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Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.01SA/UU21

Topic: H.01. History of Neuroscience

Title: Sir William Osler and the evolving neurological sciences

Authors: D. BERGERON1,2, A. TURMEL2, *A. PARENT1;
1Psychiat & Neurosci Dept, Univ. Laval, Quebec City, QC, Canada; 2Neurosurg. Dept, CHA, Quebec City, QC, Canada

Abstract: William Osler (1849-1919) is one of the greatest clinicians of the Modern Era. Born in Canada, he worked as professor of medicine first at McGill University, then at University of Philadelphia and at Baltimore, where he contributed to the development of Johns-Hopkins. He crowned his prestigious career as Regius Professor of Medicine at Oxford. Osler’s remarkable working capacity and insatiable curiosity led to the publication of about 1400 papers on a multiple medical issues, so that his legacy to general medicine somewhat overshadowed his contribution to neuroscience. Osler initiated his career while the then controversial theory of cerebral localization was being elaborated through the studies of pioneers such as Broca and Charcot in France, Hughlings Jackson and Ferrier in England, and Hitzig and Wernike in Germany. While in Philadelphia, Osler was influenced by Weir Mitchell, one of the fathers of American neurology and a leader in the field of cerebral localization. Osler himself participated in the debate and contributed about 200 papers containing various anatomo-clinical observations dealing with CNS affections as varied as cerebral aneurysms, vascular infarctions, multiple sclerosis, cerebral abscesses and brain tumors. Furthermore, Osler’s monographs on cerebral palsy and chorea attracted neurologists' attention worldwide. Osler was one of the first clinicians to envisage the exploitation of the localization theory to the benefit of brain surgery. For example, he commended Godlee and Benett’s pioneering surgical resection of a glioma and actively supported Victor Horsley in his efforts to develop a surgical approach for the treatment of epilepsy. Early in the 20th century, Osler made a vibrant plea for “medico-surgical neurologists,” properly trained in all aspects of brain anatomy, physiology, clinic and surgery. He was also a mentor and a close friend of Harvey Cushing, who became internationally known for the novelty of his brain surgical approaches and is currently considered the founder of modern neurosurgery. Osler also inspired Wilder Penfield, an Oxford Rhodes Scholar, who later moved to McGill University and founded the Montreal Neurological Institute, which became a
world-renowned center for epilepsy surgery. A close examination of Osler's unpublished communications, which are stored at McGill Osler library, will allow us to further our knowledge of the major role that he played in the development of modern neurological sciences. This unique contribution stemmed largely from the elaboration and maintenance of a vast network of collaborators and friends that included leading American and English neurologists and neurosurgeons.

**Disclosures:** D. Bergeron: None. A. Turmel: None. A. Parent: None.

**Theme H Poster**

**021. History of Neuroscience**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 21.02SA/UU22

**Topic:** Manufacturing a neural interface - a summary of the published cochlear implant manufacturing processes

**Authors:** *R. CALIXTO;*

Advanced Bionics, Hannover, Germany

**Abstract:** Cochlear implants (CIs) are the most successful neuroprosthetic in history with over 300,000 patients implanted. Since their introduction in the 1960's, manufacturing technology and material science have advanced significantly. However, the process of making the electrodes themselves is still relatively rudimentary by comparison. In great part this is due to the demands of an active implantable medical device (AIMD), which must maintain functionality for decades. In the case of pediatric implantation the lifetime of the implant is literally the lifetime of the patient. Hence, given this perspective, it is not surprising that the materials and processes used in the manufacturing of such devices are very conservative and has changed little over the past half a century. This poster will discuss the early cochlear implant electrodes and their manufacturing process. It will follow the development of CIs from single channel to multi-channel electrodes and end with an in depth overview of the manufacturing process today, based on published literature and patents. Finally a perspective on the trends of the field of neurostimulation and neural interface electrodes is presented as a discussion point of where this field could grow towards in the future.

**Disclosures:** R. Calixto: A. Employment/Salary (full or part-time); Advanced Bionics.
Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.03SA/UU23

Topic: H.01. History of Neuroscience

Title: An analysis of the poisons acting nervous system mentioned in The Canon of Medicine by Avicenna

Authors: Z. EBRAHIMIAN¹, Z. KARIMI², *M. RAZA³;
¹Dept. of Pharmacol. and Toxicology, Shiraz Univ. of Med. Sci., Shiraz, Iran, Islamic Republic of; ²Dept. of Toxicology, Tarbiat Modares Univ., Tehran, Iran, Islamic Republic of; ³Section of Neurosciences, Dept. of Neurology, Fac. of Med., Baqiyatallah Univ. of Med. Sci., Tehran, Iran, Islamic Republic of

Abstract: Background: Avicenna (d. 1037), the great Persian physician wrote several books on a wide range of subjects. His most famous book, The Canon of Medicine, besides being the standard text on medicine in Europe for 600 years, also describes in detail poisons and their antidotes. In this study we analyzed poisons acting on nervous system mentioned by Avicenna in the Canon of Medicine. Methods: The corresponding sections of the Canon of Medicine (volume 4 in English and volume 5 in Persian version) were studied. Poisons were systematically analyzed and their details including name and source, symptoms for poisoning on nervous system were noted and the mechanism of action was studied based on modern scientific literature. The poisons were then accordingly categorized. Results: At least 24 poisons with signs and symptoms of neurotoxicity and their treatments were mentioned in the Canon. Many of these poisonous plants are nowadays known to contain neurotoxic compounds. These poisons were categorized in 3 groups by Avicenna: [1] Inorganic poisons, such as mercury, lead and arsenic that are known neurotoxins. [2] Poisonous plants with the warm temperament for example, Aconitum napellus, Delphinium staphisagria, Veratrum album and Veratrum nigrum that contain neurotoxic compounds which inhibit neuronal transmission mainly by blocking sodium channels and [3] Poisonous plants with the cold temperament, such as Conium maculatum, Mandragora officinarum, Datura metel, Equisetum palustre have neurotoxins that act at acetylcholine receptors. The routes of administration were oral, by inhalation and by instillation in ear. General treatments included decrease of absorption, increase of excretion and use of antidotes. Conclusion: The Canon of Medicine provides a comprehensive description of poisons acting on nervous system with the signs and symptoms of poisoning and treatment most of which is found valid according to modern research.
Disclosures: Z. Ebrahimian: None. M. Raza: None. Z. Karimi: None.

Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.04SA/UU24

Topic: H.01. History of Neuroscience

Title: Leonardo Da Vinci and the search for the anatomical basis of the soul

Authors: *R. E. BROWN; Psychology & Neurosci., Dept. of Psychology and Neurosci., Halifax, NS, Canada

Abstract: Leonardo da Vinci (1452-1519) was one of the greatest thinkers of the Italian renaissance. As well as being an artist and an engineer, he was also an anatomist and a physiologist (M. Clayton & R. Philo. 2012. Leonardo da Vinci: Anatomist. London: Royal Collection Publications). Leonardo's anatomical work in Milan (1487-1499) was primarily as background detail for his paintings, but his drawings indicate that he attempted to solve, by observation and description of anatomical materials, some of the leading questions of the day about mental activity. How did the senses function? What organ controlled mental activity? Where was the seat of the soul? Unfortunately, his observations were never published in his lifetime and scholars have only his notes and drawings to examine. During Leonardo's time, there was a controversy as to whether the heart or the brain controlled mental life. Leonardo determined that mental life resided in the ventricles of the brain. He showed the optic nerves entering the anterior ventricle (the "impressiva") and the auditory and olfactory nerves entering the middle ventricle (the "senso comune"). He put the intellect ("intelletto") in the anterior ventricle, the will and voluntary movement ("volonta") or "soul" in the middle ventricle and memory ("memoria") in the posterior ventricle. Thus, he thought that sensory information had a direct input to the intellect which controlled motor behaviour and led to memory (Del Maestro, 1998. J. Neurosurg 89, 874-887). This poster shows some of the drawings that Leonardo used to illustrate his ideas and gives some idea of how important the anatomical studies of the renaissance artists were for the development of theories of brain function in the early modern era.

Disclosures: R.E. Brown: None.
Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.05SA/UU25

Topic: H.01. History of Neuroscience

Title: Present status of pathological autopsy in the oldest psychiatric hospital in Japan, including its association with neuroscience

Authors: *K. NIIZATO;
Dept of Psychiat, Tokyo Metropolitan Matsuzawa Hosp, Tokyo, Japan

Abstract: In Japan, autopsy was initiated in the Meiji period after the establishment of the first medical school in Tokyo. Until then, human autopsy was forbidden by the shogunate, and doctors in the Edo period observed the external appearance of organs in the body and estimated their functions by observing “fuwake” (dissection of the body after execution) of criminals in the place of execution, and published many anatomical illustrations and books. The first Department of Anatomy was established after the establishment of the Eastern College of the University (predecessor of the Faculty of Medicine, Tokyo University) in 1864. Since then, pathological autopsy has been recognized as the most important step to clarify the cause of disease. Our hospital (Tokyo Metropolitan Matsuzawa Hospital) is the oldest extant psychiatric hospital in Japan (established in 1879). In our hospital, since the description of the first autopsy case in 1887, more than 3,000 cases have been autopsied until the present. The mortality rate markedly increased during a certain period due to World War II. In addition, changes in “progressive paralysis” as the diagnosis at death are characteristic. Cases of “progressive paralysis”, which accounted for about 50% of all autopsy cases in a certain year, gradually decreased after the end of World War II, and are rarely observed at present. In recent years, the rate of autopsy cases involving dementia has been increasing, which reflects the development of Japan’s super-aging society. In addition, due to the characteristics of psychiatric hospitals, autopsy cases of psychiatric disorders such as schizophrenia account for about 50%. Reviewing the history of autopsy may also be important to predict changes in neuroscience in the future.

Disclosures: K. Niizato: None.
**Abstract:** The early phases of research into anesthetic mechanisms, more than a century-and-a-half-old, offer an opportunity to analyze the development of a research enterprise from its very beginning. My analysis is based on review of original literature, from the 19th and early 20th centuries, and an interpretation from the perspective of contemporary history and philosophy of science. The historic perspective offers an opportunity to trace the dynamic of forces shaping a nascent field of scientific inquiry. The longest-lived theories of anesthetic action attributed anesthesia to changes in the properties of cell protoplasm. While they were not the very first ideas proposed, their underlying paradigm gave rise to the first systematic experimental inquiries involving a large body of scientists. Their rise, evolution and decline offer unique insights into the molding of scientific thought by an interplay of discovery, interdisciplinary fertilization, technical innovation and scientific theorizing during the first century after ‘Ether day’ when pharmacology was in its infancy. Three processes in the 2nd half of the 19th century had far-reaching consequences for research into anesthetic mechanisms. In biology, following the acceptance of the cell as a fundamental building block of all organisms, the ‘protoplasm theory of life’ came to temporarily dominate scientific theorizing. In chemistry, the recognition of a novel class of compounds termed ‘colloids’ spawned new fields of chemistry and industry. Moreover, this epoch also witnessed emergence of experimental pharmacology and the gradual displacement of ‘materia medica’-based therapy. The understanding of protoplasm as a colloid, paired with advances in microscope lens technology, tissue staining techniques and the establishment of experimental pharmacology as an academic discipline provided a fertile ground for theories of anesthetic action that would shape anesthetic research for decades. The best known theory was popularized and branded as ‘the protoplasm coagulation theory of anesthesia’ and considered protoplasmic proteins as the primary targets of anesthetics. Unlike other theories, the pursuit of anesthetic-induced reversible changes in the properties of cellular proteins remained a viable idea for an exceptionally long time before being largely and undeservedly forgotten. Like other forgotten theories, this notion is undergoing a revival in the 21st century in the context of heretofore underappreciated anesthetic effects on structural cell proteins.

**Disclosures:** M. Perouansky: None.
**Title:** The Vater-Pacini corpuscle - how many times did it need to be "discovered?"

**Authors:** *B. W. BAKKUM;
Illinois Coll Optometry, Chicago, IL

**Abstract:** The corpusculum lamellosum is a large oval rapidly adapting mechanoreceptor that is found primarily in glabrous skin. It is much more commonly known by its eponymous name: pacinian corpuscle or Vater-Pacini corpuscle. It appears that this structure has been independently “discovered” at least four times. The existence of lamellar corpuscles was first noted in the skin of fingers in a 1717 doctoral dissertation by Abraham Vater (1684-1751), where they were called *papillae nervae* but with little other description. In 1741, Vater was the praeses and Johann Gottlob Lehmann (1719-1767) was the respondent on another thesis that described these structures and included a drawing. Several modern authors give Lehmann credit for authorship of this dissertation. It appears that this same 1741 dissertation was also published in a collection of anatomical disputations that was accumulated by Albrecht von Haller in 1747. This is the citation that appears most frequently in the older literature, and Vater is always listed as the author. In 1832, three candidates for anatomical appointment in Paris named A.G. Andral, Camus, and Lacroix, demonstrated these same structures on the cutaneous nerves of the hand. The first memoir about this finding that appeared in print was presented before the Anatomical Society of Paris in 1834, where they were represented as ganglia. Little else is known about these three investigators. Their first names and even the first initials of Camus and Lacroix are not listed in any of the literature. At about the same time that this work was going on in France, Filippo Pacini (1812-1883) independently found these structures. He claimed he first saw them in a hand dissection in 1831, while he was a 19 year old student at the medical school at Pistoia. In 1840, Pacini published an extensive description of these “tactile ganglia,” including microscopic findings. His observations were corroborated in 1844 when Friedrich Henle and Rudolph Albrecht von Köllicker published a detailed study on these corpuscles. These same structures seem to have been independently “discovered” by John Shekelton (1795-1824) in Ireland. In an 1848 book, R.W. Smith included a rendering of these structures from the Museum of the Royal College of Surgeons that he credited to Shekelton. This dissection must have been conducted somewhere between 1820 and 1824 when Shekelton was curator at the museum.
the title of Henle and Kölliker’s paper, they named the lamellar corpuscles after Pacini, and an
eponym was created. It took a nearly two decades, but in 1862, Karl Langer claimed priority for
discovery of these structures for Vater, and the second, but less frequently used, eponymous term
was generated.

**Disclosures:** B.W. Bakkum: None.

**Theme H Poster**

**021. History of Neuroscience**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 21.08SA/UU28

**Topic:** H.01. History of Neuroscience

**Title:** *In vivo* pharmacological profile of S 38093, a novel inverse agonist at histamine H₃
receptors

**(Authors):** *F. PANAYI¹, A. SORS¹, L. BERT¹, B. MARTIN¹, G. ROLLIN-JEGO¹, R.
BILLIRAS¹, I. CARRIE¹, K. ALBINET¹, L. DANOBER¹, N. ROGEZ¹, J.-Y. THOMAS¹, P.
LESTAGE¹, L. PIRA², V. BERTAINA-ANGLADE³;
¹Idr SERVIER, Croissy sur Seine, France; ²Pharmaness, Pula, Italy; ³Biotrial, Rennes, France

**Abstract:** S 38093, a novel inverse agonist at histamine H₃ receptors, was tested in a series of
neurochemical and behavioral paradigms designed to evaluate its procognitive and arousal
properties. In line with its H₃ inverse agonist properties, S 38093 dose-dependently increased
extracellular levels of histamine in the prefrontal cortex of freely-moving rats. Acute
administration of S 38093 also facilitated cholinergic transmission in the prefrontal cortex and
ventral hippocampus of rats (10 mg/kg i.p.), both brain areas involved in cognition. When
chronically administered at 10 mg/kg i.p., S 38093 maintained its properties to increase
extracellular levels of acetylcholine in these two cerebral areas. In rats, S 38093 demonstrated
memory-enhancing properties in a model of working memory and two episodic memory tests.
Acute oral administration of S 38093 at 0.1 mg/kg significantly improved spatial working
memory in adult rats in the Morris water maze test by reducing the latency to reach the platform
from the second trial. Following a single oral administration, S 38093 also displayed cognition
enhancing properties in the two-trial object recognition task in adult rats, in a natural forgetting
paradigm at the doses of 0.3 and 1 mg/kg and in a scopolamine-induced memory deficit situation
at 3 mg/kg. The property of S 38093 to promote episodic memory was confirmed in a social
recognition test in rats at 0.3 and 1 mg/kg i.p.. Arousal properties of S 38093 were assessed in
freely moving rats by using electroencephalographic recordings: at 3 and 10 mg/kg i.p., S 38093 significantly reduced slow wave sleep delta power respectively 1 and 2 h after administration and induced at the highest dose, a delay in sleep latency (first non-REM sleep episode). Taken together these data indicate that S 38093, a novel H3 inverse agonist, displays cognition enhancing properties at low doses and arousal potential at higher doses. These properties are suitable for a clinical development in cognitive disorders. S 38093 is currently in clinical trial (Phase II) for the symptomatic treatment of mild to moderate Alzheimer’s disease.


Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.09SA/UU29

Topic: H.01. History of Neuroscience

Title: Camillo Golgi and the Black Reaction

Authors: *N. E. KINNEY;
Southeast Missouri State Univ., CPE GIRARDEAU, MO

Abstract: Bartolomeo Camillo Golgi (1843-1926) was born in a small mountain village in the Lombardy region of northern Italy. He graduated with a medical degree from the University of Pavia in 1865. By 1870 he was publishing works on the histopathology of the brain under the guidance of Guilio Bizzozero (1846-1901) at Pavia, an exponent of the new German experimental approach to medicine using the microscope. It was here that Golgi acquired a passion for the microscopical investigation of neurohistology, his early publications studying neuroglia and the structure of the cerebellum and olfactory bulb. However, the histological techniques of the time had serious limitations, yielding only partial images of neurons, and little progress was being made in the study of the nervous system. But in 1873 Golgi, trying to impregnate the pia mater with silver nitrate using tissue previously hardened with potassium dichromate, by chance observed whole nerve cells, intensely stained in black, in adjacent brain tissue. Only 1-5% of the nerve cells present were stained, but these were often displayed in their entirety. Why only a small percentage of the neurons present are stained is still not known. Much
later, x-ray diffraction methods showed that the precipitate, deposited inside the neuron, is silver chromate (Ag₂CrO₄). His new technique became known as the black reaction (la reazione nera). Golgi went on to discover the “internal reticular apparatus” (Golgi apparatus), the Golgi tendon organs (proprioceptors), the Golgi-Mazzoni corpuscles which transduce pressure stimuli, a second staining method for neurons utilizing potassium dichromate and mercuric chloride, Golgi's pericellular nets (forgotten until recently when they attracted much attention), and the Golgi cycle of malarian parasites. In the hands of microscopists like Golgi, Santiago Ramón y Cajal (1852–1934), Albert von Kölliker (1817–1905) and others over the next 30 years, the black reaction method enabled the discovery of a wealth of detail about the anatomical organization of the cerebral and cerebellar cortices. It also enabled Cajal to establish the neuron doctrine and share the Nobel Prize with Golgi in 1906. Despite its inherent capricious and unpredictable nature, modern versions of Golgi's method (metallic salt impregnation techniques) are still used today in histological preparations suitable for light or electron microscopy.

Disclosures: N.E. Kinney: None.

Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.10SA/UU30

Topic: H.01. History of Neuroscience

Title: An historiographic survey of the failed queries of brain research and the search for the role of the brain in cognition and the superiority of the human brain

Authors: *L. KRUGER;
Dept Neurobio., UCLA Geffen Sch. of Med., Los Angeles, CA

Abstract: It was surmised in 17 C England that one could observe the thoughts of an individual by examining their face, leading to the birth of “Physiognomy” - a discipline that endured for centuries, but eventually displaced by the scientific revolution and systematic attempts to analyze the role of the brain in cognitive function. Brain research began with comparison of the human brain in Thomas Willis’s depiction of the less convoluted cerebral gyri of a retarded “changeling” compared to that of a “normal” individual - misinformation of remarkable persistence, but soon leading to the discipline of comparative anatomy by Edward Tyson and his 1684 comparisons with the brain of an African “Blackmore”, a “pygmy” and various apes. Comparative anatomy of putative brain status correlates dominated until the late 19th century...
when evidence for functional localization emerged from both clinical and experimental observations. Anatomy revealed that the brains of whales and elephants were larger and more convoluted than in humans and the ‘brainiest’ mammals were the smallest rodents. Human brains were compared in contexts of naïve concepts of “race”, “criminality”, sex, gender, ”genius” or fame and various disease states, but little progress in identifying key brain feature correlates failed to emerge until the 20th century. Experimental research, largely in animal models, led to a variety of new directions and functional brain maps emerged to displace the earlier absurd fad of “phrenology”, but even the detailed electrophysiological maps of the sensory fields of cerebral cortex failed to elucidate the structural basis for human brain cognitive capacity, although clinical diagnostic imaging techniques and observations from surgical ablation provided new insights. By the late 20th century, examination of the brains of talented individuals or animal species variants could be studied in living animals and human brain scanning expanded to include metabolic and molecular measures. Modern development of computerized quantification tools extend beyond gross observation and enable examination of molecular genetic and epigenetic experience-dependent variables and the varieties of neural circuit formation underlying a reformulation and measurement of brain factors underlying individual variation and cognitive function.

Disclosures: L. Kruger: None.

Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.11SA/UU31

Topic: H.01. History of Neuroscience

Title: Compound 4560 RP and the Birth of Psychopharmacology

Authors: *L. T. MOISA, T. J. DONAHUE, J. H. PORTER1; Psychology, Virginia Commonwealth Univ., Richmond, VA

Abstract: Paul Charpentier, a chemist at Rhône-Poulenc Pharmaceutical Company in France, synthesized 4560 RP on December 11, 1950 as part of a synthesis program to develop new antihistamines. On February 13, 1952 Laborit, Huguenard, and Alluaume published a report titled “Un nouveau stabilisateur végétatif (le 4560 RP)” (“A new vegetative (autonomic) stabilizer”) in which they reported on 4560 RP’s central actions. These actions included antiemetic and hypothermic effects, the latter being most important to them, as 4560 RP was
used in a “lytic” cocktail to potentiate anesthesia. At the end of the article, Laborit made the first published suggestion of the utility of this new compound in psychiatry: “Ces faits laissent prévoir certaines indications de l’emploi du produit en psychiatrie, son action potentialisatrice permettant, par ailleurs, une cure de sommeil avec limitation posologique heureux dans l’emploi des barbituriques.” The first part of the sentence reads “These facts enable us to predict some uses of the product in psychiatry⋯.” The first documented use of 4560 RP in psychiatry was in a patient named Jacques Lh., a 24-year-old severely agitated psychotic (manic) male. This patient was treated with 50 mg (i.v.) on January 19, 1952 at the Val-de-Grâce military hospital in Paris. This treatment with 4560 RP continued over 20 days for a total of 855 mg and was supplemented with barbiturates and electroshocks. The patient was then discharged and was ready “to resume normal life” (Hamon, Paraire, & Velluz 1952). Delay and Deniker published a series of 6 articles in 1952 detailing the first use of 4560 RP as the sole treatment for psychosis without other drugs or electroshock at Saint-Anne’s hospital in Paris. Their first article was published in June 1952 and was titled, “Utilisation en thérapeutique psychiatrique d’une phenothiazine d’action centrale élective (4560 RP)” (“Utilization in psychiatric therapy of a phenothiazine with elective central action (4560 RP)”). Compound 4560 RP was the drug you know as chlorpromazine. Marketed in France in November 1952 as Largactil® (“large in action”) and later in the United States as Thorazine® in March 1954, the discovery in 1952 that chlorpromazine (4560 RP) was an effective therapeutic drug for the treatment of psychosis marked the birth of psychopharmacology and the therapeutic use of drugs to treat the symptoms of schizophrenia, depression, and anxiety.


Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.12SA/UU32

Topic: H.01. History of Neuroscience

Support: NIH R01-HD059852

Title: Phase-reversal in the oscillatory entrainment of neural interactions is a general principal of learning

Authors: *Z. WILLIAMS¹, R. HASLINGER², M. ESCOLIA²;
¹Harvard Med. Sch. (MGH), Boston, MA; ²Harvard Med. Sch., Boston, MA
Abstract: The ability to create new memories is thought to be based on the formation of new, synaptic-based interaction between neurons. While changes local field rhythms, representing dendritic input, have also been broadly observed during learning, how these rhythms relate to the spike interactions between neurons remains unknown. Here, we used simultaneous neuronal recordings and novel computational techniques to identify the complete correlated spiking structure of distinct cortical areas as they related to the local field rhythms in monkeys performing two unique learning tasks. We find that, pairwise interactions between neurons were largely confined to the peak phase of the theta and alpha rhythms. Once learning occurred, however, these spike interactions disappeared and shifted to the trough of the cycle. These changes were consistently observed during both instrumental and declarative learning and across motor and prefrontal cortical sites. They were also observed independently of changes in simple single-spike density, spike-field coherence and periodicity. These findings suggest that the transition of spike interactions from the peak phase of the cortical field rhythm to its trough is a general principal of learning.

Disclosures:  Z. Williams: None. R. Haslinger: None. M. Escolia: None.

Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.13SA/UU33

Topic: H.01. History of Neuroscience

Title: Revisiting William James, automata, and thoughts about ‘free will’:
Entorhinal/Hippocampal and Prefrontal dynamics contributing to repetitive behavior and the possibility of new behavior

Authors: *S. CURTIS;
True North, LLC, Bloomington, IN

Abstract: In 1867, in his article Are We Automata?, William James (1867) suggested that sensory awareness precedes conscious awareness. He further suggested that much of day-to-day, habitual behavior occurs without either conscious awareness or direction. This conclusion, in turn, caused him to question commonly held notions of ‘free will’; notions that continue to be debated. This presentation describes some of the current neuroscience and brain mechanisms that bear on 1) the human bias to repeat past behaviors, as well as 2) the expression of new, possibly consciously initiated, behaviors, i.e., ‘creative’ behaviors that might qualify as expressions of
‘free will’. In the tradition of Thomas Aquinas’ proposal (1297) that sensory awareness actively shapes the observer, Walter Freeman (2000) hypothesized that behaviors proceed from entorhinal/hippocampal efferents that are shaped by sensory and motor preafferent patterns that reflect previously experienced sensory motor sequences/behaviors. These preafferent sets are sequenced in time and space through entorhinal/hippocampal multisensory capabilities and act effectively as hypotheses for upcoming sensory motor experiences/behaviors. With regard to prefrontal contributions, fMRI studies on humans by Koechlin, et al. (2007) have revealed that the lateral prefrontal cortex (LPC) appears to be involved in directing ‘everyday’ choosing, typically among variably well-practiced behavioral options. Although degree of practice/repetition 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). Translated into the Freeman model, the FPC efferents to entorhinal cortex and hippocampus are apparently capable of overriding the LPC-directed, minute-to-minute, behavioral repetition of everyday living to allow expression of a new behavior. The remainder of this presentation will 1) review data gathered by this author (Curtis, 2013) that support the power of ideal outcomes for the creation of new behaviors, and, 2) fMRI findings examining the potential of sympathetic arousal to limit these expressions of ‘free will’; i.e., increased repetition with increased fear or anxiety.

Disclosures: S. Curtis: None.

Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.14SA/UA34

Topic: H.01. History of Neuroscience

Title: Ubiquitin and CNS: An historical perspective

Authors: *T. R. BUTT;
Progenra Inc, Malvern, PA

Abstract: The relationship of the ubiquitin (Ub) proteasome pathway to normal and pathological functions of neuronal cells has been a prominent focus since the discovery of Ub in the 1970s. Before all of the steps and enzymatic components of the pathway for regulating protein homeostasis had been completely characterized (i.e., during the period 1980 - 1990), numerous
reports appeared describing the localization of Ub to protein aggregates that are hallmarks of various neurodegenerative diseases. For example, Iqbal and colleagues injected neurofibrillary tangles into mice to raise antibodies against various components; remarkably, only antibodies against Ub emerged -- a very surprising result given the non-immunogenic nature of Ub.

Parkinson’s Disease was characterized by the presence of Lewy bodies, which contain both α-synuclein and Ub. The deubiquitylase UCHL-1 (originally known as PGP 9.5, and one of the first Ub pathway enzymes identified in diseased neuronal cells) was seen to be reduced in patients with Lewy body dementia, as was the deubiquitylase USP9, which is involved in α-synuclein turnover. Neurofibrillary tangles of Alzheimer’s Disease were shown to contain Ub, and Ub intra-neuronal inclusions in the substantia nigra were described as a feature of motor neuron disease with dementia. Abnormal levels of Ub were found in cerebrospinal fluid of Creutzfeld-Jakob disease patients and Ub-containing inclusions in ALS patients, and a role for the Ub proteasome pathway in degrading poly Q expanded huntingtin, a protein mutated in Huntington’s disease, was uncovered. Increasingly, as the field has matured, ubiquitylation has been recognized as an important component of post-synaptic function and plasticity as well as the cellular response to the pathological protein aggregates of neurodegeneration. Nearly 10 years have passed since the Nobel Prize was awarded to Rose, Ciechanover & Hershko for discovering the Ub Pathway. Ub conjugating and de-conjugating enzymes are now recognized as very compelling therapeutic targets for neuronal disorders that are separate from, or complications of neurodegeneration. Initial descriptive studies have given way to two decades of mechanism-oriented work. Among the ~600 E3 ligases and ~80 deubiquitylases identified in the last twenty years are several enzymes linked mechanistically by biochemical and/or genetic data with various neuronal disorders; by the use of these enzymes, molecular targeted drug discovery addressing neuronal diseases is currently being pursued in the Ub pathway.

**Disclosures:** T.R. Butt: None.

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**Theme H Poster**

**021. History of Neuroscience**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 21.15SA/UU35

**Topic:** H.01. History of Neuroscience

**Title:** Toward a richer understanding of neuronal process in aesthetic appreciation: Neuroaesthetics history
Abstract: The concept Aesthetics generally encompasses the perception and creation of art works. Semir Zeki asserts that artists, like neuroscientists, explore the potentials and capacities of the brain. That is why art manifestations, arousing aesthetic experiences, can only be fully understood in neural terms (Zeki, 2009). Neuroaesthetics is a relatively new discipline which has been trying to clarify the biological underpinnings of those aesthetic manifestations (Cinzia and Vittorio, 2009). The aspects explored by Neuroaesthetics comprise from music to performing arts (Calvo-Merino et al, 2008). However, most researches have looked for neuronal basis of visual arts appreciation. For instance, when people are observing paintings they consider beautiful, orbitofrontal cortex and visual cortex (V5) activation is particularly taking place (Kawabate and Zeki, 2003). In contrast, ugly stimuli, derived from art works, have accomplished to activate same brain structures in an opposite way. Specific with abstract art appreciation, activation of other brain areas has been found by fMRI analysis, such is the case of nucleus accumbens, amygdala and sensory cortices (Ticini and Omigie, 2013). In order to understand why some primitive structures (nucleus accumbens and amygdala) could participate in elevated processes like aesthetic appreciation, approach known as parallelism has been theorized. One of the most didactic examples of parallelism approach (peak shift phenomenon) was taken by Ramachandran and Herstein (1999) to explain how abstract art is evoking primitive neuronal processes, which are also available parallel to the aesthetics phenomenon itself (Chatterjee, 2010). Studying neuroaesthetics is important not only within art domains, but even for spreading out the knowledge about other behavioral fields such as mate selection, communication and consumer behavior (Chatterjee and Vartanian, 2014). Therefore, neuromarketing ought to put more attention on new neuroaesthetic discoveries.

Disclosures: V. Estrada Gonzalez: None.

Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.16SA/UU36

Topic: H.01. History of Neuroscience

Support: Fondi Ateneo UCSC-Rome
Abstract: The induction of disequilibrium and visual field movement (oscillopsia) in response to acoustic stimuli of low frequency is named after Pietro Tullio (Tullio’s phenomenon), an Italian physiologist who demonstrated that in a variety of animals subjected to loud sounds, fenestration of the labyrinth caused dysconjugate eye movements (ocular tilt reaction) and disequilibrium. He also noticed that torsional nystagmus could be induced in dogs with a fistula involving the superior semicircular canal and conducted experiments in which he directly observed the otolith apparatus vibrating in response to sound. Pietro Tullio (1881-1941) was an outstanding physiologist of the twentieth century. He graduated in Medicine on 1905 at the University of Bologna (Italy) and dedicated his scientific life to the vestibular labyrinth. His first publication was dated 1917 and in the years 1929-1938 descriptions of the phenomena caused by loud sound stimulation on vestibular reflexes was published in Italian journals of that period (e.g. Study on the behavior of labyrinthine sound evoked reflexes in the dog; Italian Archives of Otorhinolaryngology). All the vestibular symptoms were analyzed in a variety of animals such as ducks, pigeons, chickens, rabbits, fishes and even in humans. Now days his name is well-known in literature because of Tullio’s phenomenon and there is a well recognized association between sound or pressure induced vertigo and superior semicircular canal dehiscence (SSCD). Furthermore, the work of Tullio in the 1920s, involving inspection of the eye, head, and postural responses to sound of alert animals with surgical fenestrae into various parts of the bony labyrinth have lead the basis to the research on vestibular responses to sound and to the relatively recently development of the vestibular evoked myogenic potential recordings (VEMP). Since the initial report, VEMPs have become a standard clinical test of otolith (predominantly saccular) function, with documented diagnostic utility in varied vestibular and central nervous system disorders.


Disclosures: D. Troiani: None. A.R. Fetoni: None. P.M. Picciotti: None. E. Manni: None.
Title: 25 years of the Mouse Genome Informatics resource: Integrating genetic, genomic, expression, functional and phenotypic data for the neuroscience research community

Abstract: Mice are used extensively in neuroscience research for studying developmental processes, brain and neuron function, cognition, vision, behavior, and for modeling pathology, molecular mechanisms and therapies for human disease. The Mouse Genome Informatics (MGI) project (www.informatics.jax.org), initiated in 1989, provides a free, comprehensive public resource where neuroscience research, along with other genetic, expression and phenotypic data are collected, integrated and provided in support of future research efforts. MGI currently provides a comprehensive gene index including all ~23,000 protein coding genes in the mouse along with over 15,000 non-coding RNA (including miRNA, snRNA, snoRNA, lincRNA, etc). Over 37,000 different mutant alleles have associated phenotypic data, including over 17,000 annotations to neurological/behavior terms and 28,000 annotations to nervous system (morphology or physiology). 4,338 genotypes are described as modeling human diseases. MGI also includes expression data for nearly 14,000 genes with over 1.4 million total results and 260,000 images available for a range of adult tissues and developmental stages. Created as a component of the NIH’s Human Genome Project program, MGI is one of several core model organism database systems. Over the years, MGI has evolved with the rapidly expanding field of genetics from the creation of early linkage maps to annotation of the complete physical reference genome to commonplace usage of genetically engineered models. Scientific data in MGI are obtained from curation of research literature, direct submissions by laboratories and consortia, or via curated data loads from large-scale projects (Knockout Mouse Project, International Mouse Phenotyping Consortium, Online Mendelian Inheritance in Man, Brain Gene Expression Map, GenBank, HomoloGene, Ensembl, National Center for Biotechnology Information, GenePaint, InterPro, Gene Ontology, etc). MGI integrates these data by applying controlled vocabularies to describe phenotypes and anatomical structures, together with more specific free-text details in order to associate similar observations, despite diverse experimental strategies employed by
researchers. The relational nature of the database, along with the tools developed by MGI developers, allows simple and complex searches, analyses, and downloads of data sets by biologists, clinical researchers and computational scientists.


Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.18SA/UU38

Topic: H.01. History of Neuroscience

Title: A mexican women dedicated to the study of the brain

Authors: *J. VILLED, SR1, *J. VILLED, SR1, F. FERNÁNDEZ-VALVERDE2, V. CAMPOS PEÑA3;
1Home, MEXICO DISTRITO FEDERAL, Mexico; 2Lab. Neuropatología Exptl., Inst. Nacional de Neurología y Neurocirugía, MEXICO DISTRITO FEDERAL, Mexico; 3LAB. DE ENFERMEDADES NEURODEGENERATIVAS, INSTITUTO NACIONAL DE NEUROLOGIA Y NEUROCIRUGIA, DISTRITO FEDEAL, Mexico

Abstract: Dr. Rosario-Moguel Barroso, born in Oaxaca on October 5, 1921, daughter number 12 of a large family, as a child was able to fight major obstacle to a society where women are educated only to be housewife. Disgruntled including their parents to study medicine. Began in 1940 as a partner of Dr. Issac coast being disciple of the third generation (pioneers in neuroanatomy) of the Spanish School, Dr. Agustin Chevez student too, were the first in Mexico to achieve neuronal cultures of human and cat both cortical and cerebellar and medicine for the first time. They made movies of brain tumors, gliomas, glioblastomas, oligodendrogliomas Neuroblastomas. Studied the encephalopathy of children with heart disease, disorders of the nervous system produced by malaria, in brains of children with toloache intoxicated, results published in the book Dr Ni to. His interest in the nervous system, study cannabinol the active component of marijuana, as well as morphological alterations of the central and peripheral nervous system caused by the experimental inhalation of industrial solvents in cats, rats, primates and humans, wrote the book Thinner inhalation and consequences, with his enthusiasm of knowledge studied the effect of cocaine , heavy as lead, cadmium and thallium in rats, was
President of the International Academy of Pathology, First woman joined the National Academy of Medicine Mexico, Woman of the Year in 1988, belonged to Distinguished Societies of Pathology, directed numerous undergraduate and graduate thesis, she participated in several conferences in Radio and Television, the effects produced by drugs on the nervous system in children and youth (Lourdes Guerrero, Sabludobsky Jacobo, Guillermo Ochoa) published more than 200 scientific papers

Disclosures:  J. Villeda: None. F. Fernández-Valverde: Other; Research. V. Campos peña: Other; Research.

Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.19SA/UU39

Topic: H.01. History of Neuroscience

Title: Corrections in neuroscience: the vision of the past and the future

Authors: *K. V. KHACHATRYAN, SR¹, *K. V. KHACHATRYAN, SR¹, A. AYDINYAN², M. KHACHATRYAN³, T. KHACHATRYAN³;
¹ abs, Mikayelyan Surgical Inst., Yerevan, Armenia; ²Mikayelyan Surgucal Inst., Yerevan, Armenia; ³N1 Univ. Hosp. of the Yerevan State Med. Univ., Yerevan, Armenia

Abstract: The number of patients suffering from severe neurological disorders is exponentially growing. Epilepsy, movement disorders, schizophrenia etc. are still considered being untreatable. This is of no surprise and has its explanation. Our clinical practice, observation of open brain surgeries, acknowledgment of the literature and discussions with colleagues worldwide lead us to conclusion that the reason for this are some mistakes in neuroscience. The following mistakes can be considered the brakes for development of scientific and clinical neurology. 1 It is well known that the main principle of functioning of nervous system is reflex. This means that every electrical process begins from receptors and ends in analyzers, which is impossible. There has to be a source of electric energy inside the brain where the electrical circuit completes. We think that reticular neurons function as storage for electric energy. In 1931 Pavlov himself suddenly came up with the idea, that subcortical structures are accumulators of electric energy utilized for cortex functioning. This was the first and the last strike against theory of reflex. 2 Skeletal muscle spindles are not receptors. Their main function may be production of electricity for reticular system, which is later used for controlling the function of every cell in the body. Volta
and Galvani have discussed about production of electricity inside the muscle. Nowadays it is proven that cardiac cells are able to produce electricity. Why can’t a skeletal muscle also do the same? 3 Physiological meaning of sleep is considered to be the gradual, step-by-step recharge of reticular system. 4 The intracranial pleasure (ICP) plays a significant role in autoregulation of brain blood supply. When ICP increases, hyperemia of cortex occurs. Blood supply to the subcortical structures decreases. When ICP decreased, opposite changes occur. It is well known that during the hyperventilation hypoxia of the brain occurs. Yarulin explained this phenomenon in 1967 by cerebral vasospasm due to hypocapnia. It’s not correct, however Dr. Yarulin still has many followers. We think that hypoxia of the cortex occurs due to decreasing of ICP. 5. The EEG waves are not the sum of cortical neurons’ potentials. They rather represent the electric vector potentials of white matter. In 1920s The Austrian psychiatrist Hans Berger was the first to record EEG in humans. He assumed that EEG represents electric currents of millions of cortical neurons. This misconception leads many scientists until now. Each of the above-mentioned mistakes has been addressed also by other investigators and contains illogical elements. Therefore, these must be rechecked and revised.

Disclosures:  A. Aydinyan: None. M. Khachatryan: None. T. Khachatryan: None.

Theme H Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 21.20SA/UU40

Topic: H.01. History of Neuroscience

Title: Is ignorance of methodological details bliss? Fundamental differences in the interpretation of Libet's 1983 experiment revealed by a large scale quantitative review of 463 citing papers

Authors: *J. DREO, *J. DREO, S. SKUBIC, S. KNEZ, R. PANTZAKIS, Z. PIRTOŠEK; Dept. of Neurology, Univ. medical Ctr. Ljubljana, Lab. For Cognitive Neurosci., Ljubljana, Slovenia

Abstract: Benjamin Libet’s 1983 experiment on the relation between the time of conscious intention to act and the onset of cerebral activity has all the hallmarks of a classical neuroscientific experiment. The contrast created by the merging of its ingeniously simple design and far reaching implications has served to stir scientific and philosophical debate for the past 30 years. Its findings are often summarized, both in the lay press and in the scientific literature, as evidence against the commonly held notion of »free will«. The Web of Science citation database
lists 509 peer-reviewed papers that have cited Libet's 1983 study (up to March 2014). Intriguingly, there seems to have been a significant resurgence of interest since the year 2000, as 432 (85%) of the citing papers were published since then. To discover the prevailing scientific opinion regarding Libet's experiment, we obtained 463 citing papers and conducted a systematic quantitative review of the opinions their authors’ expressed towards Libet’s experiment and his conclusions. Each citing paper was independently reviewed by 2 readers that extracted the following information: 1) Journal field, 2) Paper type (original research, review paper, short opinion piece/letter), 3) Relatedness of paper subject to Libet’s research (on a scale from 0 = very unrelated to +3 = very related, i.e. replication of original study) and 4) Expressed agreement with Libet’s conclusions (from -2 = strongly disagree with Libet to +2 = strongly agree; 0 = ambiguous or undecided and an additional category of “NS” = agreement/disagreement not explicitly specified). Larger discrepancies between both reviewers were settled by discussion. Our results showed that 301 papers expressed an explicit agreement with Libet’s conclusions, 85 disagreed, 24 were neutral and 53 did not explicitly state an opinion. The overall agree/disagree ratio was 3.54 in favor of agreement. However, when the same comparison was performed separately for papers that are very closely related to this field of study (relatedness >=2.5; N=98 papers), the result was drastically different with an agree/disagree ratio of only 0.85. A highly significant (p<10^-10) negative correlation (r=-0.41) was obtained between relatedness and agreement, with more related papers expressing less agreement. These results lead us to conclude that there is a fundamental dissociation of scientific opinion regarding the implications of Libet’s experiments; where the generally expressed opinion is in stark contrast with the opinion of subspecialists. We propose that these findings should be considered by the neuroscientific community when referencing Libet’s experiment in the future.

**Disclosures:** J. Dre: None. J. Dre: None. S. Skubic: None. S. Knez: None. R. Pantzakis: None. Z. Pirtošek: None.

**Theme H Poster**

**022. K-12**

**Location:** Halls A-C

**Time:** Sunday, November 16, 2014, 8:00 AM - 12:00 PM

**Program#/Poster#:** 22.01SU/UU41

**Topic:** H.02. Teaching of Neuroscience

**Title:** UCLA neuroscience outreach to LA schools
Authors: N. F. HARDY¹, D. ALEXANDER¹, M. DESALVO¹, R. ROMERO-CALDERON¹, C. A. GHIANI¹, W. GE¹, C. E. EVANS¹, J. B. WATSON¹, *E. M. CARPENTER²; ¹Brain Res. Inst., ²Dept. of Psychiatry and Biobehavioral Sci., UCLA Sch. Med., Los Angeles, CA

Abstract: UCLA’s Interdepartmental Program in Neuroscience and the Brain Research Institute conduct major outreach activities throughout the year through Project Brainstorm and Brain Awareness Week. Both of these activities aim to promote an interest in neuroscience and higher education to underserved schools around the greater Los Angeles area. Project Brainstorm (PB) is an outreach course offered to 3rd and 4th year undergraduate majors in neuroscience at UCLA. The course offers undergraduates an opportunity to design and implement an interactive classroom lesson on neuroscience 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. In the first part of the course, students select a topic and develop their presentations while receiving feedback from a group of faculty, staff, graduate students, and their peers. This year’s topics included reflexes, the visual system, pain perception, motor movement, and olfaction. The undergraduates are then invited into classrooms primarily in Title 1 K-12 schools in the Los Angeles (LA) area to present their lesson plans and engage younger students in a variety of interactive neuroscience activities. UCLA’s Brain Awareness Week (BAW) is an annual event that brings students from LA schools to campus for a day of neuroscience related activities. The event is organized by graduate students from the Neuroscience Interdepartmental Ph.D. program and is staffed with over 60 volunteers from the graduate and undergraduate neuroscience programs, the David Geffen School of Medicine, and UCLA faculty. Over the course of the week, we hosted 300 students between 4th and 12th grade from five LA schools. Each day began with the visiting students rotating through the following six interactive stations: 1) Brain anatomy, 2) Homunculus mapping, 3) Vision-altering goggles, 4) Human brain specimens, 5) Animal brain specimens and evolution, and 6) Brain injury. Students then participated in lab tours that included hands-on demonstrations such as extracting DNA from cheek cells and viewing *aphysia* or *Drosophila* and in campus tours. To evaluate the efficacy of BAW and PB in increasing neuroscience knowledge and inspiring an interest in science in the students we administered pre- and post-evaluation forms for the students to complete. Preliminary data analysis indicates that students, across all age groups, knew significantly more basic neuroscience after their BAW and PB experiences than before. Further, many students indicated a more positive attitude toward science after their visit.

Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program/#/Poster#: 22.02SU/UU42

Topic: H.02. Teaching of Neuroscience

Support: NIH Blueprint for Neuroscience Research Award, National Institute on Drug Abuse (Grant number R25DA033011).

Title: Sowing the seeds of neuroscience: a new curriculum for middle school students

Authors: *E. H. CHUDLER*¹, K. STRAUS², L. COLLINS³;
¹Univ. Washington, Ctr. For Sensorimotor Neural Engin., SEATTLE, WA; ²Bioengineering, Univ. of Washington, Seattle, WA; ³Ctr. for Res. and Learning, Snohomish, WA

Abstract: Sowing the Seeds of Neuroscience (“Neuroseeds”) develops, disseminates and evaluates a novel neuroscience curriculum for middle school students. This curriculum promotes science literacy while focusing on the neuroactive properties of traditional medicinal plants. Neuroseeds breaks down barriers to understanding, rewards curiosity, and encourages students to pursue careers in science. Teachers attend a summer workshop to learn how to use the Neuroseeds curriculum. These teachers then borrow kits with everything needed to implement the curriculum in their classrooms. Each lesson is aligned with Washington State, Common Core, and Next Generation Science Standards. The eight lessons are 1) Neuroscience 101; 2) Infusions and Decoctions: Plant Extracts; 3) Chromatography; 4) Botanical Superheroes: Antibacterial Plants; 5) If Worms Drank Coffee: Planaria Movement; 6) Heads and Tails: Planaria Regeneration; 7) SpikerBox: Neural Activity of Cockroaches; 8) Botanical Heart Throbs: Lumbriculus Heart Rate. Seventeen teachers have been trained to use the Neuroseeds materials and have used the resource with more than 650 students in Washington and Oregon classrooms. Results from the pre- and post-test indicate that our curriculum is highly effective in teaching about neuroscience and medicinal plants. The number of correct science content knowledge answers was significantly higher in the post-test compared to the number of correct answers in the pre-test (p < 0.0001). In the pre-test, 8th graders scored significantly higher than seventh graders (p < 0.0001), and white and Asian students scored significantly higher than African-American students (p < 0.001). No significant differences were observed by grade level or race in the post-test. The Neuroseeds curriculum closed the achievement gap between white and black students. For science attitudes, three of twelve scientific attitude questions showed significant differences (p < 0.01). That the Neuroseeds curriculum did not more significantly shift attitudes about science may be because our teacher-participants were enthusiastic.
instructors of science, whose students started the lessons excited about science and interested in studying science in the future. Neuroseeds is an effective method to improve student knowledge about neuroscience and attitudes about science. We are continuing our efforts in a summer camp and in classrooms and expanding to informal science education venues with a pilot-scale project this summer.


Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.03SU/UU43

Topic: H.02. Teaching of Neuroscience

Support: NeuroScience Associates
Florida Fish and Wildlife Conservation Commission
The Brain Museum
Terrapin Hollow Farm
Haremco
Dana Alliance for Brain Initiatives of the Dana Foundation

Title: Brain camp for Brianiacs: Neuroelectrophysiology as a tool for teaching scientific process to gifted upper middle and high school students

Authors: L. G. MORRIS¹,2, J. L. PECORE¹,3, W. D. THOMPSON¹, S. B. FELDMAN¹, *M. K. DEMETRIKOPOULOS¹;
¹Inst. Biomed Philosophy, DUNEDIN, FL; ²Biol., Piedmont Tech. Col., Newberry, SC; ³Teacher Educ. and Educational Leadership, Univ. of West Florida, Pensacola, FL

Abstract: The Institute for Biomedical Philosophy offers a week-long neuroelectrophysiology day camp for gifted upper middle school and high school students in collaboration with Energetic Einsteins and Bouncing Brainiacs. As with our Brains and Behavior Camp, which has
content focused on neuroanatomy, the primary goal of the camp was ensuring students had a strong foundation in the scientific process so they could gain experience being scientists by developing testable hypotheses and selecting proper controls. All our programs include additional emphasis placed on learning scientific practices including laboratory safety, use of animals in research, and evaluating sources of information. Students received guidance as they designed experiments by using the Polycyclic Inquiry Approach. Investigations included training invertebrate organisms such as annelids as well as conducting electrophysiological experiments that explore the effect of common drugs such as caffeine and nicotine on invertebrates. Some experiments were conducted in groups to allow students to collaborate as part of a research team while others were individually designed and conducted to ensure each student understood the entire experimental process. Experiments were also divided into phases so that students explored preliminary data and were encouraged to consider finalizing their experimental design and refining their research question. Students collected data, graphed results, and reported findings to the larger group. Upon completion of projects, students reflected on how the methods and questions could be further refined and what additional factors or questions they could explore within their experimental models. Students also explored how neurotransmission occurs by modeling the electrical circuitry involved in neuronal communication and had the opportunity to record their own electroencephalograms. This summer camp was specifically designed to meet the needs of gifted students that had completed the 6th-11th grade.


Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.04SU/UU44

Topic: H.02. Teaching of Neuroscience

Title: Biological research through independent investigations in a high school setting

Authors: J. GLEKLEN¹, N. KUMAR¹, A. HOOVER¹, M. FIELDS¹, *A. PARSEGIAN²; ¹Sidwell Friends Sch., Washington, DC; ²The Mol. & Behavioral Neurosci. Inst., Ann Arbor, MI

Abstract: Students at Sidwell Friends School in Washington, D.C. have the opportunity to conduct original research both inside and out of the classroom. In Biology 1A, an accelerated
biology course for ninth grade students, students plan and conduct an experiment of their choosing as a part of their Independent Research Project, or IRP. Additionally, upperclassmen may take the Neuroscience Research Course to refine their research skills and learn more advanced concepts in neuroscience. Those students who wish to conduct research apart from class may join the Biological Research and Investigations in Neuroscience (BRAIN) club. Older, more experienced students in the club, along with conducting their own research, act as mentors to younger students, who may be conducting their own research for the first time. Many students partner with scientists from research institutions including National Institutes of Health, Georgetown University Medical Center, and MAYO Clinic. Through the curricular and extracurricular forms of independent research, students participate in weekly scientific meetings, journal club, seminar presentations, and lectures by visiting scientists. In addition, many participate in and present posters at several meetings throughout the year. Most students choose to utilize Danio rerio, a popular model organism because of its translucent embryos, rapid development, and completely mapped genome, in their research. Experiments presented here involving Danio rerio include observing the effect of nicotine on the mesolimbic pathway, recording shoaling preferences, testing the effect of changes in earth-strength magnetic fields on behavior, observing pregnenolone’s effect on cell movement, and determining the stage of development when the Shh inhibitor ethanol will affect the sonic hedgehog pathway.


Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.05SU/UU45

Topic: H.02. Teaching of Neuroscience

Support: NIH SEPA 5R25OD011131-05

Title: Student Knowledge Gains From Neuroscience Teacher Professional Development

Authors: *J. M. DUBINSKY¹, M. MICHLIN², M. HOELSCHER³, C. ELLINGSон³, G. ROEHRIG³;
¹Dept Neursci, Univ. of Minnesota, Minneapolis, MN; ²Ctr. for Applied Res. and Educational Improvement, ³STEM Educ. Ctr., Univ. of Minnesota, St. Paul, MN
Abstract: In science education, inquiry-based approaches to teaching and learning provide a framework for students to build critical thinking and problem-solving skills. Teacher professional development (PD) has been an on-going focus for promoting such educational reforms. However, despite a strong consensus regarding best practices for PD, relatively little systematic research has documented increases in student learning consequent to these experiences. The current BrainU Program provides up to 160 hr of PD over 2 summers to high school science teachers in neuroscience using active pedagogy that encompasses scientific processes and methods (www.brainu.org). During BrainU, teachers learn neuroscience through a series of interactive classroom and laboratory activities and experiments designed for their students. Thus teachers experience learning neuroscience the way they are expected to teach it. Providing teachers with an understanding of the neurobiology of learning may influence their classroom practices and student learning. Exactly how this impacts teachers’ instructional practices has been investigated through classroom observations, student performance on a content exam and both formal and informal teacher interviews. Student knowledge was assessed in a pretest - posttest paradigm in the classrooms of teachers following 0, 1 or 2 summers of BrainU. Student demographic information was provided under an IRB protocol with participating districts. Student performance on the pretest was not different or dependent upon the amount of PD teachers received. Students demonstrated significantly increased knowledge at posttest, with learning in classrooms where teachers had 2 summers of PD significantly exceeding that of teachers with only 1 summer of PD. Minority students or those qualifying for free and reduced lunch had significantly lower performance on both pretest and posttest. However, equal, significant gains in knowledge acquisition were observed when the data were broken down by sex, free and reduced lunch or minority status. Effect sizes were moderate. Thus, the longer, two summer, in depth PD experience increased student neuroscience knowledge, presumably through teachers' increased familiarity, confidence and ability to successfully teach neuroscience.


Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.06SU/UU46

Topic: H.02. Teaching of Neuroscience
Support: Personal funds (R.L.C.)

Title: Citizen science with high school students and adults from around the world participating in analysis of synaptic transmission


Abstract: The goal in this project is to have people of the world participate in data analysis of synaptic transmission and contribute to authentic scientific processes in the interpretation and make meaning of the findings. High school aged students in Kentucky, USA beta tested the protocols and then we engaged world citizens in participation. Ideas for novel methodological approaches in analysis were encouraged in the discussion. The learning objective is to be able observe and measure quantal synaptic vesicular events and examine perturbations in the responses due to various experimental manipulations. One project is to examine if CO2 may cause blocking of glutamate receptors, another is the influence of factors present in the spillage of cytoplasm from injured cells on glutamatergic receptors, modulation of GABAergic transmission and mutational effects of synaptically relevant proteins. The specimens were crayfish and *Drosophila* larval NMJs. Assessment of learning in the area of synaptic transmission and enthusiasm of engagement in this citizen science project by the participants are underway.


Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.07SU/UU47
Topic: H.02. Teaching of Neuroscience

Support: NIH Grant R25OD010953-04

Title: Neurological Disorders in the High School Classroom: Creating both a novel biomedical
curriculum and an innovative teacher mentoring program to facilitate implementation

Authors: *K. F. MEIRI, *K. F. MEIRI;
Tufts Univ. Sch. of Med., BOSTON, MA

Abstract: Here we describe the development of a novel health science curriculum for high
schools that is focused on neurological disorders, and a unique approach to teacher professional
development (PD) that facilitates its implementation. This comprehensive biology II curriculum
was developed by a professional learning community of scientist content specialists from Tufts
Medical School and teachers from Boston public schools, with the goal of fostering student
engagement with science, promoting scientific literacy and influencing health-related choices. It
is supported by ‘Modeling for Fidelity’ (MFF) an innovative PD program founded on evidence-
based best practices. MFF is built around an extended mentor relationship between scientists and
teachers carried out virtually in conjunction with online educative materials. We have evaluated
MFF directly via fidelity of implementation metrics and indirectly via student performance. Here
we report results of a comparison study of four teachers from diverse high schools who
implemented the curriculum in conjunction with MFF, with a comparison teacher who received
‘gold-standard’ in-person PD. In all settings student participants demonstrated significant
increases in skills critical for health literacy, namely conceptual knowledge and problem solving
and attitudes and self-efficacy toward learning about neuroscience. Teachers valued MFF and
found it highly effective. The results suggest that when teachers are effectively supported in
implementing novel curricula, integrating life and health sciences in high schools is an effective
approach to instill skills fostering science performance, engagement and health literacy.

Keywords: curriculum, teach professional development, health literacy, K-12 education

Disclosures: K.F. Meiri: None.

Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.08SU/UU48

Topic: H.02. Teaching of Neuroscience
Title: Developing a neuroscience high school summer camp

Authors: *J. S. SHUMSKY; Neurobio. and Anat., Drexel Univ. Col. of Med., Philadelphia, PA

Abstract: The Department of Neurobiology and Anatomy in collaboration with the Graduate School of Biomedical Sciences and Professional Studies at Drexel University College of Medicine has created a two-week summer camp to expose high school students to neuroscience information and research. Faculty and senior graduate students provided two weeks of morning lectures on a topics selected to highlight the breadth of neuroscience such as: comparative neuroanatomy, nerve conduction, cellular neuroscience, spinal cord injury and rehabilitation, sensory systems, neuropathology, neuropharmacology, animals in research, and brain machine interfacing. A guided tour of the Academy of Natural Sciences of Drexel University was arranged in conjunction with the comparative neuroanatomy lecture. Afternoon sessions consisted of laboratory demonstrations, brain dissection, clinical correlates of spinal cord injury, and a group laboratory research project. Neuroscience graduate students guided the students through their projects, which culminated in group presentations to the Departmental faculty, who were very impressed. Applicants to the program were asked to submit a statement of interest, a transcript, and two letters of recommendation and were selected by a holistic review process. A diverse group of 15-20 students was admitted in 2013 and 2014, and 30% came from out of town to participate. A scholarship mechanism was created for under-represented minority students. Feedback on the entire experience was overwhelmingly positive. In the months following the camp, several students asked for letters of recommendation for their college applications or to volunteer in the research laboratories. Future plans include expansion to include additional two-week summer sessions as well as recruitment and fellowships for area high school science teachers who will then be able to communicate neuroscience knowledge in the context of their regular classroom curricula.

Disclosures: J.S. Shumsky: None.

Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.09SU/UU49

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant R25MH095735
Title: The Institute On Neuroscience (ION) summer research program for outstanding high school students and teachers


Abstract: To recruit bright students into the scientific research community, we have offered an eight-week summer research program since 2003. In various forms since 2008, we have also recruited middle and high school teachers to reinvigorate their science teaching through research involvement. The program involves a week-long introductory course in basic neuroscience, followed by a seven-week traditional mentored research apprenticeship in a metro-Atlanta institution (Georgia State University, Emory University, Georgia Institute of Technology, Morehouse College, or Spelman College). Using a mixed-method (quantitative and qualitative) evaluation approach, we have tested the hypothesis that ION program participation positively affects scientific research self-efficacy, teaching self-efficacy, neuroscience content knowledge, science identity, commitment to research or teaching, and/or science and research anxiety. Beyond data from preliminary surveys and focus groups, two cohorts of 12 participants each contribute to the current data set, which includes responses to pre-, mid-, and post-program surveys, as well as qualitative evaluation of slide presentations, written research reports, and proposed lesson plans. We detected significant improvement in confidence with neuroscience concepts early in the program, and scientific research self-efficacy later in the program, coupled with increases in teaching self-efficacy and teaching commitment scores among teachers. Yet for neither students nor teachers did we observe significant changes in scientific research anxiety, neuroscience anxiety, or general science anxiety, nor did we detect any significant change in science identity. We attribute the former to low levels of science-related anxiety among the applicant population at start (a floor effect). We attribute the latter to both high levels of science identity to start and to the relatively short-term nature of the summer program. An alumni survey might reveal increased science identity through retrospective attributions. Slide presentations, reports, and lesson plans reveal knowledge acquisition in some areas for all participants. Formative program evaluations suggest which program elements are perceived to contribute the most to participant progress. These initial short-term benefits of summer research immersion predict long-term benefits such as retention in pathways toward research careers for students and successful career advance for teachers.


Theme H Poster

022. K-12
Location: Halls A-C  

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM  

Program#/Poster#: 22.10SU/UU50  

Topic: H.02. Teaching of Neuroscience  

Title: Divergent Thinking: Using Roth's dystopian trilogy as a neuroscience teaching tool  

Authors: K. KELLY, K. VASILLOFF, *L. M. FREEMAN;  
Mary Baldwin Col., Staunton, VA  

Abstract: Veronica Roth, author of the popular young adult dystopian series Divergent, began work on the series as an undergraduate at Northwestern University, where she studied both creative writing and psychology. Roth has acknowledged in multiple interviews that her psychology studies inspired her fiction, particularly her studies of biopsychology, fear conditioning and personality testing. U.S. teenagers ranked Divergent as their favorite book of 2011 in a survey by the American Library Association (ALA News, 2012), and the trilogy was ranked as #19 on National Public Radio’s list of “best-ever teen novels,” ahead of both the tremendously popular Twilight series and classics like Flowers for Algernon and Call of the Wild. The first film in the series premiered in March 2014 and three sequels are already in the works. The futuristic society of the series is divided into five factions: Erudite, Abnegation, Candor, Amity and Dauntless. At age 16, all children must take an aptitude test and choose a faction as their permanent home. The protagonist, Tris Prior, is shocked to discover she is a genetic anomaly in her world; she is “Divergent,” showing equal affinity for three factions. A neurological explanation is provided for this condition in the second book, Insurgent, when Tris is captured by an evil neuroscientist named Jeanine and subjected to brain scans that reveal she has an abnormally large lateral prefrontal cortex, a smaller than average orbitofrontal cortex and an excessive number of mirror neurons. The frontal lobe structures, Jeanine explains, account for Tris’s tendencies toward altruistic behavior and her resistance to the usual motivating powers of reward. The mirror neurons give Tris a particularly flexible personality, a high capacity for mimicry and exceptional empathic concern for others. Other neuroscience-related topics in the book include self-awareness gained through mirror imaging and conditioned fear responses. Like babies in Gallup’s rouge test, Tris gains increasing self-awareness through visual feedback of her image in mirrors, a object she was forbidden to use in her Abnegation childhood home. Fear conditioning through hallucinogenic simulations is a key part of initiation training in Tris’s chosen faction, Dauntless, and she develops a debilitating phobia of guns when she is forced to shoot a close friend to save her own life. Given the popularity of the books and movies, Divergent has potential to be a valuable teaching tool for neuroscience and biopsychology. In June 2014, Louisiana State University will offer a workshop on the psychology and neuroscience of the series at its inaugural Young Adult Literature Conference and Symposium.
Disclosures:  K. Kelly: None. L.M. Freeman: None. K. Vasiloff: None.

Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.11SU/UU51

Topic: H.02. Teaching of Neuroscience

Title: Muscles Alive! A novel, experiential neuroscience education outreach program for elementary, secondary, and university students

Authors: *B. L. TRACY; Hlth. & Exerc Sci., Colorado State Univ., FORT COLLINS, CO

Abstract: An effective strategy to improve neuroscience education is to make lessons fun, interactive, and immersive for students. Experiential, auditory, and visual modes of information transmission can optimize learning in diverse student groups. Our lab conducts experimental neuromuscular studies that often involve measuring the electromyogram (EMG) with expensive lab-based equipment not suitable for use in public education in the field setting. In 2012, a collaboration between our group at Colorado State University and the team at Backyard Brains (BYB), Inc., resulted in BYB’s new Human EMG Spikerbox, a small, inexpensive bioamplifier that for the first time allows students of all ages to experience, hear, see, and record their own muscle electrical activity in school and community settings. The EMG signal is detected with 15-cent disposable electrodes made from common materials, displayed in real time via a free App on smartphones or tablets, and played through hobby speakers. The novel EMG kits are the centerpiece of our 1.5 yr-old program Muscles Alive!, named as an homage to the classic EMG text. Offering vivid visual and audio feedback, our participatory demonstrations include: 1) Live visual/auditory display of raw EMG signals from muscles of the hand, arm, leg, and face during different tasks 2) Jaw muscle activity - chewing experiments with foods of different consistencies. 3) Weight lifting and arm wrestling 4) Occasional successful recording of single motor unit spike trains, allowing observation of single neuron discharge behavior 5) Tendon vibration demos with handheld massagers that target afferent muscle sensors: The Phantom Limb (biceps brachii tonic vibration reflex) and the Neurophysiology Trust Fall (body sway vibratory proprioceptive illusion). Our demonstrations, along with accompanying age-appropriate educational materials, are designed to teach students about 1) biological electricity and excitable cells, 2) the relation between brain command and muscle activation, 3) how action potentials are
transmitted efferently to muscle and converted to force, 4) the role and extreme sensitivity of muscle sensors (spindles) in reflexes and proprioception, and 5) the essential role of voluntary muscle control in everything that makes us human. We have interacted with over 1,000 9-18 year-olds during > 20 events in public schools, science fairs, expos, and after school programs. The same equipment and concepts have been used successfully in presentations to adults and we are currently implementing these techniques in university neuromuscular physiology, kinesiology, and biomechanics courses.

Disclosures: B.L. Tracy: None.

Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.12SU/UU52

Topic: H.02. Teaching of Neuroscience

Title: Biomedical Research Academy in Neuroscience (BRAiN): An educational model to engage middle-schoolers in stem fields

Authors: *C. C. SWANWICK1, C. B. FAVERO2, J. HEITZ1, R. HEITZ1; 1Ideaventions, Oakton, VA; 2Ursinus Col., Collegeville, PA

Abstract: Rapid advances in cutting-edge technology will require a future workforce well-educated in fields pertaining to Science, Technology, Engineering, and Mathematics (STEM). For example, between the years 2010-2020, the number of jobs for biomedical scientists and engineers is projected to increase by 36% and 62%, respectively (U.S. Dept. of Education). We propose that exposing middle-schoolers to modern biomedical research will provide an inquiry-based approach for stimulating interest in STEM fields. With this objective, we developed an educational model for rising 6th-8th graders utilizing applied neuroscience to introduce them to basic concepts of cellular and molecular biology. The pilot program of this Biomedical Research Academy in Neuroscience (BRAiN) features two phases: summer and school-year programs. Limited to eight students, the summer session encompasses two weeks of intensive hands-on learning organized according to principles of the scientific method. Research sessions will be intertwined with instruction in basic laboratory techniques and key biological principles such as cell structure, the central dogma of biology, and neuroanatomy. The school-year phase of BRAiN allows students to expand their research projects with more in-depth weekly laboratory sessions. Effects of the BRAiN program will be assessed via multiple methods, including
knowledge retention, student tracking, and community impact. With modifications, the BRAiN model could potentially be utilized for as a platform for other biomedical fields to generate interest and advance knowledge of STEM subjects.


Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.13SU/UU53

Topic: The 2014 International Brain Bee championship

Authors: N. MYSLINKSI, *D. SEMINOWICZ;
Dept of Neural & Pain Sci., Univ. of Maryland, Baltimore, Baltimore, MD

Abstract: Future neuroscientists from around the world met in Washington, DC to compete in the Sixteenth International Brain Bee (IBB) Championship. The Brain Bee is the preeminent neuroscience competition for high school students. The American Psychological Association hosted the event at their convention, August 7 -10, 2014. 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 using human brains, a patient diagnosis component with student actors, and a neurohistology exam. The countries competing were not known at press time, but the 19 countries that competed last year and their National Coordinators include: Linda Richards (Australia), Alfred Sholl-Franco (Brazil), Judy Shedden (Canada), Jiangjie (Jason) Yu (China), Julianne R McCall (Germany), Seema Raghunathan (India), P. Paolo Battaglini (Italy), Nchafatso Gikenyi (Kenya), Thomas Lao (Macau), Jafri Malin Abdullah (Malaysia), S Louise Nicholson (New Zealand), Polycarp Nwoha (Nigeria), Cristian Gurzu (Romania), Thameen Dheen (Singapore), Ferhan Esen (Turkey), Seong-Whan Lee (Korea), Andrii Cherninskyi (Ukraine), Sathy Parvathy (United Arab Emirates), and Norbert Myslinski (United States). 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. Presidents, Ambassadors and other public officials have recognized the IBB. 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 Coordinator for the 2015 IBB is Linda Richards from Australia. The IBB is a program of Mankind for International Neuroscience Development, Inc. (MIND).

Disclosures:  N. Myslinksi: None. D. Seminowicz: None.

Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.14SU/UU54

Topic: H.02. Teaching of Neuroscience

Support: Society for Neuroscience

American Society for Neuroscience

Robert Jeffrey

University of Maryland, Baltimore

Title: The american national brain bee championship 2014

Authors: *N. R. MYSLINKSI, J. RO;
Neural and Pain Sciences, 8th floor, Univ. Maryland Sch. Dent., BALTIMORE, MD

Abstract: After two days of intense competition, the 2014 USA National Brain Bee Champion is Adam Elliott from Piscataway, New Jersey. The Brain Bee is a neuroscience competition for high school students. A record forty-eight regional winners from around the country competed at the University of Maryland, Baltimore on March 14th and 15th of Brain Awareness Week. Adam goes to Matawan-Aberdeen Regional High School. He won a scholarship, a summer internship at a neuroscience lab, trophies for his school and himself, and the right to represent the United States at the Fifteenth International Brain Bee (IBB) Championship in Washington, DC in
August, 2014 (See the IBB Poster). The Brain Bee tests a student’s knowledge of the human brain, including such topics as intelligence, emotions, memory, sleep, vision, hearing, sensations, Alzheimer’s disease, Parkinson’s disease, autism, schizophrenia, addictions, brain research and many others. The USA Championship competition involves a neuroanatomy laboratory practical exam with real human brains, patient diagnosis involving face-to-face interactions with patient actors, MRI brain imaging analysis, brain histology with microscopes, and a final question-and-answer component with judges. Second place went to Venkata Macha representing Birmingham, Alabama. Third went to Valentina Lorenzi, Las Vegas, Nevada. Forth went to Rajath Salegame, Chicago, Illinois. Tied for fifth were Apolonia Gardner of San Diego, California and Daniel Shaykevich of Scranton, Pennsylvania. Seventh went to Chunhua Ni, East Lansing, Michigan. Tied for eighth were Anahita Iyer of Philadelphia, Pennsylvania and Sai Allu of St. Louis, Missouri. To advance to the USA Championship, Adam had to win the Central New Jersey Regional Brain Bee Competition coordinated by Dr. Micahel Matise of Rutgers Robert Wood Johnson Medical School. AT the IBB Championship, Adam will compete against other national champions from such countries as Australia, Brazil, Canada, China, Germany, India, Italy, Kenya, Korea, Malaysia, New Zealand, Romania, Singapore, Turkey, Ukraine, United Arab Emirates, and others. The USA National Brain Bee was founded by Dr. Norbert Myslinski, and is one of 30 National Brain Bees in 6 continents. Its purpose is “to motivate young men and women to learn about the brain, and inspire them to consider careers in basic and clinical neurosciences.” He says “We need them to treat and find cures for the more than 1000 neurological and psychological disorders including Alzheimer’s, Autism, and Addictions.”

Disclosures:  N.R. Myslinski: None. J. Ro: None.

Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.15SU/UU55

Topic: H.03. Public Awareness of Neuroscience

Support: Funding by Loma Linda School of Behavioral Health

Title: Inaugural San Bernardino County brain bee

Authors: *C. RAY, P. LORENZO, N. MISTRY, R. HARTMAN; Loma Linda Univ., Riverside, CA
**Abstract:** Loma Linda University sponsored the inaugural San Bernardino County Brain Bee and Neuroscience Conference in April 2014. Prior to 2014, there had been no local brain bee or brain awareness events for San Bernardino County. Between 2000 and 2010, only 19% of San Bernardino County residents over the age of 25 had a Bachelor’s degree. This is well below the state (30%) and national (28%) proportion. San Bernardino youth need diverse educational opportunities and exposure to potential careers. The San Bernardino County Brain Bee hosted by Loma Linda University helped to do both. We established our local brain bee as an annual event to provide an opportunity for healthy competition and pique students' interest in brain science. Additionally, we wanted to engage the community so they could understand and develop a greater appreciation for neuroscience, mental health, and other brain related fields. On that note, we did not limit the day merely to the competition portion. Instead, in an effort to inspire our attendees toward exploring fields of study related to the brain, our schedule of events included presentations by individuals who were either professionals or advanced doctoral students in brain related fields. Our successful inaugural event saw a large number of attendees from high schools, colleges, graduate schools, and the community. We were able to create relationships with area educators and, because of these newly established inroads, we have subsequently been able to present about neuroscience at area schools to reach out to even more students. This was the first of what we hope will be an annual event to help spread brain awareness and inspire researchers, clinicians, and neuroscience leaders of the future.

**Disclosures:** C. Ray: None. P. Lorenzo: None. N. Mistry: None. R. Hartman: None.

**Theme H Poster**

**022. K-12**

**Location:** Halls A-C

**Time:** Sunday, November 16, 2014, 8:00 AM - 12:00 PM

**Program#/Poster#:** 22.16SU/UU56

**Topic:** H.02. Teaching of Neuroscience

**Support:** NSF Grant 1102997

**Title:** Ready, set, grow: Utilizing physical exercise to teach k-12 students about an anti-obesity vaccine

**Authors:** A. BEARD, D. CHAPPELL, A. PLAYER, *G. D. GRIFFIN;
Dept. of Biol., Tuskegee Univ., Tuskegee, AL
Abstract: The prevalence of childhood obesity has increased tremendously in the last three decades. In fact, the World Health Organization has estimated that over 35 million children are obese in developing countries. In the United States, over 17% percent of children aged 2-19 is considered obese. One critical factor in the increase of childhood obesity in the United States is the lack of time and resources for dedicated physical activity in K-12 public schools. Here, we present a learning module, entitled “Ready, Set, Grow,” that incorporates physical exercise with middle school pedagogy. Thus, teachers can designate teaching time to ensure that students participate in physical exercise. In the module, students will learn the differentiation between obesity and overweight, the role of the endocrine system in regulating body weight, and how vaccines are produced and act. This learning module is targeted to middle school students (6th-8th grades). The module contains a pre-test, introductory reading, a post-test, and a lesson plan aligned with major objectives. Overall, this learning module teaches middle school students topics related to neuroendocrinology and immunology while simultaneously providing for a sustainable method to incorporate physical exercise into the everyday classroom.

Disclosures: A. Beard: None. D. Chappell: None. A. Player: None. G.D. Griffin: None.

Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.17SU/UU57

Topic: H.02. Teaching of Neuroscience

Abstract: Substance use prevention education has historically focused on abstinence, self-esteem, and biological effects of drugs and is primarily aimed at reducing initiation of drug use. Teen drug use occurs at an alarming rate despite initiation prevention efforts, and it is widely understood that addiction is characterized by compulsive drug use despite consequences, affecting a subset of those who initiate use. More recent addiction education focuses on reinforcement learning, reward circuitry and genetics. These efforts may help students better understand the disorder of addiction, and change students’ definitions of addicts so that they may
recognize early signs of pathological drug use. Interactive educational experiences aimed at teaching students about reinforcement learning and compulsive reward seeking will make these lessons more salient and will provide hands-on exposure to experimental methods in the biology of addiction and other behavior. LEGO Mindstorms systems are a widely available platform for development of otherwise cost-prohibitive experimentation in operant reinforcement in schools. We have designed a working, programmable, dual-retractable lever operant conditioning apparatus (Skinner Box) using this system. In a validation experiment we were able to demonstrate that mice learn to press the lever for food within 2-3 training sessions, and that the system is sensitive enough to detect strain differences between C57BL/6J and DBA/2J mice in reinforcement learning. This device is suitable for construction in education facilities and may be deployed in collaboration with researchers possessing appropriate infrastructure for mouse behavioral experiments. Accompanying addiction education and technology/engineering exercises will provide an integrated educational experience. Behavioral experimentation is an increasingly sophisticated and important means by which we understand gene function. Despite broad personal, public health and societal impacts of behavioral phenomena, the subject receives little coverage in conventional K-12 education. Modern behavioral experimentation, particularly in research organisms such as the laboratory mouse, involves the use of automated systems to administer studies and assess behavior. Building these devices in the classroom directly engages the student in authentic scientific and engineering practices in addition to increasing knowledge about behavioral science. Through approachable designs based on the LEGO Mindstorms system we expect to foster awareness of biological psychology, while providing experiential learning in the basis of addiction and behavioral change.


Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.18SU/UU58

Topic: H.02. Teaching of Neuroscience

Support: NIDA, Intramural Research Program, NIH (PI: Dr. Elliot Stein)

Title: Genes, brain, and behavior in your pet worm: an interactive, inquiry-based neuroscience workshop for K-12 students
Abstract: Inspired by published research using behaviorally-relevant genetic manipulations in the C. elegans, this hands-on, inquiry-based neuroscience workshop aims to introduce upper-elementary-school and middle-school students to the role of receptor genes and proteins in the neural circuit function and in behavioral response to salient environmental stimuli. C. elegans is used as a model organism because of the relative simplicity of the invertebrate nervous system compared to the mammalian one. Students are first introduced to: the basic concepts of electrical and chemical signal transmission within and between neurons, including the key-lock view of ligand-receptor binding; the gene-to-protein relationship; and the basic flow of information from sensory input towards motor output. In the hands-on part of the workshop, students use precut paper parts to construct a diagram of two opposing sensory-to-motor neural circuits in the C. elegans nervous system: one circuit responsible for approach towards nutritious substances, and the other circuit mediating escape from noxious substances, when these substances are detected in the environment. Critically, the two circuits include genes as well as proteins encoding the receptors for nutritious or noxious substances, respectively; and these genes can be manipulated in systematic ways, leading to specific alterations both in circuit response and in behavior. Students first explore how the worm responds to food or poison when the circuits function normally, and then investigate the consequences of specific genetic disruptions (i.e., knocking down either or both receptors; switching or adding the receptors to the opposing circuit) on the worm’s behavior and chance of survival. In conclusion, a comparison with drugs of abuse and their potentially disruptive effects on circuit function and behavior in humans and other mammals is also made, to establish real-life relevance of the topic and to promote application of the concepts learned beyond the classroom.

Disclosures: A.J. Jasinska: None.
Sponsorship from ASU

**Title:** Engaging students in brain awareness through hands on science

**Authors:** L. HARRIS, A. GONZALES, J. J. FAUST, I. SINAKEVITCH, *D. P. BALUCH; Sch. of Life Sci., Arizona State Univ., Tempe, AZ

**Abstract:** Engaging a student’s interest in STEM education requires not only great mentorship but activities that can capture their attention and stimulate their interest to learn more. Hands on Science is an annual event held at Arizona State University which 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 university environment. Students, especially women, minorities and those with disabilities, are invited to attend this one day event to tour various labs at ASU and participate in hands on activities ranging from investigating crime scenes using DNA fingerprinting, engaging in alternative energy experiments using anaerobic chambers, observing insect behavior studies, viewing meteorites and images taken by the Lunar Reconnaissance Orbiter camera to mounting slides and scanning images of neurons with laser based microscopes. The W.M. Keck Bioimaging lab, within the School of Life Sciences, specifically focuses on the Brain Awareness portion of the event by providing multiple stations that give students the opportunity to learn 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 share their microscope images online at the ASU Hands on Science Facebook page (www.facebook.com/ASUhandsonscience) which provides a portal for ongoing education and gives them the opportunity to share their experience with friends and family.

**Disclosures:** L. Harris: None. A. Gonzales: None. D.P. Baluch: None. J.J. Faust: None. I. Sinakevitch: None.

**Theme H Poster**

022. K-12

**Location:** Halls A-C

**Time:** Sunday, November 16, 2014, 8:00 AM - 12:00 PM

**Program#/Poster#:** 22.20SU/UU60

**Topic:** H.02. Teaching of Neuroscience

**Support:** Office of Research Services, NIH, DHHS
More than meets the eye: Introducing neuroscience through optical illusions

**Authors:** *S. WILLIAMS, C. WEICHSELBAUM;*
Section on Neural Gene Expression, NIMH, Bethesda, MD

**Abstract:** An interactive presentation was developed for the annual "Take Your Child to Work Day" event at the National Institutes of Health. The goal was to introduce elementary and middle school aged children to the field of neuroscience through the engaging medium of optical illusions. While children are often exposed to such illusions as mere entertainment, we demonstrate that they can be used as a gateway to core neuroscience concepts - notably, that the brain is responsible for sensory processing. Young children are familiar with the concept of "the five senses," but generally associate them only with sensory organs and do not consider any involvement of the brain. They frequently express the misconception that the brain is only for "thinking." Our presentation dispels this idea through a variety of illusions, ranging from ambiguous figures to the Stroop task, with accompanying explanations that highlight the ways perception is affected by context, expectations, and other mental "shortcuts." Localization of function is also briefly discussed, and these principles are generalized to the other senses. Across eight presentations in the past two years, participants have gained an improved understanding of the brain's involvement in vision as well as increased appreciation for neuroscience as a field.

**Disclosures:** S. Williams: None. C. Weichselbaum: None.

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**Theme H Poster**

**022. K-12**

**Location:** Halls A-C

**Time:** Sunday, November 16, 2014, 8:00 AM - 12:00 PM

**Program#/Poster#:** 22.21SU/UU61

**Topic:** H.02. Teaching of Neuroscience

**Support:** 1038166

**Title:** Authentic research experiences for public high school teachers and students in puerto rico: University-High school partnership

**Authors:** *S. TORRES-RUIZ¹, C. OJEDA-REYES², R. BROWN², J. APONTE-RAMIREZ², J. AGOSTO-RIVERA³, N. CRUZ-BERMUDEZ¹;
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Abstract: The Boyer Commission Report (BCR) reported that most U.S. universities do not provide sufficient educational experience for the development of critical thinking as well as skills for university students. However, in Puerto Rico there have been efforts to implement this educational experience at the secondary level, yet there is no empirical evidence to support it. The experience of a science teacher, two students and parents during their participation in a scientific research experience in the areas of neuroscience and pharmacology is described. Results are presented from the perspectives of the participants. In the case of the teacher, this acquired knowledge was in the use and management of instruments and the research process. On the other hand, the students had the opportunity to work in a lab with a professor conducting a scientific investigation which won awards at a science fair at the Island level. Parents understood the process involved in carrying out an investigation and how they could help their children. In addition, both students graduated and entered science programs at the University of Puerto Rico. This experience suggests that collaborations between universities and public schools are a mechanism to promote research experiences for both students and teachers in the Puerto Rico Educational System. Keywords: authentic research experience, secondary school, teachers, partnership, education.


Theme H Poster

022. K-12

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 22.22SU/UU62

Topic: H.03. Public Awareness of Neuroscience

Support: Michael T. Goulet Foundation

AAAS STEM award

Title: The University of New England’s K-12 neuroscience outreach program

Authors: A. D'AMBRUOSO1, K. SCHWARZ1, A. DEAL1, K. ERICKSON1, E. BILSKY1, *M. A. BURMAN2;
1Ctr. for Excellence in the Neurosciences, 2Psychology, Univ. of New England, Biddeford, ME
Abstract: The University of New England (UNE) Neuroscience Outreach Program, established in 2009, provides an opportunity for undergraduate, graduate and professional 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 “grow-up, grow-out” framework, in which our learning modules increase in complexity and scientific diversity as we continue to visit students multiple times throughout their education. Our collection of interactive modules covers various topics including: neuroanatomy, neurological disease, traumatic brain injury, drugs and addiction, helmet safety, and cognition. We focus on engaging, hands-on activities that bring the science to life and get students involved in their learning. 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 curricula. In order to have a lasting impact, our vertical integration (“grow-up”) begins at the elementary level and progresses with the students into their middle and high school years while expanding in complexity of information and incorporating other scientific fields (“grow-out”), building lasting relationships that should encourage these students to continue into science fields as adults. Volunteers in our Outreach Program bring these modules to about 3000 K-12 students in the southern Maine area annually, with the goal of enhancing their interest in science, the brain, and UNE. Volunteers are trained via a combination of online and in person workshops. Our early assessment demonstrates that the program significantly improves student’s desire for a job in science as well as general good feelings about science. In addition, our volunteers rate the program as highly effective at building professional skills and complementing their classroom work. Future directions for the UNE Outreach Program include student and volunteer 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.


Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 23.01SA/UU63

Topic: H.02. Teaching of Neuroscience
Support: Grant from NeuroScience Associates

Title: Nu Rho Psi, the national honor society in neuroscience

Authors: *G. MICKLEY*¹, E. P. WIERTELAK², G. COUSENS³, L. J. ACHOR⁴;
¹Nu Rho Psi, Spartanburg, SC; ²Macalester Col., St. Paul, MN; ³Drew Univ., Madison, NJ;
⁴Baylor Univ., Waco, TX

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 42 chapters across the United States and over 2000 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 only 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 present their research at the annual Society for Neuroscience (SfN) convention. This year we have begun to offer grants to support the research of our members as well as the community outreach and educational activities of our chapters. Nu Rho Psi members may participate in a variety of professional development opportunities such as national networking videoconferences and access online resources (e.g., “How-to Guide for Graduate school in Neuroscience”). For more information, see our web page (http://www.nurhopsi.org/ ) or attend our informational session at the FUN booth during the 2014 SfN annual meeting.
Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 23.02SA/UU64

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: *J. S. SMITH¹, L. A. GABEL², N. J. SANDSTROM³;
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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 2014 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. Discussions from the most recent meeting, held at Ithaca College in the summer of 2014, will be highlighted. 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 our newsletter and listserve. 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 2014 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 2014 FUN Student Travel Award winners and sponsors as well as any Educator, Mentor, and Service Award winners.

Disclosures:  J.S. Smith: None.  L.A. Gabel: None.  N.J. Sandstrom: None.

Theme H Poster

023. College Experiences

Location:  Halls A-C

Time:  Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#:  23.03SA/UU65

Topic:  H.02. Teaching of Neuroscience

Authors:  *K. L. HAIK*¹, R. L. GARNŞ²;
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Abstract:  Universities are always looking for opportunities to provide cutting edge curriculum and research opportunities and to prepare students for the job market in meaningful ways. The purpose of this poster is to show how an undergraduate neuroscience program can provide universities this sort of transdisciplinary advantage. Transdisciplinarity can be defined as moving “⋯beyond the interdisciplinary combination of academic disciplines to a new understanding of the relationship of science and society.” [Klein 2004] It achieves a common scientific goal
through collaboration that promotes exchanging information, altering discipline-specific approaches, sharing resources and integrating disciplines. Neuroscience is one of the first transdisciplinary “disciplines,” made of collaborators from biology, psychology, chemistry, computer science, philosophy, linguistics, anthropology, etc. The common object of study is the nervous system, which figures into a wide range of scientific and social problems. A transdisciplinary undergraduate neuroscience program provides the following advantages to universities:

- Providing organization for collaboration; breaking down silos
- Providing transdisciplinary depth alongside disciplinary breadth
- Placing graduates in a wider array of career opportunities (beyond neuroscience as biology or psychology)
- Focusing future faculty hiring decisions by centering on transdisciplinary research problem areas
- Creating opportunities for new streams of external funding
- Creating opportunities for innovative research and teaching projects
- Fostering community engagement by addressing real-world problems
- Coupling with internationalization to teach globalization values

Neuroscience also teaches students the skills employers want (Forbes & AAC&U LEAP): ability to work in a team, decision-making and problem-solving skills, analyzing quantitative data, process information, computer proficiency and more. Key components to a transdisciplinary undergraduate neuroscience structure include a problem-centered curriculum, requiring cognate courses from different disciplines, and a transdisciplinary pro-seminar, capstone, lab, or internship. Additionally, finding collaborative space where neuroscience faculty and students can work is vital. With a transdisciplinary design, this type of program will draw students, parents, faculty, administrators, and employers together to drive a program that promises to help all stakeholders accomplish their goals.


Theme H Poster

023. College Experiences

Location:  Halls A-C

Time:  Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#:  23.04SA/UU66

Topic:  H.02. Teaching of Neuroscience
Title: Flow dynamics of classroom seating positions may predict achievement outcome in dental hygiene college students

Authors: *S.-I. HIRANO, T. FUJIMOTO, H. INOUE, K. UCHIHASHI, Y. NISHIKAWA; Dept of Physiol., Osaka Dent. Univ., Osaka, Japan

Abstract: To succeed in the licensing examination is one of the greatest concerns of healthcare school students. To bring their knowledge up to the required level, teachers have made many teaching attempts. A complicating factor is that each student differs in his or her learning ability. However, it is quite difficult for a teacher to understand the personality and capabilities of every student. So far, some studies have reported that the students’ seating positions in the classroom are associated with their academic performance. According to those reports, the seating position reflected the degree of interaction with the lecture. Therefore, we examined whether the theory is valid on mass education that is undertaken with a large number of students in a large classroom. This study was conducted for five years among female students of a dental hygiene college in which the authors have taught as visiting professors. We recorded the seating positions of all students whenever we taught neuroscience and physiology. There were 15 or 16 lectures per year. Students took two term examinations. The number of students during the study period was 97-119, and they were 18-19 years old. We monitored how each student changed her seating position and examined the correlation between the different positions, how they changed, and the results of term examinations. Previous reports stated that the seats in front of the teacher and in the front sections at the right and at the left were highly interactive. Furthermore, the middle section seats were moderately interactive, whereas the back end and rear sections of both wings were low interactive. Our results for the low interactive seats were almost the same as in the previous reports. However, not all students who received a good grade in the examination sat in high interaction seats. We found that they frequently used moderate interaction seats. Also good-grade students shared a certain seat over a long period of time, whereas poor-grade students changed seating position frequently and tended to travel long distance. We assume that these features that are peculiar to poor-grade students may be attributed to their poor concentration and dependent nature. Therefore, they tended to choose seats that can be expected to provide short-term benefits. In addition, they seemed to have a fear of being called upon by the teacher. Because of this psychological reaction, they want to remain as far from the teachers as possible. By knowing and coping with their concerns, we will be better equipped to lead all students to better participate by joining into the subject and discussion of a class. This is considered to be beneficial to maximize the educational efforts.

Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program/#/Poster#: 23.05SA/UU67

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant R25NS65778

Title: UNTRAC: A partnership between two universities to bring underrepresented minorities to neuroscience

Authors: *K. LACK*¹, M. BHAT², A. AILERU², S. SETARO¹, A. D. JOHNSON¹, W. SILVER¹;
1Biol., Wake Forest Univ., Winston Salem, NC; 2Life Sci., Winston Salem State Univ., Winston Salem, NC

Abstract: Introduction: The purpose of this partnership was to increase the number of underrepresented minority students (URMs) entering neuroscience careers. UNTRAC (Undergraduate Neuroscience Training Cooperative) makes the undergraduate neuroscience minor at Wake Forest University (WFU), a private liberal arts university available to students at Winston-Salem State University (WSSU), a historically black institution. While there are several active research neuroscientists at WSSU, the WSSU curriculum contains no neuroscience-related courses. According to a 2007 Association for Neuroscience Departments and Programs survey 25% of all predoctoral students are URMs, but prior to the UNTRAC program only 7% of students in Wake Forest University’s undergraduate neuroscience program were URMs. The goals of the UNTRAC program were: 1) to increase the fraction of URMs in the total class (both WFU and WSSU students combined) that go on to pursue neuroscience research and 2) to have 40% of UNTRAC students embark on neuroscience research careers. Methods: UNTRAC students were provided extensive neuroscience background information and education. WSSU students applied for the UNTRAC programs and upon acceptance were given visiting student status at WFU. Over the course of two years, students enrolled in 4 courses needed to complete the minor including a semester of research. Students also received a laptop computer, money to spend on the WFU campus, and one trip to the Society for Neuroscience meeting. Assessment of goals was done using a career track survey as well as a post-graduate applications and matriculation survey. Results: Since UNTRAC began in 2010, the total number of URM minors, 18 (12%) in WFU’s neuroscience program increased 5%. Of the 12 UNTRAC students who started the program, 3 (25%) matriculated into competitive graduate schools in the field of neuroscience and 2 (16%) chose a different field of biomedical science. We lost contact with 2
and 1 dropped out of the program to pursue another opportunity. The remaining 4 students (33%) are in the program pipeline slated to pursue careers in biomedical science. Conclusions: While the UNTRAC program recruited more underrepresented minorities to the field of neuroscience, it is unclear whether it had a significant impact on the ultimate career choice of the students. However, it encouraged the URM’s to consider graduate education in biomedical research and fostered a true collaboration and working relationship between the neuroscientists of WFU and WSSU. Furthermore, it has encouraged the faculty at WSSU to add neuroscience courses to their science curriculum.


Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 23.06SA/UU68

Topic: H.02. Teaching of Neuroscience

Title: Teaching resources for neuroscience content in the 2015 Medical College Admissions Test®

Authors: *J. R. PRICHARD¹, J. PAGE²;
¹Dept Psychol, Univ. St. Thomas, SAINT PAUL, MN; ²Assn. of American Med. Col., Washington DC, DC

Abstract: Each year over 50,000 college students and alumni take the Medical College Admissions Test® (MCAT®) and apply for admissions to medical school. For the first time since the test’s inception, starting in spring 2015 the MCAT will include social and behavioral sciences content. The new section of the MCAT exam titled “The Psychological, Social and Biological Foundations of Behavior” will test pre-health competencies that combine content knowledge with scientific inquiry and reasoning skills. As a result, more undergraduate students will be likely to enroll in neuroscience courses to learn these competencies. Anticipating growing interest in curriculum related to the biological foundations of behavior content on the exam, the AAMC (Association of American Medical Colleges) established the Pre-health Collection, a free repository of teaching resources within MedEdPORTAL’s iCollaborative (www.mededportal.org/icollaborative/pre-health). This online space gives faculty the opportunity to share access to instructional resources. Faculty and advisors can post classroom
activities they have authored or refer a resource authored by someone else. The Pre-health Collection already includes hundreds of instructional resources that are categorized by foundational concepts of the MCAT2015 exam. A community of contributors is currently being established to collect and share teaching resources that are designed to support undergraduate faculty prepare or revise courses that are interdisciplinary, teach scientific inquiry and reasoning skills, and relevant to the new pre-health competencies.

Disclosures:  J.R. Prichard: F. Consulting Fees (e.g., advisory boards); American Association of Medical Colleges. J. Page: A. Employment/Salary (full or part-time); Association of American Medical Colleges.

Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 23.07SA/UU69

Topic: H.02. Teaching of Neuroscience

Support: College of Arts and Sciences, Quinnipiac University

Bristol-Myers Squibb Center for Science Teaching and Learning, Quinnipiac University

Title: The 25th northeast under/graduate research organization for neuroscience (NEURON) conference held at Quinnipiac University in Hamden, CT

Authors: *A. J. BETZ¹, T. H. AHERN¹, C. FRYE²;
¹Psychology, Quinnipiac Univ., Hamden, CT; ²Univ. of Albany, Albany, NY

Abstract: The 25th NEURON conference was held February 22nd, 2014 at Quinnipiac University’s Center for Medicine, Nursing and Health Sciences. 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 Dr. Amelia Eisch, Associate Professor, Department of Psychiatry, University of Texas Southwest Medical Center. Professor Eisch’s talk was titled “Adult Hippocampal Neurogenesis: What are New Neurons Good For? What is Good for New Neurons?” 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 understanding relationship between mood disorders and adult...
neurogenesis and how new neurons are involved in psychiatric disorders. Students and faculty
had three workshops to choose from hosted by local and extended faculty with deep expertise in
their fields. These workshops included: Careers in Science Panel, From Molecule to Medicine:
Drug Discovery and Development, Working with Children with Neurodevelopmental Disorders:
A Community-Based Learning Experience. The Erskine, Tieman and Frye awards were given to
a young faculty member and 3 students to honor their extraordinary talent as teachers and future
neuroscientists. In addition, the conference has continued to growth with 100 posters
representing 38 different institutions and 7 states. 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.


Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 23.08SA/UM70

Topic: H.02. Teaching of Neuroscience

Support: Univ. of Iowa

Univ. of Minnesota

Univ. of South Dakota

Univ. of Wisconsin-Madison

Title: MidBrains 2013: The 7th annual undergraduate neuroscience research conference of the Midwest

Authors: *S. D. DICKINSON*¹, J. J. NEIWORTH³, E. P. WIERTELAK⁵, J. DEMAS², J. L. LOEBACH¹, S. MEERTS³, G. M. MUIR¹, J. STRAND³, L. WICHLINSKI³, J. WOLFF⁴;

¹Psychology and Neurosci. Program, ²Biology, Physics and Neurosci. Program, St. Olaf Col., NORTHFIELD, MN; ³Psychology, ⁴Biol., Carleton Col., NORTHFIELD, MN; ⁵Neurosci. Studies, Macalester Col., St. Paul, MN

Abstract: The years 2012 and 2013 were 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 7th annual MidBrains Undergraduate Neuroscience Conference - MidBrains 2013 - was held at Carleton College in Northfield, Minnesota, on Saturday, October 5th, 2013. 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 2013 conference to present their respective programs and discuss graduate school opportunities. The keynote address “Warm milk and sudden death: Role of serotonin in SUDEP and SIDS” was delivered by George Richerson of the University of Iowa. Presentation topics ranged across all areas of neuroscience, with 40 posters and talks presented by undergraduates, and 8 talks by faculty and graduate students from the participating research universities. More than 120 attendees from 19 universities, colleges and other institutions made this one of the largest MidBrains conferences to date. The advantages and disadvantages of switching to a fall schedule are discussed.

**Disclosures:**  

**Theme H Poster**

023. College Experiences

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 23.09SA/UU71

**Topic:** H.03. Public Awareness of Neuroscience

**Title:** The 26th northeast under/graduate research organization for neuroscience program at the 42nd Hunter College psychology convention

**Authors:** *A. A. WALF*¹, C. A. FRYE², J. YOUNG³;


**Abstract:** The 26th NorthEast Under/graduate Research Organization for Neuroscience (NEURON) programming held during the 42nd Hunter College Psychology Convention was on March 30, 2014 at Hunter College in New York, N.Y. NEURON has been providing educational opportunities and minority outreach to trainees across the northeast for 17 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, and beyond, have the opportunity to share their data with the rest of the scientific community. The keynote address, entitled, “Goals tune the perception of faces: Implications for prejudice and discrimination,” was given by Dr. David Amodio, Associate Professor of Psychology and Neural Science at New York University (NYU), and the director of the NYU Social Neuroscience Laboratory and NYU Social Neuroscience Network. His presentation was engaging and thoroughly enjoyed by individuals from diverse academic backgrounds. There were ninety-two posters presented by trainees in three sessions, forty-one oral presentations, and several other workshops and symposia held throughout the day. There was a NEURON-sponsored workshop entitled, “Cognitive processing of art, light, and space-views from neuroscience, engineering, and architecture”, where graduate students from Rensselaer’s Smart Lighting Engineering Research Center and the Center for Architecture Science and Ecology presented their research ideas. There was a NEURON-sponsored symposium entitled, “Brain and behavioral plasticity- the role of environmental exposures at different points in the lifespan and modulation by the endocrine and immune systems,” where undergraduate and graduate students from Rensselaer and Hunter College presented their thesis projects. This integrated conference represents an ideal environment for young scientists to learn about making their first impressions in an academic setting, engagement/networking, and professional development. Supported by: Rensselaer Polytechnic Institute, Hunter College, University at Albany, University of Alaska, Northeastern University, Simmons College, Trinity College, Wheaton College, Wellesley College, Quinnipiac University, NIH (MH60282; MH39167), NSF (IOS0957148), New England Consortium for Undergraduate Science Education.

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

**Theme H Poster**

**023. College Experiences**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 23.10SA/UU72

**Topic:** H.02. Teaching of Neuroscience

**Title:** Spreading the word about neuroscience education, one pdf at a time: The Journal of Undergraduate Neuroscience Education
Authors: *E. P. WIERTELAK*¹, G. DUNBAR², B. JOHNSON³;
¹Neurosci. Studies, Macalester Col., SAINT PAUL, MN; ²Psychology, Central Michigan Univ., Mount Pleasant, MI; ³Neurobio. and behavior, Cornell Univ., Ithaca, NY

Abstract: As an open access journal, The Journal of Undergraduate Neuroscience Education (JUNE) has been published on the Internet without charge to readers or authors for over ten years. JUNE, a peer-reviewed resource providing innovative ideas for neuroscience education, is published by the Faculty for Undergraduate Neuroscience (FUN). JUNE presents articles in multiple formats, addressing a wide range of topics in undergraduate education, from teaching through curriculum issues and the place of undergraduate education in SfN. Recent articles on teaching labs highlight innovative teaching methods, often offering a full package that allows readers to replicate the labs at their home institution. Some of these offerings include free software or instructions for using graphical computer simulations to support neuroscience instruction, creating a laboratory exercise to study the visual effects of eye diseases, and for using xenopus tadpoles to teach observational techniques in neuroscience laboratories. Other lab articles use the crayfish to study neuromodulation in axons and synapses, or data analysis exercises of positron emission tomography and graphical kinetic data. Further, JUNE often publishes articles on instrumentation innovations that allow instructors to create good quality, sophisticated instruments “on the cheap.” Recent articles on classroom teaching detail use of inquiry-based learning to augment outcomes in a lecture course. Other innovative articles describe the benefits of a flipped classrooms, discuss the challenges of providing students with adequate laboratory experience in neuroscience, examine trends in undergraduate neuroscience education, and describe outreach programs. Media and book reviews have included timely and thoughtful assessments of textbooks, videos, and web-based resources for both classroom and laboratory teaching. These reviews assist educators in discerning if the resource is appropriate for their course as well as becoming more aware of the resources available. Other formats for articles have included interviews with noted figures in neuroscience, discussions of curriculum development, reports on recent conferences, and editorials addressing issues of general concern in undergraduate neuroscience education. JUNE seeks submissions in any of these article formats. Go to www.funjournal.org/ for more details or to read and print articles for free.

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

Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM
Title: Choose Development! - A long-term and continuing mentoring program to increase the diversity of undergraduates entering research careers in developmental biology

Authors: *I. CHOW¹, K. BENNETT², G. UNGUEZ³;
¹Soc For Developmental Biol., BETHESDA, MD; ²Univ. of Missouri-Columbia, Columbia, MO; ³New Mexico State Univ., Las Cruces, NM

Abstract: Built upon a culture of inclusiveness, Choose Development is a three-year (2013-2016) NSF/IOS-funded program through which the Society for Developmental Biology (SDB) aims to increase the number of undergraduate students from underrepresented (UR) groups and students with disabilities entering into doctoral (PhD) programs in fields related to developmental biology. This innovative program based on a long-term multi-level mentoring approach was informed by the current status of STEM diversity. Recent studies have shown that despite the interest in science, technology, engineering and mathematics (STEM) by UR students in their freshman year, a dismal number actually graduate with majors in these areas. To date, the assessment of short-term interventions to broaden participation reveals that “one-time fixes” have yielded low returns (see NAS report “Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads” http://www.nap.edu/openbook.php?record_id=12984). Even though the initial participation numbers have shown impressive increases, data shows an attrition that might be due in part to insufficient mentoring, peer support, low personal or societal expectations, and an unwelcoming environment. Choose Development emphasizes professional development and research training under the continuing supervision by expert developmental biology research faculty, advanced graduate students, and postdocs. In 2013, eleven SDB Fellows were selected from a national applicant pool of 19 and matched to research laboratories of active SDB faculty members across the country (http://www.sdbonline.org/choose_development). Pre- and post-summer analyses using the Grinnell College’s SURE III Survey showed that all SDB Fellows generally scored higher in all learning gains than the population of >2000 undergraduates who also carried out undergraduate research. These preliminary data advocate our approach to provide several mentors to the Fellows throughout the years that cover their multiple intensive summer research experiences. Remarkably, all participating mentors reported a positive impact on their lab environment and excitement toward student mentoring in the lab. The Fellows will present their 2013 summer data at the SDB 73rd Annual Meeting, and will be introduced to the SDB community. Three new Fellows have been accepted for summer 2014-15 programs to replace those who have graduated. Supported by grant NSF-IOS 1239422

Disclosures: I. Chow: None. G. Unguez: None. K. Bennett: None.
Title: A tale of two research students: A perspective on the mentoring of undergraduate research students at a predominantly undergraduate institution

Authors: *V. G. MARTINEZ ACOSTA;
Biol., Univ. of the Incarnate Word, SAN ANTONIO, TX

Abstract: With the rising costs of tuition undergraduate students are looking beyond a university’s academic offerings for opportunities to interact with faculty on a 1-on-1 basis. Students involved in mentored research programs that allow for application of knowledge are more likely to be prepared for the challenges that arise in professional schools. Over a six-year period at a predominantly undergraduate, Hispanic serving institution, I have mentored over 20 undergraduate students in my research laboratory. Many have gone on to successful STEM careers or STEM professional programs. This year I took a measured approach to examine two different mentoring styles. One approach was a “jigsaw puzzle” method that involved taking a student at the beginning of their academic career with little experience and teaching them one piece of the project each semester. The second approach was one that is patterned after the graduate school model where an advanced student was taught 2-3 techniques in the laboratory in one semester and was then required to complete an in-depth literature review regarding the overarching lab questions. Each student was then required to present their research projects to an audience of faculty and peers before the student would continue in the lab for a final semester. The end results were two of the better-trained students in my laboratory who have developed a broader sense of the research we are conducting and the implications it has for the field. This investigation suggests that with expectations maintained equally high, a variety of training/mentoring approaches can be utilized successfully in an undergraduate research setting.

Disclosures: V.G. Martinez Acosta: None.
Abstract: Neuroscience is a topic that tends to fascinate undergraduate students. The downside of this popularity is that students have likely been exposed to erroneous renderings of neuroscience ideas in popular culture prior to entering the classroom. Therefore, it is not unreasonable to assume that they would harbor strong, but false beliefs about the brain and how it works. If this were the case, instructors would be well advised to take these prior beliefs into account, as this pre-existing structuring of the topics is likely to interfere with teaching and learning. We attempted to measure the extent to which entering students tend to hold these beliefs. To do so, we created a 15 question assay consisting of popular notions that literature has conclusively shown to be wrong (e.g. “we only use 10% of the brain”, “creativity is located in the right brain hemisphere”, “the primary function of the brain is to cool the blood”) and measured what proportion of students believes these statements to be true. We did so in a sample of private vs. state school students in the US and compared them with a sample from a Canadian University. We show that some of these false beliefs are held by almost all of the students (85%), but others are relatively unlikely to be held (10%). This suggests that students should not be assumed to enter the classroom as “blank slates” with regard to neuroscience topics. On the contrary, most students tend to arrive with a dearly held and sometimes quite developed belief structure about the brain, regardless of its accuracy. Instructors would be well advised to acknowledge the existence of these cultural misconceptions to improve the effectiveness of neuroscience teaching.

Disclosures: P. Wallisch: None.
Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 23.14SA/UU76

Topic: H.02. Teaching of Neuroscience

Title: Enriching critical thinking in community college students through animal research

Authors: *L. A. SCHIMANSKI;
Psychology, Glendale Community Col., Glendale, AZ

Abstract: It is difficult for students at two-year colleges to obtain hands-on research experience at their home institutions, and opportunities to engage in research using animal subjects are especially rare. Glendale Community College (Glendale, AZ) offers a unique experience for its Research Methods in Psychology students in that rats are available as research subjects; it is the only community college in the USA that houses rats on campus for research purposes. Students work in groups of four to six during a single semester to conduct an original research study of their own interest and design using Long-Evans rats. They begin by reading journal articles on their topic of interest to gain background knowledge and refine research ideas and methodology. They then develop a research proposal and detailed experimental protocol before experiments may commence. Studies are conducted in the laboratory during once-weekly scheduled lab periods over six to eight weeks, after which students analyze their data using SPSS. Findings are disseminated in a public poster session held on campus, an oral presentation given in class, and in formal APA-style research reports. Research designs have included manipulations between groups such as acute treatment with a substance (such as fluoride, monosodium glutamate, taurine, caffeine, or ethanol) or behavioral modification (such as stress induced by forced swimming in a water maze, or tactile stimulation between training trials of a learning and memory task). Numerous behaviors have been measured, including activity level (using a running wheel), stress and/or exploratory activity (using an open field maze), spatial learning and memory (using a water maze or radial arm maze), social learning and memory (using a social transmission of food preferences task) and preference/detection of novelty (using a Y-maze). Despite challenges to this research program including limitations in budget and student time in the lab, student research projects have produced results suitable for presentation at professional scientific conferences. Notable findings include demonstration of impaired extinction learning during ethanol treatment when a previously reinforced behavior is no longer reinforced, and an enhancement of reversal learning in the Morris water maze by providing tactile stimulation (stroking of the back with a paintbrush) between trials. The research experience of students that take this course offers a unique opportunity to develop critical thinking skills via designing and conducting highly controlled animal research, and to develop respect and appreciation for the importance of animal research in the production of knowledge.
Disclosures: L.A. Schimanski: None.

Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 23.15SA/UU77

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant 1R25GM107760

Title: Research education for novice and underserved student populations: Removing traditional barriers with modern technology and pedagogy

Authors: S. FROMHERZ\textsuperscript{1}, K. S. RENZAGLIA\textsuperscript{2}, *A. A. SHARP\textsuperscript{1}; \textsuperscript{1}Dept Anat, SIU Sch. Med., CARBONDALE, IL; \textsuperscript{2}Plant Biol., SIU, CARBONDALE, IL

Abstract: The Southern Illinois Bridges to the Baccalaureate Program (“SI Bridges”) is an NIH-funded research education program for community college students designed to overcome income, racial and other traditional disparities amongst student populations, and provide a path to careers involving biomedical and behavioral science research. Careers involving scientific research have been seldom realized by undergraduate students hailing from low income, rural, and/or minority populations. Access to modern scientific technology may be lacking in K-12 classrooms, and fact-acquisition may be emphasized at the expense of inquiry and experimentation. Students in introductory college courses may not have experienced the excitement of science, may not appreciate the interdisciplinary nature of science, and may be deterred from further pursuits in science by the challenges of traditional technologies such as microscopy. Recognizing today’s students are accustomed to certain technologies such as television monitors and computers, we have combined inquiry and experiential learning models with modern technology that serves to engage students while removing traditional technical barriers to learning. Students pursue inquiry-based microscopy laboratory investigations and independent projects in a facilitated learning environment. Each student is provided a Windows 8 tablet computer and each work station is then equipped with a microscope, wifi-enabled camera, a tablet docking station and large screen monitor. This system allows multiple students to access microscope samples as a group using video technology that is familiar to them and to collect and share their own data. Through active participation in scientific research, including the setup and takedown of an experimental workstation, students learn the process of science first-hand. We have witnessed complete transformations in confidence, process knowledge and engagement in
all of our participants. They are motivated by curiosity, they experience the excitement of discovery, and they learn to drive their own learning. The content they acquire is more meaningful because the learning process is self-directed. As a consequence of this semester-long experience, students are poised to tackle more technically complex experiments in neurobiology and molecular biology. We will present results showing student learning gains, including improved scientific reasoning, experimental design, confidence, and verbal communication skills.

Disclosures:  S. Fromherz: None. K.S. Renzaglia: None. A.A. Sharp: None.

Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 23.16SA/UU78

Topic: H.02. Teaching of Neuroscience

Title: Learning about the brain in a funny way

Authors: *J. VAZQUEZ RAMIREZ¹, *J. VAZQUEZ RAMIREZ¹, A. RUIZ-GARCIA², I. ROSEMBERG GARCIA², P. ZARATE GONZALEZ³, D. SOLTERO DE LA ROSA², D. PAZ TREJO², H. SANCHEZ CASTILLO², K. DELGADO SALTIJERAL¹;
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Abstract: Iberoamerican Society of Applied Neuroscience (SINA) is a NGO which has different targets, one of them is to divulge neuroscientific knowledge to general public, with the aim to explore brain’s functioning. Accordingly one of the most important international programs related with neuroscientific divulge is the Brain Awareness Week organized by DANA fundation. This year SINA participated in Brain Awareness Week, organizing three events to different kinds of public. The first event was a conference related to “Neuron Mirror System” and its implications on clinical practice in health proffesionals. This event took place in ABC Hospital of Mexico City. The second project was performed in The Latin University, this lecture talked about Forensic Neuropsychology and was addressed to bachelors. The third event was in Tomas Alva Edison High School. Activities included the presentation of workshops related with brain processes in music and love, drugs interactions in the Brain. Additionally there was an exhibition about the involvement of women in science, finally there was a conference about high
risk activities and neurotransmission systems interactions. As part of the observations, we concluded that divulge knowledge about the brain in an easy way to people that was not acquainted with neuroscience topics results motivating for them and contribute with Society.


Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 23.17SA/UU79

Topic: The Wicking Dementia Research and Education Centre - paving the way forward in online dementia education

Authors: *A. CANTY*¹, C. KING¹, A. CARR¹, J.-A. KELDER², A. PRICE¹, A. GIBSON¹, T. CAREW³, J. O'REILLY³, C. O'MARA¹, J. WALLS³, F. MCINERNEY⁴, A. ROBINSON¹, J. VICKERS¹;

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Abstract: Dementia has been described by the World Health Organisation as the public health issue of the 21st century. There is an established relationship between dementia education and the quality of dementia care, which reduces costly invasive procedures and improves the quality of life for people with dementia and those who care for them. The Wicking Dementia Research and Education Centre (Wicking Centre), part of the Faculty of Health at the University of Tasmania, Australia, has developed a Dementia Education Program which integrates two fully online courses: the Understanding Dementia Massive Open Online Course (MOOC) and the Bachelor of Dementia Care (BDemCare). This unique program is designed for non-traditional students who often have low technical literacy and non-academic backgrounds. The BDemCare is the world’s first fully online, Bachelor of Dementia Care. Launched in 2012, it has more than 500 students who are predominantly a non-traditional university cohort. With this unique challenge, the BDemCare exemplifies an inclusive and supportive approach to online education that links the biological basis of dementia and related illnesses to symptoms and care. The MOOC is a free
online course that was developed to address the international need for comprehensive, quality, evidence-based information about dementia. Launched in 2013, it is the world’s first global initiative in dementia education, attracting more than 24,000 registrants from around the world, across two deliveries. In its first iteration, the 9-week course finished with one of the world’s highest completion rates (King et al, Nature, 2014). A specialised entry pathway was created between the MOOC and BDemCare for students to gain formal university accreditation for their study, and to widen their knowledge base around understanding dementia. The Wicking Academy Dementia Education Program features a strong design framework for student centred learning, and the innovative use of technology to create engaging and effective environments for online learning. It demonstrates how technology-enhanced learning can be used to transform knowledge to address a significant local, national and global need.


Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program# Poster#: 23.18SA/UU80

Topic: H.02. Teaching of Neuroscience

Support: Virtual Worlds Development Group, AU

Title: Enhancing online neuroscience education

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

Abstract: > Athabasca University (AU) is Canada’s leading distance-education and online university. AU is dedicated to the removal of barriers that restrict access to university-level studies and to increasing equality of educational opportunity for adult learners worldwide. Individualized study courses allow students to learn at their own pace, and flexible instruction frees students from the demands of specified class times and rigid institutional schedules. For students, online learning knows no time zones, and location and distance are not an issue. In such an environment, it is essential that the educational materials be designed properly to engage the learner and promote learning. The teaching of all levels of science can be a demanding task, but
even more so when it is provided from a distance. While our students have access to tutors and professors through telephone, e-mail communication, web seminars, and video conferencing, students often find it difficult to understand fundamental concepts. In order to enhance student understanding of essential neurological structures and processes, we have developed a collection of behavioural neuroscience tutorials. Specifically, these online tutorials allow students to study neuroanatomy, physiology, pharmacology, and sensation/perception. Significant features of our tutorial website include interactive animations, auditory narrations, and self-tests. These online interactive tutorials provide the opportunity to further develop mastery of key neural concepts, mechanisms, and processes. More recent advances include a Virtual Behavioural Neuroscience Laboratory (VBNL) developed within Second Life and Open Simulation, two of the most popular virtual environments. 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.

Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 23.19SA/UU81

Topic: H.02. Teaching of Neuroscience

Support: International Group of Neuroscience

Title: Descriptors for cortical and social networks might be self-similar: Cortical graphs for hyperscanning and social impact of individualistic vs. collective education and therapy

Authors: A. L. GOMEZ-MOLINA1, F. LOPERA, BA2, A. A. RESTREPO3, *J. F. GOMEZ-MOLINA4;
1Intl. Group of Neurosci. (Col, USA member), Medellin, Colombia; 2Intl. Group of Neurosci., Medellin, Colombia; 3Dept. of (neuro)Informatics and Systems, EAFIT Univ., Medellin, Colombia; 4Intnal Group of Neuro, Medellin, Colombia

Abstract: INTRODUCTION. During learning or therapy sessions, should therapists (or professors) stimulate the individualistic (vs. social) practices? The degree of socialization affects the way our brain are wired. In neurodegenerative diseases (like multiple sclerosis and Alzheimers) and others diseases (autism, schizophrenia) the degree of functional disconnection seems to correlate with the degree of socialization. Some characteristics of the connections (short
vs. long; left-right vs. front-back) are more correlated with social behavior, even in social insects.

METHODS. Graph theory. Analysis of patient behavior. RESULTS. Fig. 1. Lets suppose that the nodes in the brain (cells, or groups of cells) represents features like faces, voices, attitudes, behaviors etc. Each person is then represented by a distributed subgraph in the brain. Collective sessions with people connected by electronic systems (videophones, hyperscanning systems) form a self-similar net (fractal-like graph). These graphs have nodes that contains a subgraph similar to the graph itself. We believe that this experience is so rich for the brain that it might help to develop and maintain brain connectivity. DISCUSSION. It is important to have "a fractal model" about other minds (a "self-similar theory of mind"). This might stimulate brain connectivity at many levels. CONCLUSION. We have proposed that the brain networks are similar to the social network of its owner (Gomez-Molina AL, Unipluriversidad 2012). Social interaction using audiovisual telecommunication during learning or physical therapy improves and maintain the wiring that is the substrate for many forms of cognition. We suggest to implement this phisical therapy in many disease including multiple sclerosis.


Theme H Poster

023. College Experiences

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 23.20SA/UU82
**Topic:** H.03. Public Awareness of Neuroscience

**Support:** Quinnipiac University

**Title:** Promoting excellence in undergraduate and graduate research presentations at NEURON, a regional Faculty for Undergraduate Neuroscience conference

**Authors:** *D. B. MCQUADE*¹, A. A. WALF², C. A. FRYE³, T. H. AHERN⁴, A. J. BETZ⁴; ¹Skidmore Col., SARATOGA SPGS, NY; ²Cognitive Sci. Dept., Rensselaer Polytechnic Inst., Troy, NY; ³Dept. of Psychology, The Univ. at Albany, Albany, NY; ⁴Behavioral Neuroscience, Dept. of Psychology, Quinnipiac Univ., Hamden, CT

**Abstract:** Training students how to most effectively present research findings begins at the undergraduate level. The NorthEast Under/graduate Research Organization for Neuroscience (NEURON), holds annual or semi-annual conferences, with representation from approximately 40 colleges and universities across the Northeast, where undergraduate and graduate students are invited to present their research at conference poster sessions. In order to promote excellence and provide guidelines for effective scientific communication (visual and oral), the Suzannah Bliss Tieman poster award, offered in her honor since 2007, recognizes one undergraduate and one graduate student with high quality presentations. Criteria include both an organized and appealing poster and an engaged interaction with the audience. Junior faculty have been recognized with Tieman awards for their role in directing student research. Likewise, the Mary S. Erskine Award for Excellence in Scholarship and Mentorship recognizes other faculty members who make significant scholarly contributions and who make substantial investments in mentoring trainees. At the February 2014 25th NEURON conference an inaugural Frye Pioneering Research Award, in honor of NEURON co-founder Cheryl Frye, Ph.D., was given to the person of diversity who presented the most novel and compelling research findings. Faculty from attending institutions have eagerly volunteered to serve on judging panels, increasing conversations about effective communication among the faculty and enabling transparency in the judging process. Additional mechanisms for advancing the training of undergraduates and graduates include the presentation of keynote addresses by speakers who target their comments toward students; offering workshops of interest to students; and special events, such as an art exhibit that featured the intersection of science and art. Attendance at NEURON has increased to approximately 300 attendees per conference and we have seen an increase in the overall quality and number of high quality poster presentations by students. Collectively, the awards and programming at NEURON promote excellence in research and scientific communication among students.

**Disclosures:** D.B. McQuade: None. A.A. Walf: None. C.A. Frye: None. T.H. Ahern: None. A.J. Betz: None.
Implementation of active pedagogies in an undergraduate neuroscience course for non-science majors

Authors: L. ROESCH¹, *K. FRENZEL²; ¹NBB Program, ²Emory Univ., ATLANTA, GA

Abstract: With a view that neuroscientific literacy is critical for public funding of neuroscience research, making informed decisions about individual healthcare options, and combatting stigma related to neurodiversity, disability and disease, we sought to develop a new course for non-science majors which would meet the general education requirement of the Emory College of Arts and Sciences. Like many liberal arts schools, Emory College requires all graduates to be proficient in at least one scientific reasoning and laboratory course. To that end, we designed a course that would explore neurobiological concepts with engaging pedagogical techniques to foster critical thinking skills, especially in evaluating media or societal content relevant to neuroscience. The course is comprised of 4 modules: Neuronal Communication, Sensory Systems, Motor Systems and Complex Behaviors. Students in this course have been able to master complex biological topics, as demonstrated by summative evaluations, are able to effectively critique neuroscience in society and self-report that they enjoy the topics and the learning style. However, one area where we’ve seen less growth is in their ability to analyze data and to use data to strengthen an argument. Here, we present learning objectives and assessments from the course, as well as published and unpublished cases and labs we have used and modified over the 4 editions of the class. We comment directly on the strengths and weaknesses of our approaches and will provide our best-practices for engaging non-science majors with complex biological concepts.

Disclosures:  L. Roesch: None. K. Frenzel: None.
Abstract: Undergraduates, especially early in their careers, are traditionally taught material with a textbook-and-lecture approach. We have previously shown that a group of highly motivated first-year undergraduate science students can learn basic neuroscience concepts effectively when taught using primary scientific literature in a seminar format (Willard & Brasier, JUNE, 2014). Here, we extend this approach to two other course formats: First, we have a first year seminar that contains a mix of students in the sciences and the humanities & social sciences. Second, we have two larger lecture courses that contain a mix of freshmen, sophomores, and upperclassmen: some of whom are planning to major in biology or neuroscience and others of whom are majoring in other natural sciences (physics or chemistry) or are non-science majors. We explore the challenges and successes of applying the literature-based approach with minimal textbook support to these settings.

Disclosures: D. Brasier: None.

Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.03SA/UA85

Topic: H.02. Teaching of Neuroscience

Support: Active Learning Fellowship, Case Western Reserve University

Title: Using simulations and a wiki to create a virtual laboratory for neurobiology
Authors: *J. P. GILL*¹, K. M. SHAW¹, L. GLAIT¹, H. J. CHIEL²;  
¹Dept. of Biol., ²Depts. of Biol., Neurosci., and Biomed. Engin., Case Western Reserve Univ., Cleveland, OH

Abstract: We converted a lecture course on introductory neurobiology to an active learning virtual laboratory. Undergraduate and graduate students must read, before class, material on a public wiki (neurowiki.case.edu). In class, students conduct a series of experiments and solve problems by working with simulations. They are given quizzes both before and after each learning unit, allowing us to assess the effectiveness of both the electronic textbook and hands-on problem solving. Students work in teams of two and are encouraged to ask questions of the instructors and the other members of their table. The course is structured on a continuous progress model. Students record their responses to problems in a lab notebook on the wiki that is reviewed by the instructors on a class-by-class basis. At the beginning of each session, instructors perform “lightning checkoffs” to rapidly review whether material due for the previous class has been completed. Instructors spend the remaining time doing in-depth, face-to-face conceptual checkoffs with students and answering questions. The students are provided with continuous feedback as they accumulate points throughout the semester and as they master the material. Assessment is based on completing problem sets, level of conceptual understanding, and short quizzes; there are no exams. Additionally, graduate students complete term papers and have the choice of writing a grant proposal, a critical review of the literature, or a Wikipedia article. Graduate students must post benchmarks toward the term paper throughout the second half of semester, and papers are due on the final day of class. Graduate students present their term papers in the last class session. Course material covers basic electrochemistry, passive membrane properties, action potentials, multiple complex conductances, cable properties, synaptic transmission, neuromodulation, simple neuromechanical models, reflexes, and the analysis of small circuits (the *Tritonia* escape swim circuit). Several units require the students to design or analyze neurons or circuits. Anonymous student comments were remarkably positive even though the course requires a great deal of work. The open source simulations are written in JavaScript and are run locally on student laptops. Thus, a central server does not perform computations beyond serving web pages, allowing the simulations to be scaled up. The simulations are designed to run in any browser, including tablets and smart phones. The grading software is a MediaWiki plugin that is also open and freely available. We encourage others to take advantage of the materials and software we have created for their own teaching.


Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C
Title: BREWERS: An active learning course using beer and coffee as a mechanism to learn neuroscience

Authors: *O. P. KEIFER, JR* ¹²³, P. MARSTELLER⁴⁵⁶, K. J. RESSLER²³⁷;

Abstract: The following poster will present the experiences with a senior capstone course titled BREWERS. BREWERS is a course built around researching, analyzing, designing, and implementing brewing methods with coffee and beer. More specifically, the students researched and developed expertise in the chemistry, neuroscience, biology, physics, engineering, and mathematics of both coffee and beer. These two drinks were selected by their exemplar status of integration of techniques, ideas, and technology across fields. A special emphasis was placed on the neuroscience of imbibing coffee and beer. The course was group driven, in a combined problem-based learning and engineering design environment. This course was designed to be a capstone course that encouraged upper level students to expand their experience with engineering knowledge, integration of previous science knowledge, and exploration of the breadth of knowledge that impacts everyday life. Therefore assessments were based on prototype building and a scientific research project. Outcomes of learning will be analyzed and discussed in detail.

The value of the IMPULSE experience for non-neuroscience majors


Abstract: The journal IMPULSE was created over a decade ago to provide undergraduates with an opportunity for an authentic experience reviewing original neuroscience submissions, as well as to serve as an outlet for publishing undergraduate research. While initially designed with neuroscience majors in mind, many of the students working with the journal are not in neuroscience or related majors. For example, of the 21 reviewers at one of the Reviewer Training Sites, four are targeting neuroscience careers, seven are pre-medical students, while the other majors are math (3), geology (2), journalism (1), religious studies (1), and undecided (3). They all joined to learn how to review and write science papers; they were indifferent to the discipline of the vehicle used for that training. In support of this are results from a survey conducted in 2012-13 with previous journal participants, indicating the value of the experience to non-neuroscience majors. As reported on the data from that survey, the majority of respondents felt it was useful for their professional writing and literature research skills, and that this applied to their long-term goals regardless of their field. While the outreach to recruit participants has historically highlighted the relevance of the journal experience for students pursuing careers in neuroscience, the past decade has shown that other majors are benefiting from this opportunity and that it should be extended intentionally to students in other fields.


Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.06SA/UU88

Topic: H.02. Teaching of Neuroscience

Support: NSF EEC-1028725

Title: The tech sandbox: Learning through play
Authors: *L. A. JOHNSON*¹, J. WANDER², D. SARMA², J. VOLDMAN³;
¹Ctr. for Sensorimotor Neural Engin., The Ctr. For Sensorimotor Neural Engin., Seattle, WA;
²Bioengineering, Univ. of Washington, Seattle, WA; ³Electrical Engin. and Computer Sci., MIT, Cambridge, MA

Abstract: One of the goals of the National Science Foundation Center for Sensorimotor Neural Engineering (CSNE) is to create graduates who are creative innovators in a globally competitive environment and to prepare them to be effective leaders in industry. As a step towards this goal, the CSNE has created a team competition, called the Tech Sandbox, to drive student innovation. This competition gives students the opportunity to be creative, establishes vertical mentoring, promotes interaction between students and industry representatives, and results in new demonstration exhibits for educational outreach. The competition was piloted as an extracurricular activity in 2012 and is now a graduate/undergraduate course offered by the Department of Bioengineering at the University of Washington. The competition has created a variety of successful outreach tools that have been used to teach neural engineering concepts to thousands of children and adults at a large number of events. The winning project from the first year, WrestleBrainia3000, has represented the Center at the Change the World: Science & Engineering Careers, a public STEM careers fair and at the USA Science and Engineering Festival. The competition has also resulted in a range of student-industry interactions. The creators of WrestleBrainia3000 presented their project at the Neurogaming Expo and at the Consumer electronics show and, the winners of the 2014 competition are pursuing commercialization of their product “vHAB”. Tech Sandbox-style courses for undergraduates and high school students are being developed at the Massachusetts Institute of Technology and San Diego State University and an open-source version of the Tech Sandbox that can be used by the CSNE education partners and the greater community is being developed.


Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.07SA/UU89

Topic: H.02. Teaching of Neuroscience

Support: NSF CAREER award 1054914

Title: Challenges and rewards of an undergraduate computational neuroscience program
Abstract: Developing and implementing a computational neuroscience (CNS) program at an undergraduate liberal arts and sciences institution is a challenging and rewarding endeavor. The main challenge is the intrinsic interdisciplinary nature of the CNS that bridges biology, psychology, physics, chemistry, mathematics, and computer science. Since a program of study requires at least two core courses and because of the staffing issues, the courses would be taught in a sequence. As a result, it takes a minimum of two years to complete such a program. One challenge is the selection of the interdisciplinary prerequisites, which is mostly determined by the available local expertise. Our program is more biophysics-oriented and is designed around physics and biology, with calculus-based mathematics and minimum computer programming experience. Another challenge is to advise potential students of the interdisciplinary program and its requirements. Our CNS has two core courses - “Biophysical modeling of excitable cells” and “Digital signal and image processing with biomedical applications” - that are not sequenced. We use Neuron software package for the integrated hands-on activities of the biophysical modeling course. The signal/image processing course has a computational laboratory component that allows us to cover a few applications using Matlab. After graduation, our students follow two career paths: some continued their (computational) neuroscience graduate studies and others decided for biomedical imaging careers.

Disclosures: S. Oprisan: None.
Abstract: The transition to college can be difficult for students majoring in science, technology, engineering, and mathematics (STEM). This is particularly true for students from groups underrepresented in STEM who often are first generation college students and are frequently not “college-ready”. Since 2010, Delaware State University, a public, Historically-Black University, has been holding a STEM Training Camp for incoming freshmen to help prepare them for STEM majors and ease their transition to college. With the support of a grant from the National Science Foundation, each year a cohort of freshman (45 - 65 students) comes to campus the week before the start of the fall semester. The students move into their dorm rooms, take intensive skill-building classes in mathematics and English and participate in team-building exercises with peer mentors. The program also seeks to build students’ engagement with STEM by having them work on a short group research project. The students work in groups under the supervision of a faculty mentor and give a presentation on their research on the final day of the program. The research program has a strong neuroscience flavor. Delaware State University has neuroscience graduate programs and a large number of faculty with neuroscience-related research. In addition, the majority of Training Camp participants tend to be in life science-related majors, so each year 4 - 5 of the research projects are related to neuroscience. Over the past few years, students have worked on projects such as the effect of caffeine on reaction time, relationship between darkness and aggressive behavior in fish, the screening commonly used pesticides for neurotoxicity, comparing the effect of BPA and BPS on the survival of neurons in culture, as well as others. We present data on the experiences of the students in the Training Camp research projects and the outcomes for the participants over the four years of the program.

Disclosures: M.A. Harrington: None. T.G. Smolinski: None. A. Lloyd: None. M. Vela-Sianjina: None.

Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.09SA/UU91

Topic: H.02. Teaching of Neuroscience

Title: Undergraduate laboratory research projects suitable for courses with a hormones and behavior module

Authors: *M. T. KERCHNER, C. CER, Y. DARWISH, A. DAVIS, E. DUENAS, C. ELIADES, A. LEGARD, Z. LEPPERT, K. MCEVOY, W. MOULDEN, A. NISONGER, M.
Abstract: The curricula at most undergraduate neuroscience programs commonly include advanced laboratory courses with modules in neuroendocrine systems and behavioral endocrinology. Here we describe two laboratory projects, one focusing on endocrine regulation of male reproductive and aggressive behaviors in mice and one examining the influence of stressors on diurnal levels of salivary cortisol in humans. In each instance, the goal was to familiarize and develop students skills utilizing common methods employed to examine neuroendocrine regulation of behavior. The first laboratory exercise examines the effects of orchidectomy on ultrasonic courtship vocalizations and inter-male aggression in B6D2F1 mice. A high proportion of these male mice continue to display these behaviors even after the source of gonadal hormones is eliminated. After conducting a literature review, the students designed a hormone replacement protocol to test several hypotheses that might explain the behavior of these continuers. Students performed pre- and post-tests of behavior, surgical orchidectomy, and chose subcutaneous implants containing either no hormone, or testosterone, or the androgenic anabolic steroid Stanozolol (STZ) or STZ plus the aromatase inhibitor Fadrozole, to assess their comparative abilities to restore or reduce the display of behaviors in non-continuers and continuers, respectively. The second laboratory exercise assessed the effects of various collegiate stressors and disruption in sleep, on AM and PM levels of salivary cortisol in classmates and student volunteers. A stress and nightly sleep quality survey was constructed by students based upon a review of relevant research publications. Samples of saliva were collected from each participant, pooled by the time of collection (AM or PM), and cortisol levels were determined via ELISA. Outcomes: The results of each project did not precisely match those predicted by the students. In the first project, there were fewer continuers than predicted and STZ had little effect on body weight. In the second project, levels of cortisol were not outside the normal range. The “learning opportunity” that these unanticipated outcomes created proved to be a valuable component of each project. At the conclusion of the semester, student teams summarized the outcome of each laboratory in a public poster session and each student submitted an independently written research report. Suggestions for developing similar laboratory exercises and recommended reading lists will be available for instructors interested in employing similar exercises for use in their courses.

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 24.10SA/UU92

**Topic:** H.02. Teaching of Neuroscience

**Title:** Graduate admissions in clinical neuropsychology: the importance of undergraduate training

**Authors:** *A. STAVNEZER*¹, J. W. REEVES², B. T. KARAZSIA³;
¹Col. of Wooster, WOOSTER, OH; ³Psychology, ²Col. of Wooster, Wooster, OH

**Abstract:** Discussions of and recommendations for the training of clinical neuropsychologists exist at the doctoral, internship, and post-doctoral level. With few exceptions, the literature on undergraduate preparations in clinical neuropsychology is sparse and lacks empirical evidence. In the present study, graduate-level faculty and current trainees completed surveys about graduate school preparations. Faculty expectations of minimum and ideal undergraduate training were highest for research methods, statistics, and assessment. Preferences for “goodness of fit” also emerged as important admissions factors. These results offer evidence for desirable undergraduate preparations for advanced study in clinical neuropsychology. Although undergraduate training in psychology is intentionally broad, results from this study suggest that students who desire advanced study in clinical neuropsychology need to tailor their experiences to be competitive in the application process. The findings have implications for prospective graduate students, faculty who train and mentor undergraduates, and faculty who serve on admissions committees.

**Disclosures:** A. Stavnezer: None. J.W. Reeves: None. B.T. Karazsia: None.

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**Theme H Poster**

024. **Teaching Neuroscience: College Courses**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 24.11SA/VV1

**Topic:** H.02. Teaching of Neuroscience

**Title:** Neuroscience of exercise: An undergraduate course examining how physical activity influences the brain and behavior
**Abstract:** In recent years it has become clear that physical activity influences not just the musculoskeletal system, but also the central nervous system. A rapidly growing body of research studies have examined how exercise influences the brain from molecular and cellular levels to physiological and behavioral levels. Specifically, physical activity influences such diverse dimensions of CNS function from gene expression, cell signaling, and neurogenesis to memory, learning, anxiety, aging, and addiction. Many undergraduates are inherently interested in exercise and understanding both health and disease, yet have rarely considered the effects of physical activity on the brain. Consequently, I developed an undergraduate seminar course on this interesting topic that is targeted to sophomores with limited experience reading research literature. The course content relies on this deep a body of basic and clinical research on the neuroscience of exercise to introduce the diversity of experimental approaches deployed in contemporary neuroscience research. In addition, the course is designed to help students develop and improve skills important to success as a scientist. Assignments and class meetings emphasize developing individual strategies for identifying, understanding, analyzing, and discussing a wide variety of scientific literature (basic research papers, clinical research papers, government documents, reviews, popular press reports and books, etc.). The course design also stresses communicating research finding with audiences of scientists and non-scientists, culminating in the production of TED-like recordings explaining recent research findings on topics of particular student interest. At the end of the semester students consistently reported that they found the content very interesting and relevant and that course increased their interest in neuroscience. With regard to skills, student reported considerable comfort with reading papers, using databases, creating visuals, and explaining new research results to others. Thus, this course topic and format provide means to engage students in the study of neuroscience and develop expertise reading and understanding neuroscience research.

**Disclosures:** B. Lom: None.
Support: NSF TUES Grant #1245526

Title: The effects of teratogens on gene regulation and whole cell currents: A collaborative research project utilizing Real-time q-RT-PCR, PCR arrays, and automated electrophysiology

Authors: *A. J. ETTINGER*¹, K. J. KARNAS²;

Abstract: Research in the biological sciences uses increasingly complex technological approaches; therefore, well-trained students need to understand the benefit of working with collaborators having varying expertise. In tandem, undergraduate students often fail to make conceptual connections across the subdisciplines of biology, instead viewing course content as compartmentalized to separate fields. To increase student understanding of a broader range of scientific questions and the interdisciplinary methodologies best suited to answering them, we initiated a cross-course collaboration that uses both traditional laboratory approaches and current technologies to test the cellular, genetic, and physiological effect of teratogens on chicken neurons. This faculty partnership has spanned five years; involves neuroscience and molecular biology students from two upper-division courses; includes additional contributions from independent research students working during the academic year and/or summer; and was recently updated to include newer technologies, the Rotor Gene Q and Nanion Port-a-Patch instruments, acquired through an NSF TUES grant. Generally, neuroscience students initiate the project, treating in ovo chicken embryos, primary neuron cultures, or an established chicken lymphoma cell line (DT40) with teratogens to examine the physiological, morphological, and/or cellular effects before sharing their samples with the molecular biology students, who examine changes in gene expression. All students then complete joint data analysis and present their results at a campus-wide undergraduate conference. In an initial course-based trial, the molecular biology students used a PCR array including apoptosis-related genes to explore differential gene expression in control versus treated brain tissue and identified several genes which were up- or down-regulated more than five-fold in response to chemicals. Research students also used control and treated DT40 cells in q-RT-PCR experiments to measure regulation of neural, developmental, and apoptotic genes and performed whole-cell recordings to measure possible changes in currents. A fundamental outcome of this research project is the development of student-friendly protocols for future teaching and broader research collaborations.

Disclosures:  A. J. Ettinger: A. Employment/Salary (full or part-time); Cedar Crest College.
K. J. Karnas: A. Employment/Salary (full or part-time); Cedar Crest College.
Title: Understanding the role of neuroeconomics in an undergraduate curriculum

Authors: **G. S. LOWRY**¹, C. L. FRANSSEN², S. M. HOLLENBECK⁴, *A. FRANSSEN*³; ¹Econ. and Business, Randolph-Macon Col., Ashland, VA; ²Psychology, ³Biol. and Envrn. Sci., Longwood Univ., Farmville, VA; ⁴Psychology, James Madison Univ., Harrisonburg, VA

Abstract: Over the past few decades, neuroscience has been integrated into and/or added onto many existing fields. In this project, we review the evolution of the field of neuroeconomics, discuss the major relevant research areas, and consider emerging related disciplines and sub disciplines such as neuromarketing and neurofinance. With a clear understanding of the history and current state of neuroeconomics, we then evaluate the contribution courses in these disciplines can make to an undergraduate education. Here, we examine two aspects of an interdisciplinary neuroeconomics course. First, we investigate the value of the course for students from a range of majors (e.g., Business, Psychology, Biology, Neuroscience). Second we analyze a variety of approaches to adding neuroeconomics to a curriculum, considering items such as prerequisites and student learning outcomes.

Disclosures: **G.S. Lowry**: None. **C.L. Franssen**: None. **S.M. Hollenbeck**: None. **A. Franssen**: None.

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**Theme H Poster**

**024. Teaching Neuroscience: College Courses**

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.14SA/VV4

Topic: Undergraduate laboratory course in physiological psychology

Authors: **H. H. LOPEZ**¹, M. SPRING²; ¹Psychology, ²Neurosci., Skidmore Col., SARATOGA SPGS, NY
Abstract: As part of our undergraduate Neuroscience Program at Skidmore College, we offer an advanced laboratory course in physiological psychology. The learning goals of the course are to have students: 1) learn about prominent animal models used within behavioral neuroscience, 2) receive extensive experience handling and working with non-human subjects, 3) further develop their scientific literacy through literature searches and critical analysis, 4) develop proficiency in experimental design, 5) gain additional training in quantitative analysis of experimental data, and 6) improve their ability to communicate scientific information effectively. Students complete three experiments across a 15-week semester, using rodent subjects (Long-Evans female rats). Each student “adopts” a single rat and is, at times, responsible for the care and feeding of that animal. Experiment 1 has students examine the anxiolytic properties of diazepam using an elevated plus maze. In Experiment 2, students use a conditioned place preference procedure to assess the rewarding properties of d-amphetamine. In Experiment 3, students use a radial arm maze to study spatial learning and the development of cognitive maps; each year, the effect of a different pharmacological or hormonal agent on spatial learning is examined (e.g., nicotine, scopolamine, estradiol, CP-55,940). Experimental results are typically significant, even with a small sample size (course enrollment is capped at 12). Through these experiments students learn numerous laboratory skills, including how to administer subcutaneous and intraperitoneal injections, and how to code and quantify relevant behaviors. Lectures provide a theoretical background for each experiment, as well as mechanistic details on drug and hormone activity, and allow students the opportunity to discuss seminal papers and empirical findings. Students write up the results of each experiment in an APA-style scientific manuscript. As a final project, each student generates and presents (both orally and written) a formal grant proposal on a novel hypothesis that falls within the broad domain of physiological psychology. This course has been particularly valuable for students who wish to acquire experience working with non-human subjects prior to initiating a senior thesis or starting a job as a laboratory technician after graduation.

Disclosures: H.H. Lopez: None. M. Spring: None.

Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.15SA/VV5

Topic: H.02. Teaching of Neuroscience

Support: Boston College Academic Technology Innovation Grant
Title: Project PNEURAL: Simulating neurophysiology using physical computing

Authors: *J. R. BURDO;
Biol., Boston Col., Chestnut Hill, MA

Abstract: The inner workings of the brain sparks wonder and curiosity amongst many of our students. Neurons are the main computational cells of the brain, and at their most basic use their dendrites and axons as miniature decision engines. Dendrites produce excitatory and inhibitory potential (voltage) changes from chemical information provided by pre-synaptic cells, and axons collect that voltage information. If the voltage in the axon rises above some threshold level, the cell will fire an action potential and pass information to the next cell in the network. This type of information processing controls everything we feel, think and do, but it is not necessarily easy for students to intuitively grasp the underlying electrical principles and thus fully appreciate the beauty of this process. Project PNEURAL involves the construction of model neurons using common household or laboratory items such as PVC piping, vacuum pumps and electrical wires in conjunction with Arduino microcontrollers to control input and output that mimics the chemical and electrical signals used in the nervous system. This system allowed me to produce a PNEURON that uses positive and negative air pressure (pneumatics) to simulate the electrical signals that are processed within neural networks. This PNEURON can be used in the physiology and neuroscience classroom to demonstrate classical electrophysiology concepts such as graded potentials, action potential thresholds, EPSPs and IPSPs, temporal and spatial summation, and time and length constants. However, I believe that student construction of PNEURONS and the coding to control them can be a powerful teaching tool, bringing together interdisciplinary concepts from neuroscience, physiology, computer science, physics, and industrial design into a unique end product that gives students a deep sense of project ownership and knowledge construction.

Disclosures: J.R. Burdo: None.
Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.16SA/VV6

Topic: H.02. Teaching of Neuroscience

Title: An in class small group exercise that helps illustrate the basics of synaptic transmission and drug action at the synapse

Authors: *D. S. ALBECK;
Dept Psychol, UC Denver, DENVER, CO

Abstract: Helping students understand synaptic transmission and subsequently, how drugs act on synaptic transmission is a difficult task, requiring students to understand basic information about cell function and then use the ability to think about how those functions might be altered by drugs to produce changes in synaptic transmission. Two hands-on, small group exercises in which students used playdoh clay to create model synapses were designed and performed. The first exercise had students form small groups and use playdoh to make a model synapse that included the basic cellular structures involved with neurotransmission. The second in-class exercise had the students recreate their model synapse and in addition, to incorporate a specific drug action on their synapse. Students used their model to demonstrate to the instructor and students from the other groups their knowledge of synaptic physiology in the first exercise and of how their assigned drug worked during the second exercise. All students viewed and rated all the group projects, with the top rated group receiving two points of extra credit, and the second highest rated group receiving one point of extra credit. Students in the first PSYC 2220 course performed the first playdoh exercise, creating model synapses and demonstrating synaptic transmission for the instructor and students in other groups and the mechanisms of drug action was covered in lecture for this class. The second PSYC 2220 course performed both in-class exercises, the initial creation and demonstration of a model synapse and subsequently showing how a randomly assigned drug would alter synaptic function in their playdoh model. Students in the second class performed significantly better on the neurophysiology / psychopharmacology exam than did the first group. Overall final grades including all assignments did not significantly differ between the two classes.

Disclosures: D.S. Albeck: None.
**Title:** Manipulating synaptic transmission in Helisoma trivolvis embryos: A laboratory exercise for undergraduate students

**Authors:** *E. F. FIELD*\(^1\), K. ATKINSON-LEADBEATER\(^2\);
\(^1\)Dept. of Psychology, \(^2\)Mount Royal Univ., Calgary, AB, Canada

**Abstract:** Mount Royal University in Calgary, Alberta, Canada is a new undergraduate university that is working towards creating learning opportunities for our undergraduate students in biopsychology laboratory-based research. The Psychology department resides within the Faculty of Arts and as biopsychologists within an Arts Faculty, we are faced with the challenge of providing hands on biopsychology research experience for undergraduates with limited access to traditional biological laboratory facilities. In addition, we are faced with the challenges of low budget, minimal animal use clearance and animal housing facilities, and classroom rather than laboratory-type workspaces. Given these challenges we propose the use of the pond snail *Helisoma trivolvis* embryos as a novel animal model for creating undergraduate biopsychology research experience in a classroom setting. We have capitalized on previous research that had characterized *H. trivolvis* embryonic rotation behavior and underlying neural circuitry and have used this phenotype to develop an undergraduate hands-on synaptic transmission exercise. At approximately three days of development, *H. trivolvis* embryos express a robust 1.5 rotations per minute spinning behavior. This action is dependent upon the function of a serotonergic sensory-motor neuron, called the embryonic neuron C1 (ENC1). The ENC1 pair sense multiple cues in the snails’ environment and release serotonin onto a population of ciliated cells to drive embryo rotation. The synapse between ENC1 and the ciliated cells can be easily manipulated to demonstrate synaptic function. Adding serotonin to the embryonic bath results in increased rotation rate (up to four rotations per minute at 20 minutes post application), and adding serotonin receptor antagonists diminishes the spinning rate. Thus, students can manipulate synaptic transmission and observe the consequences of neurotransmitter activation and the effects of antagonists on receptor function via changes in an easily observed behavioral output. This animal model of neurotransmitter driven changes in behaviour provides students with a concrete illustration of three important concepts: a) synaptic transmission involves receptor...
activation, b) increasing or decreasing receptor activity increases or decreases synaptic transmission, and c) synaptic transmission is inextricably linked to behavior.

**Disclosures:** E.F. Field: None. K. Atkinson-Leadbetter: None.

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**Theme H Poster**

**024. Teaching Neuroscience: College Courses**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 24.18SA/VV8

**Topic:** H.02. Teaching of Neuroscience

**Support:** PROAPARC/UNASP-SP

PIBIC/FMJ 27/2010

**Title:** Neuroscience integrated into practices: Proposal for undergraduate students in teaching-learning, research on health and social awareness

**Authors:** *R. M. AGUIAR, SR*¹, J. H. SATO³, F. E. B. PEREIRA¹, A. A. J. QUADROS², M. R. DA CUNHA³, R. N. ISAYAMA¹;

¹Dept. Biology-Lab. Impacto Ambiental, ²Dept. Physiotherapy, UNASP, Sao Paulo, Brazil; ³Morphology and Basic Pathology, Faculdade de Medicina de Jundiaí (FMJ), Jundiai, Brazil

**Abstract:** The nervous system has a tremendous impact on human functioning and behavior. Because nervous tissues are connected to and distributed in all parts of the body, neuroscience becomes an important field of knowledge for undergraduate students in medical and biological careers. In the last decade, educational communities have been proposing an interdisciplinary curriculum in health sciences so that students may be more involved in teaching-learning processes and clinical experiences since the beginning. Moreover, initiation to research drives academic students to search for knowledge. In addition, it should motivate undergraduate students to acting for social awareness so that people may reach better health and life style. Nothing is more exciting than stimulating one to develop his own skills and competences with a widespread progressing in the sciences of life. Bearing this motivation in mind, the present study analyzed the trajectory of undergraduate students in the field of health between 2011 and 2014. All efforts for integrating teaching-learning processes in neuroscience with clinical practices were done. Other complimentary ways of intervention were also considered and analyzed. The study was conducted at university centers and affiliate health institutions in the city of Sao Paulo-Brazil. A
model of curricular structure marked by modules and related disciplines has been implemented by university centers. Promotion, prevention and recovery of health were the scaffold to the curricular matrix. Teaching-learning strategies included laboratory of neuroanatomy and neurophysiology, group of studies, issues regarding neurophatology, neuroimmunology and neural development, clinical cases and discussions in neurology, monitoring in neuroscience, visits to external institutions, traineeships, comparative neuroscience in vertebrates, workshops, neuroscience exhibits, clinical experiences, seminars, scale models of the nervous system and the pathways. The integration of basic and clinical practices in neuroscience helped memory consolidation among the students. Furthermore, academic extension programs took an important part with the surrounding community. This population included patients with neurological clinical conditions and their caregivers. Students had access to the emerging and novel discoveries in neuroscience and clinical neurology. It may be concluded that the proposal of this study provided practices and different ways to develop the tripod research, teaching-learning and social awareness at the university centers.


Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.19SA/VV9

Topic: H.02. Teaching of Neuroscience

Title: Teaching university-level psychology and neuroscience in the 21st century

Authors: *A. J. WINTINK;
Coaching, Education, Research, & Community, Ctr. For Applied Neurosci., Toronto, ON, Canada

Abstract: With the turn of the century, and the emergence of an internet that dominates our existence, we have seen an explosion of information and new skills required to deal with this new way of being, learning, and knowing. The entire consortium skills surrounding our new existence is known by many as “21st-Century Skills”. These skills have been described in many ways but generally include: 1) ways of thinking (e.g., critical, creative, problem solving, innovation); 2) ways of working (e.g., collaboratively, process-based, through trial and error, self-directed, and experientially); 3) ways of communicating (e.g., formal writing, blogging,
infographics, spatial, video, audio); 4) digital and information literacy (e.g., computer skills, technology, internet research); and 5) social responsibility (e.g., citizenship & character development). These skills are proving themselves imperative to the lives of the 21st-Century student and citizen. These skills can be incorporated into the university classroom of Psychology-Neuroscience classes. This poster presents an overview of a template of an assignment used previously at the University of Toronto and Ryerson University, which allows for several 21st-Century skills to be addressed at once. The assignment allows for students to engage in a variety of self-chosen topics and to develop a learning plan and a final product that is unique to their interests while also allowing assessment to be consistent across students despite significant variation in methods of communication. For example, one student might submit a final product of a video whereas another student might submit a final product of a blog or twitter feed. The assessment incorporates a documentation of the student’s learning process, research, reflections, and conclusions, as opposed to just an emphasis on the final product.

Disclosures: A.J. Wintink: A. Employment/Salary (full or part-time)); Centre for Applied Neuroscience, University of Toronto, Ryerson University.

Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.20SA/VV10

Topic: H.02. Teaching of Neuroscience

Support: Funding was made possible by the Emory-Tibet Partnership

Title: Cross-cultural neuroscience education: Teaching neuroscience in Tibetan Buddhist monasteries

Authors: *M. R. ROMANO¹, C. M. WORTHMAN¹, G. DESBORDES², B. G. DIAS¹, W. HASENKAMP³, P. M. IUVONE¹, G. D. NAMGyal¹, L. T. NEGI¹, L. A. ROESCH¹, T. SAMPHEL¹, L. H. TING¹,4;¹Emory Univ., Atlanta, GA; ²Harvard Med. Sch., Boston, MA; ³Mind & Life Inst., Hadley, MA; ⁴Georgia Tech., Atlanta, GA

Abstract: The Emory-Tibet Science Initiative, established in 2006 in partnership with His Holiness the Dalai Lama and the Library of Tibetan Works and Archives in Dharamsala, India, is embarking on a long-term project to develop and implement a comprehensive science education
The range of this program, which includes six years of study in the fields of neuroscience, physics, biology, and a year of philosophy of science, represents the largest change in the Tibetan monastic curriculum in over 600 years. After five years of piloting the program in Dharamsala, the summer of 2014 begins the rollout of the science curriculum at three major Tibetan monasteries in India, and the scope of the program will expand rapidly each year. The pedagogical approach is a combination of distance-learning courses, textbooks translated in Tibetan, and annual on-site, one-week intensive programs in India that include instruction from neuroscience faculty, discussions, debates, and hands-on experiments that deeply engage the monastic students with the scientific method. Each year is concluded with an exam consisting of multiple choice and essay questions. Many challenges are involved in a project of this magnitude, requiring an interdisciplinary team that includes neuroscience instructors, Tibetan translators, and educators and leaders from both scientific and Tibetan traditions, working together to create solutions. A central challenge is in the assessment of learning, with several major factors at play. The content of the curriculum can be challenging conceptually, culturally, linguistically due to clarity of translation, or due to the pedagogical methods used. With clear differences between Western and Tibetan-monastic educational practices, designing assessment tools that are both culturally literate and usefully calibrated to analyze the effectiveness of this program is paramount. Of particular importance is evaluating which concepts prove easy or difficult to learn, and why. The neuroscience faculty will use the assessment results to continuously evolve the pedagogical methods used for teaching neuroscience in Tibetan Buddhist monasteries. Ultimately, this project aims to develop pedagogical methods that traverse two distinct traditions of inquiry, with the goal of mutually beneficial exchanges between science and Buddhism, and facilitating novel investigations in neuroscience at both ends.

Title: Incorporating MRI scans into undergraduate instruction using free web-based resources
FSL, OpenfMRI, and NITRC

Authors: N. SUTHANA\textsuperscript{1}, *W. E. GRISHAM\textsuperscript{2};
\textsuperscript{1}Dept. of Neurosurgery, David Geffen Sch. of Med. and Semel Inst. For Neurosci., \textsuperscript{2}Dept
Psychol, UCLA, Los Angeles, CA

Abstract: Although MRI and fMRI are sophisticated technologies, barriers to using these
powerful tools in undergraduate education are being removed. MRI analysis tools, such as FSL,
are free for downloading on the web http://fsl.fmrib.ox.ac.uk/fsl/fslwiki/. Also, there are banks of
brain scans that can be downloaded for free (https://openfmri.org/ and https://www.nitrc.org/ir/).
These resources allow not only the ability to replicate studies but also the capacity for
undergraduates to do genuine research in accord with the guidelines put forth in the NSF/AAAS
Vision and Change report (http://visionandchange.org/about-v-c-chronicling-the-changes/). We
have successfully used the FSL package (version 5.0; Smith et al., 2004) in an upper division
undergraduate behavioral neuroscience lab course. After a brief tutorial on using Unix, students
then used FSL’s Brain Extraction Tool (BET, Smith et al., 2002), which removes extraneous
tissue other than brain for further analysis. Students used FSL FIRST (Patenaude et al., 2011) to
segment the hippocampus, to isolate the left and right hippocampus, and used FSLutils (i.e.
fslmaths and fslstats) to calculate its volume. They also used FSL FAST (Zhang et al., 2001) to
segment white and gray matter and used FSLutils (i.e. fslmaths and fslstats) to calculate the
volume of the whole brain in order to correct the hippocampal volumes for brain size. Using
Vassarstats (http://vassarstats.net/), we found a positive relationship for age (mean age = 28.5 ±
2.4, range 10-52) and corrected right but not left hippocampal volume ($r=0.55$; $p<0.01$). We also
employed the FSL FEAT (fMRI Expert Analysis Tool, version 6.0) on scans from the Open
fMRI project (https://openfmri.org/) in an undergraduate honors functional MRI project.
Specifically, the student examined the BOLD activation produced by making judgments on
whether or not words rhymed compared to baseline. This analysis did not reveal any consistent
activity when a $Z>2.3$ and a (corrected) cluster significance threshold of $P=0.05$ was used, but
did show paradoxical right hemisphere activation when using clusters determined by $Z>1.7$ and a
(corrected) cluster significance threshold of $P=0.05$. Barriers yet remain to make use of these
tools widely in education. Specifically, operating much of the FSL analysis tool requires
knowledge of Unix, which students find difficult to use. Secondly, using the FSL package
effectively still requires some training. Participation in a workshop still seems necessary to gain
the rudimentary skills necessary to teach a class. Clearly, there is need to provide appropriate,
approachable training for educators at a low cost.

Disclosures: N. Suthana: None. W.E. Grisham: None.
Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.22SA/VV12

Topic: H.02. Teaching of Neuroscience

Support: NSF Grant DUE-0815135

Title: Use of the bean beetle, *Callosobruchus maculatus*, as a model system for studying circadian activity in the college classroom

Authors: *T. M. REED;* Dept Biol, Col. Mount St. Joseph, CINCINNATI, OH

Abstract: Bean beetles, *Callosobruchus maculatus*, are agricultural pests of tropical and subtropical Africa and Asia. The female bean beetles oviposit their eggs on stored beans including black-eyed peas, *Vigna unguiculata*. The larvae hatch from the eggs and complete their entire life cycle (5-6 months at room temperature) within the bean, emerging as adults. The adults do not eat or drink; rather they spend their adult life mating and reproducing for the 10-14 days from emergence to death. The bean beetles will readily mate and oviposit on a single layer of beans in tissue culture plates. This makes the bean beetle an easy model system to maintain and use for studying circadian activity in college biological psychology and neurobiology laboratories. Following discussions on circadian rhythms in the classroom, students were introduced to published literature on bean beetles and their behaviors. After developing hypotheses about the circadian activity of the bean beetles, the locomotor activity of nineteen male and thirteen female beetles was monitored for a ten day period at ten minute intervals using the TriKinetics *Drosophila* Activity Monitoring (DAM) System. Ten males and ten females exhibited locomotor activity for at least five days; the other beetles died shortly after introduction to the monitoring system. The activity data were graphed in Microsoft Excel. Peak activity was observed approximately every 24 hours for both males and females between 1530 and 1930 hrs. Little to no activity occurred for eight hours in each 24-hour period between 1930 and 330 hrs. Full laboratory reports were written for the experiment. The use of the bean beetle as a model system introduces students to insects as viable model organisms for observing behaviors, allows application of the scientific method for a novel experiment that can be conducted within a short time period, encourages discussion and comparison of circadian rhythms of human and nonhuman subjects, and has the potential for additional novel experiments beyond the classroom setting.
Abstract: In the present classroom exercise, we demonstrated acute stress effects on heart rate in an academic setting. Students (N = 22) were equally and randomly divided into controls and experimental participants. Students in both groups were asked to take their heart rate for one minute three times, and these were averaged for each individual (baseline). Then, students were asked to read a science article on the brain. Then, all students were told that the controls only had to take their heart rates as before, and, that one randomly chosen experimental subject would be asked to explain the reading to the rest of the class after the experimental group took their heart rates again. The post challenge heart rate average was subtracted from the baseline heart rate average for each individual, yielding a change score for each student. The highest and lowest scores in each group were considered outliers and dropped from further analysis. A one-way between subjects ANOVA was conducted to compare the effect of stress on heart rate in control and experimental conditions. There was a significant effect of the academic stressor at the p<.05 level for the two conditions [F(1, 16) = 4.70, p = 0.04]. Post hoc comparisons using the t-test paired sample for means was conducted after rank ordering the change scores in both conditions. The test indicated that the mean change score for the stress condition (M = 1.52, SD = 15.0) was significantly different than the control (M = -3.31, SD = 29.70.). Taken together, these results suggest that the stress induced by an unpredictable challenge, (i.e., someone in the stress group would be asked to explain a complicated science article to the group), led to a significant rise in heart rate in the experimental group; in addition, the individuals in the control group were relieved to hear that they were not going to be challenged, and their heart rates declined significantly overall as a result. It is important to note that, although there were significant group differences, there was also a very large amount of variation between individuals, which was eliminated as a confounding factor by calculating the change score, i.e., the amount of change...
between baseline and challenge conditions for each individual. It is important to recognize that
some undergraduates are comfortable speaking about scientific concepts in public, while other
individuals may experience very large acute stress reactions which do not have any obvious
clinical signs before they are actually asked to start speaking. The present experience was useful
for students, because it helped each of them to realize their own stress reaction to a neuroscience
public speaking challenge.

Disclosures: H. Viem: None. J.C. Neill: None.

Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.24SA/VV14

Topic: H.02. Teaching of Neuroscience

Support: generous hospitality of the Dept. of Anatomy

Title: Department of Anatomy at the Ege University Faculty of Medicine and the Neuroscience
Society of Turkey have developed and now propose a unique teaching-learning model: A multi
mediatic neuromorphology tour from cadavers to molecules

Authors: *G. O. PEKER¹, G. SENGUL², R. ERZURUMLU³, E. ULUPINAR⁴, S. CELIK², A.
KESER¹, L. OZTURK²;
¹Physiol., ²Anat., Ege Univ. Fac. of Med., Izmir, Turkey; ³Anat. and Neurobio., Maryland Univ.
Col. of Med., Baltimore, MD; ⁴Anat., Osmangazi Univ., Eskisehir, Turkey

Abstract: Background & Aim: Neuroscience is an integrated multidisciplinary and
multiprofessional area of awareness, recognition, philosophy, education, research, treatments,
and management dealing with the yet unknown and problematics of the human brain-behavior.
These challenge scholars/researchers from varying backgrounds (biomedicine, health, life, social
sciences, engineering). This approach requires as priority, the orientation of the heterogeneous
beginners to the basics of neuromorphology and the logic of communication in the nervous
system. The primary aim for designing this model was to introduce/give an overall feeling of the
neural structures to all who are eager and determined to become neuroscientists; nonetheless,
totally/partially illiterate of biomedical sciences. Secondly, refreshing/reinforcing the past
experience of those who were relatively familiar was also desired. Setting a very rich, dynamic,
original, highly interactive learning environment utilizing all conventional ways&means plus the
state of the art digital/virtual media was a must. Fifty participants (senior graders/graduates of aforementioned bachelor/medical degree programs, several freshmen already enrolled in other graduate programs, and several senior honors students from reputable high schools) were accepted. Instructional plan required the optimum use of the six large tables organized as different stations, each being manned by a competent/experienced faculty. Materials, Resources & References: Cadavers, intact/isolated human pièces, matrushka style layered and sectional models, real and virtual slides, Netter’s and Elsevier Atlases, Elsevier 3D Brain Navigator Database, Allen Institute for Brain Science Gene Expression Database, X-ray, CT, MRI, and PET images. Each student was given a printed Syllabus/Guide in advance. Objective structured feedback/evaluation forms for the educators and students, individually were also handed out. Outcomes: Motivation was remarkably high throughout the four hour concourse. Students perception/interpretation of the context, materials, instruction and floor design were highly consistent with those idealized by the curriculum designers. The educators’ enthusiasm, warmness and intellectual capacity were rated as impressive. The majority of the students valued their gain as “very efficient” and “efficient conceptual learning”. Several students requested a similar repeat in the near future. The overall satisfaction/appreciation exceeded the expectations of all stakeholders.


Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.25SA/VV15

Topic: H.02. Teaching of Neuroscience

Title: Visualizing the morphology of *Drosophila* dendritic arborization neurons: An undergraduate laboratory exercise

Authors: *S. M. WEBSTER*¹, F. ANGGORO²;
¹Dept. of Biol., ²Dept. of Psychology, Col. of the Holy Cross, Worcester, MA

Abstract: We developed an exercise to build laboratory skills in using a dissecting microscope, fine dissection, immunohistochemistry, and careful observation, to encourage students to appreciate the complexity of neuronal morphology even in the lowly fruit fly larva. Students are given a coded stock of flies containing GFP in one of four classes of dendritic arborization (da)
neurons. They must manipulate the live larvae under a dissecting microscope to pin the larvae to the dissecting dish. From anecdotal reports, many students have never worked under a dissecting scope to accomplish a fine motor task and find pinning out the mobile larvae quite challenging. After a brief fixation in 4% paraformaldehyde, the students then counterstain with a fluorescently labeled anti-HRP to identify all neurons. For the subsequent lab period, groups of 4 students used the departmental research grade confocal microscope under the guidance of the instructor to image their larval preparations. The students mount the larvae in 50% glycerol on standard microscope slides and seal them with nail polish. Even in the process of finding appropriate regions for imaging, the students compare the image quality between their classroom dissecting scopes and the research scope. Not all groups have preparations that produce images of the intended neuron class, but for those that have clear structures, we collect a Z-stack and construct a 3-D projection. The whole class shares the best images from the data set and attempts to identify which class of neurons is labeled in each sample in order to decode the original stocks. Using the class images, students design figures as they would appear in a journal article. Before and after this exercise, students complete a survey designed to assess several of the learning objectives: appreciation of neuron complexity, the relationship of neuron structure to its function, understanding procedures for labeling neurons, and comparison of imaging techniques. Our findings will help identify areas for improvement in the exercise to enhance student learning.

Disclosures: S.M. Webster: None. F. Anggoro: None.

Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.26SA/VV16

Topic: H.02. Teaching of Neuroscience

Authors: *N. STAFFEND1, C. SISK1, J. LIBARKIN2;
1Neurosci., 2Geology, Michigan State Univ., East Lansing, MI

Abstract: As a future faculty member, I have participated in a number of pedagogical training sessions that all stress the need to utilize “backwards design” methodologies and “active learning” in higher education curriculum to enhance student learning outcomes. In my Psychology 209: Brain and Behavior course, I embedded research quality assessments within the
curriculum to evaluate the efficacy of these aforementioned instructional strategies. The semester prior to the course was spent explicitly outlining major learning goals and developing an aligned curriculum (activities, lectures, exams) designed to inform the specific learning goals and progress students’ learning outcomes towards the upper cognitive domains of Bloom’s Revised Taxonomy. During the execution of the course, approximately half of total class time was devoted to team-based active learning sessions (i.e. model building, discussion/analysis of current primary research, debate, behavioral evaluation, etc.). Each session concluded with some type of formative assessment, with the cumulative goal (activity + assessment) explicitly designed to enhance critical thinking and communication skills of the students. These activities allowed students to move beyond knowledge and recall, and move toward application, analysis, and synthesis. Data generated from this course demonstrated that utilizing backwards design methodologies to improve the alignment of curriculum positively impacted critical thinking skills and student learning. Qualitatively, these data also demonstrate that incorporating active learning components within a backwards design model allowed students to take an ownership role in their individual learning process, improving critical thinking and communication skills, while increasing enjoyment of course content.

Disclosures:  N. Staffend: None. C. Sisk: None. J. Libarkin: None.

Theme H Poster

024. Teaching Neuroscience: College Courses

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 24.27SA/VV17

Topic: H.02. Teaching of Neuroscience

Title: Methods of heat sensory phenotyping: Why results of examine by QST and co2 LEP are different from diode laser QST and Nd:YAP LEP

Authors: M. I. NEMENOV\textsuperscript{1}, *M. J. IADAROLA\textsuperscript{2}, D. C. YEOMANS\textsuperscript{3}; \textsuperscript{1}Lasmed LLC, Mountain View, CA; \textsuperscript{2}Clin. Center, NIH, Dept. of Perioperative Med., BETHESDA, MD; \textsuperscript{3}Dept. of Anesthesiol., Stanford Univ. Sch. of Med., Stanford, CA

Abstract: The encouraging results from preclinical and early clinical studies of drugs developed for neuropathic pain eventually appear to generate negative side effects in wider trials. The modern hypothesis is that such negative results could be due lack of patient subgrouping by specific patterns of underlying pain mechanisms or pathophysiological variation [ Baron R. The Lancet 2012 11: 999-1004]. An important tool for such subgrouping and sensory phenotyping is
measurement of heat sensitivity. The commonly used contact thermode for QST and the CO2 laser LEP are perfect tool for testing of healthy volunteers but they may generate an inaccurate outcome when applied to pain patients, especially in patients in which cutaneous nociceptors are partially denervated. In such case the translation of results from preclinical to clinical phase studies could be less than optimal. The main challenge of heat sensory evaluation is access to functioning of cutaneous C nociceptor that are under ongoing pain and clear the response of stimulation from accompany effects. In case of healthy subjects or non-treated animals a subject or animal response is a direct measure of functioning of cutaneous nociceptors. In patients with peripheral neuropathy and loss of heat sensitivity, superficial heat stimulation by contact thermode or CO2 laser may not be sufficient to reach deeply located surviving cutaneous C-fiber nociceptors. Besides, the both stimulation paradigms are not selective and activate both A delta and C cutaneous nociceptors. Infrared diode laser devices provide selective stimulation (DLss) when used in animals, healthy subjects and patients. It allows selectively access to functioning A delta or C cutaneous nociceptors (Veldhuijzen Pain 2009, Cuellar Mol Pain 2010, Mitchell Mol Pain 2010, 2014, Tzabaris Mol Pain 2011) in any layers of epidermis or dermis (Moeller-Betram Pain Medicine 2013) in animals and humans as well as intensity testing in in vitro reduced preparations and can be used as an alternative to non-selective stimulation techniques. We compared the physics and the physiology of DLss heat sensory protocols with the Nd:YAP, contact thermode and CO2 laser and discuss why sensory responses depend on type of heat stimulation.

Disclosures:  M.I. Nemenov: A. Employment/Salary (full or part-time); Lasmed LLC. M.J. Iadarola: None. D.C. Yeomans: None.

Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.01SA/VV18

Title: Positive evaluation of the importance of neuroscience education by Pharm.D students

Authors: *G. M. KHAN;
Pharmaceut. Sci., Appalachian Col. of Pharm., Oakwood, VA

Abstract: Objective: To assess teaching needs of ANS/CNS course (neuroscience/neuropharmacology) from pharmacy students’ interest and perspectives. Method:
To accomplish this objective, a survey was conducted among P1 year Pharm.D students in a three year (accelerated) pharmacy college in rural Virginia. A total number of 56 students participated anonymously in the survey. Students were given a questionnaire that included, among others, the requirements, importance and role of neuroscience in shaping future pharmacists, as well as questions about neuroscience sub-disciplines, mode of contents delivery etc., in the ANS/CNS course. Result: About 92% of the students expressed either very high or high importance for the ANS/CNS course. In addition, 61% of the students found that better diagnosis of mental disorders is the key reason responsible for the increasing role of neuroscience education in pharmacy curricula. Students, however, were widely divided on the question about which neuroscience sub-discipline fascinates them most. Conclusion: The surveyed pharmacy students’ response underscores positive reflection of neuroscience education in pharmacy curricula.

**Disclosures:** G.M. Khan: None.

**Theme H Poster**

**025. Graduate and Professional Education**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 25.02SA/VV19

**Topic:** H.02. Teaching of Neuroscience

**Title:** Brainstem 101: An Interactive iOS application for graduate and medical students

**Authors:** *O. ZABARJADI*¹, B. PUDER²;

¹Touro Univ. California, Novato, CA; ²Samuel Merritt Univ., Oakland, CA

**Abstract:** Brainstem101 is an innovative iOS application that links brainstem’s intricate anatomy, functions and clinical relevance together in an interactive learning module. The Atlas features a dynamic model of the brainstem, nine transverse sections, and a searchable index of structures designed to retrieve linked diagrams. A secondary application was developed to create Bezier paths that, once incorporated, transformed each of the cross-sections into a responsive surface that enabled learning by interaction. Other features include a “Draw-Pad” and a “Quiz Mode” designed to accommodate notes and recall. Finally, an extensive clinical page was designed to showcase the link between structures, regional lesions, and the resultant deficits — the syndromic functio laesa. The theoretical vascular compromise is highlighted in detail on 2D and 3D diagrams that are swiped into view.
Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.03SA/VV20

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant R25 MH059472

Title: Enhancing graduate and post-doctoral training: Insights from the neural systems & behavior course at mbl in woods hole

Authors: *A. A. FENTON*¹, R. M. HARRIS², H. A. HOFMANN³;
¹Ctr. for Neural Sci., New York Univ., New York, NY; ²Dept. of Integrative Biology, Inst. for Cell. and Mol. Biol., ³Dept. Integrative Biology, Inst. for Cell. & Mol. Biology, Inst. for Neurosci., Univ. of Texas at Austin, Austin, TX

Abstract: The Neural Systems & Behavior (NS&B) course has provided intensive training in the concepts and methodology of behavioral neurobiology and systems neuroscience to outstanding pre- and postdoctoral students and junior faculty since 1978. During this eight-week summer course, within a discovery-driven curriculum, 20 trainees receive intensive lectures and discussion, one-on-one interaction with internationally renowned scientists, and extensive hands-on laboratory training with a variety of invertebrate and vertebrate preparations using state-of-the-art techniques and equipment. More than 30 dedicated faculty members arrive from all over the world to teach in NS&B and at least another 7 visit for 1-2 days. They present many different approaches to investigating the neural basis of behavior. NS&B trainees learn to think creatively about the brain, behavior, representation of information and plasticity. Each year, the trainees are exposed to at least 7 different preparations. These “modules” include rodent somatosensory cortex, rabbit cerebellum, mouse hippocampus, the brains of songbirds, weakly electric fish, the spinal cord of zebra fish, the crab stomatogastric ganglion, and the nervous systems of the fruitfly, the nematode Caenorhabditis elegans, and the medicinal leech. Methodologies incorporate intracellular and extracellular electrophysiology, imaging, biomechanics, computational modeling, and molecular biology. Trainees attend all lectures but focus on four modules, each for a 2-week cycle. One week of each cycle is devoted to trainee-developed discovery research, which has resulted in peer-reviewed publications. There is an explicit effort to teach and conduct research across multiple levels of biological organization. This diversity of
approaches provides students with a global perspective on the problems underlying the relationship between brain and behavior. NS&B provides a novel scientific perspective with its blending of methodologies, intellectual traditions, and experimental preparations, and thus adds exceptional value to graduate and post-doctoral training in neurobiology and systems neuroscience. Most (>97%) PIs of the last 5 years of NS&B trainees strongly agree/agree that the trainees’ participation in the course was valuable and has a positive impact on the PI’s research program. The training and professional social networks that NS&B provides has the capacity to catapult the scientific careers of trainees and has established NS&B as the premier short course for training the next generation of neuroscientists.

Disclosures:  A.A. Fenton: None. R.M. Harris: None. H.A. Hofmann: None.

Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.04SA/VV21

Topic: H.02. Teaching of Neuroscience

Title: From ion currents to compound action potentials with the Virtual Physiology teaching tools SimNeuron and SimNerv

Authors: *H. A. BRAUN\(^1\), A. TCHAPTCHET\(^1\), D. HÖHL\(^2\), U. THOMAS\(^2\);
\(^1\)Univ. Marburg, Marburg D-35037, Germany; \(^2\)Thomas Recording, Gießen, Germany

Abstract: Understanding the relations between ion current recordings in voltage-/patch clamp experiments and action potential recordings in current clamp experiments is a major challenge for many students of life sciences. Even more, medical students, in their practical clinical work, will mostly have to deal with compound potential recordings, e.g. of electromyograms, electrocardiograms or electroencephalograms. The neurophysiology teaching tools of the Virtual Physiology series cover the full spectrum. SimNerv offers a highly realistic laboratory on the computer screen for recordings of compound action potentials from the frog’s 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 data as another one which allows individual control of the students’ results. The same features apply for SimNeuron simulating widely used experiments with current- and voltage/patch-clamp recordings that are too difficult to be physically carried out in conventional students’ courses but can be performed in silico. A

Disclosures:  H.A. Braun: Other; ThomasRecording, BM&T. A. Tchaptchet: None. D. Höhl: Other; ThomasRecording. U. Thomas: Other; Thomas Recording.

Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.05SA/VV22

Topic: H.02. Teaching of Neuroscience

Title: A simple logical perspective for students of neuroscience to learn, understand, and memorize major trends of mapping time (past, present, and future) in the CNS -- incline toward assigning past to future points of the real world as posterior to anterior zones of the brain?

Authors: *A. BISWAS;
Speech Language Hearing, Edinboro Univ., Edinboro, PA

Abstract: The human brain is often considered to be the most complex object to deal with, and it often confuses students of neuroscience unless its descriptions are understandable in a logical framework. Many students experience difficulty answering whether the precentral gyrus is sensory and the postcentral gyrus is motor or the other way around. What they need is a logical framework instead of rote memorization. Fortunately, it has often been found that the mutual positions of various subunits of the brain strikingly correspond to the arrangement of their corresponding real world objects and activities. For example, Steven Barlow has described a concept of “efference copy” to help understand a logical frame-work of sensori-motor activities in the brain. Other simple examples are motor and sensory homunculi in pre-central and post-central gyrus respectively. This poster presentation describes a logical framework behind overall organization of the brain from a perspective of the arrow of time. The concept of arrow of time was initially brought forward in the general context of science by British Astronomer Arthur Eddington in 1927. Following the arrow of time, neural activities are brought about by some previous causation and these activities cause some activity to occur subsequently. Basically, the arrow of time points ahead into the future from the past. As shown in the attached schematic, the
The arrow of time dictates that a true sensation follows from past experience. It is not possible to “see” the sun before it rises. Similarly a real motor command points to the future ahead. It is not possible to “catch” a ball that has already dropped. This arrow of time from past to future is mapped very logically in the brain from posterior to anterior, rather than the opposite way. Just as the past is behind us and the future is ahead of us. This general pattern exists in the cerebral cortex, as well as in other structures, such as the spinal cord. The motor horn of the spinal cord is situated relatively anterior and the sensory horn is situated relatively posterior. The poster will provide further examples and counterexamples.

Disclosures:  A. Biswas: None.

Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.06SA/VV23

Topic: H.02. Teaching of Neuroscience

Title: An examination of publication bias in neuroimaging research of autism spectrum disorder

Authors: *J. DAY, B. K. CARR, K. N. DAY, M. VASSAR;
Oklahoma State Univ. Ctr. For Hlth. Scienc, Tulsa, OK

Abstract: Background: The meta-analysis of neuroimaging studies represents an important advancement in the data synthesis of brain activity. Over the past few years, meta-analytic methods have been applied to brain imaging studies to elucidate areas of brain activation and
deactivation in various psychiatric disorders. Meta-analytic approaches, such as this, do have challenges. Perhaps one of the more controversial issues within these studies is the over-reliance on published outcome data to generate an aggregate effect. Oftentimes, unpublished studies are not included, which could likely change the overall meta-analytic outcomes. This issue is commonly referred to as the file drawer problem. Excluding non-published studies represents a publication bias within the meta-analysis. To date, little research exists to determine the extent of publication bias within the neuroimaging literature. This study addresses that limitation. Aim: The purpose of this study is to examine publication bias within the neuroimaging research on Autism Spectrum Disorder. Methods: A comprehensive search was performed to identify meta-analytic studies of Autism Spectrum Disorder that applied a neuroimaging modality. Each primary study making up these meta-analyses was located and coded for analysis. Results: Funnel plots were constructed to examine the extent of publication bias for each meta-analysis. Funnel plot asymmetry was assessed using Egger’s regressions. Results indicate that publication bias was found in these meta-analyses. Conclusion: Publication bias appears to be an issue within the meta-analyses examined in this investigation. Future work should continue to study this issue in the neuroimaging literature, and greater effort should be made to report these findings.


Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.07SA/VV24

Topic: H.02. Teaching of Neuroscience

Title: Using network geometry to display regions of brain activity across neuroimaging studies of post-traumatic stress disorder

Authors: *G. COOK, B. K. CARR, J. M. DAY, M. VASSAR; Oklahoma State Univ. - Ctr. For Hlth. Sci., Tulsa, OK

Abstract: Background: Network geometry has been used to graphically display multiple intervention comparisons for a particular disorder to provide a holistic picture regarding the current state of evidence. Recently, network geometry has been used to graphically depict possible selection bias in five neuroimaging meta-analyses of post-traumatic stress disorder (PTSD). In this study, we extend the use of network geometry to visually represent the regions of
brain activity across 66 primary neuroimaging trials of PTSD. Aim: To graphically display the network of relationships between the results (areas of activation and de-activation) of 66 neuroimaging studies of PTSD. Method: Sixty-six primary studies using brain activation neuroimaging techniques in patients with PTSD were located through electronic databases and handsearching. These studies were examined individually for the regions of brain activation that the authors reported as most significant. These regions were linked graphically using social networking software to each corresponding study, looking for commonality and uniqueness among identified regions. Results: The primary result is a graphical display of activation/de-activation regions across primary studies. This display shows evidence of activity in the prefrontal cortex, temporal gyrus, cingulate cortex, amygdala, and hippocampus. Conclusion: Based on the data collected from the included studies, there are several areas of the brain that show significant activity in patients with PTSD. The visual presented in this study can provide researchers with an intuitive and straightforward approach to examining the current research in PTSD neuroimaging.


Theme H Poster

025. Graduate and Professional Education

Location:  Halls A-C

Time:  Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#:  25.08SA/VV25

Topic:  H.02. Teaching of Neuroscience

Support:  NIH GRANT K12GM074869

Title:  Preparing for academic careers through the Tufts TEACRS Program

Authors:  *L. C. MELON*¹, K. K. O'TOOLE², C. MOORE³, M. MCVEY⁴;
¹Neurosci., ²Microbiology, ³Microbiology, ⁴Biol., ¹Tufts 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 skills needed to succeed in an academic career. 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 small 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 and course design, 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 18 other programs similar to TEACRS across the United States.

**Disclosures:**  
L.C. Melon: None. K.K. O'Toole: None. C. Moore: None. M. McVey: None.

**Theme H Poster**

**025. Graduate and Professional Education**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 25.09SA/VV26

**Topic:** H.02. Teaching of Neuroscience

**Support:** R25GM061222  
R25NS080685
Title: Build your STEM career: Accelerating student degree progression and professional achievement

Authors: *E. E. SERRANO*
Biol., New Mexico State Univ., Las Cruces, NM

Abstract: Broadening participation in STEM professions through the achievement of postsecondary degrees has emerged as a national priority. To accomplish this goal, greater numbers of underrepresented, disadvantaged, and non-traditional students must be retained as STEM majors. The open dissemination of flexible tools that can be used to retain students in the pipeline, while reducing the time to STEM degree completion, will enable the research education community to develop practices that are adapted to their individual academic setting and student constituencies. The “Build Your STEM Career” Toolkit comprises a set of interrelated activities that enable students to identify career pathways and work strategically toward a goal. The activities were gradually developed through two decades of experience working with over 2000 undergraduates and 500 MS and PhD students as a research mentor, educator, and R25 PI/PD (RISE; BP-ENDURE) at a minority-majority (Hispanic-serving) research institution where ~60% of undergraduates, regardless of ethnic or racial background, are Pell Grant recipients. The premise of the toolkit is that career knowledge gaps can prevent students from identifying purpose and direction for their STEM education. Specifically, lack of knowledge about what is possible to accomplish with a STEM degree poses a recruitment barrier for students from disadvantaged backgrounds, particularly first generation college students. Moreover, “normative” professional practices are not always obvious to STEM newcomers. Nevertheless, knowledge of available options early in the student’s education is essential for development of a career plan that can maximize personal satisfaction and professional achievement. The toolkit uses a hand-on practical approach that can be undertaken individually or in teams. Briefly, students document and showcase their achievements in six areas relevant for STEM: research, teaching, service, leadership, entrepreneurship, and philanthropy. Students are also shown how to build a productive research component by proactively engaging their mentor in frank conversations about their projects and mentor expectations. By reflecting on their accomplishments and interests, students begin to build a strategic plan that establishes concrete, frequent benchmarks, while considering the financial and personal cost of the desired end-goal. Taken together, the activities provide a structured yet flexible training mechanism that builds self-efficacy by emphasizing an evidence-based approach and placing students in command of their degree progression and career pathway.

Disclosures: E.E. Serrano: None.

Theme H Poster

025. Graduate and Professional Education
Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.10SA/VV27

Topic: H.02. Teaching of Neuroscience

Title: Tutorial contents on the INCF Japan Node platforms

Authors: *Y. YAMAGUCHI$^1$, S. SATOH$^2$, T. IIJIMA$^3$, R. KANZAKI$^4$, T. FURUICHI$^5$, Y. SHINODA$^5$, S. KAKEI$^6$, S. MASAKI$^7$, H. WAGATSUMA$^8$, T. MIYAKAWA$^9$, K. TAKAO$^{10}$, H. IKENO$^{11}$, K. TANAKA$^{12}$, Y. OKAMURA-OHO$^{13}$, Y. OKUMURA$^1$, S. KAMAKURA$^4$, Y. ISONO$^1$, Y. MORII$^1$, S. SUENAGA$^1$, S. USUI$^{1,14}$;

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Abstract: International Neuroinformatics Coordinating Facility (INCF) Japan Node (J-Node) has developed web databases as neuroinformatics platforms in collaboration among RIKEN Brain Science Institute, universities and research institutes throughout Japan. In accordance with the principle of neuroinformatics proposed by INCF, J-Node neuroinformatics platforms serve for data-sharing and on-line use of neuroscience resources. They are available for not only research but also education it high school, undergraduate, graduate students and researchers. In this demonstration, J-Node focuses on the presentation of tutorial contents, all of which you may instantaneously and conventionally use from the website. Currently 13 platforms are open in public. Visiome Platform, Brain Machine Interface Platform, Invertebrate Brain Platform, Cerebellar Platform, Neuro-Imaging Platform, Dynamic Brain Platform, Comprehensive Brain Science Network Platform provide experimental data, computational models, analysis tools and their tutorial contents in individual fields. Simulation Platform offers on-line simulation/demonstration environment of graphical data, models and tools registered at J-Node platforms and cooperating repositories. Brain Science Dictionary is an on-line dictionary in Japanese for students and researchers. As for gene expression data, J-Node has three platforms: First, CDT-DB is a cerebellar development transcriptome database that contains a large amount of data obtained for profiling of spatial and temporal gene expression patterns in postnatal mouse brain, especially cerebellum, with links to various bioinformatics websites. CDT-DB will introduce the project and various brain development genes. Second, determination of gene expression-anatomy associations is crucial for an understanding of complex function in the brain. ViBrism introduces how the Transcriptome Tomography produces 3D images of the association
and how they are useful for informatics approach to gene function. Third, Mouth Phenotype Database contains the raw data of behavioral tests derived from various genetically engineered mice. Finally, BSI-Neuroinformatics is original databases obtained by RIKEN BSI laboratories. All the above are available at INCF Japan Node portal: http://www.neuroinf.jp/?ml_lang=en


Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.11SA/VV28

Topic: H.02. Teaching of Neuroscience

Title: Examining the use of post-hoc procedures in neuroimaging research

Authors: *J. REDMOND, M. VASSAR, B. K. CARR; Oklahoma State Univ. Ctr. For Hlth. Scienc, Tulsa, OK

Abstract: Background: Neuroimaging data is often analyzed at the voxel level and involves forming a statistical image that can be assessed for statistically significant experimental effects. Given the potential for Type I error within voxel-wise comparisons, it is necessary to employ post-hoc adjustments that may be used to control this issue. To date, many of the articles discussing these techniques are rather technical and mathematically-intensive. Furthermore, unanswered questions remaining regarding the actual use of these techniques in practice. Aim: The purpose of this poster presentation is to examine the use of post-hoc adjustments in neuroimaging research in 3 academic journals and to provide a conceptual understanding of these procedures. Method: Three peer-reviewed journals (NeuroImage, Journal of Neuroimaging, and Brain Imaging and Behavior) were content analyzed over a 5 year period to examine the types of post-hoc procedures being utilized by neuroimaging researchers. A comprehensive literature review was performed on the types of post-hoc procedures suitable for such data. Results: Of the articles from these 3 journals, the Bonferroni correction was among the most popular. Other methods that were consistently utilized included random field theory as well as nonparametric permutation tests. These results will be detailed descriptively. We will also
present the audience with a conceptual overview of these methods in a reader-friendly format. Conclusion: Post-hoc adjustments are an important aspect of data analysis in neuroimaging. In many cases, the explanatory articles detailing these procedures are mathematically complex and not accessible to an audience of practitioners. This poster presentation will seek to showcase the types of corrections commonly applied in the literature, explain these methods, and highlight their strengths and potential weaknesses.


Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.12SA/VV29

Topic: Using course objectives and the Learning Through Discussion Method to establish instructional validity in a small-group graduate neuroscience class

Authors: *S. O. AHMAD;
Doisy Hlth. Sciences: Office of the Dean, St. Louis Univ., Saint Louis, MO

Abstract: Educators constantly strive to improve educational outcomes. Clear, precise objectives in a manner easily understood by students are essential to this process (Mancall, et al., 1987). Well-articulated and clearly defined objectives enable instructors to evaluate whether students’ performance meet those objectives. Setting clear course objectives also helps instructors choose appropriate strategies to promote students’ investment in the pedagogical process (Bloom, 1956; Gronlund, 1991), facilitate students’ understanding of the course and ultimately student learning. However, there is little research that examines the degree by which course objectives were understood by the students. The purposes of this study were to: (a) determine whether course learning objectives were conveyed during class periods using the Learning Through Discussion (LTD) method (b) determine if there was congruence between the students’ and instructors’ perceptions of course objectives addressed during class periods and (c) to provide continuing course development. The study utilized a mixed qualitative and quantitative methodology with a questionnaire administered at the end of each class period. Results indicated that there was a high correlation between instructor and student responses for most of the objectives, and a general trend reinforcing the validity of objectives covering course content in the LTD Method. The study was used as a tool to modify subsequent small group, graduate neuroscience courses by the
professor. The method described in the study will be continuously modified and utilized in subsequent semesters to provide the course instructors with timely and useful feedback. Additionally, longitudinal comparison is planned to assure quality education is being implemented in the classroom. This uses a previously reported method with electronic entry.

Disclosures: S.O. Ahmad: None.

Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.13SA/VV30

Topic: H.02. Teaching of Neuroscience

Title: A Social Network analysis of scientific collaborations in neuroimaging research

Authors: *B. K. CARR, J. M. DAY, M. HOLZMANN, M. VASSAR; Oklahoma State Univ. Ctr. For Hlth. Sci., Tulsa, OK

Abstract: Background: The use of social network analysis (SNA) to study the networks of scientific collaborators is a meaningful way to elucidate important qualities of a body of literature and to the contributors thereof. In particular, outcome measures such as which researchers are most influential in a particular field of study or which potential new collaborations are most rewarding may be determined using this approach. To date, the application of SNA to examine social structures within neuroscience, and more specifically neuroimaging, has been very limited. Aim: The purpose of this study was to examine the social structures of scientific collaborations within the neuroimaging community, specifically addressing the influence of the particular researchers, the potential for new collaborations, the temporal evolution of the network, and the effects of the social network on study quality.

Method: Sixty-six trials that applied neuroimaging modalities to study post-traumatic stress disorder were identified and retrieved for analysis. First, all trials were carefully assessed for study quality by two independent reviewers using a standardized scoring tool for neuroimaging studies. Social network analysis was used to construct a network map to visually represent co-authorships of researchers within the field. Finally, network metrics were calculated to address the research questions posited above.

Results: Results indicate that the social network of neuroimaging scientists who study PTSD has a somewhat dense structure. Centrality measures and rank aggregation techniques were calculated to address the influence of particular researchers within the field. The random walk and restart algorithm was used to construct a
recommendation model for suggesting new research collaborations. Finally, a relationship was noted between network structures and study quality. **Conclusion:** Important characteristics of scientific networks can be demonstrated using SNA, offering the potential for additional lines of research within the neuroscience community. In particular, the relationship between study quality and network architecture should continue to be investigated to determine the replicability of this finding in other areas.

**Disclosures:** B.K. Carr: None. J.M. Day: None. M. Holzmann: None. M. Vassar: None.

**Theme H Poster**

**025. Graduate and Professional Education**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 25.14SA/VV31

**Topic:** H.02. Teaching of Neuroscience

**Support:** INCF

**Title:** Training activities of the international neuroinformatics coordinating facility

**Authors:** M.-L. LINNE¹, G. EGEN², G. EINEVOLL³, A. KUMAR⁴, B. RICHMOND⁵, T. WACHTLER⁶, M. SUNDSTRÖM⁷, *M. B. ABRAMS⁸,⁷, D. WILLSHAW⁹;

¹Tampere Univ. of Technol., Tampere, Finland; ²Monash Univ., Melbourne, Australia; ³Norwegian Univ. of Life Sci., Ås, Norway; ⁴Bernstein Ctr. Freiburg, Freiburg, Germany; ⁵NIMH/NIH/DHHS, Bethesda, MD; ⁶Ludwig-Maximilians-Universität München, München, Germany; ⁷Intl. Neuroinformatics Coordinating Facility, Stockholm, Sweden; ⁸Karolinska Inst., Stockholm, Sweden; ⁹Univ. of Edinburgh, Edinburgh, United Kingdom

**Abstract:** Neuroinformatics is a newly emerging research area that aims to integrate neuroscience data and develop modern computational tools to increase our understanding of the functions of the brain and nervous system. Neuroinformatics requires the integration of knowledge from mathematics, physics, computer science, and engineering together with detailed knowledge of the nervous system. This interdisciplinary nature poses a specific challenge for training, as the knowledge and research cultures are only rarely combined in one single place and this field often falls between the boundaries of traditional academic departments. To promote global collaboration on neuroinformatics tool development, the International Neuroinformatics Coordination Facility (INCF) established a Training Committee in 2010 ([http://www.incf.org/programs/training-committee](http://www.incf.org/programs/training-committee)). The Committee, led by Prof. David
Willshaw, brings together professionals in the field interested in contributing to global training and education. The ultimate aim of INCF is to offer worldwide access to neuroinformatics education to students at the MSc and doctoral stage and multidisciplinary training to post-docs and senior researchers. Previous activities coordinated and overseen by INCF Training Committee have been the following. INCF has organized a two-day short course in neuroinformatics that has attracted 50 participants yearly. The first two courses were intended for doctoral students and held in connection with the international Neuroinformatics Congresses in Munich, Germany, in September 2012, and in Stockholm, Sweden, in August 2013. INCF is also dedicated to support advanced neuroinformatics courses on specific topics organized in various locations all over the world. Most of these activities have produced online teaching materials. In addition, INCF continually assigns INCF travel grants to students and young researchers interested in initiating new research activity with a research group in the area of neuroinformatics. INCF also takes part in the Google Summer of Code program which is a global program that offers students stipends to write code for open source projects. In the program, INCF provides state-of-the-art project work topics related to development of informatics and computational tools for the benefit of neuroscience. In 2014, INCF projects were awarded 13 stipends. Future actions of the Training Committee include promoting integration between wet lab and theoretical neuroscientists by organizing joint training and networking events.


Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.15SA/VV32

Topic: Case-based active learning as a method of introducing the neurosciences within a medical school curriculum

Authors: *B. D. FISCHER, R. J. BUONO, C. C. CAGANDE, M. A. CARRAN;
Cooper Med. Sch. of Rowan Univ., Camden, NJ
Abstract: The curriculum at an increasing number of medical schools includes active learning group discussions as a method of disseminating core medical concepts related to the neurosciences. Here, case stems are prepared and delivered to individual medical students from which each student identifies learning objectives, seeks the information necessary to meet the objectives, and subsequently contributes to the learning of a group with information that the student prepares and discusses. As part of a six week Neurology-Psychiatry course, we developed a case to introduce spinal cord anatomy and function. Here, a hypothetical patient was described as having difficulty walking concurrent with painful, numb parasthesias in the shoulders and arms. The results of a neurological exam were also described in the case stem. The learning objectives for the case were focused around the ascending, descending, and reflex pathways found in the spinal cord, as well as nutritional, degenerative, inflammatory, and structural diseases which affect its function. The case was discussed in the active learning groups over three two-hour sessions, and additional releases were presented to the students prior to each session to help guide their preparation. Upon completion of the active learning group sessions, a majority of students rated the case and the active learning group format as a “very good” or “excellent” method of delivering the material. Together, this method allowed for active learning and teaching of the material, and fostered collaboration, interpersonal and communication skills, and professionalism.


Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.16SA/VV33

Topic: H.02. Teaching of Neuroscience

Authors: *K. N. DAY, H. D. MUCKELRATH, J. M. DAY, B. K. CARR, M. HOLZMANN, M. VASSAR;
Oklahoma State Univ. CHS, Tulsa, OK

Abstract: Background: Meta-analysis is a promising approach to research synthesis, and results from meta-analytic studies can have important implications for treatment and practice. One primary methodological concern among researchers in this area is the overrepresentation of
statistically significant results in a meta-analysis study, as the over-inclusion of published papers tends to increase the magnitude of the effect sizes or study results. One way to combat this problem is to include grey literature, which theoretically, should provide a more realistic summary effect. We recently examined five meta-analytic studies of neuroimaging in post-traumatic stress disorder (PTSD). None mentioned attempts to recover grey literature. The current study was performed to address this limitation within this body of literature. Aim: The purpose of this study was to perform and document an extensive grey literature search of neuroimaging research in PTSD. Methods: We used the method proposed by Mahood, Eerd, and Irvin (2013) to complete the grey literature search. To showcase a few, we searched Google, Google Scholar, repositories, online databases, digital dissertations, greylit.org, and elicited responses from previous authors via email. Results: Results from the grey literature searches are provided as descriptive statistics. We present the sources where most of the grey literature was found and classify it by the source of the information. We also present a detailed account of search strings and offer practical advice for researchers or academic search specialists who perform grey literature searches. Conclusions: Grey literature is available in the neuroimaging literature of PTSD. Examining summary effects of brain activity with the inclusion of grey literature would be interesting.


Theme H Poster

025. Graduate and Professional Education

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 25.17SA/VV34

Topic: H.02. Teaching of Neuroscience

Support: DFG Grant #IGK1247

Title: The international, 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.

**Disclosures:** J. Zhang: None.

**Theme H Poster**

**025. Graduate and Professional Education**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 25.18SA/VV35

**Topic:** H.02. Teaching of Neuroscience

**Title:** Integrating neuroscience into graduate education in social work
Authors: *J. BLACK*;
GSSW, Boston Col. Grad. Sch. of Social Work, Chestnut Hill, MA

Abstract: Social work graduate education is based on the bio-psycho-social model of human development, yet until recently the biological domain has been much less explored and not as systematically integrated into graduate level curriculum and professional development/continued education programs. If interested in neuroscience, social work graduate students often need to seek out neuroscience electives from other departments because until recently few programs offer neuroscience courses tailored to social workers. However, attention to neuroscientific research and applications within the social sciences have grown considerably, and this new direction presents exciting opportunities for design of neuroscience curriculum within social work. This presentation emphasizes the importance and feasibility of integrating cutting-edge neuroscience research and applications into graduate level social work curriculum (from foundation to advanced practice courses). Advancements in neuroimaging modalities provide a complimentary vantage point to understand, define and intervene with human conditions, such as psychopathology, that were once examined through behavioral methods alone (e.g. interview, neuropsychological testing, observer checklists). Given the tremendous growth of neuroscience research with clinical implications and the emerging necessity of “bio” literate social workers (as researchers, administrators, educators and clinicians), now is the time to increase focus on this bridging of fields within curriculum. Material presented will include: (1) a history of the integration of biological sciences research within social work coursework and training, (2) background of select neuroscience research (sMRI, fMRI, NIRS, EEG) focused on research questions and applications of interest to social work (such as aging, poverty, stress, attachment, cognition, emotional development), (3) specific courses within social work education where neuroscience could be integrated (such as Psychosocial Pathology, Child Welfare and Human Behavior in the Social Environment), (4) examples of currently existing neuroscience electives specific to social work (two of which developed by the presenter, an educational neuroscientist in social work), (5) the future of neuroscience within social work including field placement education and ongoing professional development and continued education programs, (6) opportunities for those within the neuroscientific community to become involved with social work curriculum and professional training opportunities.

Disclosures: J. Black: None.

Theme H Poster

**025. Graduate and Professional Education**

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM
Program#/Poster#: 25.19SA/VV36

Topic: H.02. Teaching of Neuroscience

Title: A new model for teaching advanced neuroscientific methods to graduate students

Authors: *M. EINSTEIN*¹, S. BONANNO², C. CHING², T. HARRISON², A. M. ANDREWS³;
¹Interdepartmental Neurosci. Grad. Program, ¹UCLA, Los Angeles, CA; ³Psychiatry and Chem.
& Biochem., Semel Inst. for Neurosci. & Human Behavior and California NanoSystems
Institute, UCLA, Los Angeles, CA

Abstract: **Introduction:** It is essential that graduate students in neuroscience understand what tools are available to study brain function. Knowledge of neuroscientific techniques will enhance students’ abilities to: 1) design novel research projects, 2) collaborate with investigators spanning a greater spectrum of expertise, and 3) critically evaluate others’ findings using a given technique. However, traditional graduate neuroscience coursework stresses what is known about the brain with relatively little emphasis on the techniques that made these discoveries possible. Moreover, self-teaching of neuroscientific techniques can be difficult because of lack of detail in methods sections, field-specific jargon, and unclear experimental rationale found in papers. Therefore, we designed a student-taught literature review seminar specifically to teach students about varied techniques in neuroscience. Based on anonymous surveys distributed before and after the class, students improved in their knowledge of and confidence in engaging others on various neuroscientific techniques. **Design:** In this 10 week literature review seminar, first year neuroscience graduate students were required to present on the history, development, and interpretation of diverse neuroscientific techniques, from optogenetics to genomics to functional MRI. 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 maximize their learning experience. To facilitate discussions, experts in the discussed technique attended each class meeting and served as co-leaders in discussion. **Assessment:** Students were administered a survey at the beginning and end of the class to assess their knowledge of and confidence in engaging others on various neuroscientific techniques (table 1). The survey was designed such that greater agreement with each statement would indicate greater knowledge of and confidence in discussing a broad range of techniques used in neuroscience. We found that the mean response for each question increased significantly (p<.05, Wilcoxon Rank-Sum Test).

**Disclosures:** M. Einstein: None. S. Bonanno: None. C. Ching: None. T. Harrison: None. A.M. Andrews: None.
Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.01SU/VV37

Topic: H.03. Public Awareness of Neuroscience

Title: The homunculus mapper: An interactive experiment for educators and outreach groups

Authors: *T. WALKER¹, R. CORLEW², O. ZHOVNIR³;
¹Max Planck Florida Inst. For Neurosci., Jupiter, FL; ²Functional Architecture and Develop. of
Cerebral Cortex, ³ITS, Max Planck Florida Inst. for Neurosci., Jupiter, FL

Abstract: Since it’s birth in 2013 the Homunculus Mapper is rapidly becoming a celebrated
Neuroscience Education and Outreach tool. This online/hands-on activity brings current
technology to a classic psychophysics experiment. Neuroscientists, teachers, amateur scientists
and kids are using this tool to understand fundamental concepts about how the human brain
processes sensory information, and experimenting on their own BRAINS!! Measuring your two-
point discrimination threshold for different body parts and plotting the data has long been a
standard experiment to demonstrate concepts such as cortical mapping and cortical
magnification. Now amateur neuroscientists can enter that data into the Homunculus Mapper
program and instantly create a visualization of the data they collect. The tool can be used in a
variety of settings and for all ages. The websites "Backyard Brains" and "Neuroscience for Kids"
both use the tool for different versions of the experiment, targeting different ages. Educators and
outreach programs are using it in their events for kids and adults and it is being adapted to fit into
the curriculum of Neuroscience courses for K-12 and college classes. Using real human brain
mapping data gives kids in a classroom or adults at an outreach event a tangible demonstration of
how our senses are mapped in our brains. We encourage collaborative connections in which the
tool can be used in different ways. http://www.maxplanckflorida.org/fitzpatricklab/homunculus/

Disclosures:  T. Walker: None. R. Corlew: None. O. Zhovnir: None.
Abstract: The downturn in federal funding of science has forced researchers to more closely follow governmental budget decisions. Scientists are concerned about the negative impacts on the economy, health, and security, due to a loss of scientific momentum. But we need lawmakers to share our concerns in order to change the situation. There are a number of ways that you can use your skills and position as a researcher and/or educator to make real policy changes. As an SfN Early Career Policy Fellow for 2014, I took three different approaches centered on the premise that when you combine Outreach and Advocacy, you encourage and equip the public to advocate for us. 1) Make Advocacy a part of your institution’s Outreach activities. It’s critical that legislators hear from non-scientist constituents about the value of science to their districts. Outreach events are a perfect venue to inform the public about the importance of funding basic research. Then, ensure that the message gets back to the politicians by: inviting them to an outreach event, collecting supportive statements from constituents, or encouraging the public to contact their representatives. 2) Initiate or support an Advocacy Committee through your local SfN chapter. An Advocacy Committee allows you to identify a group of motivated scientists, easily identify yourself when contacting officials, and coordinate support and connections through SfN’s Advocacy department. Make sure that the Advocacy and Outreach committees communicate and collaborate on events. Both groups can gain by doubling exposure with half the effort. 3) Visit legislators where they work and invite them to where you work. Participate in a Hill Day. SfN sponsors a Hill Day each year, as do other organizations with similar goals. Invite a congressperson or senator to your lab for a tour and then connect and maintain contact. Use this time to pass on supportive messages that you’ve collected from local residents about their excitement for your work. If we, as scientists, explain the importance of our research to lawmakers, and also educate and encourage the public to speak to the same lawmakers about the realized value of science in our society, we-together-will make a convincing case.
Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.03SU/VV39

Topic: H.03. Public Awareness of Neuroscience

Support: SfN Chapter Grant for Outreach Activities

Title: Growing public awareness and enthusiasm for neuroscience locally: Outreach activities of the palm beach chapter of the society for neuroscience

Authors: *S. A. SANGUINETTI*¹, R. CORLEW², W. BOSKING², V. HOKE², K. C. DIAH², D. J. CASCIATO², C. P. JOHNSON², A. L. JACOB², N. A. BUILES⁴, S. MARSH³, J. C. SAHAGIAN³, Y. CHEN⁵, S. SWARNKAR⁵, L. RIOS¹, J. LORA¹, L. LEE¹, C. DUHANEY⁶, K. ARRIZZA⁶;

Abstract: Neuroscience is new to the community of Palm Beach Florida. With the recent arrival of Scripps, MPFI, Torrey Pines, and the FAU Neuroscience department (all within the last few years), the area is seeing a neuroscience boom. The local public is excited, but also unsure of what neuroscience is, what we do, and how they can learn more. The Palm Beach Chapter of SfN has a big job in front of it. And we have risen to the challenge. We have a number of outreach events that target kids and adults planned throughout the year. In an effort to maximize our outreach to the community, we spread our "Brain Awareness Week" events across the entire year and join forces with organizations with already established community roots. For example, our "Brain Daze" at the public library is incorporated into a summer series for kids that the Palm Beach County Library has in place. Our "Art of the Brain" events are held at a local art gallery that hosts art events for kids. Our school visits are spread throughout the year to fit into the existing curriculum. A major aim of our events is to incorporate neuroscience into the community by using, and supporting, current programs and institutions. We have a partnership with the South Florida Science Center to incorporate neuroscience into their existing outreach. Examples of this collaboration include a “Science on Tap” night where adults can hang out and talk with scientists and a “Science Nights” series where experiments are brought to schools to give approximately 50,000 kids/year the opportunity to engage in hands-on experiments. We also volunteer and bring neuroscience to other museum events. Finally our members support ongoing events such as hosting a booth at the Miami Brain Fair showcasing a one-of-a-kind neuroscience experiment developed by a member of our chapter, and hosting a Science Olympiad event with neuroscience as the focus. By supporting and growing established educational opportunities, we
are building support in a sustainable fashion both for our members and for local alternative education organizations. South Florida is becoming a recognized hub for not only neuroscience research but also for innovative outreach and education.


Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.04SU/VV40

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: A history of cognitive enhancement use makes people less desirable as employees

Authors: *N. FITZ, L. CABRERA, P. REINER;
Natl. Core for Neuroethics, Univ. of British Columbia, Vancouver, BC, Canada

Abstract: A hearty debate about the ethics of cognitive enhancement (CE) persists today. Opponents assert that CE is unnatural and immoral while enthusiasts counter that CE is beneficial and may even be a moral obligation. One of the beguiling aspects of enhancement is that its use is perceived as demonstrating a commitment to hard work while simultaneously raising concerns about shortcuts to success. We hypothesized that evidence of a history of CE usage would have a substantial effect upon the decision of potential employers to hire prospective employees. To test this hypothesis, we designed an experiment (using the contrastive vignette technique) exploring public perceptions towards people who have used CE. Recruited via Mechanical Turk, participants (n = 301) were randomly assigned to read one (and only one) of three contrastive vignettes and respond to 100-point measures. The vignettes all described an individual, Michael, who was applying for a job for which he was qualified. Near the end of the interview, Michael is asked whether he ever used CE to improve his grades; this is the contrastive feature of the experiment. Michael either NEVER USED, OCCASIONALLY USED or OFTEN USED prescription CE pills. We note that it is perfectly legal to ask this in an interview. The primary outcome measure asked participants how likely they were to hire Michael. Participants who responded to the NEVER USED vignettes (mean = 78.2) were significantly more likely to hire Michael (F(298) = 26, p < 0.001) than those who responded to
either the OCCASIONALLY USED (mean = 51.2) or OFTEN USED vignettes (mean = 48.8). The manipulation explained 19% of the variance in hiring decisions ($R^2 = 0.19$). After participants explained, in their own words, why they answered as they did (mean word count = 37.4), they responded to four more questions that probed how productive Michael might be, how trustworthy he might be, how honest he might be, and how likely he was to develop a substance abuse problem. For all measures, the pattern of results was identical to what was seen in the primary outcome: participants had much more positive attitudes toward Michael when he never used CE. The data demonstrate that people view a history of using CE in university as a handicap rather than an advantage. One explanation is that CE usage prompts rule-based character judgments, which influence hiring decisions. Another interpretation is that people view performance without CE as indicative of greater natural talents, and therefore such individuals are better candidates for employment. Irrespective of the exact mechanism for these effects, the results are valuable in navigating concerns about enhancement in the context of the workplace.

Disclosures:  N. Fitz: None. L. Cabrera: None. P. Reiner: None.

Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.05SU/VV41

Title: Neuromodulation of virtue circuits: Ethical considerations of modulating positive character traits via neuroplasticity

Authors: *D. C. LARRIVEE$^1$, A. GINI$^2$; $^1$Roman Catholic Diocese of Charleston Educational Outreach Office, Williamston, SC; $^2$San Camillo Forlanini Med. Ctr., Rome, Italy

Abstract: Phineas Gage, the handsome, but unfortunate, survivor of a railroad demolitions accident, has retained an iconic imagery as a medical marvel for the demonstration while living of a purported correlation between localized neural activity and behavior. While the historical, and even medical, facts of the case remain contested, particularly in regard to the extent to which Gage’s behavior actually changed, it has long been cited as supporting the notion of a causal relationship between localized activity and expressed human behavior. In recent decades another neurophysiological phenomenon, neuroplasticity, has been accorded a role in underwriting human behavior in numerous, socially important contexts. Neuroplasticity, understood as activity...
dependent synaptic alteration, has been shown to enable a spectrum of experience dependent behaviors including learning, motor skill acquisition, and therapeutic psychiatry, among others. Its latent potential for individual transformation has thus prompted numerous calls within the neuroscience community to promote human flourishing through use of experiential principles that promote synaptic strengthening (Merzenich, 2013). The confluence of recommendations parallel current developments in psychiatric theory which propose a volitional strengthening of habitual character traits, virtues, as a form of preventive mental therapy (Peterson and Seligman, 2004). Philosophically, virtues acquisition depends on innate capacities, that can be potentiated by reinforcement and converted into habits, both processes resulting in some form of cerebral remodeling. By extension neuroplasticity affords a biologically based mechanism by which virtuous habits may be established. Positive psychology categorizes a broad range of human behaviors that can be subsumed within a taxonomic profile of positive character traits, including prudence. While some theories of neural operation however, based on physical principles of network operation, argue that human behavior deterministically follows cerebral function, the breadth of neuroplastic potential is more consilient with a natural freedom, within a process of rational deliberation coupled to the repeated volitional execution of task activities. The breadth of positive human behaviors, including the process of their willful engagement, raises the question of the impact of contemporary neuromodulatory techniques on either their implementation or deferral. In this poster we explore neuroethical issues which may arise in relation to proposals for neuromodulation of virtue, including modulation of neural processes associated with free will.

Disclosures: D.C. Larrivee: None. A. Gini: None.

Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.06SU/VV42

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: The role of the national science foundation office of the inspector general in research misconduct investigations

Authors: *E. RUNKO;
Abstract: The Office of Inspector General (OIG) is responsible for conducting inquiries and investigations into compliance with National Science Foundation (NSF) rules, regulations and policies in relation to NSF proposals and awards. NSF/OIG investigates allegations of research misconduct. NSF’s regulation defines research misconduct as fabrication, falsification, or plagiarism in proposing or performing research funded by NSF, reviewing research proposals submitted to NSF, or in reporting research results funded by NSF. OIG does not make findings or takes actions, but rather investigates and makes recommendations to NSF. The recommendations can be based on a variety of factors including the severity of the research misconduct, the level of intent the act was committed, whether the act was an isolated event or part of a pattern, and its impact on the research record, research subjects, institutions or public welfare. NSF takes appropriate actions against individuals such as faculty members, research staff members, post-doctoral fellows, graduate students, and undergraduate students. The imposed actions can range from a letter of reprimand, requirements of certifications or assurances, restrictions on activities or expenditures, suspension or termination of active award(s), to debarment of an individual from receiving Federal funds. Other possible actions include a requirement to submit corrections or request retraction of the publication, to submit detailed data management plans, to participate in responsible conduct of research training, and to being barred from participating as a peer reviewer, advisor, or consultant for NSF. NSF entrusts awardees to provide careful oversight of its awards and to ensure the protection and safety of human subjects and animal subjects utilized in NSF funded research projects. NSF OIG also reviews allegations such as noncompliance with the Common Rule or the Institutional Review Board (IRB) protocol and noncompliance with Animal Welfare Act or the Institutional Animal Care and Use Committee (IACUC) protocol. Investigations into violations could result in an increased oversight and other administrative measures. There has been a recent significant increase in the number of substantive data fabrication and falsification allegations in NSF funded research. Case study summaries, notable trends and conclusions from several recent investigations will be presented. Given the number of high profile research misconduct cases in emerging fields of stem cell science and neuroscience, the dissemination of scientific integrity and ethical issues are important to the neuroscience researcher.

Disclosures: E. Runko: None.

Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.07SU/VV43
Topic: H.03. Public Awareness of Neuroscience

Support: Boston College Graduate Student Association (GSA) Group Grant (to Kelly A. Bennion)

Title: The integration of mentorship and outreach: Creating a community of young scientists sharing neuroscience research with people across the lifespan

Authors: *K. A. BENNION;
Psychology, Boston Col., Chestnut Hill, MA

Abstract: In addition to sharing research with colleagues, it is equally important to mentor young scientists and to share the benefits of research with the public. As such, in 2012, Boston College developed two mentorship programs: The Grad/Undergrad Mentorship Program and the Psi Chi Undergraduate Peer Mentorship Program. Students participating in these programs actively take part in Brain Awareness Week at Boston College, which since 2008, has been a series of events that focuses on three target audiences: children, college students, and older adults. The two mentorship programs pair 1) a PhD student with an undergraduate student, and 2) an upperclassman Psi Chi (National Honor Society in Psychology) member or research assistant with a sophomore psychology or neuroscience major. These students are matched by research interest, and consequently, the programs have led to several undergraduates gaining positions as research assistants, as well as helped contribute to successful acceptance into graduate school. The mentorship programs, due to their focus on both large group meetings and the individual communication of knowledge between mentor-mentee pairs, foster an environment in which students are eager to share their knowledge of neuroscience with others. As such, they engage in Boston College’s Brain Awareness Week programming, which includes events for children, college students, and older adults. For children, we have created activities teaching about brain structure, neurons, concussion awareness, sensation and perception, and memory. For college students, we host a documentary screening and lecture about the neuroscience behind a topic relevant to their daily lives. For older adults, we give talks at a local senior center on topics such as strategies to remain cognitively sharp and benefits of physical activity on brain health. Together, Boston College’s mentorship programs and Brain Awareness Week outreach efforts provide undergraduate students with a comprehensive view of both conducting research and sharing it with others. Through several yearly events, we hope to convey the benefits of neuroscience research to people of all ages, along with providing undergraduate scientists with the mentorship they need to soon contribute to the field as well.

Disclosures: K.A. Bennion: None.
026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.08SU/VV44

Topic: H.03. Public Awareness of Neuroscience

Title: 2014 regional brain awareness program in Eastern Kentucky

Authors: *I. M. WHITE, J. L. HUFF, W. WHITE;
Psychology, Morehead State Univ., MOREHEAD, KY

Abstract: Our regional brain awareness program focuses on community outreach through lectures, presentations, and dissemination of science information in the Eastern Kentucky region. As in previous years, this year’s goal was to target over 1000 people in the region, and we exceeded our goal by organizing a brain drawing contest (K-12th), receiving visitors to the neuroscience lab (4th-6th), and making visits to high schools (9th-12th). High school visits included lectures on the effects of drugs on the brain and behavior, as well as distribution of materials on brain health and brain research. The Brain Drawing Contest is designed to enhance brain awareness among students (K-12th). This year, we received nearly 850 entries, with themes specific to each grade. Judging was done by 16 student judges, 8 faculty members, and a community representative. Judging was based on originality, scientific accuracy, and overall design. Each year, participation in the program and support for it has increased steadily. Our collaborative efforts in the community have included parents, teachers and administrators. Collaboration among faculty and students across different disciplines has increased significantly. This program is sponsored by Morehead State University. The Dana Foundation, the SfN, and the NIH provided educational material.


026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.09SU/VV45
Topic: H.03. Public Awareness of Neuroscience

Title: Cogsci connects: It’s just brain science!

Authors: T. L. VENKATESAN, Y¹, *D. PURVES²;
¹Cognitive Sci., Yale Univ., New Haven, CT; ²Duke Univ. Inst. For Brain Sci., Durham, DC

Abstract: Brain science is transforming virtually all fields: from music to medicine, from education to economics. For young people to be competitive and invent tomorrow’s disruptive technologies, a basic knowledge of cognitive science is essential. Currently, however, it remains an elite field studied only in select universities. The mission of CogSci Connects Inc. is to increase brain science literacy among students to prepare them for 21st century careers and opportunities. The company targets high school, undergraduate and graduate students with a diverse range of specialities and interests. An interactive, multimedia, science communication platform, CogSci Connects excites, entertains and educates students about cognitive science. Through mini-documentaries, seminars, blogs, discussion threads and celebrity chats with leading experts, students content drivers presenting cutting edge research and concepts in a fun, provocative and accessible way. To further hook the audience, the subject is introduced through its applications in music, gaming, life-hacks and film. The enthusiastic response from 1100 participants - students, companies and policy makers in CogSci Connects’ first student led conference in Asia (Jan. 2013) , stood testimony to this innovative approach. Featuring professors from 10 top universities and institutions, the conference was inaugurated by the Education Minister of Singapore and showcased in international media (1-3). The vision of CogSci Connects Inc., a sustainable company partnering schools, businesses and foundations, is to be the ‘go-to’ resource on cognitive science for students around the world. ----------------------- **CogSci Connects, a 501 (C) (3) corporation regd. in MD, USA, is headquartered at National University of Singapore Incubator. Tara Venkatesan is the founder, CEO of this Corporation. The technical advisory board consists of leading researchers from Harvard, Yale-NUS, Duke and JHU. Student content developers are from India, Singapore and the US. References: 1. Lim, Rachel. "Communicating Science." Asia Pacific Biotech News 17 (2013): 25-28. Print. 2. Nanda, Akshita. "Learn How Music Moves Your Brain." The Straits Times [Singapore] 1 Jan. 2013: C5. Print. 3. Cognitive science can help educators design better lessons. See, Sharon. Channel News Asia. 4 Jan. 2013. Television.

Disclosures:  T.L. Venkatesan: Other; CEO of CogSci Connects, a social venture. D. Purves: None.

Theme H Poster

026. Public Outreach I
Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.10SU/VV46

Topic: H.03. Public Awareness of Neuroscience

Support: Mahoney Institute for Neurosciences, University of Pennsylvania

Title: Graduate-led outreach initiatives: improving neuroscience literacy in children and adults

Authors: *M. TAYLOR, K. L. CHRISTISON-LAGAY, I. J. PERRON, D. J. REINER, J. GOLD;
Neurosci., Perelman Sch. of Med., Univ. of Pennsylvania, Philadelphia, PA

Abstract: Although scientific advances have vastly improved the quality and duration of human lives in the past century, scientific literacy in the general public remains low. A lack of scientific understanding is damaging to the future of science, especially in the current bleak funding climate. Therefore, communication to the public about science in general, and neuroscience specifically, has become increasingly important. The graduate students in the Neuroscience Graduate Group (NGG) at the University of Pennsylvania feel it is incumbent upon scientists to help foster greater scientific literacy through a diversity of forms. The NGG Graduate-Led Initiatives and Activities (GLIA) committee coordinates outreach efforts broadly classified in two categories: 1. outreach to K-12 students, and 2. outreach for non-scientist adults. Outreach for young students includes visiting local elementary school science classrooms, presenting interactive neuroscience demos to elementary school students at Penn’s annual “Kids Judge!” event, tutoring high school students for the international Brain Bee competition, teaching a neuroscience course and a hands-on research course to Upward Bound summer students, and writing and publishing a neuroscience primer for high school students. Outreach efforts for non-scientist adults include presentations at Philadelphia Science Festival events; a new Neuroscience Public Lecture series; and Brains in Briefs, a new website devoted to providing easily understood summaries of papers published by NGG students. These activities are supported by the Mahoney Institute for Neurosciences (MINS), Penn's long-standing, interdisciplinary institute for the study of the brain. These outreach activities improve public neuroscience literacy, which will have positive effects at multiple levels on the future of neuroscience research. They allow us to share the joys of learning how the brain works, help interest the next generation of scientists, and will hopefully lead to increased public support of scientific funding. We urge our colleagues to install similar outreach programs at their institutions to accomplish these goals.

Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.11SU/VV47

Topic: H.03. Public Awareness of Neuroscience

Support: Bloomsburg University College of Liberal Arts Curricular Enhancement Grant

Title: Bloomsburg university’s 4th annual brain awareness week: outreach to preschool, elementary, middle, high school, and university students in central pennsylvania

Authors: *J. A. JOHNSON¹, L. E. GANEY², A. A. MODICA², N. C. UPDEGROVE²; ¹Psychology, Bloomsburg Univ., Bloomsburg, PA; ²Psychology, Bloomsburg Univ. of Pennsylvania, Bloomsburg, PA

Abstract: Bloomsburg University (BU) participated in its 4th annual Brain Awareness Week (BAW) in Spring 2014. We held 6 off-campus events at local schools within the community. 79 BU undergraduate Psychology majors presented interactive brain activities to 348 local school students. The 6 off-campus sites were 1 preschool, 2 elementary schools, 2 middle schools, and 1 high school. For the preschool, we created 3 activities: Match Card game, Spinning Wheel game, and Play-Doh Brain activity presented by trained undergraduate volunteers to small groups of 3-4 children. Preschool students (n = 25) also participated in 2 group activities: dancing to a Brain Song and watching a puppet show about the brain. For the elementary schools, we visited six 5th grade classes (n = 134). We created activities: Mr. Egghead (demo of helmet safety), Mnemonic Devices (memory test with/without memory tricks), Taste and Smell (demo of how taste relies on smell), Nifty Nimble Neuron (structure/function of neurons), Brain Plasticity (demo using prism goggles), and Sheep Brains (structure/function of brain areas). Groups of 3-4 elementary students completed the activities run by trained undergraduate volunteers. A 10-item pre-/post-test of neuroscience-inspired questions revealed significant improvement after completing the activities (pre: 48%; post: 74% correct). Also, students’ ratings of the importance of helmet safety significantly increased (pre: 4.5 out of 5; post: 4.9). Students also reported enjoyment participating in the program (9.5 of 10). We also visited six 7th grade classes (n = 110) and one 6th-8th grade class (n = 49). We created several activities for the middle school students: Would you eat that? (influence of vision/smell on taste), Visual Illusions (figure/ground, color afterimages), Brain Hat (decorated pre-cut brain hats), 3D Brain App (used tablets to view brain), Mr. Egghead, and Brain Plasticity (both described earlier). Trained undergraduate volunteers presented the activities to small groups of students. Middle schoolers reported a high level of enjoyment of the program (9.2 of 10). Our high school visit included two 11th-12th
grade classes (n = 30). Upper-level undergraduate Psychology majors in a Sensation and Perception seminar developed interactive activities based on the book “See What I’m Saying” (Rosenblum, 2010) and presented them to small groups of high school students. A sample of high school students and volunteers rated the experience highly (9.9 of 10; 10 of 10 respectively). Rosenblum was then invited to campus to give a keynote address regarding the powers of implicit perception which was attended by 220 members of the BU community.

Disclosures:  J.A. Johnson: None. L.E. Ganey: None. A.A. Modica: None. N.C. Updegrove: None.

Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.12SU/VV48

Topic: H.03. Public Awareness of Neuroscience

Support: Northwestern University TGS Community Building Grant

Northwestern University Interdepartmental Neuroscience Program

Title: The Northwestern University Brain Awareness Outreach organization shares excitement for neuroscience with the Chicago community

Authors: *N. M. FREDERICK, L. K. SHANAHAN, S. HATTORI, S. R. MCIVER; Northwestern Univ., Chicago, IL

Abstract: Founded in 2010, the Northwestern University Brain Awareness Outreach (NUBAO) is an organization consisting of graduate and undergraduate students, postdoctoral fellows, faculty, and staff representing a diverse range of departments and academic programs at Northwestern University. NUBAO aims to educate the broader Chicago community about the brain through the use of fun, interactive activities that demonstrate a plethora of neuroscience concepts. In our ever-expanding effort to reach a broader and more diverse audience, NUBAO has taken a three-tiered approach in 2014 with events targeted to benefit K-12 students, middle and high school science educators, and the general public. 1) The annual Brain Awareness Fair is an open house-style event for K-8 students and their families, consisting of hands-on activities and demonstrations exhibiting a variety of neuroscience topics. This year’s 4th annual Brain Awareness Fair, held in partnership with Lake View High School, featured 21 booths and
attracted ~400 attendees from over 40 Chicago neighborhoods, representing 90 different schools.

2) Held in partnership with the Chicago Chapter of SfN, the Brain Awareness Teachers Workshop is a professional development workshop for middle and high school science educators designed to inform them about neuroscience research and provide them with the necessary tools to integrate neuroscience into their science curriculums. Held for the second consecutive year, 20 science educators attended this year’s workshop where they learned about brain injury, sensorimotor systems, motor learning, and neuroanatomy. 3) In a newly established partnership with Walter Payton High School, NUBAO will be implementing a 16-week neuroscience seminar series beginning in September aimed at educating their high school students about more complex neuroscience topics in an effort to inspire them to pursue higher education in neuroscience. Through this multi-tiered approach, NUBAO ensures that neuroscience education reaches a broad and diverse audience. NUBAO volunteers also benefit by learning to adapt their teaching and communication strategies to accommodate a variety of audiences. Since its inception in 2010, NUBAO has received overwhelmingly positive feedback from both the Chicago community and its volunteer base. In the future, we hope to utilize our growing volunteer base to develop more innovative neuroscience activities and continue to broaden our reach to more Chicago neighborhoods.

Disclosures:  N.M. Frederick: None. L.K. Shanahan: None. S. Hattori: None. S.R. McIver: None.

Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.13SU/VV49

Topic: H.03. Public Awareness of Neuroscience

Title: Utah brain awareness week 2014: Brain storm

Authors: S. N. REDMON1,2, T. DAHL2,3, J. M. CAHOON1,2,4, P. PARKER2, K. CHANDLER2, G. SMITH2, S. LUKS-MORGAN2, P. MALDONADO2, J. BARRIOS2, A. D. IUSO2, A. TAIBI2, A. HAACK2, *R. DORSKY5, A. DAVIS6;
1Ophthalmology and Visual Sci., 2Interdepartmental Program in Neurosci., 3Pediatrics, 4MD/PhD Program, Univ. of Utah, Salt Lake City, UT; 5Neurobio. & Anat., Univ. of Utah, SALT LAKE CTY, UT; 6Univ. of Utah, Salt Lake City, UT
Abstract: Our brain awareness team chose ‘Brain Storm’ as our theme for Brain Awareness Week 2014 as a way of representing our overall objective of getting people to think about the brain. This year, prior to BAW, we were able to conduct our annual volunteer training event evolving over 20 people from different PhD and MD programs as well as multiple institutions. This year we were able to reach over 1200 students ranging from 6-18 years of age. In addition, a public event was held during the weekend at The Leonardo, a modern museum of science and culture reaching an additional 100-200 members of the community. We were again honored to collaborate with the Ripple company who donated their time and new prototype of their ‘Brain Ball’ brainwave-biofeedback mind station. This year we were able to add several new modules and improve upon existing activities. Added to our Drugs in the Brain module was an interactive 6 foot neuronal model allowing students to explore differences in synaptic transmission after drug use. For more advanced classes we were able to teach them proper techniques for dissecting sheep brains. This year also saw the expansion of our spiker-box unit to include the ability to perform electromyography. New modules were created to address the popular subjects of learning and memory, popular psychology myths, and keeping an aging brain healthy. BAW team members either edited or created a Module Summary Sheet giving a basic overview of how to conduct the module and tips for adapting it for the wide age range that we experienced this year. These individuals then took responsibility for teaching all volunteers for BAW 2014 at the annual training event. Overall BAW 2014 was extremely successful and outreach events are planned to continue during the spring and summer.


Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.14SU/VV50

Topic: H.03. Public Awareness of Neuroscience

Title: The impact of brain awareness week in southern Puerto Rico

Abstract: Approximately 20% of the population in Puerto Rico (~700 thousand people) lives in the non-metropolitan south part of the island. In this region the only institution that does NIH funded neuroscience research is the Ponce School of Medicine and Health Sciences (PSMHS). For this reason, there is a necessity for PSMHS to provide neuroscience outreach activities to this part of the island. Bringing neuroscience knowledge to high school students will increase their awareness about the importance of neuroscience in their daily life and increase their appreciation of the critical role of neuroscience research in understanding the biological basis of many common neurological diseases. Graduate students from PSMHS have organized Brain Awareness Week (BAW) events over the years for high school students from many towns in the south of Puerto Rico to increase their neuroscience knowledge. Our 2014 BAW activities impacted 151 public and private high schools students from the Ponce, Juana Diaz, and Villalba municipalities. During the three separate activities, the students were exposed to a short presentation about neuroscience followed by a panel of graduate students describing their experience and why they decided to pursue a career in neuroscience research. In addition, students participated in 6 interactive stations: human brain anatomy, optical illusions, rodent behavioral testing, rodent brain surgery, visualization of neurons in brain slices, and DNA extraction. To determine whether the activities improved their understanding of neuroscience, pre- and post-tests were given to the high school students before and after the activity, respectively. The tests consisted of 5 basic neuroscience questions. Students from all three schools significantly improved in 4 out of the 5 questions on the post-test. Improvement in neuroscience knowledge surpassed more than 34% overall after combining the correct answers for the three schools. Our results show that our BAW activities impacted the high school students from the south of Puerto Rico and improved their knowledge and awareness about the importance of neuroscience.


Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM
Abstract: How does your brain control your muscles? The “Electric Muscles!” exhibit hosted by the UNC Bowles Center for Alcohol Studies addressed this question. 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. Visitors entered the lab area and first explored the human brain by observing and touching a postmortem human brain and brain models. Volunteer staff talked with visitors about brain function and how it communicates with the rest of the body. Emphasis was placed on the length of some axons - e.g., going to the toes - and how electricity is used to transmit the signal quickly. At the second station, volunteer staff used portable electromyography (EMG) instruments from Backyard Brains (EMG SpikerBox, https://backyardbrains.com/) to show visitors the electricity associated with movement of their own muscles. The EMG SpikerBox units were attached to iPod Touches running the Backyard Brains app that displayed the voltage measurements from the muscle - muscular contractions resulted in larger voltage measurements. Visitors observed the temporalis muscle (at the temple, elevating the mandible during chewing), the dorsal interossei muscles (in the hand, moving fingers side-to-side) and/or the flexor digitorum superficialis and extensor digitorum communis muscles (in the forearm, moving fingers up and down). The activities were easily adapted to accommodate large groups of children on field trips or multigenerational families. The exhibit was staffed by 40 scientists and students from UNC, Duke University and North Carolina State University, as well as community professionals. Approximately 500 children and 250 adults came through the exhibit over 5 days. Later we adapted these activities to an outdoor table-top exhibit for the UNC Science Expo during the North Carolina Science Festival (http://www.ncsciencefestival.org/). Instead of a human brain, we had various mammalian brains in containers on display, as well as brain models. We used two EMG SpikerBox units attached to android tablets to visualize muscle-associated potentials. At all events, brochures from SAMSHA and the National Institute on Alcohol Abuse and Alcoholism were distributed and conversations on science outreach and brain health (wearing a helmet, eating healthy food, protecting our brains from drugs and alcohol) were encouraged. Funded by the Education Core of the UNC Alcohol Research Center (National Institute of Alcohol Abuse and Alcoholism, P60AA011605, “Molecular and Cellular Pathogenesis in Alcoholism: Education Core”, PI: Fulton T. Crews).
Disclosures: D.L. Robinson: None.

Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.16SU/VV52

Topic: H.02. Teaching of Neuroscience

Title: Using Gromphadorhina portentosa, the Giant Madagascar Hissing Cockroach, as a model organism in the neurobiology laboratory

Authors: *K. G. Sossa;
Notre Dame of Maryland Univ., Baltimore, MD

Abstract: The American Cockroach (*Periplaneta americana*) has been the standard model insect in biology laboratories for decades. Here we present the Giant Madagascar Hissing Cockroach, *Gromphadorhina portentosa*, as a novel model organism. This Malagasy cockroach is a low maintenance, inexpensive, non-federally regulated invertebrate organism that requires minimal bench space. Laboratory exercises employing the Malagasy roach present students with an opportunity to study the intricacies of anatomy and principles of physiology. This roach’s considerable size (about 8 cm length) provides for ease of visualization and dissection. Textbook knowledge of organ systems, especially respiratory and nervous, is reinforced using *G. portentosa*. Students learn valuable techniques like respirometry and extracellular electrophysiological recordings. Taken together, *G. portentosa* makes a new and versatile model insect for use in undergraduate courses with laboratories from General Biology to Animal Physiology.

Disclosures: K.G. Sossa: None.
Program#/Poster#: 26.17SU/VV53

Topic: H.02. Teaching of Neuroscience

Support: Brigham Young University, Office of Research & Creative Activities Grant

Brigham Young University, College of Life Sciences, Start-Up Grant

Title: Customizing 3D printed models from MRI data: Creating educational anatomy models of neurologic disease

Authors: *B. GARDINER\textsuperscript{1}, S. ROBISON\textsuperscript{1}, J. WISCO\textsuperscript{1,2}; \textsuperscript{1}Brigham Young Univ., Provo, UT; \textsuperscript{2}Univ. of Utah Sch. of Med., Salt Lake City, UT

Abstract: INTRODUCTION: Neuroanatomy lab specimens are limited to cadaver availability and inconsistently demonstrate variations confronted in pathology. Using rapid prototyping (RP) technology to create 3D models from segmented MRI data offers distinct benefits to medical education. An efficient and replicable procedure for customizing these models can be developed to provide unique perspectives of brain models from real data. METHODS: Our methods consist of (1) image segmentation, (2) post-processing lobular isolation and slice manipulation, (3) mesh optimization and (4) rapid prototyping. We performed manual segmentation by labeling the brain structures to be demonstrated in the printed model. From our demarcation, we generated our surface description as a triangulated mesh and later rendered a volumetric tetrahedral grid. Modules employed by the reconstruction software Amira were used to divide slices and lobes into various visual elements. These labels were closed to render individual elements of our finalized brain model. Once our desired volumes were sufficiently modeled digitally, we optimized the quality of our tetrahedral mesh by eliminating detrimental factors of a surface mesh. Afterwards, we translated our mesh into commands for a 3D printer. RESULTS: Our finalized brain models demonstrate pathologies otherwise unavailable to the classroom, and we are able to print as many models as needed within a reasonable budget. The models respect the morphological integrity portrayed by the data. Printing costs do grow exponentially as the printed volume increases; however, by extracting segmented cortical structures of interest, large portions of costs can be eliminated, and models specific to classroom objectives can be printed to specification. Further economic efficiencies can be explored including downscaling and shelling out models to reduce infill material. CONCLUSION: By manipulating a surface mesh rendered from MRI segmentation, anatomical varieties can be modeled as handheld specimens. These demonstrations are advantageous for education over artistic models because they are representations of real data. Through the techniques we propose, we can articulate morphological neuropathologies and provide unique and modular perspectives for neuroanatomy education.

Disclosures: B. Gardiner: None. J. Wisco: None. S. Robison: None.
026. Public Outreach I

**Location:** Halls A-C

**Time:** Sunday, November 16, 2014, 8:00 AM - 12:00 PM

**Program#/Poster#:** 26.18SU/VV54

**Topic:** H.03. Public Awareness of Neuroscience

**Support:** Society for Neuroscience Local Chapter Grant

**Title:** Three years of the brain & mental health art show in Ottawa: Carleton University’s Brain Awareness Week

**Authors:** *H. A. MACKAY, V. ST-ONGE, R. GABRYS, R. MCQUAID, O. MCINNIS, N. RUSTOM, S. HUDSON, L. FRIBERG, S. KING JOHNSON, B. WARTMAN, T. PARNO, S. SYED, K. FARMER, C. RUDYK, C. SMITH, M. WELLMAN, A. ABIZAID; Carleton Univ., Ottawa, ON, Canada

**Abstract:** This year marked the third annual edition of the “Brain and Mental Health Art Show”. A continuing and growing success, this show is hosted at a trendy downtown coffee shop, and saw submissions from students at all levels from elementary school to graduate school, professors and medical doctors, and members of the community. Roughly 200 people attended the opening exhibition, and our silent auction of donated art pieces raised $2900 for Ancoura, a local charity that provides low-cost community housing for individuals with mental illnesses. 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 Brain Awareness Week campaign, with over 60 volunteer presenters reaching approximately 3000 elementary and high school students in the Ottawa region. We also hosted the third annual Ottawa Brain Bee, bringing together 12 students from local high schools for a brain trivia competition. 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.

Theme H Poster

026. Public Outreach I

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 26.19SU/VV55

Topic: H.03. Public Awareness of Neuroscience

Support: OHSU Portland Alcohol Research (PARC) Grant

Regional Arts and Culture Council Grant
Title: NW Noggin: Collaborative neuroscience outreach in Portland and Vancouver - Undergraduates, graduates, scientists, middle and high school students work together to learn about the brain


Abstract: In urban areas there are often several universities with thriving research and education programs in neuroscience, along with public schools teaching science to K-12 students. Yet despite a strong shared interest, these various students rarely interact. Here we describe a successful effort to involve them all in learning about the brain. There are many positive reasons to get them together. Some graduate students are isolated, because their institution lacks undergraduate programs, as in the case of Oregon Health & Science University (OHSU) in Portland, Oregon. Graduate students may struggle to gain teaching experience and share their work with a broader audience. They are less competitive for jobs that require classroom expertise. Undergraduates are often curious about graduate opportunities in neuroscience, 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 programs, and what studies are underway. The chance to work directly with graduate students improves their appreciation of graduate options, and exposes them to students involved in funded research. Outreach also benefits undergraduates by reinforcing concepts learned in class. In addition, studies suggest that, in middle and high school, students are excited or discouraged by science. Fostering enthusiasm for inquiry into the mechanics of the natural world, including the brain, 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 increases engagement, as students explore concepts by creating objects they can share with family and friends. This year we brought together graduate students from OHSU and Washington State University in Vancouver (WSUV), who participated in a supervised teaching practicum, with undergraduates from Psychology departments at Portland State University and WSUV. The undergraduates enrolled in advanced neuroscience classes, and studied neuroscience concepts and techniques before working with graduates. Graduates and undergraduates, along with art students from the Pacific Northwest College of Art, used this experience to collaboratively develop successful, sustained courses for students at three Portland Public middle schools during summer. We also partnered with a federal grant program, GEAR UP, to excite and inform 160 diverse, academically at risk high school students about education, research and career opportunities in neuroscience and art.

Disclosures:  W. Griesar: A. Employment/Salary (full or part-time); Portland State University, Washington State University Vancouver. J. Leake: None. S. Hadenfeld: None. L. Miller:
Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.01SU/VV56

Topic: H.03. Public Awareness of Neuroscience

Title: Neuroscience outreach project: Do alaskan blueberries positively affect health?

Authors: *C. A. FRYE*^{1,2}, V. F. LEMBO^{3}, J. F. LEMBO^{4}, L. F. LEMBO^{4}, J. K. LEMBO^{4};

^{1}Psychology, Univ. Albany, Albany, NY; ^2Anne Wein Elementary Sch., Fairbanks, AK; ^3Anne Wien Elementary Sch., Fairbanks, NY; ^4Anne Wien Elementary Sch., Fairbanks, AK

Abstract: Many people think blueberries have a positive effect on health. Our hypothesis is that Alaskan blueberries are better for your health than lower-48 blueberries and that people who eat Alaskan blueberries will feel better and less stressed. Permission to conduct this project was obtained by the principal and my teacher. Participants were teachers and staff who volunteered. Participants of this school (and an alternate business site) were provided different blueberries and completed surveys about how they felt after a week. Blueberries were either hand-picked Alaskan blueberries or store bought lower 48 blueberries that were available in the school lounge. Participants were asked to eat ½ a cup of one type or no blueberries every day for one week and complete the survey. Participants randomly selected which condition to engage in each week. Data sheets were turned in to the research supervisor at each site each week. There were 7 participants from school (Experiment 1) and 7 from the alternate site for replication (Experiment 2). When Alaskan blueberries were eaten participants reported that they felt calmer and more well-balanced physically and mentally. They also noted lower stress levels and described themselves with fewer negative adjectives. The data appear to show that Alaskan blueberries are better to relieve stress and promote well-being than lower-48 or no blueberries. This may be because there are more antioxidants in Alaskan blueberries because they have more skin and less pulp. ACKNOWLEDGEMENTS: This is the family science project of VFL. Everyone collected blueberries. JKL and CAF bought the store blueberries. VFL wrote the text, which was edited by JKL and CAF, who also helped VFL with the questions and making of a poster. I thank my school, my teacher, and all of the participants and research helpers at both sites who helped me
do this exciting experiment which won first prize at the school and regional Fairbanks science fair.

**Disclosures:**  

**Theme H Poster**

**027. Public Outreach II**

**Location:** Halls A-C

**Time:** Sunday, November 16, 2014, 8:00 AM - 12:00 PM

**Program#/Poster#:** 27.02SU/VV57

**Topic:** H.03. Public Awareness of Neuroscience

**Title:** Digital Dementia: The impact of lifetime information technology use on mental functioning

**Authors:** *M. SPITZER;*  
Dept. of Psychiatry, Univ. of Ulm, Ulm, Germany

**Abstract:** Digital information technology has become part of our everyday life. They are an integral part of our environment, at work and at home to relax from work, every day, from birth to grave. In developed countries, babies get introduced to TV, Video, and Tablet-PCs, toddlers know how to use them, and pre-schoolers spend several hours per day with them. The average media use in school children is about 7 hours per day, and the average young grown-up has sent and received 250,000 short messages (SMS), has spent 20,000 hours in front of TV, 10,000 hours on the cellphone, 5000 hours playing video games, and 3500 hours in online social networks such as facebook, with these number changing upward, the more recent the data. Using data from such different fields of inquiry as basic and cognitive neuroscience, experimental psychology, education research as well as clinical studies, I argue that there is a considerable negative impact of digital media on mental functioning. Mechanisms include (1) “outsourcing” mental work from our brains into machines, with the result of a decline in mental training and corresponding neuroplasticity and development (2) replacing face-to-face contact by social contact through digital media, resulting in less empathy towards parents and peers (3) distractions, such as multitasking and being online most of the time, resulting in dysfunctional attentional and thought processes (4) giving away - slowly and hardly noticeably - the control of our lives to gadgets, thereby reducing the cognitive control of our lives, paralleled by an increase in chronic stress, with its known negative impact on physical and mental functioning (5) addiction to video games, computers, the internet, online social media and the smartphone (6)
lack of exercise and recreational outdoor activities, with its known detrimental physical and social effects. With special emphasis on development in young age and decline in old age, and using data aggregated in reviews, I will present examples to illuminate these processes and mechanisms that cause concern regarding the risks and side effects of the massive digital media use that is the norm in developed societies. In particular, I argue that these effects are long-term in nature and have to be taken seriously now—no unlike, for example, the case of global warming. I am not against the use of digital information technology per se. But I want to caution against the unrestricted and market-driven exposure of our most precious resource, the brains and minds of the next generation, on a large scale, to devices with strong risks and side effects which are either already known or are suggested by what we know about brain development and functioning.

**Disclosures:** M. Spitzer: None.

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**Theme H Poster**

**027. Public Outreach II**

**Location:** Halls A-C

**Time:** Sunday, November 16, 2014, 8:00 AM - 12:00 PM

**Program#/Poster#:** 27.03SU/VV58

**Topic:** H.03. Public Awareness of Neuroscience

**Title:** Bridging two worlds: Creating a science policy seminar to generate lines of communication between scientists and policymakers

**Authors:** *M. L. ANDERSON*¹,²;
³Rutgers Univ., Alexandria, VA; ²Neurosci., Rutgers Univ. Neurosci., Piscataway, NJ

**Abstract:** In the current research funding climate and with so many neuroscience topics generating public interest, it is becoming increasingly important for scientists to communicate with policymakers. A greater understanding about the nature of both science and policy worlds can enhance the awareness for how policy decisions affect the future of neuroscience research and vice versa. A cooperative relationship based on such a greater understanding can be fostered by giving scientists and policymakers more opportunities to interact starting from an early point in both groups’ careers. To create an opportunity of this kind, a science policy seminar was created for graduate and post-doctoral Fellows from fields including law, biomedical sciences, political science, public policy, education and social work at Rutgers University. The aim of the session was to educate these select, advanced students and young professionals on how science can inform policy decisions while exploring the interaction between science issues and political
factors. A panel consisted of a Member of Congress, a scientist working at the National Academy of Sciences and a neuroscientist/academic running a neuroscience laboratory. Each panelist gave a 10-20 minute presentation describing how science and policy can influence each other, the similarities and differences in decision making processes of scientists and policymakers, and the unique messaging challenges that can manifest between the science and policy worlds. The presentations were followed by a question and answer session that covered numerous topics including science education, the balance between public and private funding of science and how scientific knowledge about human behavior can contribute to policy decisions and the legal process. This seminar created a direct line of communication between current and future scientists, policy-makers, advocates, and politicians. Additionally, the program appeared to generate interest about science policy issues in general. The policy and neuroscience programs at Rutgers University are now exploring opportunities to create future seminars that would involve a greater number of students and programs. Additionally, materials from this science panel have been generated to assist neuroscientists at other institutions who may also be interested in promoting conversations between scientists and policymakers.

Disclosures: M.L. Anderson: None.

Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.04SU/VV59

Topic: H.03. Public Awareness of Neuroscience

Support: Mary Gates Leadership Scholarship

Title: Providing a new focus for neuroscience popularization

Authors: *B. J. CORDY*¹,², J. T. MILES²;
¹Seattle VA Puget Sound Hlth. Care Syst., Seattle, WA; ²Neurobio., The Univ. of Washington, Seattle, WA

Abstract: *Grey Matters Journal* is the University of Washington undergraduate neuroscience journal, whose mission is to enhance public understanding of neuroscience, encourage greater participation in the scientific community, and to develop skilled science communicators. The journal was founded by undergraduate students and continues to be written, edited, illustrated, and produced entirely by a volunteer staff of students from a variety of disciplines. Our outreach
model is defined by two important principles that reflect our mission. First, the journal is intrinsically interdisciplinary. From its inception, the focus of Grey Matters has been equally divided between producing high-quality scientific writing and visually appealing and informative art and design. Such a commitment is reflected in the Grey Matters membership, which represents more than nine University of Washington majors, including: Neurobiology, Communication, English, Art, Philosophy, and Business. Recruiting students with diverse interests and expertise enables us to undertake a wide variety of outreach opportunities that would otherwise be unattainable. Second, an explicit objective of Grey Matters is to provide tangible membership to its members. We accomplish this primarily by fostering the skills necessary for emerging scientists to become effective communicators. Authors are rewarded by honing writing skills critical for a scientific career. Artists learn to illustrate complex concepts in way that clearly communicates their scientific value. This promotes effective scientific communication and strongly improves our outreach efforts. Grey Matters is an effective model that shows that including a wide variety of disciplines, not typically represented in the scientific community, substantially improves the impact and efficacy of outreach projects.

Disclosures:  B.J. Cordy: None. J.T. Miles: None.

Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.05SU/VV60

Topic: H.03. Public Awareness of Neuroscience

Title: The role of the interaction between medical scientific community and public organizations of parents on rare diseases (based on materials of Rett Syndrome Association, Russia)

Authors: *O. V. TIMUTSA, ESQ¹, L. MURTAZINA²;
¹29, Kazan State Med. Univ. / Assn. For Assistance To Rett Syndrome Pati, Kazan, Russian Federation; ²Assn. For Assistance to Rett Syndrome Patients, Kazan, Russian Federation

Abstract: There are common problems for all rare diseases in Russia: late diagnosis, lack of awareness about rare diseases, lack of standards for the treatment and medicines. In Russia the term rare disease was enshrined for the first time in 2011. According to this document, rare disease is considered to be the disease occurring with a frequency of 10 cases per 10 thousand population. There is no effective treatment for the majority of rare diseases. However, there are methods of improving the quality and life expectancy for such patients. RTT is a rare genetic
disorder for which effective treatment has not yet been found. In Russia the situation of children with RTT is complicated due to the fact that the diagnosis (blood tests on mutation) is possible only in Moscow. The patient registry has just begun to emerge, and only those children who have a confirmed diagnosis are included there. RTT research had not been maintained since 2004. In 2012, the Association in conjunction with the Institute of Pediat. & Ped.Surgery of Russian Ministry of Health conducted a research. In 2013, the study was repeated, and it has identified the following: microdeletions Xq28 affecting gene MECP2 have a high frequency among girls with Rett syndrome without the gene mutations and cause milder forms of the disease[Link: http://www.molecularcytogenetics.org/content/6/1/53/abstract]. This means that it is possible to prevent the disease at the stage of diagnosis. RTT researches are being held all around the world. It is very difficult for parents to navigate in a specific mass of biomedical terminology. This situation can cause irritation and despair. Counseling families bringing up children with rare diseases shows that in some cases the family does not follow through interaction with the doctor or, being aggrieved by the survey results, begins to look for other, more comfortable specialist or even may withdraw from interaction. Following the interests of the child, it is necessary to keep the parents from premature termination of counseling and further treatment and rehabilitation. We suppose that close cooperation of the medical community (including research scientists) and parent organizations and associations plays very important role. The Association held conferences devoted to the RTT, Seminar for parents, School for the patients aimed to increase the competence of about 300 representatives of children and adult patients with rare diseases and representatives of the medical community. In all countries, the main driver of the development of childhood diseases researches (especially researches of rare diseases) was parents (U.S. an example of such organizations are RSRT, IRSF, IRSA).

Disclosures:  O.V. Timutsa: None.  L. Murtazina: Other; specialist - translator.

Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.06SU/VV61

Topic: H.03. Public Awareness of Neuroscience

Title: Crowdsourcing the Evaluation of Journal Articles
Abstract: How can we measure a journal article’s future impact on our research field? To estimate this future impact, we typically rely on the impact factor of the journal publishing the article, a measurement based on the average number of citations generated per article within the journal over the last 2 years. Thus, the journal’s historical “success” of generating citations is used to predict the article’s future “success” in generating citations. However, an article is ultimately evaluated by the number of citations it generates rather than the journal’s impact factor. In other words, a manuscript published in a lower-impact journal with many citations will be for the most part judged as having a greater influence on the field, than a manuscript published in a higher-impact journal with few citations. Although citation counting is a more accurate method of evaluating an article’s influence, the problem is that it takes 2 or more years to get an accurate citation count. Because we often need to get an accurate assessment of a manuscript’s impact as soon as possible (e.g. a postdoc going on the job market after publishing an article), a journal’s impact factor remains the primary method of evaluating a recently published article. Can we find a better way to fairly and quickly evaluate a journal article’s future impact? We developed a crowdsourcing approach to journal article evaluation (http://neuralprediction.org/ceja/). This system provides user anonymity, and is open and free to use for everybody (including non-scientists), for both contributing and viewing the evaluation of journal articles. Participants can rate journal articles in two ways: 1) their prediction of the number of citations the article will generate in 2 years (post-publication), and 2) by a number of subjective criteria (e.g. reproducibility, innovation, etc.). In turn, participants are rated in their ability to accurately predict the number of citations an article will generate. Because the number of citations produced by a manuscript is an objective measurement, we can measure a person’s “expertness” by the accuracy of their citation prediction. We are testing different algorithms for predicting a journal article’s future impact by weighting a crowdsourced evaluation by the “expertness” of each participant. The goal of this crowdsourced evaluation method is to use subjective input calibrated by objective measurement, to generate an accurate citation prediction and subjective evaluation within 3 months of publication, while accounting for subjective bias and level of expertise.

Disclosures: D.A. Bendor: None. S. David: None.

Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM
Program#/Poster#: 27.07SU/VV62

Topic: H.03. Public Awareness of Neuroscience

Title: Embracing autism and neurological difference at the College of William & Mary: A novel neurodiversity initiative

Authors: *J. A. BURK\textsuperscript{1}, J. L. ZEMAN\textsuperscript{1}, K. A. WULF\textsuperscript{2}, J. E. ROBISON\textsuperscript{1}, C. L. DICKTER\textsuperscript{1}; 1Psychology, 2History, Col. of William & Mary, Williamsburg, VA

Abstract: Neurodiversity is a growing civil rights movement to embrace and accept individuals with neurological differences. This movement largely comes out of the autism community, although individuals with a variety of diagnoses, including Attention Deficit/Hyperactivity Disorder and dyslexia, could be considered neurodiverse. There is a growing recognition that neurodiverse students are present in significant numbers on college campuses. At the College of William & Mary, a Neurodiversity Working Group has been developed with the goal of supporting a campus climate that is more welcoming to neurodiverse students, by considering their unique strengths and challenges. Our Neurodiversity Working Group includes students, faculty, staff, administrators as well as representation from Residence Life and the Counseling Center. One goal in bringing these groups to the same table is to achieve a more complete picture about the experiences of neurodiverse students on college campuses. The Neurodiversity Working Group has focused on three domains: student activities, teaching and research. Student activities have included invited speakers to campus along with student-led workshops on topics such as Autism 101. For teaching, we developed a set of “Hidden Rules” PowerPoint slides that make implicit rules for interacting in a seminar more explicit. Furthermore, we team-taught an interdisciplinary 1-credit course on Neurodiversity, including inviting several neurodiverse speakers. We will continue to teach this course at William & Mary as well as at our Washington, D.C. office. Finally, we have conducted research to better understand the neurodiverse population at William & Mary, including stereotypes toward these individuals. Ongoing research studies are designed to assess executive function and emotional face processing differences between neurodiverse and neurotypical individuals. Future goals for this Neurodiversity Initiative include developing PowerPoint presentations to describe rules for other situations (e.g., working in a laboratory, talking with an advisor), developing additional courses and exploring opportunities to collaborate with other universities on programmatic and research activities.


Theme H Poster

027. Public Outreach II
Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.08SU/VV63

Topic: H.03. Public Awareness of Neuroscience

Support: NSF EEC-1028725

Title: Neural engineering in the classroom: Interactive workshops for high school students and teachers

Authors: *S. SEEMAN, B. R. KONDILES, K. E. M. MANBECK; Univ. of Washington, SEATTLE, WA

Abstract: The Neurobiology and Behavior Outreach group is a student run organization with the intent of introducing neuroscience to the K-12, undergraduate and public communities. Each year we serve over 1,000 people via classroom visits, science fairs and our annual Brain Awareness Week Open House. Since 2006 we have hosted over 10,000 downloads of our educational materials through our website. Our most recent project implements neural engineering workshops for high school students and teachers to inspire students and enhance academic performance in the sciences. The SpikerBox (Backyard Brains©, 2013) is a portable electrophysiology rig ideal for teaching high school students about neuroscience. It is easy to set up, enables lesson plans at various levels and exposes students to experiments they might not otherwise have in the classroom. Furthermore, electrophysiological exploration of the nervous system teaches fundamental principles of neuroscience, physics, math and engineering. Students in the workshop are introduced to concepts such as stimulus-response functions, encoding/decoding algorithms and neural engineering. The peripheral nerve of a cockroach leg is a simple preparation to teach the foundations of these concepts. Spines on the leg are innervated by neurons that respond to movement. Students begin by recording and characterizing spontaneous action potentials from the nerve. By physically manipulating the spine, students learn how spine neurons encode sensory information. We close the neural engineering loop by showing that similar neural activity can be evoked via artificial electrical stimulation. Students explore these concepts by developing and testing their own hypotheses based on the lesson. Teacher workshops give high school teachers the means to implement neural engineering inspired lesson plans in their classrooms. To fully immerse and familiarize teachers with neural engineering concepts, we assist teachers in assembling their own SpikerBox (provided) and creating lesson plans. At the end of the workshop teachers have several SpikerBoxes to take back to their classroom. By arming teachers with the tools to implement our lessons in their classrooms we reach a larger number of students. We continue to offer support to teachers as they develop lessons to fit the needs of their classroom. Teachers receive clock hours for these all-day workshops. These workshops increase the scientific knowledge of the public, specifically
regarding neural engineering, and highlight the hands-on nature of scientific experimentation and
the joy of discovery. We hope to inspire high school students to pursue further study and careers
in neuroscience.

Disclosures:  S. Seeman: None. B.R. Kondiles: None. K.E.M. Manbeck: None.

Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.09SU/VV64

Topic: H.03. Public Awareness of Neuroscience

Title: Institute for Healthcare Improvement (IHI) Open School Online Leadership Course
combined with community-based proposals for unmet needs in the clinical neurosciences: From
medical student professionalism to underserved middle school students, teen depression/suicide
conferences, Alzheimer’s support groups, and statewide conferences on science education, social
work, elder abuse, and guardianship

Authors: *P. F. ARAVICH*1, L. L. WELLMAN2, D. A. COHEN3;
Virginia Med. Sch., Norfolk, VA; 3Clin. Course Advisor, Sentara Neurol. Specialists & Eastern
Virginia Med. Sch., Norfolk, VA

Abstract: Psychiatric and neurological disorders account for more health care costs than all
other disorders combined. And, while the US spends much more on health care than any other
nation, its outcomes are below average or last on several measures compared to peer countries,
making cost an essential part of health reform and of the IHI Triple-Aim. The single most costly
health care problem is substance use disorders ($600B annually in direct and indirect costs)
while the second is serious mental disorders (more than $300B annually). And, the cost of
dementia exceeds $200B annually. Consequently, the total of these selected behavioral health
costs approaches $1.2T annually, or the estimated total cost of 10 years of war in Afghanistan
and Iraq. Finally, there is no better example of a failed system of care than behavioral health. The
Flexner professionalism ethic for medical education stresses the need to train “social change
agents who are leaders for the greater good of the community.” The IHI Open School has an
online Leadership 101 course by which persons can become certified leaders in health care. For
several years now, our medical neuroscience course students take the IHI leadership course and
then, using those leadership skills, write a proposal to address unmet community-based needs in
the clinical neurosciences. The proposal is aligned with the 4 Overarching Goals of Healthy People 2020 and the core principles of bioethics, and is an effort to promote social change agents. Based on its popularity, the approach was extended by the first author to the public at large at, e.g.: 1) regional STEM programs for underserved middle school students; 2) regional teen depression/suicide awareness conferences; 3) a regional Alzheimer’s Association program for persons newly diagnosed with dementia and their caregivers; 4) the annual statewide science educator conference; 4) the annual statewide guardianship conference; 5) the annual statewide elder abuse conference; and 6) a planned statewide conference for Wounded Warriors and their families. Since our program started, the IHI has announced a similar initiative to promote “social change agents” in general. The first author is a former member of the SFN Committee on Neuroscience Literacy and affiliated with the American Brain Coalition. It is argued that this leadership proposal approach extends to the continuum of learners in a new way to bring neuroscience to the public; is a new way to promote pipeline programs in the neurosciences; is a new way to promote interprofessionalism in the clinical neurosciences; and is a new way to promote “social change agents who are leaders for the greater good of the community.”


Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.10SU/VV65

Topic: H.03. Public Awareness of Neuroscience

Title: Annual international conference on biologically inspired cognitive architectures

Authors: *A. V. SAMSONOVICH;
Krasnow Inst. Adv Study, George Mason Univ., Fairfax, VA

Abstract: Biologically Inspired Cognitive Architectures (BICA) are computational frameworks for building intelligent agents that are inspired from biological intelligence. Biological intelligent systems, notably animals such as humans, have many qualities that are often lacking in artificially designed systems including robustness, flexibility and adaptability to environments. At a point in time where visibility into naturally intelligent systems is exploding thanks to modern brain imaging and recording techniques allowing us to map brain structures and functions, our ability to learn lessons from nature and to build biologically inspired intelligent systems has never been greater. At the same time, the growth in computer science and
technology has unleashed enough computational power at sufficiently low prices, so that an explosion of intelligent applications from driverless vehicles to augmented reality, to ubiquitous robots, is now almost certain. The emerging on these grounds challenge of computational replication of all essential aspects of the human mind (the BICA Challenge) is interdisciplinary in nature and promises to yield bi-directional flow of understanding between all involved disciplines. BICA annual conference series are now seven years old. Initially organized under the auspices of AAAI, the conference grew up into a world-wide forum coordinated and organized by the BICA Society: a nonprofit US corporation, whose mission is to promote and facilitate the study of BICA. In recent years, the BICA conference traveled around the globe: from Washington, D.C. to Palermo, Kiev, and Boston. Today BICA is a mainstream interdisciplinary field, promising solutions to urgent problems that resisted traditional approaches for decades. In all previous years, the BICA conference was a huge success in growing progression. We are looking forward to its bright future and integration with the Neuroscience community.

Disclosures: A.V. Samsonovich: None.

Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.11SU/VV66

Topic: H.03. Public Awareness of Neuroscience

Support: NRF 2010-0020408

Title: Combination therapy with hematopoietic growth factors enhances angiogenic factor and transcriptional activator in hypoxic-ischemic brain injury

Authors: J. YU1, J. SEO1, M.-S. KIM2, *S.-R. CHO2,3;

Abstract: Hematopoietic growth factors such as erythropoietin (EPO) and granulocyte-colony stimulating factor (G-CSF) are likely to play a broad role in the brain. A total of 79 C57BL/6 mice with hypoxic-ischemic brain injury were randomly assigned to acute phase (days 1-5), subacute phase (days 11-15) or chronic phase (days 28-32) group. All of which were treated with G-CSF (250 μg/kg) and EPO (5000 unit/kg) or saline daily for 5 consecutive days. Behavioral
assessments and immunohistochemistry for angiogenesis, neurogenesis and astrogliosis were performed with an 8-week follow-up. Hypoxia-inducible factor-1α (HIF-1α) was also measured by western blot analysis. To investigate optimal concentration and underlying mechanism of the combination therapy in hypoxia-induced cell models, neuroblasts and astrocytes were exposed to low oxygen tension under 1% O₂ during 6 hours, and treated with EPO and G-CSF for 6 hours in serum-free media. The supernatants were then used for the measurement of HIF-1α and signal transducer and activator of transcription 3 (STAT3). The combination therapy with EPO and G-CSF in acute phase significantly improved rotarod performance. In the cylinder test, the difference (Δ) relative to control group in the percentage of wall contacts with contralateral limb was significantly greater in mice treated with EPO and G-CSF in acute phase compared to mice treated in subacute phase and chronic phase. In ladder walking test, mice treated in acute phase and subacute phase showed a significant reduction in the difference (Δ) relative to control group in the percentage of the slips among total steps with hemiplegic forelimbs compared to mice treated in chronic phase. The acute phase treatment significantly increased CD31 (PECAM-1)⁺ and α-smooth muscle actin (α-SMA)⁺ vessels density in frontal cortex and striatum. The acute phase treatment also increased BrdU⁺/PSA-NCAM⁺ neurogenesis in subventricular zone, but decreased astroglial density in striatum. Furthermore, the treatment in acute phase significantly increased the HIF-1α expression in cytosol and nucleus, whereas the treatment in chronic phase did not change the HIF-1α expression, consistent with behavioral outcomes. Induction of HIF-1α, and probably STAT3 expression, by the combination therapy with EPO and G-CSF synergistically enhances not only behavioral function but also neurogenesis and angiogenesis while decreasing the astroglial response in a time-dependent manner. This study was supported by grants from the National Research Foundation (2010-0020408). J. Yu and J. Seo present equally.


Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.12SU/VV67

Topic: H.03. Public Awareness of Neuroscience

Support: Universidad Nacional de Colombia HERMES 14645

Title: Exploring neuroendocrine mechanisms of sexual dimorphism in early stress response
Authors: J. CAICEDO M, *Z. DUENAS; 
Ciencias Fisiológicas, Univ. Nacional De Colombia, Bogota DC, Colombia

Abstract: Sexual dimorphism in early stress response is a relevant field whose molecular mechanisms remain unclear. Despite several research have demonstrated differential hormonal actions and neurological changes related to gender, there are few studies that explore behavioral and biochemical aspects through integrative approaches that combine different models and methods. In this study, hormonal interactions of ovaric steroids and glucocorticoids in two neurons lines and behavioral effects of early stress protocol in a rat model were analyzed, in order to explore possible neuroendocrine mechanisms that explain dimorphic expressions of stress response. In the results, CAD and SH-SY5Y neurons cultures treated with different doses of dexamethasone, 17β-Estradiol and progesterone showed bimodal dose-dependent effects on cell viability, consist on protective effects in low doses range (1 to 100 µM) and proapoptotic effects in high doses ranges (500 to 1000µM) when they were used alone. Some costimulationtreatements at high doses(estradiol + dexamethasone and estradiol + progesterone) showed increased induced damage in CAD cells, while only protective effect induced by 50 µM of estradiol were able to antagonize dexamethasone induced damage in SH-SY5Y cells. On the other hand, open field and object recognition memory test in Wistar adolescent rats that received a maternal separation protocol of three hours in the morning and three hours in the afternoon during lactation period, showed that separate females group expressed anxiety and hypoactivity behaviors while separate males group presented anxiolytic and hyperactivity behaviors. Both separate groups exhibited lower exploration time of new objects in memory test. Taken together, these results allow to propose that neuroendocrines responses associated to supraphysiological levels of glucocorticoids could mediate anatomical and behavioral expressions in mammals in a sex-dependent way, which probably involve interactions with sexual hormones such as ovaric steroids

Disclosures:  J. Caicedo M: None.  Z. Duenas: None.

Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.13SU/VV68

Topic: H.03. Public Awareness of Neuroscience
Title: The ninds repository: A public collection of biomaterials for disease modeling, gene and biomarkers discovery in neurological research

Authors: *C. TARN*¹, G. BALABURSKI¹, S. HEIL¹, K. REEVES¹, J. SANTANA¹, J. GILROY¹, M. SELF¹, C. PÉREZ¹, M. SUTHERLAND², K. GWINN², R. CORRIEVAU²; ¹NINDS Repository, Coriell Inst. For Med. Res., Camden, NJ; ²Natl. Inst. for Neurolog. Disorders and Stroke, Bethesda, MD

Abstract: Neurological disorders are a major public health care concern but the pathological mechanisms in neurodegenerative disorders remain largely not understood. The major challenges in disease mitigation reside on lack of reliable genetic and molecular biomarkers for caustic, diagnosis, and progression monitoring; as well as limited reproducible cellular models for disease modeling and drug screening. The National Institute of Neurological Disorders and Stroke (NINDS) Repository, funded by NINDS, was established with the mission of providing high quality biospecimens as a strategy to facilitate and accelerate research in neurological diseases. The NINDS Repository collects biospecimens and de-identified clinical data from diverse patients diagnosed with various neurological disorders as well as neurologically normal controls. In addition, the NINDS Repository features collections of patients-derived fibroblasts and induced pluripotent stem cells (iPSC) with well-defined mutations as essential research tools for understanding the pathological mechanisms and establishes cellular models for neurological diseases. Recently, the NINDS Repository has broadened its collections to include whole blood RNA, biofluids such as plasma, serum, cerebrospinal fluid, and urine, to facilitate biomarker discoveries utilizing samples obtained longitudinally from both affected and neurologically healthy individuals. Since its establishment, biomaterials from more than 44,000 individuals with cerebrovascular diseases, Parkinsonism, motor neuron diseases, epilepsy, Tourette syndrome, Dystonia, Huntington's disease (affected and at risk) and neurologically-normal controls have been banked in the NINDS Repository. The NINDS Repository has established validated standard operating procedures and rigorous quality control assessments that span the life cycle of all biospecimens collected to provide premium samples. The NINDS Repository aims to ensure and implement standardization for collecting and processing across all samples without compromising patient safety and privacy. In addition, the NINDS Repository utilizes secure and integrated laboratory information management systems to monitor inventory, sample processing, storage, and distribution of biospecimens, and facilitates sample-data association by cross-referring with other databases such as dbGaP. By developing such a centralized collection of human biospecimens and their associated de-identified clinical data, the NINDS Repository thus provides a vital resource for research designed to discover and validate genetic and proteomic biomarkers of neurological disorders.

Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.14SU/VV69

Topic: H.03. Public Awareness of Neuroscience

Support: PIRG07-GA-2010-268385

Title: Biogenesis of fatty acid ethanolamides: Structural insights

Authors: G. GARAU, P. MAGOTTI, *S. PONTIS, D. PIOMELLI; Drug Discovery and Develop., Inst. Italiano Di Tecnologia, Genova, Italy

Abstract: N-Acyl Phosphatidylethanolamine specific-Phospholipase D (NAPE-PLD) initiates from membrane NAPEs the biosynthesis of bioactive fatty acid ethanolamides (FAEs). Polyunsaturated FAEs such as arachidonylethanolamide (anandamide) are endogenous agonists for cannabinoid receptors, the same G protein-coupled receptors (GPCR) that are activated by Δ9-tetrahydrocannabinol in marijuana, and participate in the control of pain, energy balance, and the response to stress. On the other hand, monounsaturated and saturated FAEs, such as oleoylethanolamide (OEA) and palmitoylethanolamide (PEA), regulate food intake, inflammation and cancer cell proliferation by engaging nuclear peroxisome proliferator-activated receptor-α (PPARα), and, possibly, other receptors. The brain shows a high NAPE-PLD activity that increases with development. We have determined the crystal structure of human NAPE-PLD at 2.6 Å resolution in complex with 1,2-diacyl-sn-glycero-3-phosphoethanolamine (PE) unveiling the physiological stimulus and mechanism by which this membrane enzyme mediates the biogenesis of FAEs. In addition, the comparison of the structure with that of the ancestral phosphodiesterase tRNA maturase RNaseZ shows that the unusual MβL fold of NAPE-PLD provides a rare example of protein dimer evolution to face and recognize hydrophobic membrane phospholipids, rather than negatively charged ribonucleic acids. An exciting result of this study is the key role of bile acids in the stability and function of NAPE-PLD. Bile acids are physiological detergents produced by the liver and gut microbiota responsible the intestinal absorption of fat substances present in food. Findings reveal that they can bind the enzyme with a kD ≈ 38 μM, enabling its catalytic activity in a potent, selective and reversible manner. These results suggest that NAPE-PLD might connect the action of bile acids to FAE signals. The structure may facilitate the design of specific modulators of NAPE-PLD as therapeutic agents for
a variety of relevant metabolic and neurological disorders.


Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.15SU/VV70

Topic: H.03. Public Awareness of Neuroscience

Title: (Re)Habilitar- a multidisciplinary group focusing on spinal cord injury awareness in south of Brazil

Authors: *A. C. MARTINI¹, S. D. SCHOELLER², A. R. S. GRUMANN², B. D. HORONGOZO², K. S. TRIERVEILER², D. L. DA SILVA², N. R. DRABOWSKI³, E. KINOSHITA², D. LIMA², C. OLIVEIRA², S. FORNER¹;
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Abstract: (Re)habilitar stands for (Re)habilitation in English and consists of a group of undergraduates, graduates and professionals from many different areas such as pharmacy, nursing, medical, physical therapy and engineering. The main goal of the group is to study and create awareness on rehabilitation after spinal cord injuries (SCI). The group has been active in the Science and Extension Programs Week at Universidade Federal de Santa Catarina (SEPEX) since 2009. In 2009 and 2010 the group won the best booth award on the event. During SEPEX several children and adults from the local community, as well as many students from the University, go to the booth’s activities that includes playing sports (basketball and rugby), riding and doing a circuit in which they must complete using a wheelchair, and also use a computer
using eye-movement software for quadriplegics. They can look a rat spinal cord injured section
under the microscope as well and have a talk research on the spinal cord injury area. On that
matter, during SEPEX, the group has also have done week short-term courses on rehabilitation
and awareness of spinal cord injury to undergraduates of the university. Such activities have
raised the awareness about preventing spinal cord injury due to vehicle accidents and falls, as
well as creating awareness towards respecting people who live with SCI, especially in a country
such as Brazil where the lack of accessibility is still an issue on the rehabilitation and prejudice
manner.

Disclosures: A.C. Martini: None. S.D. Schoeller: None. A.R.S. Grumann: None. B.D.

Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.16SU/VV71

Topic: H.03. Public Awareness of Neuroscience

Title: Risk factors for ischemic stroke, about 442 cases

Authors: *A. CHAHIDI*1,2, M. CHRAA3,2, N. KISSANI3,2;
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UCAM, Marrakech, Morocco; 3Mohamed VI Univ. hospital, Marrakech, Morocco

Abstract: Introduction: High blood pressure, smoking, diabetes and dyslipidemia the classic risk
factors of ischemic stroke. Several studies showed that ischemic stroke “IS” is very frequent in
our environment and is responsible for serious consequences in terms of households but also on
the macro-economic scale. Objectives: To determine the frequency of hospital IS and its major
risk factors. Patients and methods: Retrospective study from January 2000 to December 2009. It
focuses on 442 cases of patients hospitalized for IS in the Neurology Department in the Ibn
Tofail university hospital, of Marrakesh, Morocco. The diagnosis of IS was established in base
of clinical and CT criteria and coverd much of southern Morocco. Results: There were 215 men
(48.6%) and 227 women (51.4%). The average age was 61 years. It was 60.5 ± 11.07 years for
men and 62.5 ± 13.6 years for women. The IS Prevalence in our department was 10.4%.
Hypertension was major and most frequent factor with 42.9%. IS revealed hypertension in 30.3%
of cases. Tobacco consumption was noted in 25.3% of patients. Incidence of diabetes (type 2)
was 15.3%. The rate of patients with dyslipidemia was 5.7%. Alcohol consumption was noted in 5% of patients. Left ventricular hypertrophy was noted in 30.4% of cases, atrial fibrillation in 13.9% of cases. IS were caused by cardiac embolism in 28.4% of cases. The recorded death rate was 13.4% (59 patients). Hypertension poorly treated or ignored was the main risk factor for IS in our department. Discussion: There are three categories of stroke risk factors, those related to medical conditions, including family history of stroke, those related to personal choices such as smoking, and finally the social determinants such as poverty. Age intersects all these categories. At age 55, the risk of stroke increases approximately by double every ten years. Some sources predict an increase of 30% of stroke in the next 15 years because of aging population. Although the rate of stroke is higher among men, a greater proportion of women died from a stroke. In most studies, hypertension is the leading risk factor for stroke, which joins the results of our study. Only 1 risk factor may be sufficient to cause stroke, but the association of several risk factors in one person (case in our stay for 28% of our patients) increases the risk. It is therefore important to fight against the possible risk factors for stroke prevention. Conclusion: The certitude of involvement of these factors in the occurrence of this disease, leads us to definitely give prominence to prevention as the cornerstone of our policy to support stroke. This goal passes by a better education of our population as well the establishment of hospital stroke unit.

Disclosures:  A. Chahidi: None. M. Chraa: None. N. Kissani: None.

Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.17SU/VV72

Topic: H.03. Public Awareness of Neuroscience

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Abstract: The Brain Awareness Week is a global campaign that aims to show the benefits and progress of neuroscience. On that behalf, Brazil has started participating in it in 2010 and from 2012 the Brazilian Society for Behaviour and Neuroscience (SBNec) has been promoting it as “National Brain Week”. Therefore, the Department of Pharmacology of Universidade Federal de
Santa Catarina (UFSC) has been promoting activities at the “National Brain Week” since 2012. The first two years were focused on reaching middle school and high school. However, in 2014 working together with the Cellular, Embryology and Genetics Department of UFSC, undergraduate and graduate students reached the local community by placing the awareness on a local shopping mall and entitling the activity as “Exhibition of Brain Week: What happens in our brain when...”. The main goal of placing it at a mall was to have a major outreach toward neuroscience to the local community, from kids to elderly. On that matter, the activity was made with posters related to neuroscience subjects on what happens when we sleep, eat, fall in love and other ordinary daily activities. There were also presentations of neuroscience on a TV and a place for kids to play different activities, we also had a reading space focused on odor, vision, touch, smell and taste. Nevertheless, within the 3 days of the exhibition, more than a thousand people visited it. Therefore, the activity is now on the annual calendar of the mall and such event and activity has proved to be a great way to promote brain awareness towards the local community.


Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.18SU/VV73

Topic: H.03. Public Awareness of Neuroscience

Support: PCORI PPRN

bluebird bio

Title: ALD Connect, an all-inclusive consortium with the goal to eradicate X-linked adrenoleukodystrophy

Authors: G. RAYMOND1, I. TSVANG2, B. LENAIL3, K. VAN HAREN3, K. ZACKOWSKI6, A. PAKER7, *F. EICHLER8, L. JAMAL6, J. BONKOWSKY9, J. K. FINK10, A. SALZMAN11, P. AUBOURG12, K. FORTIN4, A. SHERMAN2, A. FATEMI6;

Abstract: Adrenoleukodystrophy (ALD) is an X-linked disorder that affects 1:17,000 individuals. Yet the most common phenotype, adrenomyeloneuropathy, currently has no treatment options available, and the most severe phenotype, cerebral ALD, can only be treated in the early stages of disease. We seek to address these needs and empower patients, caregivers and their affinity groups to move beyond conventional research participation, advocacy, and fundraising efforts to improve care for and ultimately eradicate this debilitating single-gene disorder. Eight patient advocacy groups partnered with 7 academic centers across the U.S. to form the consortium ALD Connect. Together with representatives from interested biotech companies the group convened a first formal meeting in June 2013. We identified the unmet needs and common challenges and formed several work groups to address them. The group has achieved several goals: (1) Adopted bylaws to establish infrastructure and governance; (2) Conducted an inventory of legacy data at Kennedy Krieger Institute and other centers for ALD; (3) designed common data elements and collected information from resources around the world through partnership of the ALD/AMN Global Alliance, the largest patient advocacy group for ALD, and the Neurological Clinical Research Institute at Massachusetts General Hospital; (4) Developed algorithms for prioritizing clinical trials; and (5) Created a website (www.aldconnect.org) for dissemination of ALD-related disease information as well as other materials such as educational videos to enhance the understanding and awareness of ALD.

Through direct participation in decisions on research and drug development, ALD Connect allows patients to influence research priorities and directions. The ALD Connect collaborative network introduces a novel all-inclusive model to improve care and drug discovery for well-defined single-gene disorders. Unique to the effort is the transformative collaboration between patients, academics and industry that may allow for more rapid trial development because of an engaged patient community.


Theme H Poster

027. Public Outreach II

Location: Halls A-C
**Time:** Sunday, November 16, 2014, 8:00 AM - 12:00 PM  

**Program#/Poster#:** 27.19SU/VV74  

**Topic:** H.03. Public Awareness of Neuroscience  

**Support:** 2013 SfN Chapter Grant  
- FSU Program in Neuroscience  
- FSU Congress of Graduate Students  
- FSU Student Government Association  
- Tallahassee Memorial Healthcare Foundation  

**Title:** Expand your mind! educational outreach by florida state university neuroscience  

**Authors:** *A. M. STATHOPOULOS¹, S. B. OGDEN², M. J. BASISTA², M. T. ROSS², M. TABBAA², K. S. KOSHUNOV², S. TERRILL², C. L. ROBISON²; ¹Neurosci. - Biol., ²Florida State Univ., Tallahassee, FL  

**Abstract:** The FSU Neuroscience outreach program has become a staple for the Leon County school district and many schools have already incorporated the outreach programs into their curriculums. During the 2013-14 academic year, Neuroscience graduate students visited high school classrooms, developed a Neuroscience lecture series for senior citizens, and hosted the 8th annual North Florida Brain Bee and the 3rd annual Brain Fair. In the fall, we visited 21 classes at 5 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 8th annual North Florida Brain Bee, held in early 2014, attracted 61 participants from 4 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 senior, placed 22nd out of 54 participants. In addition to the high school classroom visits, the Neuroscience graduate students, under the guidance of two faculty, developed the second iteration of our 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 47 registered participants. Importantly, this course allowed the Neuroscience graduate students to reach seniors, a population typically not well represented in outreach efforts. In the spring, we held our annual Brain Fair, an open house event to educate K-12 children and their parents on basic neuroscience. We had 21 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 255 people from Leon county as well as neighboring counties in north Florida and south Georgia. Lastly, we had a significant increase in undergraduate involvement with the formation of the Neuroscience Undergraduate Student Association (NUSA), which further helped develop our outreach with dedicated undergraduates interested in neuroscience and future careers in the field.


Theme H Poster

027. Public Outreach II

Location: Halls A-C

Time: Sunday, November 16, 2014, 8:00 AM - 12:00 PM

Program#/Poster#: 27.20SU/VV75

Topic: H.03. Public Awareness of Neuroscience

Support: PROAPARC/UNASP-SP

Title: Neuroscience contribution for perception of pain and discomfort in clinical trials

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Abstract: Relief of pain and discomfort are the most relevant symptoms of functional recovery in clinical trials. The effectiveness of a therapy depends on multiple factors, such as drugs’ efficacy, the way a medical procedure has been employed, variables related to patient-professional interaction and the therapeutic or medical equipment used to care for patients’ life. Moreover, a possible placebo response encounters the real effect of therapies even in non-pharmacological interventions. It’s is well established that pain and discomfort are differently modulated by neurochemistry and by specific areas of the central nervous system. For that reason, interpretation of patients’ symptoms is challenging in medical-clinical practices. Therefore, the behavioral mechanisms underlying pain and discomfort due to a disease have not been completely unfolded. The present study summarizes and brings the idea that neuroscience is a powerful source of knowledge capable to characterize neurological and behavioral interferences on pain and discomfort in clinical trials. A society of neuroscience creates helpful
tools and the scientific foundation to interpret pain or discomfort in humans. Novel equipment or forms of pain measurements have been developed in the last decade. Clinical and scientific questionnaires added to experiences and cases reported by clinicians and other medical professional should be in touch with neuroscientific issues. Neurological investigations for assessing and treating pain and other physical, psychological, social and spiritual issues are encouraged to address perceptions of pain and discomfort. The magnitude of these symptoms in clinical trials for individuals should be further elucidated by other forms of interdisciplinary interaction and progressive education, research and extension.


Theme H Poster

028. Ethical and Policy Issues

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 28.01SA/VV76

Topic: H.04. Ethical and Policy Issues in Neuroscience

Support: HHHS-N-316-2012-00028-W

National Library of Medicine

NIH

Title: Promoting awareness of and access to sex and gender differences research

Authors: M. E. EDWARDS\(^1\), H. NORTON\(^2\), N. SCHAEFER\(^1\), M. R. TENNANT\(^3\), *L. NOTTERPEK\(^4\);
\(^1\)Biomed. and Hlth. Information Services, Univ. of Florida, Gainesville, FL; \(^2\)Biomed. and Hlth. Information Services, Univ. of Florida, Gainesville, FL, FL; \(^3\)Biomed. and Hlth. Information Services; UF Genet. Inst., Univ. of Florida, Gainesville, FL; \(^4\)Neurosci., McKnight Brain Inst, Univ. Florida, GAINESVILLE, FL

Abstract: Objective Historically, medical and scientific thinking has been based largely on male anatomy, disease presentation, and response to therapy. This male-centered focus presents a variety of ethical challenges to medical and scientific research. To promote equitable research that is sensitive to and focuses on sex and gender differences, our library embarked on an outreach project to promote research in sex and gender differences in both the basic and clinical
sciences, including neurology and neuroscience. This project, funded by the National Library of Medicine and the NIH Office of Research in Women’s Health, has enabled the HSC Library (HSCL) to promote awareness of the need for research in sex and gender differences and women’s health and to create and expand research collaborations among clinical and research faculty. Methods To facilitate cross disciplinary collaboration, the library has hosted three of four planned “Collaborating with Strangers” (CoLab) workshops at which researchers shared information on projects and research on sex and gender differences in biomedicine and health with interdisciplinary colleagues. In Year Two (2014), we will expand this preliminary work to a full-day symposium with keynote speakers. To increase awareness of sex and gender differences in medicine and healthcare, we have presented basic concepts and resources to various audiences, from undergraduate classes in various areas including Genetics and Women’s Studies and graduate students and junior faculty in an Introduction to Clinical and Translational Research (ICTR) course. The ICTR course’s small group themes were women’s health in 2013 and sex and gender differences in pain in 2014. In 2014 we will partner with the College of Medicine departments of Neuroscience and Neurology. The workshops, symposium and instructional sessions will be evaluated using post session (and post semester) surveys. Year Two data will include surveys from the instructional sessions and workshop as well as surveys and selected interviews from the CoLabs. Results In Year One the HSCL hosted two CoLabs with a total of 37 attendees representing 20 campus departments and conducted 6 instructional sessions. Our first CoLab in Year Two involved 12 attendees. Qualitative feedback from CoLab evaluations of the three workshops indicate that the attendees shared their research and made valuable connections. Conclusions The library has leveraged existing and built new partnerships with faculty to introduce and heighten awareness of this area of research and practice and used workshops to bring together researchers from various non-medical, clinical, and biomedical research backgrounds.


Theme H Poster

028. Ethical and Policy Issues

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 28.02SA/VV77

Topic: H.04. Ethical and Policy Issues in Neuroscience

Support: Swedish medical research Council Grant Nr 2710
Title: Cardiac arrest and spinal cord damage

Abstract: Cardiac arrest (CA) is the leading cause of death and disability across the whole world. In the United States of America alone about 4 to 5 hundred thousands cases are occurring every year and the survivors are either die instantly or they live their lives with major neurological disorders, gait and other behavioral and cognitive dysfunctions. This indicates that CA induces not only damage to the heart but is primarily responsible for the neurological disorders as well. Unfortunately, our policy makers and healthcare providers are largely ignorant about the neurological damages in CA and thus the victims of CA suffer the most. In our laboratory using porcine and rat models of CA we have shown profound brain damage in several key areas e.g., thalamus, hippocampus, cerebral cortex, cerebellum and hypothalamus. The distinct changes are seen including neuronal death and damage in thalamus, hippocampus, cerebellum and the cortex that are much more higher and global than traumatic injuries to the central nervous system. Leakage of serum albumin and edema formation are the most prominent events in areas showing neuronal damage. This suggests that in cases of CA we must deliver neuroprotective drugs as well to reduce the consequences of brain injury. This aspect must be considered by our policy makers and healthcare providers in conditions of CA cases. However, to our knowledge damage to the spinal cord in CA is not at all known and discussed so far till date. Although CA patients often show problems of spinal cord damage e.g., severe alterations in the gait and other spinal dysfunction at various levels. However, spinal cord damage in CA even in experimental situation is not known. Recently, in our laboratory we found profound leakage of the blood-spinal cord barrier to albumin, edema formation and expression of major stress...
proteins e.g., ubiquitin, heat shock proteins and hemeoxygenase 1 in various parts of the spinal cord in the motor and sensory areas after CA in a rat model. This shows that spinal cord is also selectively vulnerable to CA. Thus, there is an urgent need to recognize CA induced spinal cord injury. New CA patients should be taken care for their spinal cord damage to avoid lifetime disability. In preliminary observations when we treated rats with antioxidant compound H-2901/51 or Cerebrolysin in high doses and then examined the spinal cord we found that the spinal cord damage is significantly reduced after CA. These rats also perform better on their locomotor functions on a treadmill. These examples clearly suggest that spinal cord is highly vulnerable in CA and this should be included in new lexicons of CA manual in order to provide better healthcare to patents of CA in future.


Theme H Poster

028. Ethical and Policy Issues

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 28.03SA/VV78

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Leveling the playing field: Using an integrative translational neurodevelopmental model to optimize substance abuse intervention and reduce disparities

Authors: *E. J. ROSE, D. FISHBEIN;
Psychiatry, Univ. of Maryland Sch. of Med., Baltimore, MD

Abstract: High risk behaviors in adolescence, such as substance abuse (SA), are accompanied by substantial personal, social and economic costs. For example, the economic burden arising from adolescent problem behaviors the US has been estimated to be as high as $340 billion yearly. Moreover, teenagers with SA problems are at substantially increased risk for antisocial and risky sexual behaviors and are more likely to suffer mental health problems, such as depression. For each youth to overcome the conditions that drive high risk behaviors (e.g. genetic risk factors, adverse environments) and live a healthy, happy and productive life, it is imperative that we effectively tailor intervention strategies (e.g. what works for whom, why and under what circumstances?) and the policies that support them. Critical to this endeavor are: (1) the determination of factors (e.g. neural and environmental) that underlie suboptimal developmental trajectories and how they interact; (2) defining developmental pathways
predictive of high risk outcomes; and (3) ascertaining underlying risk mechanisms that are malleable and responsive to intervention. Advances in neuroscience related to brain development offer an unprecedented opportunity to address these questions and have significant translational potential. It is our contention that neurodevelopmental pathways that are directly or indirectly impacted by factors related to SA liability may provide critical guidance for optimizing prevention efforts. In a model of accumulative risk for adolescent SA disorders, here we consider the integrative effect of genetic and environmental risk factors. In this framework genetic risk is modeled as “switches” that are “on” or “off” (i.e. risk present or absent) and are largely predetermined, while environmental contexts (e.g. risk or resiliency factors) are considered to be “dials” that are either turned “up” or “down” depending on experience. While no one factor is necessary or sufficient to give rise to SA, it is postulated that as the number of genetic switches that are “on” and the number of environmental risk dials turned “up” increases so does the chance of crossing a “liability threshold,” i.e. having brain networks “primed” for SA. In contrast, turning up dials related to resilience factors (e.g. positive contexts) may have a protective effect and reduce predetermined liability. This neurodevelopmental model serves as a framework for elucidating the multitude of liability pathways with the overarching goal of developing targeted interventions strategies, which redress the balance for children at high risk of SA, and driving policy change to promote such evidence-based approaches.

**Disclosures:** E.J. Rose: None. D. Fishbein: None.

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**Theme H Poster**

**028. Ethical and Policy Issues**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 28.04SA/VV79

**Topic:** H.04. Ethical and Policy Issues in Neuroscience

**Support:** Obra Social la Caixa

Institute for Culture and Society, Universidad de Navarra

**Title:** The liberating dimension of habit: Breaking free from the stimulus-response model

**Authors:** *F. J. GUELL, SR*¹, L. NÚÑEZ²;

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Abstract: The notion of habit has acquired an important role within studies of drug addiction and dependence. Classical models of addiction conceive of learned compulsive behaviors in terms of a unidirectional stimulus-response model, for which habits are behavior patterns based on studies of animals and are considered to be purely automated (Tyffani 1990, Miles et al., 2003). For this approach, learning converts behavior into an automatism, or what some have termed an addictive habit (Hogarth et al., 2013). Some of these models have been expanded to incorporate motivational aspects of addiction. Such models regard reinforcement (positive or negative) as the initial and central drive for drug abuse and are situated in a context of a larger, goal-directed, decision-making framework. However, while these approaches offer important clues for understanding addiction, they do not appear to account for important aspects of long-term chronic dependencies such as cravings. Accordingly, it has been proposed to expand the habit formation model by distinguishing between motor habits and motivational habits (Sjoerds et al., 2014). In the case of motor habits, behavior is based on a stimulus-response model, while motivational habits refer to compulsive behavior that is controlled by an emotional/motivational state and seems to be at least partially goal-directed. This distinction is a marked improvement over a strictly motor-habit notion of addiction, but we believe that it still falls short of the full context in which the notion of habit acquires its full significance. Our suggestion is that only by taking into account the fuller, the liberating dimension of habit that is revealed in the therapeutic context can we break free from the stimulus-response model. REFERENCES. Tiffany, S. T. (1990). A cognitive model of drug urges and drug-use behavior: Role of automatic and nonautomatic processes. Psychological Review 97, 147-168. Miles, F.J. et al. (2003). Oral cocaine seeking by rats: Action or habit? Behavioral Neuroscience, 117 (5), 927-938. doi: 10.1037/0735-7044.117.5.927 Robinson, T. E. and Berridge, K. C. (2003). Addiction. Annual Review of Psychology 54, 25-53 Sjoerds, Z. et al. (2013). Behavioral and neuroimaging evidence for overreliance on habit learning in alcohol-dependent patients. Translational Psychiatry 3, e337. doi:10.1038/tp.2013.107 Hogarth, L. et al. (2013a). Associative learning mechanisms underpinning the transition from recreational drug use to addiction. Annals of the New York Academy of Sciences 1282, 12-24.

Disclosures: F.J. Guell: None. L. Núñez: None.

Theme H Poster

028. Ethical and Policy Issues

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 28.05SA/VV80
**Topic:** H.04. Ethical and Policy Issues in Neuroscience

**Support:** Society for Study on Neuroprotection and Neuroplasticity (SSNN) Cluj-Napoca, Romania

Astra Zeneca Mölndal, Sweden

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The Indian Medical Research Council, New Delhi, Govt of India

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Swedish Strategic Research Foundation

**Title:** Oxidative stress and co-morbidity factors are the key for brain pathology. Antioxidants are helpful in neurodegeneration

**Authors:** *D. F. MURESANU*¹, A. SHARMA², J. V. LA FUENTE³, R. J. CASTELLANI⁴, P.-O. SJÖQUIST⁵, H. MOESSLER⁶, Z. TIAN⁷, H. S. SHARMA²;

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**Abstract:** Recently oxidative stress is recognized as one of the major players in neurodegenerative diseases e.g., Alzheimer’s, Parkinson’s, Huntington’s Diseases, stroke, trauma to the brain and spinal cord and multiple sclerosis. However, for the treatment of these diseases use of antioxidants are not so well demonstrated in the basic or clinical literature so far. Thus, there is an urgent need to work on development of antioxidant therapies for better success in treating neurological and neurodegenerative diseases in the future. Several oxidative parameters such as Luminol, leucigenin, superoxide dismutase, malondialdehyde are known to increase in neurodegenerative diseases whereas, glutathione decreases in such conditions. Thus, drugs acting to enhance endogenous antioxidants and to reduce oxidants could be a good neuroprotective strategy. However, in clinical situations, further complication due to occurrence of various other co-morbidity factors such as hypertension, diabetes, exposure to nanoparticles from the environment affects the final outcome. In our hands animals with these co-morbidity factors when subjected to stroke, trauma or brain tumors, there pathophysiological outcomes are worsening and the drugs known to reduce these pathologies failed to reduce brain pathology. These co-morbidity factors may also exacerbate production of oxidants and reduction in
endogenous antioxidants. Thus, there is an urgent need to find out novel antioxidants compounds to tackle these co-morbidity factors following stroke or trauma. Our observations showed that Cerebrolsyrin that is a balanced composition of various neurotrophic factors and active peptide fragments is able to thwart oxidative stress with co-morbidity factors following stroke and trauma. Interestingly, another powerful antioxidant compound H-290/51 is also doing similar actions in animals with higher doses in the presence of co-morbidity factors. When we combined H-290/51 with Cerebrolsyrin the oxidative stress parameters were considerably reduced in animal models of trauma and stroke in combination with hypertension and diabetes. These observations suggest that a good combination of antioxidants e.g., H-290/51 and cerebrolysin may be used for future treatment of neurodegenerative diseases including Alzheimer’s and Parkinson’s for better treatment. Thus, new guidelines for the treatment and policy issues may be considered by the lawmakers and healthcare providers in future regarding antioxidants therapy for the better treatment of mankind in future.


Theme H Poster

028. Ethical and Policy Issues

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 28.06SA/VV81

Topic: H.04. Ethical and Policy Issues in Neuroscience

Authors: *G. Y. RYU*¹, A. LAM², E. OHAYON²; ¹The Green Neurosci. Lab., San Diego, CA; ²The Green Neurosci. Laboratory; Neurolinx Resea, San Diego, CA

Abstract: The development of a nosological system has been a central driving force in the history of psychopathology. Most therapeutic approaches in Western medicine, as well as neuroscience research approaches, continue to be fundamentally based on the aims of identifying pathology, its categorization and modeling. However, the theoretical foundations and resulting practices of these taxonomic approaches have been fraught with deep conceptual, methodological, and ethical problems. On the empirical front, multiple studies have described the limitations and instability of these categorical boundaries. On the theoretical front, issues of demarcation, complexity and ontology have long been identified and debated. From an ethical
Perspective multiple sources of bias have been reported including: ethno-cultural, gender, financial interests as well as broader pressures aimed at maintaining social and political status quo. Together these factors have often resulted in medicalization, stigmatization and the tragic loss of autonomy to diagnosed individuals. The continued attempt to unify all psychopathological classifications has only served to amplify the pitfalls and dangers despite its evolving complexity. In response to many of these issues, recent trends have turned to molecular-biology and neuro-genetics. The hope is that bio-markers may circumvent the ambiguity of the categorical classification system and offer more definitive boundaries. However, the turn to these reductionist classifications, in many ways, is merely repeating the nosological conundrum in a different form. Moreover, these new approaches may exacerbate the situation by entrenching already fatalistic tendencies while further distancing the subject from the social and environmental context. In this presentation we review some of the history of the failings in nosology-based approaches including recent developments. We suggest that it is critical to understand and reassess nosology with these historical references in order to dissect social issues regarding the label of being mentally ill and the stigmatization that follows. In response to this historical context we also identify new approaches to care and mental health that may avoid the hazards of classification systems altogether by focusing instead on principles inspired by traditional, non-Western, health practices and contemporary approaches to physical accessibility.

**Disclosures:** G.Y. Ryu: None. A. Lam: None. E. Ohayon: None.

**Theme H Poster**

**028. Ethical and Policy Issues**

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 28.07SA/VV82

**Topic:** H.04. Ethical and Policy Issues in Neuroscience

**Support:** T32NS041231

T32NS041218

T32HD046388

**Title:** A longitudinal study of practices and perspectives on authorship in a neuroscience graduate program
Abstract: Authorship criteria represent a long-standing challenge and cause of conflict within and between research groups. Despite considerable guidance regarding “best practices” in determining authorship on scientific publications, practices across laboratories differ widely from established criteria. After graduate students learn about the policies and best practices in a course on Responsible Conduct in Research (RCR), they quickly discover that actual practices depart from what they have learned. In our neuroscience Ph.D. program at Georgetown, we have attempted to confront this issue by having students interview faculty about their actual practices in assigning authorship. In the context of our RCR course, a case-based discussion of authorship occurs in the classroom, where students are provided with formal criteria (e.g. from J. Neuroscience). Through the discussion, it becomes evident that policies are subject to interpretation, leading to different conclusions as to who deserves authorship. Students then interview faculty, using the same authorship case, to find out who each faculty member would include as an author. Faculty are also asked about their familiarity with formal criteria from journals; interview results are shared on the course website. Over 8 years, 87 interviews were conducted with 56 different faculty. The interviews revealed a diversity of faculty practices when it comes to assigning authorship. By examining the results over the past eight years, it may be possible to detect shifts in attitude. For a subset of faculty who were interviewed repeatedly, we assessed the stability of responses. Moreover, we investigated the degree to which authorship practices differed as a function of seniority or research area. As a follow up, survey-based assessment of student and faculty practices and attitudes regarding authorship provides a snapshot of the current state of authorship practices. Because journals have increasingly made authorship criteria explicit, most faculty are aware of these criteria. However, insofar as the criteria conflict with past experience, past practices may override strict adherence to the formal criteria. This was reflected in faculty comments suggesting that most investigators do not strictly follow formal guidelines. While the primary goal of the RCR course is to train students, it is just as important to ensure that faculty reinforce the “best practices” that the students learn in the course. Including faculty as panelists and encouraging the students to discuss issues such as authorship with faculty outside of class, aid in opening effective lines of communication between students and faculty.
Theme H Poster

028. Ethical and Policy Issues

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 28.08SA/VV83

Topic: H.04. Ethical and Policy Issues in Neuroscience

Support: India-EU Research grant for Neuroscience

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Society for Study on Neuroprotection & Neuroplasticity (SSNN) Cluj-Napoca, Romania

SAIOTEK, and IT/491/10 (Basque Government.

Title: Histaminergic drugs are not well considered for the treatment of Central Nervous System dysfunction. New approach and policy required

Authors: *R. PATNAIK*¹, A. SHARMA², D. F. MURESANU⁴, J. V. LAFUENTE⁵, H. S. SHARMA³;

Abstract: Ever since histamine was first discovered by Sir Henry Hallett Dale in 1910 its role in regulating the central nervous system (CNS) gained attention in the health and medicine. Histaminergic neurotransmission and nerve fibers are well distributed in various areas of the CNS that could regulate the vascular tone, interact with different neurotransmitters and modulate cell-to-cell communication by affecting cellular and molecular processes effectively. However, in spite of this knowledge the role of histamine in the CNS dysfunction is not well characterized. As a result even we know today about more than 4 classical histamine receptors and subtypes, the amine has not got the real attention that it deserves for the development of neurotherapeutics for the benefit of patients of CNS injury or neurodegenerative diseases. In early 1990s we have shown the role of histamine H2 receptors in traumatic brain injury followed by its involvement in spinal cord injury. The pathophysiology of CNS injury could be lessened by treatment with histamine H2 receptor antagonists either alone or in combination with 5-HT1 rectors drugs e.g., cyproheptadine. Even histamine receptor modulation that could lead to exacerbation of brain pathology following trauma or stress speaks about the involvement of the amines in the CNS
pathology. Apart from a transmitter role of histamine the amine is also known to modulate the action of other neurotransmitters e.g., serotonin and catecholamines. Thus, with the discovery of novel histamine receptors, new roles for the treatment of CNS injuries based on Histaminergic drugs require further attentions. We believe that not only histamine receptors are needed for the maintenance of human health they could play important roles in neurodegenerative diseases e.g., Alzheimer's disease, Parkinson's Disease. This could be not only through the compounds ability to modulate receptors for histamine but also a cross talk with other neurodestructive elements. For example we have found that Histaminergic H2 receptor blockade attenuate nitric oxide synthase upregulation, a free radical and toxic gas. This suggest that histamine mechanism are involved in a wide range of CNS components during normal and in pathological conditions that require urgent attention by neuropharmacotherapeutics for further development of suitable drugs to contain neurodegeneration. It is also likely that Histaminergic drugs in combination with other neuroactive drugs could enhance the beneficial effects of the compounds in clinical cases. This idea requires further development for suitable future clinical therapy for the benefit of the mankind.

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**Theme H Poster**

028. Ethical and Policy Issues

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 28.09SA/VV84

**Topic:** H.04. Ethical and Policy Issues in Neuroscience

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

**Title:** It’s pleasant and heavy: Convergence of visual contents in tobacco, alcohol, and food marketing

**Authors:** *K. R. VIACAVA*¹, G. Weydmann², M. Vasconcelos¹, J. Jaboinski¹, R. De Almeida¹, L. Bizarro¹;

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**Abstract:** IT’S PLEASANT AND HEAVY: CONVERGENCE OF VISUAL CONTENTS IN TOBACCO, ALCOHOL, AND FOOD MARKETING

Abstract: The use of visual
perceptual content in marketing may affect the processing and selection of information related to products and even encourage impulsive consumption. It is important to investigate the tactical use of such content in order to safeguard the population from the risk of exposure to advertising. In this study, the application of visual perceptual content was compared in advertisements used by industries of tobacco, alcohol and food. The aim was to ascertain whether similarities exist in the strategies used as variables for the selection of stimuli related to products, such as color, position and size. A non-probability sample of advertising images (n = 150, 50 from each industrial segment) was selected on the Internet during the period between March and April 2012. Scion Image software and Corel Draw Graphics Suite were used to analyze the content of the images. Differences were identified in the use of the colors green (p = 0.040) and red (p = 0.018), but not the use of the color blue (p = 0.641). A post hoc Tukey test confirmed differences related to the colors green and red between the tobacco and food industries, but indicated no significant difference between the alcohol and tobacco industries, suggesting that induction of feelings of pleasantness resulting from the use of the color blue may be associated with the advertising in these industries. Regarding the position of the product, a predominance of the use of quadrants “C” (p = 0.008) and “D” (p = 0.011) was found in all three industries, indicating a similar strategic use of the “position effect”, favoring areas perceived as being “heavier”. As to the size of the target stimulus (i.e., product and brand), 78% of advertisements (tobacco 82%, alcohol 88% and food 64%) placed the stimuli within a range of 0% to 25% of the total image. The results showed some similarities in the use of visual perceptual content in advertisements for tobacco, alcohol and food, especially between tobacco and alcohol. **Keywords:** advertising, visual stimuli, tobacco, alcohol, food


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**Theme H Poster**

028. Ethical and Policy Issues

**Location:** Halls A-C

**Time:** Saturday, November 15, 2014, 1:00 PM - 5:00 PM

**Program#/Poster#:** 28.10SA/VV85

**Topic:** H.04. Ethical and Policy Issues in Neuroscience

**Title:** Choosing animal models for biomedical neuroscience

**Authors:** *A. LARSON*¹, J. ROBERT²;

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Abstract: The use of non-human model organisms in biomedical neuroscience research works on the premise that research on the organism is applicable to the human nervous system. Neuroscientists who intend their work to apply to the human nervous system should deliberately choose models that are similar to humans in some useful way in order to maximize the positive benefits of neuroscience research to humans, and should be able to explain the relevant similarities and differences between the nervous system of their model and that of a human. A 2008 study hypothesized that researchers in translational neuroscience are generally not able to fully answer conceptual, epistemological and methodological questions about their choice of research models. We tested this hypothesis by engaging neuroscience researchers in open-ended in-person interviews. The interviews were composed of a series of open-ended questions designed to ask them to justify their choice of model and identify both the factors that affect their choice. Initial results show that, in principle, researchers emphasize fitness with the research question, biomedical relevance, and refinement when choosing a research model. In practice, they are affected most by cost, precedence, and perception of how the broader research community will accept the research. Both the initial factors in choosing a model and the ultimate benefits and limitations were different in researchers working in established model organisms in that field than for researchers working in unusual or novel models. These results contextualize current trends in neuroscience research models and provide guidelines for policy supporting both basic and translational neuroscience research.

Disclosures: A. Larson: None. J. Robert: None.

Theme H Poster

028. Ethical and Policy Issues

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 28.11SA/VV86

Topic: H.04. Ethical and Policy Issues in Neuroscience

Support: Society for Neuroscience Early Career Policy Fellowship

Title: Science advocacy in the heartland

Authors: *N. I. CILZ, E. MURPHY; Pharmacology, Physiology, & Therapeut., Univ. of North Dakota, Grand Forks, ND

Abstract: As an Early Career Policy Fellow with the Society for Neuroscience, it is my obligation to provide a summary of my advocacy activities over the course of 2014. At the time
of this abstract being written, some of my events are still in a planning phase but certain activities will be fulfilled by the time of the annual meeting. Attending the 2014 SfN Hill Day provided excellent knowledge and practical training in advocating for public funding of NSF and NIH programs. This experience prompted me to organize a public seminar in order to provide both educational and advocacy training. Topics covered include an overview of the federal budgetary process, a history of public funding for science, how to effectively advocate for a cause, and how to engage in science advocacy. In addition to this seminar, I have made contacts with the local offices of our North Dakota delegation in order to coordinate a visit by representatives from each office to attend a neuroscience research showcase in August, where researchers in our medical school will have the opportunity to briefly present their work. Currently, I am assisting with a grass-roots effort in building support for the establishment of a state-level permanent research fund that will enable an additional funding mechanism for researchers across the North Dakota University System. The idea is that with the recent economic expansion and accumulation of substantial surplus funds, our state is faced with a perfect opportunity to re-invest money into other sectors that can ensure long-term economic prosperity within the state. Our plan is to elicit support for the establishment of a $600M fund from which interest generated (~$24-30M per year) will provide resources to fund internal research proposals. Through realization of this proposal, we expect that North Dakota can enhance and expand the level of research occurring in the state and encourage growth in private sector jobs as well.

Disclosures:  N.I. Cilz: None. E. Murphy: None.

Theme H Poster

028. Ethical and Policy Issues

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program#/Poster#: 28.12SA/VV87

Topic: H.04. Ethical and Policy Issues in Neuroscience

Title: Biomarkers for sex and gender: A medical jurisprudence approach

Authors: *S. KIMMICH;
UNIVERSITY OF CALIFORNIA, SAN DIEGO, La Jolla, CA

Abstract: Identifying potential biomarkers of gender identity in the brain has undeniable scientific and social implications, as gender is often considered to be a central component of the self. Neuroscientific research has yet to articulate the neural correlates of mental sex, though
significant progress has been made in recent years. This research takes a medical jurisprudence approach to the cutting edge of sex and gender identity research in an effort to identify how neuroscientific progress will impact the legal precedent of transgender cases in the coming decade.

Disclosures: S. Kimmich: None.

Theme H Poster

028. Ethical and Policy Issues

Location: Halls A-C

Time: Saturday, November 15, 2014, 1:00 PM - 5:00 PM

Program/#Poster#: 28.13SA/VV88

Topic: H.03. Public Awareness of Neuroscience

Title: Innovative knowledge exchange for neuroscience and neuroethics: Using graphic recordings to build engagement at conferences

Authors: *J. M. ROBILLARD*¹, P. B. REINER², J. ILLES²;
¹Univ. British Columb, Vancouver, BC, Canada; ²Univ. of British Columbia, Vancouver, BC, Canada

Abstract: Scientific research communities increasingly welcome diverse stakeholders to engage in the process of discovery and translation from bench to bedside. Expanding the conversation beyond the traditional channels of academic communications is a challenging undertaking and requires concerted efforts to ensure that all voices are integrated ethically and responsibly. Brain Matters! Vancouver, an international conference on neuroscience and social responsibility hosted by the National Core for Neuroethics at the University of British Columbia, was designed to respond to these challenges, and to expand on the concept of an academic conference with innovative features aimed at facilitating knowledge exchange. Among these features was the work of two graphic recording artists who produced, in real time, wall-sized drawings for each of 13 plenary sessions. The graphic recordings captured the full one-hour sessions comprising a 20-minute lecture, a 10-minute expert response, as well as the extended 30-minute interaction between conference participants and speakers. The rapidly produced, hand-drawn images provided a visual mapping of the key concepts and their thematic connections, and were designed to solidify the understanding of complex topics by experts and non-experts alike, as well as appeal to both visual and kinesthetic learning styles. Further, once displayed around the conference venue, these graphic recordings catalyzed in-depth discussions of neuroscience and social responsibility well beyond the formal Q&A period of each session. In the open comments
section of the conference evaluation survey, nearly one in five respondents (18%) commented positively about this form of scientific engagement. To create a lasting knowledge exchange resource, the graphic recordings were animated into short videos with audio excerpts from the presentations, and will be made available on websites of the event host and sponsors. These freely accessible videos will allow educational delivery to a large, geographically dispersed audiences and further the goals of raising awareness about social responsibility in neuroscience discovery. Although the present study explores the use of graphic recordings in the context of furthering neuroethical discourse, the strategies employed are readily generalizable to other disciplines.