graduates.

Graduates and undergraduates, along with art students from the Pacific Northwest College of Art, used this shared experience to develop extended brain and behavior courses for students at three Portland Public schools during summer.

Disclosures: W. Griesar: None. E. Shaw: None. K. Lehman: None. M. Rudolph: None. J. Leake: None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.05SU/NNN28

Topic: H.03. Public Awareness of Neuroscience

Title: The BRAIN Network: Establishing connections between educators and neuroscience

Authors: *J. A. SEGGIO¹, A. ABDELAL²;

¹Biol. Sci., ²Communication Sci. and Disorders, Bridgewater State Univ., Bridgewater, MA

Abstract: Recent advances in neuroscience over the past two decades have led to numerous discoveries that have direct implications for academic content as well as pedagogical practices across various academic levels. These discoveries have demonstrated how the brain acquires and retains knowledge, and how new learning modifies the structure and physiology of the brain. Theories and conceptions about teaching and learning have been constantly modified in response to new brain research findings. Thus, neuroscience provides us with the opportunity to understand learning, and to modernize the way we think of learning and how we can enhance the way we teach. Unfortunately, several years often pass before new discoveries find their way into curricula and get translated into actual classroom practices. Cutting-edge neuroscience research is published in journals that are not commonly accessible to most educators (e.g., American Journal Neuroscience, Brain and Cognition, etc.). Most educators, however, find it challenging to access current neuroscience research and to understand it well enough to translate it into novel teaching techniques and/or new curricular content. For these reasons the BRAIN Network (Brain Research Applications for Instructional Needs) was created at Bridgewater State University in 2009. The mission of this interdisciplinary network is to bridge the gap between educational neuroscience and education practices by making cutting-edge brain research available to and accessible by educators in the State of Massachusetts and nationally. We offer professional development opportunities to BSU faculty and school educators to enable them to modernize curricula and utilize evidence-based teaching methods. We have been very successful at achieving our goals. Our community outreach initiatives (e.g., monthly meetings and annual educational neuroscience conferences) have brought together educators from all levels. While we provide them with the knowledge about the brain, how it learns, and about evidence-based

practices, they have shown tremendous enthusiasm and engagement. This has inspired us to continue to increase our initiatives. This presentation is part of these initiatives. In summary, the goal of this presentation is to inform participants about our model, hoping to inspire some to begin similar initiatives. We recognize the many challenges and shortcomings of current educational practices. However, we see neuroscience as an invaluable and indispensable source for modernizing educational pedagogy and content.

Disclosures: J.A. Seggio: None. A. Abdelal: None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.06SU/NNN29

Topic: H.03. Public Awareness of Neuroscience

Title: Avengers assemble! batman, iron man, neuroscience, and the general public

Authors: *E. ZEHR;

Ctr. Biomed Res., Rehab Neurosci. Lab., Victoria, BC, Canada

Abstract: One avenue for popularizing science is to link scientific concepts to images and concepts in popular culture. Currently, comic book superhero movies and TV shows are extremely popular and Batman and Iron Man have been used as vehicles for popularizing neuroscience and physiology. Through his years of rigorous training the fictional human Bruce Wayne pulled himself to near-superhuman status as Batman. This part of the Batman mythology makes him attractive because it seems well-grounded in the reality of hard-work and achievement_but is it really scientifically possible to train to become Batman? This is the central question of the book “Becoming Batman: The Possibility of a Superhero” (Johns Hopkins University Press, 2008). As for Iron Man, through years of rigorous experimentation and training the fictional genius inventor Tony Stark created the fully articulated and animated anthropomorphic robotic suit of armor that defines Iron Man. Assuming that such a suit existed, would it actually be possible to don the suit and use it without altering the human inside? What would happen if the suit was connected directly to the nervous system? These are questions central to the book “Inventing Iron Man: The Possibility of a Human Machine” (Johns Hopkins University Press, 2011). As such, Batman and Iron Man have been used to address neuroscience concepts including: the hierarchical organization of the nervous system; supraspinal and spinal reflex control of movement; neural adaptations to skill training and motor learning; the

neuropsychology of martial arts training and combat; pathophysiology of concussion; neural plasticity associated with injury and training; cortical somatosensory and motor maps and phantom limbs; and the concept of neuroprosthetics including brain-machine interface. In developing the scientific content, the principles outlined in “Neuroscience Core Concepts: The Essential Principles of Neuroscience” (Society for Neuroscience, 2007) were explicitly addressed. The purpose was to bring scientific understanding to the broader public by using an anchor point that was well understood (that of the physical image of the fully articulated and instrumented Iron Man in action) and then connecting principles of neuroscience to that anchor. The objective here is to share with other neuroscientists the process and outcomes of using such an approach.

Disclosures: E. Zehr: None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.07SU/NNN30

Topic: H.03. Public Awareness of Neuroscience

Support: 2012 SfN Chapter Grant

FSU Program in Neuroscience

FSU Congress of Graduate Students

FSU Student Government Association

Tallahassee Memorial Healthcare Foundation

Self-generated funds through teaching the OLLI Neuroscience course

Title: Young (and old) minds want to know_educational outreach efforts by the Florida State University (FSU) neuroscience program

Authors: *C. L. ROBISON¹, A. M. STATHOPOULOS², S. B. OGDEN³, C. LIEBERWIRTH³;
²Biol. Sci., ³Psychology, ¹Florida State Univ., Tallahassee, FL

Abstract: The FSU Neuroscience outreach has become a staple for the Leon County school district and many schools have already incorporated the outreach programs into their

curriculums. During the 2012-13 academic year, Neuroscience graduate students visited high school classrooms, developed a Neuroscience lecture series for senior citizens, and hosted the 7th annual *North Florida Brain Bee* and the 2nd annual *Brain Fair*. In fall, we visited 16 classes at 7 different high schools and used hands-on demonstrations to teach about the five sensory systems. Additionally, we taught comparative brain anatomy using human and other vertebrate brains. The Neuroscience students also coordinated the *Friday Neuroscience Lectures*, a free 9-week course to prepare high school students for the *North Florida Brain Bee*. The 7th annual *North Florida Brain Bee*, held in early 2013, attracted 63 participants from 3 Tallahassee high schools. With funding provided by the FSU Neuroscience program, the winner of the local *Brain Bee* was sent to compete at the *USA National Brain Bee Championship* in Baltimore, MD. The competitor, a high school freshman, was not the youngest FSU competitor to be sent to the National championship and placed an outstanding 13th out of 45 participants. In addition to the high school classroom visits, the Neuroscience graduate students, under the guidance of two Neuroscience faculty, developed a lecture course for senior citizens in Leon County taught at the *Osher Lifelong Learning Institute (OLLI)*. This Neuroscience course was taught solely by graduate students with topics ranging from neuroanatomy to neuroendocrinology. The course generated immense interest with 56 registered participants. Importantly, this course also allowed the Neuroscience graduate students to reach seniors_a population previously not represented in our outreach efforts. Last year, we held the first ever *Brain Fair*, an open house event to educate K-12 children and their parents on basic neuroscience. After an overwhelming success, we held the 2nd annual *Brain Fair* in spring. We had 20 different activity stations including interactive demonstrations to teach children and their parents about the basic functions of the brain, neurons, sensory systems as well as the importance of neuroscience research. The *Brain Fair* attracted approximately 500 people from Leon County as well as neighboring counties in north Florida and south Georgia. Supported by the 2012 SfN Chapter Grant, FSU Program in Neuroscience, Congress of Graduate Students, Student Government Association, Tallahassee Memorial Healthcare Foundation, and self-generated funds through teaching the OLLI Neuroscience course.

Disclosures: C.L. Robison: None. A.M. Stathopoulos: None. S.B. Ogden: None. C. Lieberwirth: None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.08SU/NNN31

Topic: H.03. Public Awareness of Neuroscience

Support: NSF CAREER Award 1149446

CUNY CAREER Incentive Award

Title: Nameaneuron.org: An anatomically accurate 3D neuron database for crowdfunding of student neuroscience projects

Authors: ***D. P. MCCLOSKEY**^{1,2,3}, T. DEDITS¹, M. ZIONS², T. A. SHOHATEE³;

¹Dept of Psychology and Program in Developmental Neurosci., Col. Staten Island/ CUNY, Staten Island, NY; ²Program in Neurosci., Grad. Ctr. at CUNY, New York, NY; ³Ctr. for Developmental Neurosci., Col. of Staten Island/CUNY, Staten Island, NY

Abstract: Students involved in neuroscience research often develop new ideas that are outside of the funding capabilities of a laboratory head or are tangential to the main areas of focus in the lab. Here, we present the development of a new not-for-profit resource, nameaneuron.org, dedicated to the support of student neuroscience projects in an attempt to encourage students to pursue these creative endeavors. This site, which is currently under development, will allow undergraduate and graduate students to “claim” neurons in a web-based 3D neuron database and describe a resource, equipment, or travel need related to seeing their project through. Students will provide a lay summary of their project including some educational information of the brain area or process they study, a detailed quote of the financial need, and a short statement of support from a faculty sponsor to claim neurons. Benefactors can explore the brain database or a list of current projects, “purchase” the neurons related to student projects, and “name” them in our database so that any visitors to the virtual 3D brain will be able to see what project was supported and by whom. This crowdfunding approach is designed to provide a resource to support student neuroscience research and increase public awareness of the ideas of tomorrow’s neuroscientists. The current neuron database is a complete mouse brain with an estimated 135 million neurons. This 3D brain was developed using high-resolution image sets of in situ hybridized neuronal markers published by the Allen Institute for Brain Science. Images were aligned and thresholded using MATLAB at the CUNY High Performance Computing Center, and converted to a 3-dimensional graph which can be displayed on our website using OpenGL and Java 3D. The approach to develop this database will be used to create similar databases of other cell types in the mouse brain, and in other species.

Disclosures: **D.P. McCloskey:** None. **T. Deditis:** None. **M. Zions:** None. **T.A. Shohatee:** None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.09SU/NNN32

Topic: H.03. Public Awareness of Neuroscience

Support: OHSU

Title: The Oregon Health and Science University youth engaged in science initiative - YES!

Authors: *M. MATTHEWS, K. AYKES, J. NIGG, D. FAIR;
Oregon Hlth. & Sci. Univ., Portland, OR

Abstract: The Fair Neuroimaging Laboratory launched the Youth Engaged in Science Initiative (YES!) in October 2013. The program uses various modules to address educational and health disparities in underserved communities. YES! provides multifaceted opportunities for exposing underrepresented students to science, medicine, and research related careers and getting kids excited about science through education, mentorship, and hands-on experience. The flexible infrastructure built by YES! aims to arm educators, community organizations, or individual community partners with resources and programs necessary to expose their constituents to STEM careers. The pilot program also has a secondary benefit of exposing children and families to research opportunities at Oregon Health and Science University. Although the demographics of American society are rapidly changing, many studies of childhood behavior and health neglect to include sufficient African-American and Hispanic study participants to enable generalizability of results or identification of population-specific risk factors. As a result, physicians and psychologists often lack the appropriate context for understanding and supporting children in these communities when applying the latest research findings. To this end, YES! has visited six middle school classrooms to give Brain-in-a-Box presentations, focused on teaching students about the teenage brain, and has welcomed various student groups for Lab Tours of the Fair Neuroimaging Laboratory and the Advanced Imaging Research Center at the Oregon Health and Science University (OHSU). YES! has participated in various OHSU-sponsored outreach events, such as On Track OHSU! to teach local underserved high school students about cutting edge imaging techniques such as electroencephalography (EEG) and function magnetic resonance imaging (fMRI). YES! also participated in the annual Oregon Museum of Science and Industry Brain Fair in March 2013, to promote outreach opportunities, the Fair Neuroimaging Lab's brain development studies, and fun facts about the brain. The program also educates families about mental health and the importance of community participation in biomedical research, with the hopes of increasing enrollment of underrepresented populations in clinical studies. YES! sponsors informational sessions for families to get up to date information and resources on

attention deficit hyperactivity disorder (ADHD) and Autism from mental health counselors and clinical and research experts. We believe that together these programs will bridge the gaps in educational and health equity between OHSU and the Portland, OR community at large.

Disclosures: **M. Matthews:** None. **K. Aykes:** None. **J. Nigg:** None. **D. Fair:** None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.10SU/NNN33

Topic: H.03. Public Awareness of Neuroscience

Title: Carry The One Radio: A series of short interviews with scientists

Authors: ***B. SEYBOLD**, O. M. AHMED;
Univ. of California - San Francisco, San Francisco, CA

Abstract: How can we inspire a new generation of scientists? Started in 2009, Carry The One Radio is a series of short interviews with scientists. In each interview, we ask the scientist to walk through an exciting recent finding in understandable terms and discuss how he or she became involved in science in the first place. Our goal is to introduce high school and college students to science in an approachable context so that these students will consider science as a career option.

Carry The One Radio is hosted online and run entirely by a small group of dedicated young scientists, mostly graduate students at UCSF, who want to bridge the gap between the scientific community and the general public. We value science education and encourage teachers and students alike to share our freely available episodes with as many people as possible. On the 1st of each month, we post a new interview along with information about the scientist. You can download each episode as an mp3, subscribe to the show via iTunes, or simply listen to each episode directly on our website. Stop by our poster or find us online to learn how you can contribute to Carry The One Radio or even be interviewed for our show.

Disclosures: **B. Seybold:** None. **O.M. Ahmed:** None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.11SU/NNN34

Topic: H.03. Public Awareness of Neuroscience

Title: Still building the neuroscientific community through the next generation in Jackson, Mississippi

Authors: *L. N. BELOATE^{1,2}, M. O. BOHLEN^{1,2,3}, J. W. DUNCAN^{1,2}, L. GOLDEN⁴, W. L. WOOLVERTON^{1,2,4};

¹Univ. of Mississippi Med. Center, Program In Neurosci., Jackson, MS; ²Mississippi Chapter, Society for Neurosci., Jackson, MS; ³Univ. of Mississippi Med. Center, Dept. of Neurobio. and Anatom. Sci., Jackson, MS; ⁴Univ. of Mississippi Med. Center, Dept. of Psychiatry and Human Behavior, Jackson, MS

Abstract: Mississippi is one of the lowest ranked states in educational scores, particularly in mathematics and sciences. Within the state, the lowest scores are associated with African-American and Hispanic children. In 2012, under the auspices of the Mississippi Chapter of the SfN, University of Mississippi Medical Center (UMMC) graduate student members collaborated with Millsaps University undergraduates to begin building a community outreach component in the chapter. This included visiting elementary school students during Brain Awareness Week and leading activities that demonstrated neuroscientific concepts. Additionally, local high school and undergraduate students were invited to UMMC and given tours focused on brain and spinal cord structure and function. Other outreach included visits with students considering graduate school at Millsaps and the University of Mississippi in Oxford to discuss our experiences and why we chose to pursue careers in neuroscience.

The primary goal in 2013 was to build upon last year's activities and to extend them beyond Brain Awareness Week. We hope to generate interest in scientific careers, particularly to those who may not have considered them before, as well as help students apply scientific knowledge to every day events. We held a lab tour day at UMMC, allowing Base Pair students from Murrah High School to experience and learn about some of our ongoing research projects. We presented a variety of interactive, informative activities to the students that covered molecular neurobiology techniques, neuroanatomy, and behavioral concepts as well as potential educational and career paths. For example, the students were exposed to brains from various species and participated in a DNA precipitation assay. We plan to continue these tours on a quarterly basis throughout the year.

We also began a collaboration with a local non-profit organization that works with high school students from the local public school system, Scientific Research (SR1). We have been sharing

our stories of how we became scientists-in-training, focusing on our diversity, opportunities we considered and adversities that we have overcome. We will present our current research projects as well, including topics such as obesity, addiction, and depression, in a manner that will be understandable to high school students. Additionally, a science blog is being developed that will allow students to submit questions that a UMMC student will answer using scientific support. These activities will not only be beneficial to the high school students, but to graduate students as future scientists that will need to communicate with a variety of audiences throughout our careers.

Disclosures: **L.N. Beloate:** None. **M.O. Bohlen:** None. **J.W. Duncan:** None. **L. Golden:** None. **W.L. Woolverton:** None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.12SU/NNN35

Topic: H.03. Public Awareness of Neuroscience

Support: Grant from Michael T. Goulet Foundation

Title: University of New England center for excellence in neuroscience outreach program

Authors: **A. L. DEAL**¹, K. J. ERICKSON¹, E. J. BILSKY², *M. A. BURMAN¹;

¹Psychology, ²Ctr. for Excellence in the Neurosciences, Univ. of New England, Biddeford, ME

Abstract: The University of New England (UNE) Neuroscience Outreach Program, established in 2009, provides an opportunity for undergraduate and medical students as well as UNE faculty to collaborate in bringing interactive, educational neuroscience modules to local schools in Maine. The program is built around a growing collection of interactive modules covering various topics such as neuroanatomy, neurological disease, and traumatic brain injury that bring the science to life and get students involved in their learning. Volunteers in our Outreach Program bring these modules to K-12 students in the southern Maine area, with the goal of enhancing their interest in science, the brain, and UNE. Modules and activities are catered toward specific age groups and modified to fit specific classroom needs, in that we work to collaborate with local educators so that our presentation relates to and enhances students' current curriculum. In order to have a lasting impact, we are vertically integrating our modules at the elementary level and progressing with the students into their middle and high school years, building lasting

relationships that should encourage these students to continue into science fields as adults. Since its initiation, the program has grown to reach approximately 3500 students at 12 different schools in the last year, with the hope of expanding our community ties in the future. Other future directions for the UNE Outreach Program include student assessments to evaluate our impact, improving instructional tutorials for our volunteers so as to improve the quality of our modules and activities, and collaborating with other science disciplines such as marine biology and pharmacology to improve our current lessons and to create new modules and activities. First two authors contributed equally to this abstract.

Disclosures: **A.L. Deal:** None. **M.A. Burman:** None. **K.J. Erickson:** None. **E.J. Bilsky:** None.

Theme H Poster

26. Neuroscience Community Outreach

Location: Halls B-H

Time: Sunday, November 10, 2013, 8:00 AM - 12:00 PM

Program#/Poster#: 26.13SU/NNN36

Topic: H.03. Public Awareness of Neuroscience

Support: Hay Grant, Academy of Neuroscience for Architecture

NSF Grant 1027259

NIH Grant EY018613

Title: Systems neuroscience and architectural design

Authors: *S. GEPSHTEIN;

Systems Neurobio. Labs., The Salk Inst. for Biol. Studies, La Jolla, CA

Abstract: As an inaugural recipient of the Hay Program grant from the Academy of Neuroscience for Architecture (www.anfarch.org) I study the theory and practice of architectural design from the perspective of systems neuroscience. I begin from the observation that architectural practice requires simultaneous satisfaction of multiple constraints concerning aesthetics and utility of built environments. The multiple factors interact nonlinearly, making the task exceedingly difficult, more so in the environments that involve dynamic interactions on multiple spatial scales, contain moving parts, display dynamic information, or presume a continuously moving observer. I find that results of studies in sensory psychophysics, perceptual psychology, and sensorimotor neuroscience offer many cues for facilitating the task. But architects have no ready access to results of this work locked in scientific journals, couched in

terms foreign to architectural practice, and introduced in architecture schools in rudimentary form. This state of affairs prevents architectural practice from engaging and generating objective quantitative knowledge about the human response to built environments. I propose three paths toward bridging the gulf. (1) Reform architectural education such that students learn to translate relevant scientific results to architectural context, using time-tested methods that require no sophisticated equipment (such as the psychophysical procedures developed for finding equivalence classes of sensory cues and factors of perceptual organization). This goal is facilitated by the increasingly digital nature of architectural design. (2) Publish guides illustrating how quantitative characteristics of perception help to answer specific questions in architectural practice. (3) Instigate inter-disciplinary projects, such as the present Hay Program project called Vision Science for Dynamic Architecture that combines expertise from vision science (the author), architecture (Greg Lynn, UCLA), and production design (Alex McDowell, USC) to motivate design choices from measurements of human response across a wide range of spatiotemporal conditions. In conclusion, I present a case study in which the multiscale nature of perception is exploited for aesthetic and practical effects. For aesthetic effect, the same large-scale patterns evoke different perceptual organizations (gestalts) at different viewing distances, using human spatiotemporal contrast sensitivity functions (Kelly function) as a reference. For practical effect, the same patterns communicate different visual messages (such as text versus image) across different distances.

Disclosures: S. Gepshtein: None.

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Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.01SA/NNN37

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Neurobioethics and christian anthropology: Ethical framework for contextualizing neuroenhancement

Authors: *D. C. LARRIVEE¹, A. GINI²;

¹Roman Catholic Diocese of Charleston Educational Outreach Office, Williamston, SC;

²Neuroradiology, Neurosci. Dept., San Camillo Forlanini Med. Ctr., Rome, Italy

Abstract: Rapid progress in neuroscience technologies now offer the real possibility for selectively modifying the FUNCTION OR STRUCTURE of neural circuits by PHARMACOLOGICAL OR BIOTECHNOLOGICAL means, with consequent impact on behavior. Ethical concerns are as yet relatively undetermined and subject to debate. Moreover, contemporary neuroscience commonly proposes an anthropological definition that is circumscribed mechanistically, wherein affective and rational activity is grounded on a biophysical base that, for its characteristics, may be subject to a utilitarian manipulation (Gordijn & Buyx, 2010). Christian anthropology, by contrast, expands the definitional boundary to a more sophisticated, non-deterministic, ontological unity composed of spirit and matter, an inference drawn from the a priori causation and teleology of physical determinism (Aquinas). Thus, the neuro-corporeal entity is viewed as a visible manifestation of an ontological unit impressed with a divine image, and imbued with directionality (Wotyla, 1981). Rooted in this “imago Dei” are situated the derivative dimensions of human behavior, including love or agape, compassion, marital unity, and non-discrimination, among others, from which they acquire their inherent valuation and developmental trajectory (Ratzinger, 2006/2012). We believe that behavior consonant with the preservation of this ontological unity facilitates societal cohesiveness. Interpretive schema for consonance derive from the expression of this unity in its corporeal dimension with natural inclination toward perfection (Wotyla, 1981; Pinkaers, 1986). Therefore, a neuroscience grounded solely in a physicalist interpretation lays open to fragmentation multiple behavioral dimensions, thereby facilitating conflict. Neuro-modification, with its purported capacity for altering behavior discretely, is thus potentially disruptive (Spezio, 2011). We propose that a corporeal reading of integral behavior in light of a Christian anthropology will help ground neuromodification proposals, preserve the inherent dignity of the individual, and avoid disruptive social forces.

Disclosures: D.C. Larrivee: None. A. Gini: None.

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.02SA/NNN38

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: The neuroscientist pledge and other ways of opposing the misuse of neuroscience for "National Security"

Authors: *C. C. BELL;

Neurolog. Sci. Inst., Oregon Hlth. and Sci. Univ., Beaverton, OR

Abstract: For many of us, the interest and excitement that we feel about important discoveries in neuroscience is shadowed by fear of the unethical uses that can flow from the same discoveries. The danger is particularly acute in the area of “National Security”. Our conflict-laden world is filled with state and non-state actors that seem ready to use whatever technology is available to maintain or enhance power, including neurotechnology. We must actively oppose the misuse of our science for unethical or unlawful purposes.

A pledge is now circulating internationally among neuroscientists as one way of opposing the misuse of neuroscience. Signers of the pledge commit to: a) making themselves aware of the potential applications of their work and that of others to applications that violate basic human rights or international law such as torture and aggressive war; and b) refusing to participate knowingly in the application of neuroscience to violations of basic human rights or international law. In essence, the pledge calls on neuroscientists to follow the basic ethical principles of recognizing the consequences of their actions, taking responsibility for those consequences, and obeying the law. Neuroscientists in 17 different countries have signed the pledge. The pledge may be read and signed online at tinyurl.com/neuroscientistpledge

The pledge complements other actions that neuroscientists can take to counter the misuse of neuroscience for “National Security” purposes including:

1. Development of awareness through education and discussion;
2. Development of committees or working groups to examine the issue and consider ethical and legal parameters to guide work on “National Security” and legislation;
3. Strengthening and updating international law as embodied in the Geneva Conventions, the Chemical Weapons Convention, the Biological and Toxin Weapons Convention, and the Convention Against Torture and Other Cruel, Inhuman and Degrading Treatment or Punishment.
4. Including the proscription of work on applications that violate fundamental human rights or international law in the ethical statements of neuroscience societies.

Neither the pledge nor any of these other actions will prevent the misuse of neuroscience.

However, such actions can nurture a scientific culture that in addition to focusing on the enhancement of human well-being neither ignores nor minimizes the danger of applications that damage such well being. In taking such actions neuroscientists join with other professional and civil society groups in moving the world toward peace, human rights and respect for international law.

Disclosures: C.C. Bell: None.

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.03SA/NNN39

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Social dimensions and ethical issues in the use of embodied modeling with autonomous agents in neuroscience research

Authors: *A. K. LEE¹, A. LAM^{1,2}, E. L. OHAYON^{1,3};

¹Green Neurosci. Lab, NeuroInx Res. Inst., San Diego, CA; ²Univ. of Toronto Epilepsy Res. Group, Toronto, ON, Canada; ³Salk Inst. for Biol. Studies, San Diego, CA

Abstract: Throughout history, scientific breakthroughs and advances have raised critical ethical considerations. Currently, autonomous agent neural network modeling offers new neuroscientific methods to gain insight into the workings of the embodied brain. The science, however, is being increasingly used for purposes that raise ethical issues, such as the use in surveillance systems and drones. What kind of guidelines or rules should be followed to ensure that research will not bring harm to others? Is there a way to approach brain research relating to autonomous agents, artificial intelligence and robotics, in a more mindful manner? The purpose of this presentation is to identify ethical issues surrounding autonomous agent modeling. We examine the examples and discussions in (1) scientific and academic research (2) popular culture and science fiction literature (3) government and military usage. We propose initial ethical guidelines and principles for current and future research on autonomous agents. The societal impact of these ethical issues is also presented.

Disclosures: A.K. Lee: None. A. Lam: None. E.L. Ohayon: None.

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.04SA/NNN40

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: On the practice of replicating an electrophysiology study with the Center for Open Science

Authors: *M. LEWIS, M. PITTS;
Psychology, Reed Col., Portland, OR

Abstract: Replicability is essential to scientific progress. However, in recent years published research findings have been less reproducible. Recently, an initiative called the Reproducibility Project (RP) has been organized by the Center for Open Science (COS), a non-profit organization seeking to establish infrastructure for scientists to make their research process more transparent. The goal of the RP is to test the reproducibility rate of published research findings as well as to develop methods to improve the practice and dissemination of direct replication experiments. Currently, over 100 scientists have joined a single endeavor to replicate experiments published in three prominent psychology journals: Psychological Science, Journal of Experimental Psychology: Learning, Memory, and Cognition, and Journal of Personality and Social Psychology. Participation in the RP entails collaboration with other members of the COS as well as the authors of the original study to develop strategies for adhering as closely as possible to the original experiment. While the RP and COS were originally developed by cognitive scientists and social psychologists, such endeavors are likely to be of interest and utility to the neurosciences as well. Here, we discuss first-hand experience in conducting a replication experiment as part of the RP, from experimental design and data analysis to the submission of a complete report to the COS. Relevant to the neurosciences, this particular replication experiment involved electroencephalographic (EEG) and electromyographic (EMG) recordings associated with motivational aspects of error monitoring. This study not only contributed to the larger RP, but also provided unique training opportunities for students in neuroscientific techniques as well as exposure to the open science approach. The challenges involved in maintaining strict adherence to the methods and analyses of the original study prompted development of practices to efficiently share experimental materials and data. A number of potential solutions to the problems of openly encoding and providing access to neuroscientific and behavioral data will be discussed.

Disclosures: M. Lewis: None. M. Pitts: None.

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.05SA/NNN41

Topic: H.04. Ethical and Policy Issues in Neuroscience

Support: CNRS Institute for Science Communication

Title: Print media coverage of brain imaging studies addressing medically unexplained symptoms

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Abstract: Medically unexplained symptoms are symptoms with no known medical cause, and include pain associated with conditions such as fibromyalgia or irritable bowel syndrome that occurs without identified tissue lesions as well as tinnitus, the perception of sound within the ear in the absence of a sound-emitting source outside the ear. People with these symptoms report significant suffering and often face resistance from those who do not believe their symptom reports. Consequently, these patients often turn to print media coverage of scientific findings to provide validation for the existence of or potential explanations for these symptoms. Recently a number of scientific investigations have employed brain imaging techniques to study medically unexplained symptoms. It has, however, been shown that print media coverage of brain functional magnetic resonance imaging studies of other phenomena, can make the phenomena studied uncritically real or objective to the public (Racine et al., *Nat. Rev. Neurosci.*, 2005). Given that a primary issue involved in medically unexplained symptoms is their recognition, we hypothesized that print media coverage of brain imaging studies on medically unexplained symptoms would have a strong tendency to present these studies optimistically; providing evidence in favour of the objective existence of these symptoms. To address this hypothesis, we identified print media articles covering scientific brain imaging studies on medically unexplained symptoms using Factiva database searches. The majority of the print media articles covering brain imaging studies on fibromyalgia, irritable bowel syndrome or tinnitus were optimistic in tone and related the idea that brain imaging provides evidence that the medically unexplained symptoms in these syndromes objectively exist. Only a small minority of the print media articles offered a balanced view in the sense that they echoed scientific debate, underlined the need for further studies before drawing any firm conclusions or indicated that the link observed between differences in brain structure or activation and symptoms was not necessarily a causal one. Our working hypothesis being corroborated by these initial findings, we are now comparing these print media articles to the scientific brain imaging studies they cover to identify the origin of this optimistic and uncritical tone as to the objective existence of medically unexplained symptoms.

Disclosures: L. Baudet: None. R. Potier: None. J. Konsman: None.

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.06SA/NNN42

Topic: H.04. Ethical and Policy Issues in Neuroscience

Support: NIH Grant 5R21NS077050-2

Title: Providing neuroimaging incidental finding reports to all research participants: What's the harm?

Authors: C. E. COLE¹, J. P. GLUCK^{2,6}, J. M. SHOEMAKER¹, M. T. HOLDSWORTH³, L. E. PETREE¹, D. L. HELITZER⁴, R. SCHRADER⁵, *J. P. PHILLIPS^{7,1};

¹Mind Res. Network, Albuquerque, NM; ²Dept. of Psychology, ³Col. of Pharm., ⁴Dept. of Family Community Med., ⁵Clin. and Translational Sci. Ctr., Univ. of New Mexico, Albuquerque, NM; ⁶Kennedy Inst. of Ethics, Washington, DC; ⁷Univ. of New Mexico Hlth. Sci. Ctr., Albuquerque, NM

Abstract: Background: As a result of the high frequency of incidental findings (IFs) found in research MRI scans, multiple positions have emerged on the potential consequences of required IF disclosure. Institutions are concerned about adverse consequences such as generating unnecessary anxiety among participants, causing excessive healthcare resource utilization, and burdening research teams with extra work and costs. Despite significant trepidation expressed in the literature, there is a surprising lack of empirical work that characterizes the actual impact of IF disclosure on research participants and other stakeholders.

Research Question/Hypotheses: Does IF disclosure cause excessive anxiety among research participants? What is the burden to research teams when universal IF disclosure is mandated? Do research participants perceive radiology review and IF reporting as beneficial?

Research Methods: Former MRI research participants (160) completed surveys that addressed issues of health literacy, anxiety and the impact of receiving an MRI report. Previously validated surveys were adapted to allow assessment of situational and baseline anxiety, as well as health literacy. Neuroimaging investigators (130) and IRB members (50) completed surveys that assessed the extent of research burden, participant comprehension and the cost-benefit ratio to reporting findings.

Results: Participants' anxiety in response to their MRI report was positively correlated with pre-existing baseline anxiety ($p < .016$) and self-reported health literacy level ($p < .0114$). IRB

members expressed significantly greater concern than Investigators for participant's ability to understand consent forms ($p < .0001$), radiology cover letters ($<.0001$) and participants' anxiety level after receiving their MRI report ($<.005$). Further, Investigators felt reviewing and reporting MRI scans was significantly less of a time burden to research staff than what IRB members felt the burden might be ($t=-6.346$, $p < .0001$).

Conclusions: Our results suggest that anxiety associated with getting an MRI IF report is related to pre-existing baseline anxiety and level of health literacy, in addition to the severity of the IF identified. This finding suggests the need to explore possible mitigation strategies to decrease adverse participant anxiety related to getting IF reports. In addition, IRB members may overestimate the degree of burden reporting IFs has on investigators and research institutions. Further discourse among stakeholders is needed to examine the rationale behind these differences.

Disclosures: C.E. Cole: None. J.P. Gluck: None. J.M. Shoemaker: None. M.T. Holdsworth: None. L.E. Petree: None. D.L. Helitzer: None. R. Schrader: None. J.P. Phillips: None.

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.07SA/NNN43

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Sad Cyborg. The problem of disembodiment in Andy Clark's approach to human identity

Authors: *L. E. ECHARTE;

Univ. of Navarra, Pamplona (navarra), Spain

Abstract: The advances in neuroscience are bringing a better understanding of human neural function in relation to cognitive and behavioral performance. Besides, new neuro-technology is making possible powerful new ways to treat serious diseases and even, potentially, to improve lifestyles. It makes sense that, in this boom, neural theories about human identity are getting attention in intellectual debates and social life. One of the best known is that which comes over in the "extended mind thesis" (EMT) formulated by Andy Clark and David Chalmers (Clark 2008). In my poster I study the anthropological and ethical implications of the thesis of corporeality in Clark's approach: the idea of considering mechanical gadgets as part of our own body, and vice versa, the idea of considering one's own body as a mechanical gadget. In particular, I focus on the problem of disembodiment associated with that double belief. I show

how this problem appeals to, first, a loss of feeling of corporeity -the experience of meaningless and normless events in which one used to be bodily engaged-; second, the sensory experience of being in a place other than one's physical location (Burrows 1995); and finally, the paradox experience of sharing identity with those who use the same mechanical gadgets (Hayles 1999). In my conclusions, I point out the growing link between the neuroscience revolution and the emerging cyberspace culture; I identify in this link some roots of the new scientific and social interest in Buddhist ideas of self; and warn against different current global attempts at artificial re-embodiment.

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Disclosure.DisclosureBlock:

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.08SA/NNN44

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Adverse childhood experiences at the intersection of neuroscience, policy, and children's health

Authors: *K. SRIPADA;

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Abstract: Every child will experience a unique environment during their early development, with some experiences more positive than others. Adverse childhood experiences (ACEs) can include neglect, emotional, physical, and sexual abuse, and the presence of a household member

experiencing violence, substance abuse, mental illness, parental separation, and incarceration. Recent studies on ACEs have uncovered links to a variety of negative behavioral and health outcomes in later years, ranging from lower quality of life to depression, post-traumatic stress disorder, drug and alcohol abuse, and suicide attempts. ACEs often occur together and, combined, can amplify negative health outcomes in later life; some presentations may be challenging for clinicians to recognize or address. While much ACEs research has focused on retrospective assessments, some studies use prospective longitudinal cohort methodology. The study of ACEs is at the intersection of science and policy, linking developmental neuroscience and the social conditions surrounding children and families. This presentation will provide an overview of this growing body of research, highlighting examples from multiple countries, and analyze implications of the data for influencing public policy for children.

Disclosure.DisclosureBlock:

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.09SA/NNN45

Topic: H.04. Ethical and Policy Issues in Neuroscience

Support: NIH Grant 5R21NS077050-2

Title: The great divide: Disparate perspectives among participants, researchers and IRB members regarding incidental finding disclosure

Authors: L. E. PETREE¹, D. L. HELITZER³, *J. M. SHOEMAKER², J. P. PHILLIPS^{4,1}, C. E. COLE¹, J. P. GLUCK^{5,8}, R. SCHRADER⁶, M. T. HOLDSWORTH⁷;

¹Mind Res. Network, Albuquerque, NM; ²Mind Res. Network, Albuquerque, NM; ³Family Community Med., ⁴Neurol., ⁵Psychology, ⁶Clin. and Translational Sci. Ctr., ⁷Pharm., Univ. of New Mexico, Albuquerque, NM; ⁸Kennedy Inst. of Ethics, Washington, DC

Abstract: Background: While the prevalence of incidental findings (IF) in MRI research is well documented, and various opinions have been published regarding options for IF disclosure, there is a surprising lack of empirical data available that characterizes the concerns of major stakeholders directly affected by IF. Research participant, IRB member, and investigator

perspectives need to be considered in discussions of the ethical and practical issues in addressing IF in neuroimaging research. These viewpoints are also needed to better understand how and to what extent IF should be disclosed.

Research Questions: Do participants expect their MRI scans to be reviewed for IF and do they want to know the results, regardless of clinical significance? How do opinions of research participants compare to those of IRB members and investigators regarding whether and how IF should be disclosed to participants?

Research Methods: Former brain imaging research participants (160) completed surveys regarding health literacy, expectations regarding IF disclosure, and preferred methods of communication. Neuroimaging investigators (130) and IRB members (50) completed similar surveys assessing concerns surrounding participant health literacy and the ethics of IF disclosure. **Results:** 69.8% [±6.86] of investigators and IRB members felt all MRI scans should be reviewed by a radiologist, although only 27.1% [±6.68] felt all scan findings should be provided to participants, compared to 86.4% [95% CI = ± 3.2] of participants who wanted to receive all scan findings. 35.5% [±7.53] of participants preferred to receive IF reports from a research team member they knew, while only 8.9% [±8.32] of IRB members and 7.9% [±4.71] of investigators chose this communication method. Using a validated assessment, participants self-reported high health literacy levels (m=87.1, SD=15.1, scale 1-100) whereas, investigators estimated much lower participant health literacy levels (m=47.5, SD=21.89, scale 1-100).

Conclusions: Our results show participants overwhelmingly want information related to their IF, regardless of the severity of the finding. Differences of opinion exist between researchers and participants in terms of whether reporting all IF is desirable, how IF should be reported, and assessment of participants' level of health literacy. Our findings suggest the presence of paternalism in management of IF disclosure with investigators and IRB members preferring selective rather than full disclosure. Further evaluation of all stakeholders involved with IF management is needed to determine the optimal approach to IF disclosure.

Disclosures: **L.E. Petree:** None. **J.M. Shoemaker:** None. **D.L. Helitzer:** None. **J.P. Phillips:** None. **C.E. Cole:** None. **J.P. Gluck:** None. **R. Schrader:** None. **M.T. Holdsworth:** None.

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.10SA/NNN46

Topic: H.04. Ethical and Policy Issues in Neuroscience

Support: Medical Humanities and Bioethics Program, Northwestern University

Title: Introducing Neuroethics to students in law, health sciences, and the humanities

Authors: *L. S. SIMO;

Northwestern Univ., Chicago, IL

Abstract: Neuroscience, as a study of the human brain and behavior, has rapidly acquired popular status and has infiltrated many academic disciplines: economics (neuroeconomics), marketing (neuromarketing), philosophy (neurophilosophy), law (neurolaw), and very recently education (neuroeducation).

Therefore it is important for students to examine ethical and social issues raised by the new advances in neuroscience research. Among the topics are human consciousness and beginning and end of life, memory and the self, cognitive and emotional aspects of the brain in relation to moral judgment, education and mental health, the ethics of translational research, and the relationship between philosophy, economics, law, and neuroscience. Students need to reflect on the implications of new diagnostic and therapeutic approaches like neuroimaging, brain-machine interface, stem cells, genes, and nanotechnology. Here we present principles for developing a neuroethics curriculum with some element groups that can be used across academic disciplines and some specific groups relevant to each academic field and profession.

Disclosures: L.S. Simo: None.

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.11SA/NNN47

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Ethical challenges of large-scale brain simulations

Authors: *M. CHRISTEN;

Inst. of Biomedical Ethics, Univ. of Zurich, Zurich, Switzerland

Abstract: *Objective:* Large-scale brain simulations are an increasingly important tool in neuroscience. This is exemplified by the selection of the Human Brain Project as one of the two

scientific “Flagships” of the European Union in January 2013. I discuss the ethical consequences when the brain is object of large-scale simulation approaches that intend to guide the research process in neuroscience. Referring to experiences made in climate modeling, I claim that the focus of an ethical assessment should not merely be output-oriented, but should assess the (often hidden) normative decisions that model generation involves, may include the Notion of value-sensitive design, and should be sensible to side-effects of the research project, e.g. with respect to differences in “working philosophies” of the involved disciplines. *Methods:* I made a comparative assessment of recent examples of large-scale brain simulations with respect to the history of the brain-computer relation and to sociological and ethnographic research on climate modeling. Former is important, because in neuroscience, the relation between the tool for simulation and the object of simulation is bidirectional. Latter is illustrative due to the long history and political importance of climate modeling, such that there is some ethnographic and sociological work available on the various social processes that accompany model generation. *Results:* The historical analysis points to difficult epistemic problems that are related to the conceptualization of information in neuroscience and makes the attractiveness of brain simulations comprehensible, as they allow a reference to various deep philosophical problems. The comparison with experiences in climate modeling shows that collaboration between modelers and empirical scientists are tricky, that visualizations tend to blur important differences between the object of simulation and the simulations themselves, and that various psychological mechanisms are at work that may undermine the critical function of the knowledge base that underlies the modeling process. *Conclusions:* I conclude that several ethical challenges that large-scale simulations in neuroscience will have, are currently not sufficiently addressed in the neuroethics community. A reason for that may be that most neuroethicists have a background in medicine, such that issues that relate to medical problems like enhancement or incidental findings dominate. Second, I predict that brain simulations will become equally political influential as climate models both with respect to guiding research investment allocation as well as to inform political decision making.

Disclosure.DisclosureBlock:

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.12SA/NNN48

Topic: H.04. Ethical and Policy Issues in Neuroscience

Support: European Commission

Title: Towards a policy for the collection, storage and use of human embryonic and fetal tissue for neuroscience research

Authors: S. LINDSAY¹, *I. BYSTRON², S. WOODS³, V. OTELLIN⁴, T. WIERZBA-BOBROWICZ⁵, P. RAKIC⁶, C. BLAKEMORE²;

¹Inst. of Genet. Med., Newcastle Univ., Newcastle, United Kingdom; ²Physiology, Anat. and Genet., Univ. of Oxford, Oxford, United Kingdom; ³PEALS Res. Centre, Newcastle Univ., Newcastle, United Kingdom; ⁴Inst. of Physiol., St Petersburg, Russian Federation; ⁵Inst. of Psychiatry and Neurol., Warsaw, Poland; ⁶Yale Univ. Sch. of Med., New Haven, CT

Abstract: For both scientific and clinical reasons, the time is ripe for increased effort to understand the development and function of the human brain. New technologies and increasingly powerful tools for data interrogation and analysis are capable of enabling rapid advances in our knowledge. A variety of studies have already highlighted differences between human brain development and that of other mammals. This raises puzzling but important questions that can be clarified only by more research on human embryonic and fetal tissues (hEFT). However, this resurgent interest in research on human such research raises ethical issues that need to be addressed. However, in order for such research to proceed with confidence, there is a need for a policy for the use of hEFT, which the international scientific community can support and adopt. As a starting point there must be an agreed definition of hEFT and an overarching understanding that in all cases hEFT will be obtained, used, and the resulting research results disseminated in ways compatible with local and international laws.

We propose that a policy should be developed, based on the following ethical principles:

- Respect for autonomy
- Nonmaleficence (avoiding harm)
- Beneficence (maximising good)
- Justice (acting fairly)

These principles must inform the practices of those involved, at all stages from tissue collection to research use. The policy should include requirements for informed consent, ensure privacy and data protection, act to protect vulnerable individuals, maximise best use of donated tissues, avoid unnecessary waste, encourage the sharing of data amongst the widest possible field of researchers, and adhere to national and international standards of respectful disposal.

Disclosures: S. Lindsay: None. I. Bystron: None. S. Woods: None. C. Blakemore: None. P. Rakic: None. V. Otellin: None. T. Wierzba-Bobrowicz: None.

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.13SA/NNN49

Topic: H.04. Ethical and Policy Issues in Neuroscience

Support: CDKTN

CIHR

Title: Dementia 2.0: Information-sharing about alzheimer disease on twitter

Authors: ***J. M. ROBILLARD**, T. W. JOHNSON, B. L. BEATTIE, J. ILLES;
Univ. British Columb, Vancouver, BC, Canada

Abstract: Social media is widespread, easily accessible and attracts a global audience that increasingly includes a large proportion of older adults. As a majority of adult Internet users now seek health information online and through social media applications, communication about health has shifted from a model of top-down dissemination to a process of multidirectional engagement. Online health information holds the potential to significantly impact public health, especially as the demographics of the population shift and the prevalence of dementia increases. However, several studies have identified risks and potential harms of online health information, such as the broad dissemination of misinformation and the potential for overconsumption. Moreover, little is known today about how information pertaining to age-associated diseases is disseminated and shared on popular social media platforms such as Twitter, a popular microblogging platform that allows users to send and read short text-based messages. To address this gap, we examined empirically: (i) the users of social media who share information about dementia, (ii) the sources of information about dementia (e.g., news sites, health information sites) that are promoted and shared, and (iii) dementia themes dominate the discussion. We mined Twitter for content containing dementia-related keywords for a period of 24 hours and retrieved over 9,200 tweets. A coding guide was developed and content analysis conducted on a random sample (10%) of the data, and on a subsample from top users' tweets to assess impact. We found that a majority of tweets (77%) contained a link to a third party site, and these links redirected mainly to news (50%) and health information sites (18%). As well, more than half the number of tweets discussed recent research findings related to the prediction and risk management of Alzheimer's disease (53%). The results highlight the potential for the dementia

research community to harness the reach of this medium and its usefulness as a tool for multidirectional engagement.

Disclosures: **J.M. Robillard:** None. **T.W. Johnson:** None. **B.L. Beattie:** None. **J. Illes:** None.

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.14SA/NNN50

Topic: H.04. Ethical and Policy Issues in Neuroscience

Support: NIH T32 NS041231

Title: Mismatch between practice and policy for maintaining confidentiality in the peer review process

Authors: ***W. HAYWARD**, L. HEYBURN, R. M. HARRINGTON, K. GALE;
Georgetown Univ., Washington, DC

Abstract: Training in responsible conduct of research (RCR) for pre-doctoral students includes discussions of best practices and policies for the conduct, analysis, and reporting of research, including those that apply to authorship, attribution of credit, and the confidentiality of the review process. However, students sometimes discover that policies they learn are not practiced consistently in day-to-day laboratory settings.

In the T32-supported Interdisciplinary Program in Neuroscience (IPN) at Georgetown University, we have previously encountered this problem in the context of authorship (SfN abst # 225.19.2008), where faculty made authorship decisions using criteria inconsistent with journal policy. To address this, we made special efforts to include a large number of faculty as panelists for student RCR training to raise faculty awareness of standards taught to students. However, with an increasing proportion of students entering the program after extensive research experience, more are being exposed to practices that depart from established policies before entering Ph.D. training.

In the course of an RCR case-based discussion during the recruitment visit for admission to the program, we discovered that about one third of applicants had been shown a manuscript under review by the director of a laboratory who was evaluating the manuscript for publication.

Typically, the manuscript was shared with the lab group with the intention of using it as a training experience. Most applicants were unaware of official policies governing confidential

handling of manuscripts under review, and believed that sharing such a manuscript within a lab was a useful training practice.

These observations were corroborated by a recent survey of the students enrolled in the IPN. Out of 30 respondents (66.7% response rate), 11 answered “yes” to the question “Have you ever been in a situation in which a mentor or PI of a lab showed you a paper that he/she was reviewing as a referee for a journal?” When probed, most indicated that the purpose was “learning opportunity” and not for “specific expertise.” The survey did not ask whether the experience occurred prior to and/or after entering the program.

It is unlikely that this mismatch between policy and practice is due to a lack of familiarity with policy because referees are usually given explicit instructions about maintaining confidentiality. It is possible that research mentors believe that breaching confidentiality to advance training is justified. We intend to explore this further in a subsequent survey of faculty attitudes about confidentiality in the peer review process.

Disclosures: W. Hayward: None. L. Heyburn: None. K. Gale: None. R.M. Harrington: None.

Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.15SA/NNN51

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Drugs targeting brain hemeoxygenase system in cardiac arrest could be crucial for neuroprotection. A feature that requires new focus for better health care

Authors: *A. K. PANDEY¹, A. SHARMA², R. PATNAIK³, D. F. MURESANU⁴, L. WIKLUND², H. S. SHARMA²;

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Abstract: Hemeoxygenase (HO) system represents enzyme that belongs to stress proteins family and constitutively expressed in the brain and in heart in at least 3 isoforms that are known till today e.g., HO-1, HO-2 and HO-3. Cardiac arrest induced ischemia; infarct or hemorrhages could induce almost all kinds of HO expressions in the brain. Thus, cardiac arrest is quite likely to

upregulate HO enzymes in the brain but so far studies examining HO-system following cardiac arrest in the CNS is not well investigated.

The HO-isoforms are known to produce carbon monoxide (CO), a free radical gas that could induce cellular injury and membrane damages. Brain injury or spinal cord injury caused massive upregulation of HO-1 and HO-2 enzymes in the areas showing neuronal damages. Thus it is likely that overexpression of HO enzymes may induce greater production of CO that could be crucial for neurological dysfunction as well as regulatory functions of the heart leading to clinical manifestation of cardiac arrest and even death.

Since cardiac arrest also induces specific cell injuries in the brain, a possibility exists that HO-enzymes are overproduced and abnormal production of CO within the brain and or the heart could induce cell injuries. Thus, drugs that reduce HO-enzyme expression are likely to thwart cardiac arrest induced brain pathology and normalize cardiac functions after return of spontaneous circulation (ROSC). There are some reports in central nervous system injury that HO-1 upregulation induces neuroprotection however this claim is still controversial. Thus, the need of the hour is to study changes in HO-enzymes in heart and brain after various durations of ROSC and to see whether drugs targeting HO system could be of any value in reducing cardiac arrest induced brain pathology or cardiac dysfunctions.

Preliminary data in our rat model of cardiopulmonary resuscitation of chronic myocardial ischemia showed massive upregulation of HO-2 in various parts of the brain and in heart tissues followed by HO-3 and HO-1 overexpression. Interestingly, HO-2 and HO-3 expressions coincide with neuronal injury in the edematous brain areas. On the other hand, HO-1 could be seen in both normal and injured cells distributed around damaged regions. HO-enzyme inhibitors if given before cardiac arrest are able to reduce HO-2 and HO-3 expressions in the brain areas showing cellular injuries as well as in the heart tissues. However, HO-1 expression was not that affected. These observations support a new role of HO-system in cardiac arrest and opens new avenues for exploration of novel drug therapy. Thus, targeting HO-system in cardiac arrest may provide new insights for better patient care in future.

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Theme H Poster

27. Ethics and Policy

Location: Halls B-H

Time: Saturday, November 9, 2013, 1:00 PM - 5:00 PM

Program#/Poster#: 27.16SA/NNN52

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Multimodal animal experiments to simulate clinical situation of disease processes for better therapeutic strategies in neurological disease are the need of the hour

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Abstract: The first step of any drug discovery aimed to treat patients is based on the basic studies performed in various in vivo laboratory animal models. Thus, therapeutic agents are tested in normal animal models of brain or spinal cord trauma, stroke, cardiac arrest, ischemia, anoxia, or other related neurological diseases. Thus, in all such cases only healthy animals are used for experimentation. However, in human populations, CNS injury occurring in individuals is varied tremendously. Namely, many patients are already hypertensive, diabetic or reared in an environment that is full of air pollution or other microfine particles affecting their injury or disease processes immensely.

It is imperative that therapeutic agents used in normal animals aimed to treat patients with several co-morbidity factors may not be then that successful if the effects of these agents are not examined in a multimodal animal models having identical co-morbidity factors. This idea is supported by investigations in our laboratory from the findings that when normal animals are subjected to brain or spinal cord trauma or whole body hyperthermia their brain pathologies are much less as compared to hypertensive or diabetic animals subjected to identical heat stress or CNS trauma. The animals with co-morbidity factors thus showed 3- to 6- fold increase in brain pathology. Drugs that are well known to induce neuroprotection following injury or hyperthermia in normal cases failed to attenuate brain pathology in these animals that are associated with one or both co-morbidity factors e.g., hypertension and/or diabetes. This observation clearly suggests that to develop suitable therapeutic strategies we need to simulate clinical conditions where multimodal diseases are prevalent. For example, stroke is often associated with cardiovascular or endocrine disorders. Likewise, cardiac arrest (CA) could occur in patients that are predisposed to diabetes and/or hypertension. Under such cases simulation of CA model in normal animals without any hypertensive episodes or diabetes could not provide good data on evaluation of drug therapy in ideal conditions. This is further exemplified by the fact that when animals are made diabetic and then CA was induced their brain pathology is much more exacerbated. In these animals, therapeutic agents used to treat normal cases did not reduce neural injuries in standard drug doses. Taken together, future of neuroscience research lies in simulating clinical symptoms in animal models similar to that seen in patients. Only then suitable drug therapy may be explored in these models to reduce the pathophysiology and symptoms of brain damage that could improve future patient care.

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Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Targeting drugs to modulate the CNS ubiquitin system : A novel approach to achieving neuroprotection that merits focus in neuroscience research

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Abstract: Central nervous system (CNS) injury and repair are complex processes that involve several active molecules to interact in a balanced manner, so as to counteract those toxic elements released after trauma - thereby achieving neurorepair. Among various factors one should consider ubiquitin, a small molecule protein released or upregulated in nerve cells, glial cells and in endothelial cells after CNS injury or in neurodegenerative diseases. However, ubiquitin's role in neurodegeneration or neurorepair is still not well known. Neurodegenerative diseases such as Parkinson's, Huntington, and Alzheimer's, together with numerous other neurological disorders like stroke, bacterial or viral infections, ischemia, and brain or spinal cord trauma induce ubiquitin overexpression in the neuropil. Drugs that modulate ubiquitin expression might thus be of relevance in enhancing neurorepair. Ideally one would like not only ubiquitin-proteasome inhibitors that affect directly ubiquitin expression in the CNS, but also drugs that interfere with the basic mechanisms of ubiquitin expression (thereby effecting its downregulation). Such a dual-pronged attack may prove necessary to optimize the attenuation of CNS injury processes and/or enhance neural repair.

One of the basic drivers of ubiquitin expression in the CNS is stress caused by mechanical, vascular, metabolic or anoxic insults in neurons, glia or endothelial cells. In addition, oxidative stress caused by a variety of insults also involves ubiquitin expression. Thus, drugs affecting oxidative or cellular stress may have not only beneficial effects in the CNS following injury but may also affect ubiquitin expression. We found a striking upregulation of ubiquitin expression around a focal trauma to the spinal cord in association with neuronal, glial and endothelial cell injury. In line with oxidative or cellular stress playing important roles in ubiquitin expression, pretreatment with an antioxidant compound (H-290/51) markedly reduced ubiquitin expression

and cord pathology. Furthermore, repeated application of brain-derived neurotrophic factor and glial cell derived neurotrophic factor also reduced ubiquitin expression and cord pathology, pointing to a link between ubiquitin expression and neural injury/repair. Interestingly, an inhibitor of ubiquitin proteasome system reduced ubiquitin expression in the spinal cord after injury while inducing neuroprotection. These findings support the view that the ubiquitin system represents a valid pharmacological target to achieve neuroprotection/neurorepair in man for better health care.

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27. Ethics and Policy

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Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Age structure and gender differences of Stroke

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Abstract: Ethnic studies of disparities in stroke epidemiology, acute care, and post-acute outcomes in the United States indicated black Americans have more severe strokes and greater mortality. This findings and follow-up studies suggest a survival disadvantage in blacks. Stroke risk among the black populations of the Caribbean is thought to be lower than among African-origin populations in the United States and the United Kingdom. Thus, the incidence of stroke in black populations in developed countries is known to be a public health issue, but how risk varies between black communities in a third world country in Africa is unclear. The purpose of the present study was to determine the incidence and case-fatality rate of the major stroke subtypes and gender differences in a geographically defined region of Ile-Ife in Nigeria. First, we found that demographic factors such as socioeconomic status do play a significant independent part on the incidence and case-fatality rate of the major stroke subtypes in a purely black population. Second, there are striking gender and demographic inequalities in the risk of stroke in a purely black population. Because the major stroke subtypes have different patterns of

incidence and outcome, information on the incidence in a purely black population in a third world country is essential for comparative studies in same population and white population in developed countries.

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Theme H Poster

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Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Environmental interactions in neurological diseases and therapy can't be ignored

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Abstract: In recent years several reports suggest that the pathological outcome following neurodegenerative disease or trauma to the central nervous system including psychiatric illnesses could show seasonal variation and depends on several external factors commonly present in the environment. However, even our knowledge of these effects are known since last few decades no efforts are made till today to understand or discuss the environmental effects on the prognosis and modulation of the treatment strategies in clinical practices.

There are evidences that traumatic injury occurring in hot environment results in different pathological outcome as compared to the trauma seen in cold weather. Also patients with heart disease or mental abnormalities require more often hospitalizations in the areas that are heavily polluted with dust or industrial waste than in a cleaner environment. Thus, it is likely that our military personal who are engaged in the battlefield in either very cold climate or in a desert hot environment when they got inflicted with any kinds of traumatic or metabolic insults to their brain or spinal cord the pathological processes and treatment strategies should be considered according to overall situations where the injury occurred and special care may be taken to treat such cases. In our hands, we found that similar kinds of concussive brain injury done in cold environment (15 to 17°C) showed remarkable increase in edema formation than the identical injury was made in rats at thermoneutral zone (26-29°C). Moreover when the same type of lesion was produced at high environmental heat (34 to 36°C) the injury severity was further worsened. Likewise, rats exposed to silica dust when received the same injury showed different patterns of

brain pathologies when the trauma was inflicted at the cold, thermoneutral or hot environments. The most marked brain pathology was seen at cold and hot environment. This is likely that similar kind of injury could induce much more stress reaction or oxidative stress leading to greater damage at cold and hot environments than trauma at the thermoneutral zone. We feel that according to these data the treatment given to the patients should also be modified in terms of dose and frequency to achieve maximum care and neuroprotection. This is supported by our findings that almost double dose of antioxidants are needed to contain brain damage occurring in cold or hot environments than in animals where injury was made at thermoneutral temperature. Thus, further studies are definitely needed to explore these novel strategies for providing better health care of our patients in future.

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