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Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.01SA/VV14

Topic: J.01. History of Neuroscience

Title: Neuroplasticity: Past, present and future

Authors: *J. E. KOCH;
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Abstract: The concept and process of neuroplasticity and neuroplastic adaptations to differing environmental and sensory stimuli is accepted today as a fundamental capacity of the brain, however, the idea that the brain is a malleable integrated system is historically relatively recent. The focus of numerous 19th century scientists, including Gall, Flourens, Broca, and Sherrington resulted in a widespread belief among neuroscientists in both localization of function and the "fixed nature" of functional neuroanatomy. Further work by 20th century neuroscientists, such as Penfield's brain mapping, solidified support for this approach. Challenges to this interpretation of the static nature of the brain started to appear around the middle of the 20th century, eventually resulting in a paradigm shift to the perspective that the brain is continually responsive and changing over the lifespan. This presentation covers the history of neuroscience's change in perspective from "static to plastic" brains, describing pioneers and their research which resulted in the current level of knowledge and acceptance about neuroplasticity. The potential for therapeutic application of this knowledge is also explored, including recovery from stroke-related deficits, rewiring of sensory systems, and the unresolved question of the effectiveness of brain-training exercises linked to impacting the decline of specific cognitive capabilities in both clinical (i.e. Alzheimer's and other dementia patients) and non-clinical (ageing) populations.

Disclosures: J.E. Koch: None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.02SA/VV15

Topic: J.01. History of Neuroscience

Title: Circling back to Willis: Stress related neurovascular contributions to PTSD, Alzheimer's, depression, and Lou Gehrig's disease?

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

Abstract: In 1664, Thomas Willis confirmed even earlier observations of a substantial innervation of cerebral blood vessels. Since then, it has been determined that this innervation includes autonomic components as well as adrenergic projections from the locus coeruleus, both of which, in man, extend to the smallest arterioles and contribute to vascular tone. This author (Curtis, 2016) has proposed that this innervation, found preferentially in frontal areas, contributes to stress induced constriction of prefrontal (PFC) arterioles which results in reduced blood flow and, with this, inadequate support for the surrounding neural tissue. In conditions of acute stress it was proposed that this vascular constriction combines with ascending noradrenergic LC inhibition to limit PFC activity and function. With chronic stress, it was proposed that this same combination of inadequate blood flow and NE inhibition: 1) leads to the reductions in PFC dendritic spines and synapses observed in PTSD, and 2) accounts for Amy Arnsten's finding that Alpha-1 blockers reduce PTSD symptoms, i.e., prazosin reduces NE inhibition of PFC and also dilates PFC vasculature. It is now proposed that stress induced neurovascular constriction may similarly contribute to the reduced immune function in the brain hypothesized by Michal Schwartz and her colleagues as primary to the development of Alzheimer's, depression, Lou Gehrig's Disease, and a variety of cognitive impairments. These researchers have made a strong case for immune cells entering the brain through the choroid plexus (CP) to perform necessary tissue maintenance functions and that neurodegenerative diseases result from a failure of compromised CP to allow adequate numbers of immune cells to enter the brain. It has also been well established, however, that the CP is fully innervated by autonomic nerves which, in conditions of stress, constrict the CP vascular net and reduce its production of cerebrospinal fluid (Lindvall et.al., 1978) . It is proposed here that this stress-induced constriction of CP vasculature may also limit immune cell entry into the brain. Tests of these hypotheses and alternative treatment and prevention strategies are proposed.

Disclosures: S. Curtis: None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.03SA/VV16

Topic: J.01. History of Neuroscience

Title: Novel perceptual effects and stimuli from classic art and music

Authors: *E. L. ALTSCHULER[1], D. L. ALTSCHULER[2];
[1]Physical Med. and Rehabil., Metropolitan Hosp., New York, NY; [2]Brooklyn Friends Sch., Brooklyn, NY

Abstract: Neuroscience has benefitted greatly from advanced technologies such as high resolution fMRI, two-photon microscopy and genetic engineering techniques. However, given the complex, multivariable nature of neuroscience it remains useful to study historic sources including art to find new and useful perceptual effects and stimuli as we illustrate withe two examples: (1) Observation of the reflection of an arm (or leg) in a parasagittally placed plane mirror can help incite movement in the contralateral limb and be most helpful in treatment of phantom limb pain, hemiparesis following stroke and other neurologic and orthopaedic conditions (Ramachandran et al. 1995; Ramachandran & Altschuler 2009). A wonderful 1529 portrait of a man in armor by G. Solvado features the reflection of the sitter in a mirror to his left—an "anti-parasagittal" configuration. Inspired by this we set up two standing mirrors just acute to perpendicular of each other and stood offset to the left of the front facing mirror such that when one ab/adducts the right arm, you can only see the reflection right arm and not the rest of the body. The right arm then feels disembodied due to a discrepancy of vision and proprioception (Altschuler & Ramachandran 2007). Observation of the reflection of the right arm from the anti-parasagittally placed (right) mirror in the frontal mirror immediately produces the perception of the observation of one's doppelgänger! Fascinatingly, the perception of the doppelgänger is different from that of the disembodied arm. (2) Quinn and Watt (2006) in an important but not yet fully appreciated paper showed that simply using the judgment "too fast" or "not too fast" subjects can come to a consensus on the best tempo for a piece, however, they were not able to figure out what components of a musical piece drive the perception of a tempo being too fast or not. We suggest that the thematic rhythm of a piece is the key factor in this determination and we note that pieces by JS Bach provide an opportunity for testing: Bach marked the final movements of his sonatas for violin (BWV 1001, 1003 and 1005) Presto (as fast as possible), Allegro (fast) and Allegro Assai (very fast). By testing subjects with recordings of each of these pieces at the three tempos Bach's designations can be confirmed with it the role of thematic rhythm in tempo perception. Sections from the c minor and e minor preludes from Book One of Bach's Well-Tempered Clavier, that have marked tempos by JSB, played at different speeds can also be used as stimuli.

Disclosures: E.L. Altschuler: None. **D.L. Altschuler:** None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.04SA/VV17

Topic: J.01. History of Neuroscience

Title: A historical perspective of stem cell clinical trials in spinal cord injury

Authors: *B. T. DAVID, R. G. FESSLER;
Neurolog. Surgery, Rush Univ. Med. Ctr., Chicago, IL

Abstract: Spinal cord injury (SCI) is one of the most devastating types of neurological disorders, resulting in a loss of nervous tissue that affects motor, sensory, and autonomic function. Multiple treatments have been utilized in preclinical experiments, yielding a large range of results. Of these, cellular transplantation has gained widespread attention as one of the most potentially useful tools, due to the ability of cells to elicit axonal regeneration, supply trophic support, and replace neural cells outright. Stem cells, in particular, have been deemed particularly promising because of evidence of their ability to integrate, differentiate, remyelinate, and improve motor function, in preclinical experiments. However, despite the numerous preclinical studies recently published on stem cell interventions in SCI, few have led to clinical trials domestically. This, in turn, has led to the unfortunate rise of stem cell tourism. This study reviews the stem cell clinical trials that have been performed for spinal cord injury, and the preclinical experiments that preceded them.

Disclosures: B.T. David: None. **R.G. Fessler:** None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.05SA/VV18

Topic: J.01. History of Neuroscience

Title: Receptor visualization and the atomic bomb. A historical account of the development of the chemical neuroanatomy of receptors for neurotransmitters and drugs during the Cold War

Authors: *J. M. PALACIOS[1], G. MENGOD[2];
[1]FRONTERA BIOTECHNOLOGY, Barcelona, Spain; [2]IIBB-CSIC, IDIBAPS, CIBERNED, Barcelona, Spain

Abstract: This is a historical account of how receptors for neurotransmitters and drugs got to be seen at the regional, cellular, and subcellular levels in brain. The historical and social context that made it possible has also been analyzed.
The period covered, the Cold War, 1945-1990, from the end of the 2nd World War to the fall of the former Soviet Union, is marked by the role of scientific research during the war, with projects such as the Manhattan Project and others. The implication of government and industry in funding and management of research radically changed.
During the 50’s and 60’s several scientific advances relevant to this work happened. 1) The

concept of receptor was finally accepted. 2) The existence of neurotransmitters in the brain was established. 3) A number of drugs were introduced for the treatment of CNS diseases, changing it. New tools derived from the war research efforts were made available. Radiolabeled compounds, scintillation counters, fluorescent technologies and many others were commercialized.
In the 70's, in the context of Nixon's "War on Drugs" the opiate receptor was characterized by S. Snyder and others, using radioligand binding (1973). M. Kuhar used autoradiographic techniques to visualize for the first time opiate receptors after in vivo labeling (1975). This was fundamental for the visualization of receptors in human brain with PET in 1983; however its limitations led to develop a method for in vitro labeling (1979). Further advances in 1981 allowed for the use of computer assisted image analysis systems simplifying quantification and allowing the study of human postmortem samples, generation of detailed receptors maps, pharmacological study of binding sites at the microscopic level and many others.
In the 80's a revolutionary change was generated by the development of recombinant DNA technology. The first ligand-gated ion channel receptor cloned was the nicotinic acetylcholine receptor in 1982. The first G-protein-coupled receptor cloned was the beta2-adrenergic receptor by Lefkowitz and cols in 1986. This led to the development of new tools for the visualization of receptors such as in situ hybridization histochemistry, to visualize cells expressing mRNA coding for a given receptor. The cloning also made possible the in vitro expression of recombinant receptor protein or fragments of it, used to raise antibodies against the receptor thus allowing their localization at the light and electron microscopic level by immunohistochemistry.
By the end of the Cold War the chemical neuroanatomy of receptors experienced a dramatic progress reflecting the remarkable social, political, economic and cultural changes of this period.

Disclosures: J.M. Palacios: None. **G. Mengod:** None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.06SA/VV19

Topic: J.01. History of Neuroscience

Title: A tribute to James Parkinson

Authors: *A. PARENT;
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Abstract: Exactly 200 years ago, the London surgeon-apothecary James Parkinson (1755-1824) published his celebrated *Essay on the Shaking Palsy* (1817). The value of this work, however, was not fully recognized during the lifetime of his author, which spanned the American Revolution, the French Revolution and the Napoleonic Wars. Parkinson was already 31 years old

when Félix Vicq d'Azyr, personal physician to the Queen Marie-Antoinette, published his anatomical treatise containing the first description of the substantia nigra, which was associated with *Parkinson's disease* only late in the 20th century. He was 49 when Giovanni Aldini, Luigi Galvani's nephew and collaborator, visited London where he undertook troubling experiments on cadavers of hanged criminals to demonstrate the utility of electricity as a reanimation tool. Electrical treatment was the latest remedy at that time in London and Parkinson strongly recommended the use of *resuscitative process* in cases of drowning, suffocation, etc. in his popular writings. Parkinson does not allude to Aldini's experiments in his texts, but he must have been aware of them since they were fully reported in the *London Time*. We also ignore if he ever read Vicq d'Azyr's work, but we know that he was fluent in French and possessed a highly eclectic library. Parkinson was one of the most singular figures of his time and place. He was successively or concomitantly a virulent political activist, a popular medical writer, a scholarly medical contributor, a highly appreciated parish doctor, a prominent amateur chemist, a devoted madhouse doctor, and a renowned paleontologist. It is that branch of geology that brought Parkinson fame during his lifetime. He was an insatiable collector of fossils, minerals and shells, which came to form the core of the celebrated museum that he set out at his home, No 1, Hoxton Square, Shoreditch. These specimens are precisely described and beautifully illustrated in his *Organic Remains of a Former World* (1804-1811), a three-volume treatise that rapidly became a standard paleontology textbook. The title of this work, however, betrays the unfailing anti-evolutionist view of Parkinson, who considered fossils as remains of animals destroyed by the Deluge. Parkinson wrote many other valuable paleontological texts and was a founding member of the Geological Society of London. In recognition of his contribution to the nascent field of paleontology, his name was later given to many fossils, particularly ammonites (e.g. *Nautilus parkinsoni*). Hence, we owe much to *Mr. Parkinson, the paleontologist*, as he used to be referred to after his death, for such a vast and multifaceted contribution to natural science and medicine.

Disclosures: A. Parent: None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.07SA/VV20

Topic: J.01. History of Neuroscience

Support: NSF SciSIP 1646635

Title: The influence of mentorship networks on career trajectories in biomedical research

Authors: *S. V. DAVID[1], J. F. LIÉNARD[2];
[1]OHRC, Oregon Hlth. & Sci. Univ., Portland, OR; [2]OHRC, Oregon Hlth. and Sci. Univ., Portland, OR

Abstract: Most scientific researchers spend years training under just one or two graduate and/or postdoctoral mentors, suggesting that a small number of relationships can have large impact on their career. Neurotree (http://neurotree.org/) is an effort begun in 2005 to document training relationships in neuroscience and display them in an intuitive "family tree" format. This open, crowd-sourced database has expanded into the Academic Family Tree, which documents academic genealogies within and across academic fields. Here, we apply a data-driven approach to uncover how the network of mentors and protégés shape scientific contributions and academic success.

A descriptive analysis revealed that the training rate in neuroscience is higher than required for maintaining the field at its current size. Mentors often train multiple protégés and continue to do so up 40 years after their own training. This creates the a pile-up of postdocs, leading to longer training periods and a transition from an academic career for some trainees. Substantial clustering also appears in the choice of a protégé's co-mentors, where trainees often choose postdoctoral mentors closely linked to their graduate mentor in the training network.

We developed a statistical model to determine how the network providing mentorship to influences career trajectory. We focused on researchers who completed training with at least one graduate and postdoctoral mentor. The model used binomial linear regression to predict (a) the odds of continuing in academia and (b) the number of individuals subsequently trained by the protégés. Using a Shapley statistic, we identified factors that influence these outcomes, including the number of protégés trained by both the graduate and postdoctoral mentor and the time since the mentors' completed their own training. Postdoctoral mentors had a greater overall influence than graduate mentors. The trainee's graduation date was also critical, reflecting that the growing rarefaction of positions has a direct impact on research careers.

To understand how the scientific content of research influences academic careers, we conducted latent semantic analysis of mentor and protege publications. Two predictors increased the likelihood of continued academic careers: (1) diverse expertise of graduate and postdoctoral mentors, measured as low semantic similarity between their publications ; and (2) knowledge synthesis by the trainee, measured by high semantic similarity between the trainee and both mentors. These factors suggest that the key to success often lies in strong intellectual ties to mentors whose backgrounds are dissimilar enough to complement each other.

Disclosures: S.V. David: None. **J.F. Liénard:** None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.08SA/VV21

Topic: J.01. History of Neuroscience

Support: KAKENHI 16K070025

Title: Historical inconsistency in definitions of cerebellar hemispheric lobules (crus I and crus II of the ansiform lobule) of non-human primates

Authors: *I. SUGIHARA[1], Y. LUO[1], H. FUJITA[1,2];
[1]Tokyo Med. & Dent. Univ., Tokyo, Japan; [2]Dept. of Otolaryngology-Head and Neck Surgery, Johns Hopkins Univ. Sch. of Med., Baltimore, MD

Abstract: Cerebellar crus I and crus II (of the ansiform lobule), which are implicated in cognitive and visuomotor functions, are significantly expanded in human compared to other lobules in the anterior and posterior lobes, which are mainly involved in somatosensorimotor function. We recently performed a comparative study about lobular homology in crus I/II lobules of humans, non-human primates (macaque and marmoset) and rodents (rat and mouse), species of the Euarchontoglires clade (Luo et al., Brain Struct Funct, in press), by observing local lobular morphology in surface and sections, axonal projections, and molecular expression patterns. In the course of this study we noticed that definition of crus I and crus II (of the ansiform lobule) was not consistent in non-human primates among the literature. Crus I and crus II of the ansiform lobule are the names that originate from Bolk's monograph (1906). The nomenclature of crus I and crus II was adopted by Larsell in his detailed description of lobular structure observed mainly from the cerebellar surface in rhesus monkey (Larsell, 1953, 1970) and other mammals including rat, cat and human. He classified all folia in the most lateral hemisphere into crus I, similar to the nomenclature in rodents. In the atlas of the macaque cerebellum by Madigan and Carpenter (1971), the lobules (or combined folia) that are extended most laterally were defined as crus I, which is similar to Larsell's definition, in horizontal and sagittal sections. However, coronal sections by Madigan and Carpenter (1971) support a different definition of crus I and crus II; the lobule which extends most laterally was divided into two parts by the central fissure to be defined as crus I and crus IIa, respectively. In the atlas of the macaque brain by Paxinos et al. (2000), the combination of folia that are extended most laterally has also been divided into crus I and crus II. Paxinos's definition of crus I and crus II seems generally used in recent studies with non-human primates. Thus, there was historical inconsistency in definition of the cerebellar hemispheric lobules in the macaque. A similar inconsistency also occurred in the marmoset literature (Fujita et al., 2010; Paxinos et al., 2011).

Disclosures: I. Sugihara: None. **Y. Luo:** None. **H. Fujita:** None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.09SA/VV22

Topic: J.01. History of Neuroscience

Title: A brain museum tour of Europe

Authors: *R. E. BROWN[1,2];
[1]Psychology & Neurosci., Dept. of Psychology and Neurosci., Halifax, NS, Canada; [2]Dalhousie Univ., Halifax, NS, Canada

Abstract: Europe has a rich history of neuroscience, but where can the history of European neuroscience be found? The historical artifacts, documents and discoveries of European neuroscience exist in many museums, but these are often forgotten or neglected within Europe and relatively unknown outside of Europe. The purpose of this project is to present a tour of the brain museums of Europe on a WEBSITE, showing the museums with materials relevant to the history of neuroscience in each country. The history of neuroscience relies of objects from the past and this website describes the collections related to brain research in European museums. Using this website will enable students and researchers to locate historical objects in museums and plan visits to these museums for teaching and research. The presentation will consist of a poster presentation and a website which meeting participants can browse for information. The present Website contains information on 31 brain museums in 18 countries, with more being added as we find them. The website is a work in progress and we hope that users will provide us with information about brain museums which we have not yet discovered. If you are planning a trip to one of the European cities with a brain museum, this website will guide you to the location and the exhibitions on view. Enjoy your tour of Brain Museums in Europe! This project is sponsored by the FENS History of Neuroscience Committee. If you know of brain museums not presented on this poster, please contact Richard Brown at rebrown@dal.ca.

Disclosures: R.E. Brown: None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.10SA/VV23

Topic: J.01. History of Neuroscience

Support: Albion College Neuroscience Program

Title: Pavlov's 1923 visit to Vasilii Boldyrev at the Battle Creek Physiological Institute

Authors: *W. J. WILSON, G. A. INIGUEZ;
Psychological Sci., Albion Col., Albion, MI

Abstract: John Harvey Kellogg, chief medical officer of the Battle Creek (MI) Sanitarium, was a fan of Pavlov's work on digestion, and visited Pavlov's lab in 1907. He arranged for Pavlov to visit his sanitarium in 1923, where a former assistant of Pavlov, Vasilii Boldyrev, was conducting research. Kellogg's goal was to promote healthy living through proper diet; a solid

understanding of digestion being essential to this goal. Boldyrev had brought Pavlov's breakthrough gastric surgical techniques to the US, and his research at Kellogg's sanitarium was making important contributions to our understanding of digestive processes. Pavlov spent a week at the Sanitarium; he gave his blessing to his name being associated with Boldyrev's institute (thereafter the "Pavlov Physiological Institute of the Battle Creek Sanitarium"), and expressed optimism that important discoveries in conditioning would come from the Institute. This was not to be, as the Institute's main focus remained digestion (Kellogg seemed to care little about the brain). We provide detailed information about Boldyrev, the Institute, and Pavlov's visit.

Disclosures: **W.J. Wilson:** None. **G.A. Iniguez:** None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.11SA/VV24

Topic: J.01. History of Neuroscience

Support: NSERC

Title: From engrams to multiple interactive memory systems

Authors: B. D. DEVAN[1], K. BERGER[2], *R. J. MCDONALD[3];
[1]Psychology Dept, Towson Univ., Towson, MD; [2]Psychology, Towson State Univ., Towson, MD; [3]Dept. of Neurosci., Univ. Lethbridge, Lethbridge, AB, Canada

Abstract: Recent tech-driven findings suggest to some researchers that the broadly defined term 'engram' introduced by Richard Semon in the early 1920's has finally been localized within the mammalian brain, despite former skepticism expressed by Karl Lashley and others. We review a broader search for the proverbial engram, revealing the lesser known work of Robert Thompson in supporting Wilder Penfield's centrencephalic system, and propose a convergence of findings that suggest we move beyond the simple localization of an engram or memory trace to widespread neuroscientific support for a decentralized organization of multiple memory systems, expressing dynamic and emergent properties of complexity that require an integrative multilevel neuroscientific approach in future studies. Molecular to systems-level research supports dissociable components and processes of memory widely distributed throughout subcortical systems and interacting with cortical circuits in a malleable interplay that poses both future challenges for neuroscience and encouraging opportunities for discovery into neuro-mnemonic preservation and translational intervention of multidimensional memory dysfunction and dementia.

Disclosures: **B.D. Devan:** None. **K. Berger:** None. **R.J. McDonald:** None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.12SA/VV25

Topic: J.01. History of Neuroscience

Title: The oldest mystery in psychology: Overlaps in theories related to most consistent (temperament) traits

Authors: *I. TROFIMOVA;
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Abstract: This presentation reviews the overlap between functional neurochemistry and main models of temperament. Temperament is viewed here as neurochemically-based individual differences, in line with the original concept. Over 40 theories and models of temperament based on the Western European, Eastern European and North-American traditions are compared to findings in psychophysiology, neuropsychology, personality theory and psychiatry. The presentation summarizes over 200 overlapping entries of temperament characteristics and underlines six key insights, which emerged within differential psychophysiology and psychology during the 20th century, concerning 12 biologically based components of behavioural regulation. The functionality of neurotransmitters, neuropeptides and opioid receptor systems, as well as the lists of temperament traits are analysed from the functional ecology perspective, which considers the development of the structure of adult temperament as a result of certain functional properties of the tasks and activities of adult humans.

Disclosures: I. Trofimova: None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.13SA/VV26

Topic: J.01. History of Neuroscience

Title: One hundred years of the classically conditioned blink response

Authors: *M. RYAN, M. M. CAMPOLATTARO;
Christopher Newport Univ., Newport News, VA

Abstract: Eyeblink conditioning procedures have been widely used to examine the behavioral and neurobiological mechanism of associative learning for over one hundred years. The aim of our investigation was to trace the historical origins and identify some important milestones of the eyeblink conditioning paradigm. This information was found by examining scientific reports, peer-reviewed articles, and other scholarly resources. Briefly, the seminal experiments conducted in Pavlov's laboratory (circa late 1800s and early 1900s) inspired the employment of classical conditioning in various paradigms. Mayhew and Exner reported that the similarities in duration and intensity of the blink response observed in the human and non-human animal eye made it an

elegant research tool, especially when paired with classical conditioning. Twenty years later, Hull and Carson published the first results obtained from human subjects who were given eyeblink conditioning. Subsequent experiments by Hilgard and Marquis in the 1930s used humans, dogs, and monkeys as subjects. The rabbit later became the most common model organism used in eyeblink conditioning research, however other species including rats, mice, frogs, turtles, ferrets, sheep, and cats have been studied. Brain lesion studies in published in the 1980s identified the cerebellum as an essential brain area for acquisition and retention of the conditioned eyeblink response, although other brain areas are also involved. Current and future eyeblink conditioning procedures study the specific neural mechanisms (e.g., cellular and molecular mechanisms) of associative learning and serve as a diagnostic tool for brain disorders.

Disclosures: M. Ryan: None. **M.M. Campolattaro:** None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.14SA/VV27

Topic: J.01. History of Neuroscience

Support: ERC Starting Grant, Horizon 2020

Title: History of neuroscience of self-initiated action and volition: Recent developments and paradigm shift

Authors: *B. TROVÒ[1,2], A. SCHURGER[1,3];
[1]INSERM U992/Cognitive Neuroimaging Unit, Neurospin/ Cea-Saclay, Gif-sur-Yvette, France; [2]Ed3c, Univ. Pierre et Marie Curie - Paris VI, Paris, France; [3]Dept. of Life Sci., École Polytechnique Fédérale de Lausanne, Geneva, Switzerland

Abstract: The discovery in the 1960s of a slow buildup of neural activity preceding uncued, “self-initiated” movements marked the beginning of a new era in the neuroscientific study of voluntary movement initiation. This buildup has been observed using both invasive and non-invasive neural recordings and in both vertebrate and invertebrate species. Research on self-initiated action has provided important insights into the neural regions involved in self-initiated action and volition (the subjective sense of being the author of one’s actions), but has proceeded for decades under the assumption that this buildup reflects a process of “planning and preparation for movement”. Recent developments in the field seriously challenge this assumption and have opened the door to a paradigm shift in this area of research. Here we review the modern history of research on self-initiated movement and volition with a focus on these recent developments, including the introduction of formal computational models into this field of research, the evolving quest for “the dividing moment between not moving and moving” (the

neural commitment to move), and the search for “intentions” in the brain. We also suggest updated conceptual and (macroscopic) neural models of self-initiated movement based on these new developments.

Disclosures: B. Trovò: None. **A. Schurger:** None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.15SA/VV28

Topic: J.01. History of Neuroscience

Title: Myrtelle may canavan: Pathologist who discovered a progressive degenerative disorder of the central nervous system “ canavan disease”

Authors: M. F. KIRMANI, R. VENGILOTE, *A. NAMBOODIRI, M. F. KIRMANI, N. PUTHILLATHU;
USUHS, Bethesda, MD

Abstract: Myrtelle Canavan is a leading woman physician of early 1900’s who made huge impact in the field of medicine .She was born in 1879 in St John, Michigan. She received early education in state of Michigan but moved to Pennysylvania to join Women Medical College of Pennsylvania. She began her career in 1905 and at that time pathology was not an established medical specialty. She became interested in pathology especially neuropathology after she met Dr. Elmer Southard who is a Professor of neuropathology at Harvard Medical school. She maintained a good professional relationship with Dr. Southard throughout her professional career. She later served as resident pathologist at Boston state hospital, pathologist for the Massachusetts Commission on mental disease and in 1924 became an Associate Professor of neuropathology at Boston University and curator of the Warren Anatomical Museum of the Harvard Medical School. The major breakthrough in her career came in 1931 when she identified the progressive degenerative disease of the central nervous system characterized by spongiform changes in the brain. She published a case report of a 16 month old child which showed rare changes in brain on autopsy. The brain became soft, spongy and white. She was the first one to diagnose this condition and it was named after her as “Canavan Disease” which now belongs under the classification of leukodystrophies. There is still no cure for the disease but scientists are working towards this goal. Dr. Canavan died in 1953 but her discovery has opened the door for further research of this rare disease aiming towards treatment and cure.

Disclosures: M.F. Kirmani: None. **R. Vengilote:** None. **A. Namboodiri:** None. **M.F. Kirmani:** None. **N. Puthillathu:** None.

Theme J Poster

021. History of Neuroscience

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 021.16SA/VV29

Topic: J.01. History of Neuroscience

Title: Charles Bell: Controversial scientist

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

Abstract: Sir Charles Bell (1774-1842) was a Scottish anatomist/surgeon that came from a family of doctors. Bell appears to have been a dichotomous figure. On the one hand he was known around London to be genial and unaffected, a sensitive artist, fastidious in his dress, and a devout Christian. On the other hand, Bell was ambitious and not afraid of controversy. He was famously involved in at least three very public arguments related to neuroscientific discoveries. The first involved the interventricular foramen (of Monro), a passage that links the lateral ventricles of the brain with the third ventricle. Alexander Monro *secundus* (1733-1817) described this foramen in 1764 and gave fuller descriptions of it in 1783 and 1797. Bell called Monro to task in his 1802 textbook. Bell's critique was more of a personal attack on Monro for presuming to describe something that was already well known, which Monro had acknowledged, than an attempt to show that Monro had the anatomy wrong, which he did. Another controversy involved the French physiologist, François Magendie (1783-1855). In 1811, Bell claimed that the ventral spinal nerve roots have a motor function. In 1822, Magendie established that not only are the ventral roots motor but that the dorsal roots are sensory in function. Meanwhile, Bell had republished his findings with subtle changes that made it sound like he had also discovered the sensory nature of the dorsal roots in 1811. The conflict lasted until Bell's death and even had nationalistic overtones. Bell and British politicians rebuked the French vivisection methods as crude and cruel. Finally, it was established that the term Bell-Magendie law be used, although Johannes Peter Müller (1801-1858) was the first to show this phenomenon with absolute reproducibility in frogs in 1831. Bell was also involved in a controversy with one of his former students, Herbert Mayo (1796-1852) that was entwined with the dispute with Magendie. Bell had vaguely claimed that cranial nerve V (now known as the trigeminal nerve) and the *portion dura* (now known as the facial nerve) had sensory and motor functions, respectively. In 1822, Mayo unambiguously defined the separate motor and sensory functions of the various branches of these nerves. In 1823, Bell accurately described these nerves with no reference to Mayo and had used these as examples in his argument with Magendie. Subsequently, Bell left it to his brothers-in-law, John and Alexander Shaw, to go on a decades-long campaign to slur Mayo, not only on a scientific basis but also on a personal level, claiming Bell's priority of this discovery before

1822. So, while Bell seemed nice in polite company, he had a definite mean streak when it came to other scientists.

Disclosures: B.W. Bakkum: None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.01SA/VV30

Topic: J.02. Teaching of Neuroscience

Support: NSF MRI - 1626326 (VDCS)

NSF IOS - 1355034 (TH)

St. Paul's Lower School (MCM)

Title: Discovery center project: Learning about the brain and neuroscience at level up village - global doctors anatomy seminars

Authors: *V. D. SHIELDS[1], T. HEINBOCKEL[2], M. C. MAY[3];
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Abstract: Third grade students at St. Paul's Lower School participated in a one week "Level Up Village (LUV) - Global Doctors: Anatomy Project Seminar Series." These seminars were given within the confines of the "Discovery Center." This center, under the direction of Mr. May, enhances the traditional academic curriculum, where students participate in problem based learning through an extended process of inquiry in response to complex questions, problems, or challenges. In the LUV course, the students exchanged video messages with global partner students in developing countries to share what they learned and asked questions about daily life, hobbies and popular culture. In addition, grade three parent volunteers, with training in a health or biologically-related discipline, were selected to participate in this program and to deliver the following organ and systems presentations: heart, eye, brain, ear, nose, throat, circulatory, digestive, nervous, muscular, and skeletal. For some of the presentations, students learned about the human body through a variety of animal specimen dissections or demonstrations. A video of each anatomical presentation was made available to the global partner school. Based on Eric Chudler's website, "Neuroscience for Kids," we chose the topic, "reflexes," to help the students understand how certain parts of the brain work. We introduced reflexes by discussing the knee-jerk reflex (patellar reflex). We came up with two activities to measure reflexes and reaction time. In one activity, each student wore goggles and a lightweight object was thrown toward

his/her eyes. Each student was asked not to blink and to suppress his/her eye-blink reflex. All students failed, even the bravest ones! A second activity measured each student's response time to something that he/she saw. We held a long ruler (yardstick) displaying the highest number, by its end, and let it drop. Each student was asked to catch it and was told that the ruler would be dropped without warning. Each student caught it as fast as he/she could. The time at which each student caught the ruler was recorded as a response time, as indicated by the location on the ruler (i.e., measured in inches or centimeters). The distance was then converted into a reaction time according to Chudler's website chart and these times were compared between students. These activities allowed the students to understand the neural connections that mediate reflexes and responses to sensory input.

Disclosures: V.D. Shields: None. **T. Heinbockel:** None. **M.C. May:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.02SA/VV31

Topic: J.02. Teaching of Neuroscience

Support: Department of Education P047M120289

NSF EEC-1028725

Title: An open online course in neural engineering for high school students

Authors: *K. CASIMO, D. WOLCZYK;
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Abstract: We present a free, interactive online course on neural engineering geared towards advanced high school students. The course design incorporates guest instructors to highlight the diversity of fields involved in neural engineering research and career paths available to pre-college students. It culminates with a small group research project on current topics in neural engineering to promote scientific research and writing skills. Course development was supported by the NSF Center for Sensorimotor Neural Engineering (CSNE) and the Math Science Upward Bound programs at the University of Washington, and incorporated educational materials and highlighted current research across the multiple CSNE sites.
The live version of the course was instituted in summer 2016, during which we collected data on qualitative and quantitative student outcomes and topics of primary interest to students. For summer 2017, the course was redesigned based on this feedback, particularly to increase the focus on current research in neural engineering and to expand the research project. The curriculum assumes that students have had at least one year of biology, but does not assume

background in any field of engineering or in computer science.
The live course was six weeks long, with four classes per week, each week focusing on a different theme in neural engineering: introduction to neuroscience, introduction to engineering design principles, sensory systems, motor systems, and BCI design and implementation. Neuroethics issues were examined and discussed in all units. Hands-on student activities included a sheep brain dissection, 3D printing and demonstrations of 3D printing for neural engineering, electromyography measurement demonstrations, and sensory feedback and illusion demonstrations.
The online version of the course, which is available as of October 2017, includes videos of all lecture segments, including guest lectures; complete instructions and video demonstrations for all activities (a version for groups conducting the activity themselves and one for those following along virtually); homework assignments and grading criteria; final project assignment and grading criteria; and exams. This course is appropriate for advanced high school and early college level learners. The online course design allows us to track the number of schools, classes, and individuals who use the course and their educational levels. We have also made a feedback form available for users to submit questions.

Disclosures: K. Casimo: None. **D. Wolczyk:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.03SA/VV32

Topic: J.02. Teaching of Neuroscience

Title: Evaluation of a pull-out neuroscience curriculum for high-school gifted students in science

Authors: *K. SUEN[1], M. LIN[1], W. TANG[1], W. CHAN[1], R. C. CHANG[2];
[1]Po Leung Kuk Laws Fndn. Col., Hong Kong, China; [2]Lab. of Neurodegenerative Diseases, LKS Fac. of Medicine, Univ. of Hong Kong, Hong Kong, China

Abstract: We are a pioneer high school in Hong Kong to develop a neuroscience curriculum for scientifically gifted students (Suen et. al. 2010). It focuses on nurturing students' scientific literacy and interest through the Purdue Three-Stage Enrichment Model (Suen et. al. 2013). Research-based learning associated with neurodegenerative diseases is highlighted in this curriculum (Suen et. al. 2013). Students can apply brain cell culture (Suen et. al. 2008) and live-cell imaging microscopy in their research (Suen et. al. 2015). In the present report, we evaluate students' development on social skills, scientific literacy, knowledge in neuroscience and interest in science in this pull-out neuroscience curriculum. Both graduates and current students participating in this gifted program were interviewed. In addition, teacher's observation on students' daily performance in doing research and various learning tasks was applied to evaluate

this pull-out neuroscience curriculum. Students' views of nature of science were also studied. Results showed that most of these students participating in neuroscience-related research for 0.5 to 4.0 years demonstrated increasing interest in science. They also indicated higher tendency to study science or science-related programs in universities. Yet, students' capacity on acquiring neuroscience knowledge can be promoted in this pull-out neuroscience curriculum. For example, students may not explore the anatomy of the nervous system of different species of organisms when their research projects are not related to these organisms. As students were required to collaborate with each other in doing research, they demonstrated improved social skills in terms of appreciation to others and self confidence. Taken together, this research-driven neuroscience curriculum can help scientifically gifted students to develop scientific literacy and interest.

Disclosures: K. Suen: None. **M. Lin:** None. **W. Tang:** None. **W. Chan:** None. **R.C. Chang:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.04SA/VV33

Topic: J.02. Teaching of Neuroscience

Support: NSF Grant 1633184

NIH Grant U54MD007587

UPR Seed Funds

Title: Neuroscience research experiences for public school students: Outcomes from partnerships between schools and the University of Puerto Rico-Rio Piedras

Authors: N. D. CRUZ-BERMUDEZ[1], P. A. LLERANDI-ROMAN[2], J. S. RAMIREZ-LUGO[3], M. M. ROMAN-RODRIGUEZ[3], R. BROWN[1], C. OJEDA-REYES[4], S. TORRES-RUIZ[4], J. APONTE-RAMÍREZ[5], *J. L. AGOSTO[3];
[1]Psychology, [2]Physical Sci., [3]Biol., [4]Educ., Univ. of Puerto Rico, Rio Piedras Campus, San Juan, PR; [5]Alberto Melendez Torres High Sch., Orocovis, PR

Abstract: Previous work shows that research experiences help to increase the number of students that pursue careers in science, technology, engineering, and mathematics (STEM). Despite this, we still need to develop new methods to train science teachers in STEM and provide high-quality authentic research opportunities to K-12 students, particularly to Hispanics/Latinos and underrepresented minorities. We examined the viability and outcomes of various neuroscience research experiences involving partnerships between public school science teachers, students, and professors at the University of Puerto Rico, Río Piedras Campus. Using

Drosophila melanogaster as a model system, we designed research projects that together explored how alcohol, nicotine, artificial sweeteners, and other substances affect fruit fly development and behavior. We collected data through field observations and carried semi-structured interviews with the teacher, parents, and students to assess the long-term effects of such experiences. As hypothesized, engagement of science teachers in authentic research was an effective strategy to recruit school students into research and establish lasting school-university partnerships. The implementation of authentic research experiences in the context of a science fair enabled the involvement of parents who play a key role on students' career choice. Interview data revealed that these experiences generated satisfaction among students and for some of them, participating in the research experience was a decisive factor for pursuing a science-related career in college. Based on the interviews, we also conclude that students' affective and emotional processes combined with other psychosocial variables, significantly influence the outcomes of authentic research experiences. In addition, the teachers' understanding of research, motivation strategies, and self-efficacy were critical for the successful participation of students. Despite some limitations, we conclude that these strategies are effective to establish reliable collaborations between science teachers, students, and university professors. Significant findings of this work could be used in other settings to advance science education and research, and increase young students' interest in STEM nationwide.

Disclosures: **N.D. Cruz-Bermudez:** None. **P.A. Llerandi-Roman:** None. **J.S. Ramirez-Lugo:** None. **M.M. Roman-Rodriguez:** None. **R. Brown:** None. **C. Ojeda-Reyes:** None. **S. Torres-Ruiz:** None. **J. Aponte-Ramírez:** None. **J.L. Agosto:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.05SA/VV34

Topic: J.02. Teaching of Neuroscience

Support: Supported by funding from Washington University in St. Louis and the Society for Neuroscience St. Louis Chapter

Title: Brain Discovery: A school-based outreach program to inspire the next generation

Authors: *C. T. WEICHSELBAUM[1], B. V. LANANNA[1], E. D. HERZOG[2];
[2]Dept. of Biol., [1]Washington Univ. In St. Louis, Saint Louis, MO

Abstract: Brain Discovery is a school-based science outreach program recently developed by graduate students at Washington University in St. Louis. This initiative brings working neuroscientists into local 4th-6th grade classrooms to lead the students in a six-week series of experiments and hands-on activities, allowing them to experience the scientific process while

learning about the brain and nervous system. In contrast to many outreach programs that consist of a single event or presentation, Brain Discovery is designed to maximize the benefits of longer-term mentorship while balancing the time constraints of busy graduate students. In addition, we focus on upper elementary students, a critical age at which children are forming beliefs about their interests and capabilities in STEM fields. To measure our impact, assessments of student knowledge and attitudes toward science are collected before and after the program, as well as feedback from teachers, administrators, and participating scientists. As of May 2017, approximately 600 students across 31 classrooms have received the program, with 18 volunteers providing a total of nearly 200 teaching hours. Here we present data from the first two years of Brain Discovery (2015-16 and 2016-17), including a recently completed wait-list control study of the program's effectiveness in a sample of eighty 5th grade students. Beyond many positive responses to open-ended questions, the multiple choice and Likert scale items indicate significant changes in several measures of neuroscience knowledge and broader science attitudes. Surveys of volunteers and school personnel further suggest a positive experience for all involved. We present this program as a model for other scientists wishing to have a measurable impact on STEM interest in their local communities.

Disclosures: C.T. Weichselbaum: None. **B.V. Lananna:** None. **E.D. Herzog:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.06SA/VV35

Topic: J.02. Teaching of Neuroscience

Title: Building an in-house independent research program at the high school level using *Caenorhabditis elegans*

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Abstract: During the 2016-2017 academic year, students at Trinity School in NYC had the opportunity to participate in a brand-new after-school neuroscience research program. The program was voluntary and not-for-credit; students committed to attend the program twice a week after school for up to 2 hours each time. The program began with a brain dissection and introduction to basic neuroanatomy. Students learned to engage with primary literature at a rudimentary level and to explore the online resources available to *Caenorhabditis elegans* (*C. elegans*) researchers. Students were introduced to sterile technique and basic *C. elegans* culture and behavior protocols; students then developed and wrote up their own formal research proposals in groups of 2-4, including methods and plans for data analysis. Student projects included comparisons of wild type and mutant *C. elegans* behavior, investigations of differential

stress response in a variety of *C. elegans* strains, frequency of matricide in different strains, chemotaxis preferences, and siRNA knockdowns on a variety of backgrounds. Between January and March, students carried out their projects with increasingly more independence, culminating in an informal poster session for classmates, teachers, and administrators at the end of April. The program ultimately drew 17 students from the 9th through the 11th grade; several students involved with the program sought out further opportunities for research and STEM learning for the summer following the 2016-2017 academic year. The relative affordability of both the model and the materials used for these investigations suggests that a *C. elegans* research program may offer an accessible way for high school students to gain experience with, and excitement for, the scientific research process.

Disclosures: E.E. Coffey: None. **I. Rios:** None. **P. Cernota:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.07SA/VV36

Topic: J.02. Teaching of Neuroscience

Title: Biological research and neuroscience investigations in a high school setting

Authors: N. AMIN[1], M. C. FIELDS[1], A. SCHIPMA[1], A. KIM[1], *R. D. FIELDS[2], R. GUPTA[1]; [1]Sidwell Friends Sch., Washington, DC, DC; [2]NICHD, NIH, Bethesda, MD

Abstract: The BRAIN (Biological Research and Investigations in Neuroscience) Club at Sidwell Friends School provides opportunities for students to conduct scientific research. BRAIN Club members collaborate in groups and with local scientists to carry out scientific research experiments using zebrafish (*Danio rerio*) and guppies (*Poecilia reticulata*) as model organisms. Following biology freshman year, many students further explore research in an extracurricular setting. Students in BRAIN club have opportunities to partner with scientists from research institutions such as the National Institutes of Health and Georgetown University Medical Center. Projects by students include the following. (i) Students investigate substances such as aminophylline and conessine, in order to determine whether they can be used in the future to aid in Duchenne Muscular Dystrophy. (ii) Another experiment observes the effects of disrupted circadian rhythms, light exposure and temperature on zebrafish lateral line hair cell regeneration. Results suggest neuromasts of zebrafish in variable light regrow at a much faster rate than those in all dark and all light conditions. (iii) An experiment explores the effects of metformin as an endocrine disruptor demonstrated that pregnant guppies did not give birth when exposed to this diabetes medication. (iv) Students demonstrate that zebrafish embryos exposed to the pesticide imidacloprid experience delayed body length development. (v) Another experiment suggests that higher temperatures result in decreased enzymatic function by analyzing the effect of

temperature on the potency of restriction enzymes. (vi) Finally, one student observes Red-capped, Orange-crowned, White-ruffed, and Blue-crowned Manakins which make elaborate courtship displays on the Osa Peninsula. This study, sited at Osa Conservation's Piro Research Station, records the habitat type of the manakin leks with a focus on old or new growth forest. Students explore paths in STEM through extracurricular research, engage in student-to-student mentoring, learn to assess scientific articles, and seek out internship opportunities. They aim to pursue research throughout their high school careers and beyond.

Disclosures: **N. Amin:** None. **M.C. Fields:** None. **A. Schipma:** None. **A. Kim:** None. **R.D. Fields:** None. **R. Gupta:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.08SA/VV37

Topic: J.02. Teaching of Neuroscience

Support: UPR RCM Chancellor's Office

UPR RCM Dean of Medicine

UPR President's Fund and Lab of Fear Learning

The Grass Foundation

Title: NeuroBoricuas: Revolutionizing education by incorporatingneuroscience laboratories in schools of Puerto Rico

Authors: *D. SIERRA-MERCADO[1], Y. FERRER-ACOSTA[5], J. COLÓN-MERCADO[2], H. BRAVO-RIVERA[1], L. RAMOS-MEDINA[6], A. TORRADO-TAPIAS[1], A. VEGA-MEDINA[1], Z. QUINTERO-MARTÍNEZ[3], F. CRUZ-LÓPEZ[4], A. MERCED[1], A. ALDARONDO-HERNÁNDEZ[7], A. LANDIVAR[6], A. ZAYAS-SANTIAGO[5], M. DÍAZ-RÍOS[1], M. A. SOSA-LLORENS[1], G. J. QUIRK[3], C. BRAVO-RIVERA[8];
[1]Anat. and Neurobio., [2]Physiol., [3]Psychiatry, [4]Microbiology, Univ. Puerto Rico Sch. of Med., San Juan, PR; [5]Neurosci., Univ. Central Del Caribe, Bayamón, PR; [6]Estancia Montessori, Gurabo, PR; [7]Psychology, Carlos Albizu Univ., San Juan, PR; [8]Neurosci., Cold Spring Harbor Lab., Cold Spring Harbor, NY

Abstract: Puerto Rico is going through a financial recession that undermines its development and social advancement. Approximately one thousand Puerto Ricans leave the Island each week. Consistent with this, Puerto Rico is ranked seventh in the world in terms of population loss (Kilpatrick, 2015), with estimates of 300,000 citizens emigrating by 2020. Current projections

estimate a loss of $2 billion in revenues (Díaz, 2013), and most migrants are young people looking for job opportunities (López-Alicea, 2015). Therefore, it is imperative to create, nourish and implement social initiatives to retain young talent and stimulate economic growth. Improving educational offerings in Neuroscience and careers in biomedical research could positively impact the economy, in addition to the development of scientists and health professionals. According to the National Institutes of Health (NIH), Neuroscience is the fastest-growing branch of biomedical sciences (Koroshetz, 2015). In Puerto Rico, this growth was demonstrated by the participation of approximately 500 scientists in the 2016 Puerto Rico Neuroscience Annual Conference, almost double the attendance from previous years. In the short term, education in neuroscience research keeps people motivated to perform contributing roles in society. In the long run, this training creates a culture that values knowledge, eradicates prejudice and fanaticism, and promotes a thirst for social and economic development.
Here we present a group of neuroscientists and educators, the NeuroBoricuas, committed to revolutionizing the scientific culture of Puerto Rico by incorporating neuroscience research training and inquire-based activities in schools. We serve our mission through community outreach to the public, where we promote neuroscience literacy using diverse learning activities. In parallel, we are designing a neuroscience course and textbook with educators to be implemented in schools. We also established neuroscience labs in K-12 schools and trained science teachers to manage such labs, using equipment from the company “Backyard Brains” https://backyardbrains.com/. These lab experiences are integrated into the academic curriculum in high schools and are also available for students interested in designing their independent research projects. Lastly, we are a growing network of scientists committed at integrating academic researchers with educators to help nurture future neuroscientists early in their academic preparation. We expect to expand this network to other Latin American countries and underrepresented minorities in the United States.

Disclosures: D. Sierra-Mercado: None. **Y. Ferrer-Acosta:** None. **J. Colón-Mercado:** None. **H. Bravo-Rivera:** None. **L. Ramos-Medina:** None. **A. Torrado-Tapias:** None. **A. Vega-Medina:** None. **Z. Quintero-Martínez:** None. **F. Cruz-López:** None. **A. Merced:** None. **A. Aldarondo-Hernández:** None. **A. Landivar:** None. **A. Zayas-Santiago:** None. **M. Díaz-Ríos:** None. **M.A. Sosa-Llorens:** None. **G.J. Quirk:** None. **C. Bravo-Rivera:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.09SA/VV38

Topic: J.02. Teaching of Neuroscience

Title: Attitudes of high school students for healthcare careers using a week-long neuroscience-based immersion experience

Authors: A. S. HAFER[1], A. VENUGOPAL[1], D. G. YOUNG[1], G. K. MUELLER[1], S. S. URBAN[1], E. S. HALEY[1], S. P. CREDEN[1], H. GALADIMA[2], *P. F. ARAVICH[3];
[1]MD Student, [2]MPH Program, [3]Pathology/Anatomy, Eastern Virginia Med. Sch., Norfolk, VA

Abstract: Since 2010, the Camp Neuro program has been enriching the minds of high school students in the basic and clinical neurosciences. During the summer of 2015, Eastern Virginia Medical School (EVMS) held its inaugural Camp Neuro with a number of distinguishing features. Recruitment fliers were sent to guidance counselors at >20 high schools in Hampton Roads, VA. Twenty-five students ages 15-18 participated in a week-long July immersive experience: 20 girls and 5 boys and 12 underrepresented minority students. Tuition was $550, but more than half of the participants had it waived due to economic circumstances. The week included EVMS faculty presentations, a dissection session with pig and human brains, introduction to the neurological exam, and a patient panel. Throughout the week, campers worked in small groups to complete a community bioethics project focused on unmet community problems and proposed interventions. Project titles included: "The Stigma of Mental Illness", "Screening for Mental Illness and Substance Abuse in First Responders", and "The Effect of Race and Social Class on Mental Illness Perception." IRB-approved outcome data were collected by anonymous pre and post-camp attitudinal surveys using a 5-point Likert scale; questions related to health career options, importance of knowledge in the fields of arts and humanities, preferences for clinical practice versus research, and perceptions of community clinical neuroscience issues. Students also had a pre and post-camp knowledge assessment that included three fundamental basic neuroanatomy and neurophysiology questions. Results. The program increased health career awareness (3.36 to 4.33) and interest in the fields of clinical research (3.24 to 3.60) and psychiatry (3.76 to 4.2). For the 3 knowledge questions, correct responses increased from 4% pre to 60% post, 16%-96%, and 20%-48%. Anecdotally, there was much more student interest in wet human brains than pig brains. Conclusion: These preliminary data show our program increased interest in health careers, clinical research, and psychiatry. These increases were spurred by the dynamic presentations by faculty. Similar outcome data need to be collected from subsequent programs and long-term outcome data followed; more males are also needed. Overall, these findings suggest that Camp Neuro EVMS 2015 promoted health career interest and reduced mental illness stigma.

Disclosures: A.S. Hafer: None. **A. Venugopal:** None. **D.G. Young:** None. **G.K. Mueller:** None. **S.S. Urban:** None. **E.S. Haley:** None. **S.P. Creden:** None. **H. Galadima:** None. **P.F. Aravich:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.10SA/VV39

Topic: J.02. Teaching of Neuroscience

Support: NSF IOS - 1355034 (TH)

NSF MRI - 1626326 (VDCS)

St. Paul's Lower School (ND)

Title: Building neurons and the brain: Explaining the structure and function of nerve cells and the brain to elementary school children at St. Paul's School

Authors: *T. HEINBOCKEL[1], V. D. C. SHIELDS[2], N. DIMITRIADES[3];
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Abstract: Understanding the structure and function of neurons and the brain is fundamental in gaining an appreciation of how we think and how the brain works. Students from St. Paul's Lower School, Brooklandville, MD (K-4) had the opportunity to attend and participate in a STEM-based science fair led by science teacher, Ms. Dimitriades. Students were given the opportunity to visit numerous expositions and were presented with many different hands-on activities in all areas of the STEM disciplines. The children participated typically in small groups consisting of 4-10 participants. Each activity lasted a total of 5-10 minutes. Two of the booths, led by Drs. Shields and Heinbockel, were entitled "Building Models of Neurons Using Edible Items" and "How Does it Feel to Hold a Human Brain in Your Hands?" The first exposition engaged the children by exposing them to build neurons using food items, such as cookies, M & M's, licorice strips, and icing. The presence of plastic neuron models helped to reinforce concepts and to assist the children in learning appropriate neuronal terminology and function. At the second exposition, children handled plastinated human brains, as well as life size brain models and learned the names of the different brain lobes, as well as general functions housed in these areas. Following both presentations, the children were asked general questions about the material to assess their level of comprehension. These expositions are two-way streets for communicating and learning about neuroscience. Neuroscience professionals, who participate in these activities, change their perception of how to teach children about neuroscience and to communicate science more effectively to the general public, thereby improving neuroscience education and general science literacy for children using fun activities.

Disclosures: T. Heinbockel: None. **V.D.C. Shields:** None. **N. Dimitriades:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.11SA/VV40

Topic: J.02. Teaching of Neuroscience

Support: SW Center for Mind, Brain and Education

Title: Application of neuroscience to lesson planning

Authors: *J. M. DUBINSKY[1], V. HINESLEY[2], Z. CHANG[2], M. SCHWARTZ[2];
[1]Dept Neursci, Univ. of Minnesota Dept. of Neurosci., Minneapolis, MN; [2]SW Ctr. for Mind, Brain and Educ., Univ. of TX at Arlington, Arlington, TX

Abstract: This project explored the impact of a new 36-hour intercession course, Neuroscience for Educators, on 14 teachers in a Masters Program in Education at a major university in three areas: (1) Their understanding of neuroscience; (2) Their self-assessment of their ability to use neuro-concepts to improve their lessons; and (3) the degree and nature of changes in a personal lesson plan based on course concepts. Surveys of confidence in their ability to apply neuroscience ideas to pedagogy and revisions to a personal lesson plan were used for evaluation. Teachers successfully learned neuroscience content, improving significantly on a multiple choice test (pre 59.9±20.9%, post 75.9±13.4%, p=0.013 paired 2 tailed t test, effect-size 0.62) and a free response drawing item (pre 28.8±20.3%, post 62.6±11.2%, p<0.001, effect-size 0.92). Teacher ratings of their confidence in generically applying a set of neuroscience ideas also improved significantly (pre 72.4±13.4%, post 90.2±9.2%, p<0.001, effect-size 0.90). All participants made non-trivial changes to one of their own lesson plans. Teacher ratings of their confidence in applying the set of neuroscience ideas to their own lesson plans also improved significantly (pre 76.2±11.5%, post 88.4±7.5%, p<0.001, effect-size 0.75). Using a rubric designed to reflect course neuroscience concepts relevant to pedagogy (Dubinsky et al 2013), ten of fourteen teachers (71%) made explicit reference to course concepts in lesson changes, and twelve (86%) made implicit references. Changes to lesson plans and teachers' comments justifying those changes were analyzed qualitatively to provide further insights into how teachers might apply neuroscience concepts to their classroom practice.
Dubinsky JM, Roehrig GH, Varma S. 2013 Infusing Neuroscience Into Teacher Professional Development. Educational Researcher 42:317-329.

Disclosures: J.M. Dubinsky: None. **V. Hinesley:** None. **Z. Chang:** None. **M. Schwartz:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.12SA/VV41

Topic: J.02. Teaching of Neuroscience

Support: NIH Grant DA35133

Title: The Rex virtual experiment platform: Design, implementation, and effects on situational interest

Authors: *B. W. YANG[1], D. V. BLONDEL[2], J. ROSENBERG[3], A. SANSONE[3], L. LINENNBRINK-GARCIA[3], R. D. SCHWARZ-BLOOM[2];
[1]Psychology and Neurosci., Duke Univ., Durham, NC; [2]Pharmacol. and Cancer Biol., Duke Univ. Med. Ctr., Durham, NC; [3]Counseling, Educational Psychology and Special Educ., Michigan State Univ., East Lansing, MI

Abstract: High school science laboratories have historically faced obstacles including limited funds, “boring” topics, and cookbook-style approaches. To address these issues, we have developed Rex, a web-based platform that allows students to conduct virtual experiments online, interact with real scientists and use real data generated from published studies. Students can choose from seven neuroscience and behavior experiments using zebrafish and rats as model systems to study the effects of THC, caffeine, alcohol, and cigarette smoke. By using this active-learning interface and including topics relevant to teenagers, we seek to increase student interest and engagement in science. We implemented Rex in 13 high school biology classrooms using a pre-post counterbalanced design to test its effectiveness, measuring situational and individual interest, as well as critical thinking skills. In particular, we are interested in student situational interest, which reflects the extent that Rex captured students’ attention, and whether it was an enjoyable and meaningful experience. Situational interest has been found to be a precursor to the longer-term, deeper connections associated with individual interest in science. Here we report details of the development of Rex, its implementation, and its effects on student situational interest. A composite measure of situational interest after a Rex experiment was in the middle of a 5-point scale. When comparing situational interest student scores across classrooms of different teachers who used the same experiment, there was a significant teacher effect. These differences were likely related to classroom implementation factors, such as classroom management, teacher engagement and preparedness, and technology reliability. Ongoing analysis will reveal which of these issues are significant moderators of student situational interest after performing Rex.

Disclosures: B.W. Yang: None. **D.V. Blondel:** None. **J. Rosenberg:** None. **A. Sansone:** None. **L. Linennbrink-Garcia:** None. **R.D. Schwarz-Bloom:** None.

Theme J Poster

022. Teaching of Neuroscience: K-12

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 022.13SA/VV42

Topic: J.02. Teaching of Neuroscience

Support: FAPESP 2014/17959-1

CAPES-PROEX

CNPq

Title: Maternal care and stress in childhood: Neuroscience, education and society

Authors: *L. D. GODOY[1], P. B. F. DAMAS[1], L. F. ALVES[1], L. S. FACCIOLI[1], R. C. CARDOSO[2], W. L. LOPES[2], N. GARCIA CAIRASCO[1];
[1]Physiol. Department, Univ. of Sao Paulo, Ribeirao Preto, Brazil; [2]Neurosci. and Behavioral Sci., Univ. of Sao Paulo, Ribeirao Peeto, Brazil

Abstract: Understanding behavior is important not only for neuroscience research but also for our society. Some behaviors, such as the maternal behavior, are considered highly adaptive and conserved among species. Changes in maternal behavior may cause profound impact on offspring and parental care has enormous effects on the behavior and development of a child's brain. Early life stress (ELS) contributes to psychiatric disorders in adult life. Many studies on manipulations in maternal behavior have promoted significant contribution on its role in neurodevelopment. Considering this scenario, we have proposed a scientific initiation project, with public high school students (K-12). The project aimed to address the impacts of maternal care and ELS in the nervous system and in society. First students debated over nature/nurture paradigm and historical advances of Pavlov, Lorenz and other important names from Ethology. More recent discoveries on experimental manipulations were discussed, which included enriched environment and stress. Some meetings did not have predetermined topics and were guided by student's curiosity. In this context, non-verbal communication in other species classes culminated in a deep learning on bee communication. Some classes were used to talk about concepts the students learned on online plataforms, such as the role of oxytocin (TED/ Khan Academy). Finally, we discussed the impact of ELS and maternal care in experimental models and in society. Students actively participated in experimental manipulations related to maternal behavior and prepared an essay (University entrance examination format) and an artistic production on maternal care and nursing. Also, students were guided through textbooks and scientific papers on the importance of playing behavior to neuroscience, to explore evolution, neurodevelopment and psychological aspects. From this discussion, they produced posters that were presented in activities at the Brain Awareness Week (inside 'SOS: the brain in the park' activity in a public venue) and in their school. Students shared information learned and the importance of outreach activities. The project successfully allowed the insertion of high school students in the University and an important discussion on the relevance of neuroscience research. We strongly believe that K-12 projects are important tools in neuroscience that can be used to integrate education and society with academia.

Disclosures: L.D. Godoy: None. **P.B.F. Damas:** None. **L.F. Alves:** None. **L.S. Faccioli:** None. **R.C. Cardoso:** None. **W.L. Lopes:** None. **N. Garcia Cairasco:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.01SA/VV43

Topic: J.02. Teaching of Neuroscience

Title: Clinical neuroscience in practice: An experiential learning course for undergraduates offered by neurosurgeons and neuroscientists

Authors: *H. SONTHEIMER[1], E. A. MARVIN[2], L. S. APFEL[2], Z. ELIAS[2], G. A. HOWES[2], M. R. WITCHER[2], E. N. WEAVER[2], J. C. FRASER[2], J. J. SYNKOWSKI[2], J. T. PRICKETT[2], C. M. ROGERS[2], C. M. BUSCH[2], M. J. BENKO[2], N. SOU[2], M. J. CHURNING[2], D. C. SUMMERS[2], G. R. SIMONDS[2];
[1]Sch. of Med. and Res. Inst., Virginia Tech. Sch. of Neurosci., Roanoke, VA; [2]Virginia Tech. Sch. of Neurosci. and Carilion Clin., Roanoke, VA

Abstract: Virginia Tech started a Neuroscience degree for undergraduates in 2014, and as of 2017, the program governed by the School of Neuroscience has over 500 students. To support the mostly pre-health students who pursue the clinical Neuroscience major, students who have successfully completed a series of introductory and advanced neuroscience courses have the opportunity to participate in a unique experiential learning course that is offered in collaboration with the Virginia Tech Carilion Neurosurgery Department. All participating clinicians, including residents, hold adjunct faculty appointments in the VT School of Neuroscience, and take pride in providing a clinical education superior to that received by many medical students. This time intensive course meets twice weekly and is composed of a 75 minute lecture module that covers diseases affecting the nervous system and their treatments, complemented by a weekly half-day intensive clinical experience (in the operating rooms, ICU's, emergency room, angiographic suites, and wards). In the operating rooms, students actually "scrub-in" for complex surgeries. On hospital rounds students experience direct patient care and receive in-depth exposure to modern nervous system imaging. In addition, students participate in at least two 24h "on-call" experiences with team residents. For the latter, cognitive and psychological testing is performed before and after call to assess the effects of sleep deprivation. In total, students attain approximately 100 clinical contact hours. Students prepare weekly essays on challenging socioeconomic and ethical questions in modern medicine ranging from its cost to society and inequalities in access to health care. Towards the end of the course students meet with the admission dean of the VTC medical school; they prepare a personal statement for medical school/graduate school application; and attend a half-day block of mock medical school/ graduate school interviews delivered by experienced clinicians. In lieu of a final exam, each student presents to the entire neurosurgery department, an in-depth clinical case analysis of a case in which they participated. We will provide details on implementation, challenges and

outcomes measured based on experiences from 3 semesters with a total enrollment of approximately 60 students.

Disclosures: H. Sontheimer: None. **E.A. Marvin:** None. **L.S. Apfel:** None. **Z. Elias:** None. **G.A. Howes:** None. **M.R. Witcher:** None. **E.N. Weaver:** None. **J.C. Fraser:** None. **J.J. Synkowski:** None. **J.T. Prickett:** None. **C.M. Rogers:** None. **C.M. Busch:** None. **M.J. Benko:** None. **N. Sou:** None. **M.J. Churning:** None. **D.C. Summers:** None. **G.R. Simonds:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.02SA/VV44

Topic: J.02. Teaching of Neuroscience

Title: Experiential learning courses: An example of behavioral neuroscience in a course-based undergraduate research experience

Authors: *J. A. SEGGIO, *J. A. SEGGIO;
Biol. Sci., Bridgewater State Univ., Bridgewater, MA

Abstract: Students interested in pursuing graduate work or career opportunities in the biomedical sciences need research experiences during their undergraduate career. This research experience will not only help students clarify whether they want to pursue a career in research or clinical settings, but also will increase their marketability in today's competitive environment. Undergraduate Research Experiences (URE) help students become passionate for science and develop characteristics that are highly sought by graduate admissions committees. Unfortunately, at some larger institutions with high student to faculty ratios, UREs with individual faculty members may be limited to only a few, select students, while the majority will be deprived of such opportunities. To cover this need, our biology department developed Course-based Undergraduate Research Experiences (Experiential Learning Courses) designed to provide students with technical and conceptual research skills within a class setting. In upper-level neuroscience courses, students develop their own original 6-week projects in small groups, which foster collaborative and team-working skills. Prior to the project’s start, student groups are given a list of IACUC approved protocols and pour through the previous research on their topic by reading and discussing journal articles. Using mice, students are able to develop and test their hypotheses on how pharmacological or other treatments affect physiology and behavior. Students utilize a wide variety of behavioral assays, including open field, light:dark box, sociability tasks, and novel object tests. Examples of student-led projects within the classroom include how removal of a high-fat diet affects anxiety behaviors and how combined lithium and alcohol consumption affects anxiety and locomotor activity. Additionally, students learn about the peer-review process by writing a group report on their project, submitting it for review by the other

lab teams, and then revising the article based upon the reviews. In this way, all biology students gain some research experience and critical thinking skills prior to graduation and the behavioral and molecular techniques the students acquire in these courses can facilitate gaining employment within the biomedical field.

Disclosures: J.A. Seggio: None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.03SA/VV45

Topic: J.02. Teaching of Neuroscience

Title: Interdisciplinary neuroscience: Teaching undergraduate neuroscience through varied lenses

Authors: *A. KAUR;
UNC Asheville, Asheville, NC

Abstract: With an increased interest in neuroscience, undergraduate faculty are challenged to innovate ways to engage students in understanding neuroscientific principles and their real world relevance. Neuroscience is a truly interdisciplinary subject, which allows us to pull from varied pedagogies when delivering our curriculum. Here we report on four multidisciplinary classroom projects used to engage students in the concepts being discussed in their classes and recruit students into the Neuroscience program at University of North Carolina, Asheville. Students in a freshman colloquium (Neuroscience in Film) were asked to identify an instance of neuroscience in their lives and investigate the science behind it. Their findings were presented in a poster session to their classmates and the university at large. Students in a 300 level Neuropharmacology course were exposed to 6 research papers from the same lab group over the course of the semester. Journal clubs were held to discuss each paper in depth, allowing the students to explore the cutting edge of a model hypothesis of addiction and observe how research projects progress over the years. Students in a 300 level cell and molecular neuroscience course participated in a laboratory course where they engaged in an authentic real world research project, including learning how to patch clamp. These students also completed a collaborative project with students in a Math Modeling course to build and test a model of the Hodgkin-Huxley equations. Students reported an increased understanding of the science and a greater appreciation for the value of using different disciplinary lenses to look at their subject of interest. In addition, these projects increased student interest in the Neuroscience program, helping increase the number of students registered as Neuroscience minors.

Disclosures: A. Kaur: None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.04SA/VV46

Topic: J.02. Teaching of Neuroscience

Support: Down Syndrome Association of Central Texas

Austim Society of Central Texas

Title: Reverse-inclusion courses aimed at adults with intellectual and developmental disabilities

Authors: *J. T. PIERCE, D. GUZMAN, K. HUCKLEBERRY, G. ORDEMANN, J. SCANLON, S. ROZMIAREK;
Univ. of Texas at Austin, Austin, TX

Abstract: Undergraduate students on track for medical, research and education careers all look forward to helping patients and students. Ironically, the people who may need their help the most, however, are by design excluded from college. These include the 5% of the US population that has intellectual and developmental disabilities (IDDs) such as autism, Down syndrome, and brain injury. Thus, many students finish college unprepared, not knowing much about people with IDDs. We have attempted to address this issue by teaching undergraduates about IDDs first-hand by having them learn alongside adults with IDDs. Since 2009, we have offered a continuous series of courses that demonstrate that adults with IDDs appreciate learning about topics in diverse academic subjects including Japanese culture, French art, and neuroscience. We will discuss practical aspects of growing our program to serve 200 adults with IDDs annually, as well as our progress on conveying material to adults with IDDs while simultaneously teaching college students about IDDs.

Disclosures: J.T. Pierce: None. **D. Guzman:** None. **K. Huckleberry:** None. **G. Ordemann:** None. **J. Scanlon:** None. **S. Rozmiarek:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.05SA/VV47

Topic: J.02. Teaching of Neuroscience

Title: Development of an applied surgical neurotechnology course for bioengineering undergraduate students

Authors: *L. C. BRAY[1], F. PISCITANI[2], L. WALKER[2], J. LEIPHART[3], M. SHENAI[4]; [1]Bioengineering, George Mason Univ., Fairfax, VA; [2]Dept. of Surgery, [3]Dept. of Neurosci., [4]Neurosci., Inova Hlth. Syst., Fairfax, VA

Abstract: Background: Undergraduate students majoring in bioengineering complete significant theoretical coursework, but opportunities for applied learning are sporadic. With this in mind, Inova neurosurgeons collaborated with Mason Bioengineering faculty to develop a "hands-on" course focused around key neurotechnologies and underlying engineering principles.
Methods: In the fall of 2016, 25 students enrolled in the "Applied Neurotechnologies" class. The weekly course consisted of four modules: [1] cerebral shunts, [2] principles of neuroradiology, [3] neurosurgical stereotaxy, and [4] neuromodulation. Each three-week module began with a didactic "pre-lab" session, followed by the laboratory session with assigned tasks, and a "post-lab" debrief. Students worked in teams of 4-5 students, and were evaluated on pre-lab and post-lab problem sets, in addition to mid-term and final examinations. All laboratory exercises were performed at the Inova Applied Surgical Technologies and Education Center (ASTEC). Specific feedback for each laboratory module was obtained after its completion, and overall feedback was obtained through standardized course surveying performed by the Mason School of Engineering. The feedback consisted of both Likert-scale metrics and subjective remarks.
Results: The course was successfully implemented as planned, enrolling 21 students. Laboratory session feedback was positive, with each lab receiving an average of 7.4, 8.9, 7.2, 9.5 (1-poor, 10-excellent). Standardized scoring resulted in a "Teaching" score of 4.73/5 and an overall course rating of 4.77/5. Positive subjective feedback primarily focused on the benefit of "hands-on" learning, whereas negative subjective feedback centered on group activities diluting the "hands-on" experience.
Conclusions: The progressive advancement of neurotechnologies requires the early cultivation of bioengineering students, as they seek post-graduate opportunities. Applied courses, delivered through Hospital-University partnerships, can provide a robust experience for students to explore pathways in surgical technologies.

Disclosures: L.C. Bray: None. **F. Piscitani:** None. **L. Walker:** None. **J. Leiphart:** None. **M. Shenai:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.06SA/VV48

Topic: J.02. Teaching of Neuroscience

Support: Robert H. Foote Fund

Title: Integrating science and humanities tools to teach "Gender and the Brain"

Authors: *S. DIETZ;
Neurobio & Behavior, Cornell Univ., Ithaca, NY

Abstract: At Cornell in Spring 2017 we introduced a hybrid science/humanities course, “Gender and the Brain,” cross-listed between the Department of Neurobiology and Behavior (NBB), the Program of Feminist, Gender, and Sexuality Studies (FGSS), and the Program in LGBT Studies. The goal of this interdisciplinary design was to bring STEM and humanities students together for a semester-long collaboration for close readings of primary scientific literature to help them to consider how cultural tropes influence the design of scientific studies. The hypothesis that incorporating humanities material into a curriculum will enhance the quality of education in science and engineering has been difficult to measure quantitatively (Stewart-Gambino and Rossman, 2015), but is particularly timely now, as the National Academies of Sciences, Engineering, and Medicine is currently conducting a review of the value of incorporating curricula and experiences from the humanities into STEM education, and vice versa (NEA 2016). Futhermore, non-science students have been shown to develop an increased interest in science after taking a course emphasizing the personal and social relevance of the material (Cook and Mulvihill, 2008). To facilitate the development of a shared knowledge base in a group with disparate academic preparation, we used a “course and a half” structure, in which students supplemented in-person classroom lecture and discussion with online learning assignments in either neuroscience or gender and sexuality studies. Using an adaptive structure of video lectures, quizzes and blog posts, students continually self-assessed their progress though a guided learning experience. Ongoing assessments of student performance over the next three years will evaluate whether the hybrid course enhances students’ ability to parse primary scientific literature relative to traditionally structured neuroscience courses. We hope to use this course as a model for developing scalable online tools for individualized instruction, and for expanding hybrid science/humanities courses to additional departments and colleges spanning both basic and applied science fields.

Disclosures: S. Dietz: None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.07SA/VV49

Topic: J.02. Teaching of Neuroscience

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

Authors: M. C. ZEE[1], L. A. BECKER[2], S. K. DEBBURMAN[3], *M. T. KERCHNER[4];
[1]Psychology, Northeastern Univ., Boston, MA; [2]Psychology, Univ. of Evansville, Evansville, IN; [3]Biol., Lake Forest Col., Lake Forest, IL; [4]Washington Col., Chestertown, MD

Abstract: *Nu Rho Psi*, The National Honor Society in Neuroscience, is a non-profit, grass-roots organization comprised of neuroscientists, like you. With more than 70 chapters across the United States and over 4000 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 exclusively through chartered *Nu Rho Psi* chapters at Colleges and Universities. *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. *Nu Rho Psi* goes beyond providing recognition of excellence in neuroscience scholarship and research. We offer our members a variety of grants and awards including competitive research grants to facilitate senior theses or other scholarly projects. Our chapters may apply for *Nu Rho Psi* Chapter Activity grants to promote their educational and community outreach initiatives. *Nu Rho Psi* members help educate their communities about the *Nu Rho Psi* Theme of the Year. The 2017-18 Theme of the Year is Anxiety and Stress. Members are also eligible for *Nu Rho Psi* travel grants to present their original research at the annual Society for Neuroscience meeting. 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. For more information, see our web page: http://www.nurhopsi.org/

Disclosures: M.C. Zee: None. **L.A. Becker:** None. **S.K. Debburman:** None. **M.T. Kerchner:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.08SA/VV50

Topic: J.02. Teaching of Neuroscience

Title: The IMPULSE neuroscience journal: An educational tool for undergraduates of all disciplines

Authors: M. PAVELKA[1], S. K. EVERETT[2], Z. S. KAPLAN[3], S. J. SNOUSE[4], C. T. FENNELL[2], L. JONES[5], *M. C. ZRULL[2];

[1]Psychology & Cell/Molecular Biol., [2]Psychology, [3]English, [5]Honors Col., [4]Appalachian State Univ., Boone, NC

Abstract: Since the founding of IMPULSE: The Premier Undergraduate Neuroscience Journal in 2003, undergraduate research journals have become increasingly popular and widespread. However, only a small number of current journals are specifically dedicated to publishing undergraduate neuroscience research. IMPULSE allows undergraduates to become familiarized with the processes of writing and reviewing scientific manuscripts for publication, specifically within the field of neuroscience. Unlike many undergraduate journals, IMPULSE accepts submissions from students of all disciplines, as well as from all undergraduate institutions. The important factor is that the submitted manuscript reflects research or review within neuroscience. Since 2014, IMPULSE has published a total of 17 articles from students at 13 undergraduate institutions with 11 submissions from 11 institutions currently in the review process. Prior to publication, all manuscripts undergo an extensive peer-review process, which is accomplished by undergraduate reviewers from multiple institutions around the world. The peer-review process is taught and overseen by faculty at Reviewer Training Sites (RTS), where student reviewers at a particular institution collectively meet to discuss reviews. Articles in the 2016 issue were reviewed by over 100 reviewers at 16 RTSs, as well as students from schools without an established RTS; these "satellite" reviewers represent 33 institutions in seven countries and five continents. Following the peer-review process, the Associate Editor at a RTS, an undergraduate student, compiles individual reviews and submits the RTS's review to the Executive Editor (EE) and his or her Associate EE, also undergraduates. The RTS reviews are compiled into a comprehensive summary of edits, which is sent back to the author(s) for further revision. Two other undergraduate students, the Editor-in-Chief and Manging Editor, complete the editorial board, which is overseen by faculty. While involvement with IMPULSE provides undergraduates with uniquely valuable experience in analyzing scientific literature, the benefits of IMPULSE extend well beyond the field of neuroscience. The use of IMPULSE as an educational tool, as well as an academic journal, has been shown to provide a lasting impact on students' writing, reviewing, and leadership skills, regardless of their major. IMPULSE may therefore serve as an effective teaching tool for undergraduates of all disciplines, as it provides students with opportunities to gain experience in various aspects of scientific publishing.

Disclosures: M. Pavelka: None. **S.K. Everett:** None. **Z.S. Kaplan:** None. **S.J. Snouse:** None. **C.T. Fennell:** None. **L. Jones:** None. **M.C. Zrull:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.09SA/VV51

Topic: J.02. Teaching of Neuroscience

Support: International Group of Neuroscience.

IGN- Initiative "Citizen Science for the common good"

Title: Simple experimental teaching tools for TMS-DWI: Water circuits, membranes and coils used to explain the relation between diffusion and conductivity tensors in water potentials during white matter activation

Authors: *J. F. GOMEZ-MOLINA[1], *J. F. GOMEZ-MOLINA[1], U. M. RICOY[2], F. LOPERA[1], M. CORREDOR[3], J. VELEZ[4];
[1]Intl. Group of Neurosci. (IGN), Medellin, Colombia; [2]Biol., Northern New Mexico Col., Espanola, NM; [3]Biol. Inst., Univ. of Antioquia, Medellin, Colombia; [4]Intl. Group of Neurosci. (IGN) -NY member, New York, NY

Abstract: INTRODUCTION. Many biophysical principles can be explored in the classroom using inexpensive resources and electronic equipment. We have used these toy models to explore simplifications and basic relations of more complex models. In this abstract, we present some experimental approaches to describe a hypothesis (Gomez-M, 2000): the relation between probability of ion channel opening (an index of neural activation) and the flow of water. METHODS. 1. Highly simplified experimental toy models using water permeable membranes, aqueous solutions with ions and network of tubes for osmotic pressure and water potential. 2. Computer programs in python for electric circuits, electric analogs and hydraulic circuits.PRELIMINARY CONCLUSIONS. Student understanding of basic principles in neuroscience and neuroengineering are critical. Moreover, to establish public debates about the appropriate application of neurotechnologies is a responsibility of everyone. A simple experimental framework to test the claims of neuroscience can be extremely useful to illustrate: 1. a relation between bulk electric conductivity in a voxel of neural tissue, water diffusion tensor and neural activity. 2. The biophysics of water flow and water potential in animals and plants. 3. Water circuits and water flow in the brain, cerebrospinal-fluid, white/gray matter and circulatory-lymphatic system. 4. Water flow can be a physiological signal of cellular swelling, strong activation and edema. 5. Complex concepts of Transcranial magnetic stimulation (TMS), diffusion-tensor magnetic resonance and impedance tomography can be approached with simple experimental and computational tools.

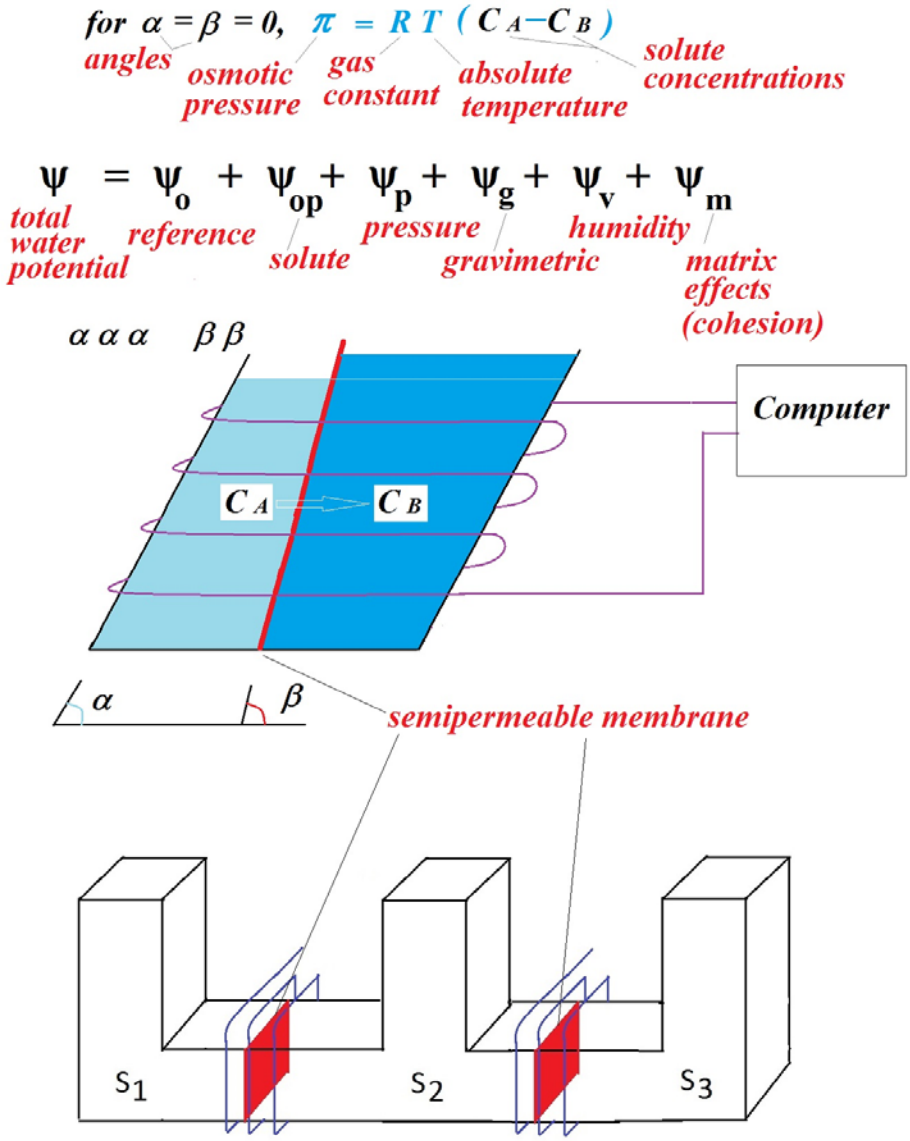


Fig 1. Simple experimental teaching tools to understand and test some of the claims of the neuro technology and neuro engineering.

Disclosures: **J.F. Gomez-Molina:** None. **U.M. Ricoy:** None. **F. Lopera:** None. **M. Corredor:** None. **J. Velez:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.10SA/VV52

Topic: J.02. Teaching of Neuroscience

Title: Utilizing quantitative neuroscience methods to illustrate cytoskeletal changes in a lab-based cell biology course

Authors: *A. L. HAWTHORNE, E. BRADSHAW, S. J. KING;
Burnett Sch. of Biomed. Sci., Univ. of Central Florida, Orlando, FL

Abstract: We developed a new cell line-based neuroscience lab for our advanced undergraduate class PCB 4529C Experimental Molecular Cell Biology. In the past the class has used fibroblast cell lines Cos7 and L cells to learn cell culture techniques. This year we incorporated a neuronal cell line to give students an opportunity to experiment with neuronal growth. We chose the F11 cell line, which is a hybrid between embryonic rat dorsal root ganglion (DRG) sensory neurons and mouse neuroblastoma, based on their ability to grow long axons upon differentiation, similar to primary DRGs. The learning objectives of the lab were to teach students to measure changes in neuronal length using ImageJ/NeuronJ and predict outcomes based on different drug treatments that alter the normal dynamics of actin or tubulin. Since students performed immunofluorescence in several labs, neurons were pre-transfected with pLifeAct-GFP to label actin with GFP for live cell visualization. Cells were also grown in two conditions: high or low amounts of serum to prevent or promote differentiation. The drugs selected were cytochalasin to inhibit actin polymerization, nocodazole to inhibit microtubule polymerization, or taxol to stabilize microtubules. Students took live pictures of the cells at low (20X) magnification to trace neurons with NeuronJ and high (100X) magnification pictures to count filopodia in 100 µm of axonal length with ImageJ. Student learning was assessed by a lab report analyzing their individual data and the aggregate class data and by a question on the lab practical in which students designed an experiment. Students performed highly on the lab report (94% average). Anecdotal evidence suggests students enjoyed learning the new software and techniques that one would actually use in a lab environment studying neuronal growth. The lab practical was more challenging for the students. Students were able to describe the microscopy and analysis but were not as detailed on the experimental setup. In the future, we will give students more experience with the experimental set up in class and more practice designing these types of experiments. Instructors teaching similar courses could readily implement this lab, with treatments tailored to the learning objectives of the course.

Disclosures: A.L. Hawthorne: None. **E. Bradshaw:** None. **S.J. King:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.11SA/VV53

Topic: J.02. Teaching of Neuroscience

Title: An inquiry-driven, cross-disciplinary laboratory experience for undergraduates

Authors: *K. M. SEIP-CAMMACK[1], B. C. MOORE[2];
[1]Psychology, [2]Biol., The Univ. of the South, Sewanee, TN

Abstract: Inquiry-driven laboratory activities that involve critical, integrated thinking across disciplines lead to better learning and retention and can enrich and deepen students' experience in the classroom. However, undergraduate students have infrequent opportunities for cross-disciplinary collaborations within laboratory courses. To address this need, we presented a semester-long collaboration between two laboratory courses, PSYC359 Advanced Behavioral Neuroscience and BIOL275 Histology & Microanatomy, at a small, undergraduate institution. The collaboration goals were to allow students to (a) compare/contrast technical and theoretical approaches used by biologists, psychologists, and neuroscientists to understand animal behavior, (b) evaluate scientific literature across disciplines, (c) design and implement an original research project using mice that adheres to ethical research standards, (d) collect, organize and analyze original datasets produced in this study, (e) create meaningful figures that depict data accurately, (f) present major research findings at our university's research conference, and (g) learn to collaborate productively with students of different disciplines, training and interests. Most students enrolled in PSYC359 and BIOL275 were psychology and/or biology majors; some were also involved in neuroscience and biochemistry programs. Briefly, PSYC359 students designed a simple experiment to induce neurogenesis in adult mice. They identified and read relevant peer-reviewed literature, developed hypotheses, and designed and conducted a behavioral experiment in mice to test these hypotheses. BIOL275 students developed hypotheses that compared/contrasted cell proliferation between various body tissues that routinely show cell proliferation (e.g., small intestine, ovary) verses behaviorally induced neurogenesis. Brain and peripheral tissues were collected for histological processing by PSYC359 and BIOL275 students, respectively. Joint class sessions were held throughout the semester and included joint faculty lectures, peer-to-peer teaching, and small group discussions. Recommendations for budgeting, technical limitations, and strategies for successful integration into course materials/content, and implementation at institutions of various sizes will be discussed. Versions of this collaboration may be translatable to a number of different courses and departments.

Disclosures: K.M. Seip-Cammack: None. **B.C. Moore:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.12SA/VV54

Topic: J.02. Teaching of Neuroscience

Title: Effects of “integrative body-mind science education” for university students of faculty of engineering analyzed by co-occurrence words network

Authors: *Y. ATOMI[1], Y. HIGASHI[1], M. SHIMIZU[1], E. FUJITA[1], T. ATOMI[2], K. HASEGAWA[3];
[1]Dept of Material Hlth. Science, Fac. and Grad. Sch. of Engin., Tokyo Univ. of Agr. and Technol., Tokyo, Japan; [2]Dept. of Physical Therapy, Fac. of Med. Sci., Teikyo Univ. of Sci., Uenohara, Yamanashi Prefecture, Japan; [3]JAXA, Sagamihara, Japan

Abstract: Mindfulness education is developed in recent years, however “Integlating Body-Mind Science Education (IBMSE)” has not been performed yet. Education is a process to make brain circuits based on activity-dependent cell system. Cells in our body can change and adapt for environmental stimuli, and neuronal cells can make neural network. To understand such own body and mind system is so important for all peoples in the world. We human beings need education, which is defined to be materialized process. This study is to know effects of IBMSE for university students of the organic-chemistry course. Although they have not learned biology and neuroscience at all, it is hypothesized they might be able to understand and accept own human system, because, for these students to increase synaps and neural cirtuit in accordance with physical activity and also sensory-motor circuit build by brain-neuro-muscular system and stress-responding system, all these process is based on chemical reaction working own activity-dependent manner. Last year, through the program including mindfulness practice as well as lectures and some experiments we reported higher significant correlation between understanding and motivation. This year we report effects of this IBMSE program, which is composed of lecture, practice, measurements, excurtion, and verbalizing. This program was performed at 15 times during about 3 months, for 40 first year students. Effects were analyzed by co-occurrence words network (COWNW) in final reports written by students. Compared with the figure of COWNW obtained in last year the word of IBMSE is placed at the center surrounded 3 verbs (remember, think, learn) and 3 abstract nouns (mind, society, life chemistry). Interestingly, ‘remember’ links ‘human being’, ‘think’ links ‘life’ and ‘learn’ links life-chemistry; ‘mind” to ‘body”, society to Japan. Some experiments to observe cultured cells, DNA from cells, observation of own posture has not yet connected well in students understanding, so far as we examine in final reports. More presice and appropriate themes should be given for final reports. Integration of practicing and verbalization is so important for our human brain system, which usually works separately. In doing something like experiments and practice, we don’t care verbalization because doing process is obtained under procedure memory. IBMSE program seems to be farly good, however we had better reconstite themas that students should write remembering, thinking, and connecting important things that they learn through educational program. We need to reprogram focusing more brain and neuroscience knowledges to foster feasibility of young students.

Disclosures: Y. Atomi: None. **Y. Higashi:** None. **M. Shimizu:** None. **E. Fujita:** None. **T. Atomi:** None. **K. Hasegawa:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.13SA/VV55

Topic: J.02. Teaching of Neuroscience

Support: University of Utah Teaching Grant, "Virtual Neurophysiology Workbench"

Title: Accelerating neurophysiology education through an interactive virtual workbench

Authors: *S. R. BLACK[1,2], C. R. BUTSON[2,1,3];
[1]Bioengineering, [2]Scientific Computing & Imaging Inst., [3]Departments of Neurol. and Neurosurg., Univ. of Utah, Salt Lake City, UT

Abstract: Neurophysiology is a multifaceted branch of study which aims to develop a functional understanding of the nervous system. An important aspect of this understanding is the ability to infer intracellular neural activity based on extracellular recordings which are typically acquired during *in vivo* and *in vitro* experiments, as well as neurosurgical procedures. These methods require extensive training and expensive, specialized equipment. We feel that students would benefit from educational experiences that facilitate this level of understanding prior to devoting years of training. To address this need, we have developed an alternative educational approach to understand the relationships between intracellular and extracellular neural signals that utilizes open-source software and inexpensive recording equipment. Publicly available computational models (e.g. https://senselab.med.yale.edu/modeldb/) provide the ability to simulate a wide range of cell types and realistic means of precise, experimental manipulation of neurons. These models are used to create varying patterns of action potentials based on user defined intracellular and extracellular properties. Transmembrane currents from these models are converted and played as audio files through headphones from which the earbuds have been removed, mimicking neural or electrical point sources. The equipment set up includes an easily producible conductive medium, made using agar as a neural tissue substitute; a low-cost, portable recording system used with surface electrodes and/or microelectrodes; and a smartphone, laptop, or desktop computer used to play the audio files and display recorded potentials. Implementation of this virtual neurophysiology workbench enables a wide variety of experiments with virtually infinite variability that would otherwise be limited or impossible through *in vivo* or *in vitro* means. Further, general and critical knowledge of this aspect of neurophysiology can be promoted in earlier education levels than are currently feasible. Labs employing this workbench have been piloted in bioengineering courses at the University of Utah and experiments will be posted to a project website (www.virtualneurophysiology.org) to encourage others to use and learn from them as well as to develop their own experiments. These hands-on labs have been well received by students and have been qualitatively shown to enhance understanding and enjoyment of neurophysiological study. In the future, we plan to further develop the workbench and website to

stimulate accessibility and collaboration in this new and exciting direction in neurophysiology education.

Disclosures: S.R. Black: None. **C.R. Butson:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.14SA/VV56

Topic: J.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: *L. A. CHASE[1], H. G. MCFARLANE[2], A. STAVNEZER[3];
[1]Hope Col., Holland, MI; [2]Neurosci. and Psychology, Kenyon Col., Gambier, OH; [3]Col. of Wooster, Wooster, OH

Abstract: Faculty for Undergraduate Neuroscience (FUN) is the international society devoted to neuroscience education 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 in 8 different areas of 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, home institutions, corporate sponsors and poster locations of the 2017 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 (see web site for details). 3. FUN supports the online, peer-reviewed, PubMed-indexed Journal of Undergraduate Neuroscience Education (JUNE), which is devoted to the dissemination of teaching and laboratory techniques for use in an undergraduate neuroscience curriculum (www.funjournal.org). 4. FUN collaborates with Nu Rho Psi, the national honor society in Neuroscience. 5. FUN holds triennial faculty development workshops, with the most recent meeting this past summer at Dominican University. These workshops bring together educators to develop and share best teaching and laboratory practices. 6. FUN supports regional undergraduate neuroscience research symposia such as “MidBrains”, “SYNAPSE”, “NEURON”, and “mGluRs”. 7. FUN annually recognizes exceptional faculty accomplishments in neuroscience education, mentorship and service at the annual FUN Social. 8. Finally, FUN supports communication and networking among its members through our newsletter and listserve. FUN members and other interested in learning about FUN are encouraged to attend our annual business meeting and the FUN Social and Poster session, held during the SfN meeting. The time and location of these events will be listed on the poster. At the FUN Social, well over 120 undergraduate researchers and their mentors will present their work in a poster session

(Sunday, November 12 at 6:45 pm). We will also honor the FUN Student travel award winners, recognize our generous sponsors, and honor faculty award winners.

Disclosures: L.A. Chase: None. **H.G. McFarlane:** None. **A. Stavnezer:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.15SA/VV57

Topic: J.02. Teaching of Neuroscience

Title: Advocating to learn

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

Abstract: There is a growing enthusiasm for science advocacy following the November, 2016 election. Capitalizing on this interest, I have developed advocacy-based course assignments for students in my neuroscience classes. These assignments, which can serve as either formative or summative assessments, include an elevator pitch, a letter to Congress, and a letter to the editor. These assignments can be used in two contexts. As "mock" assignments, students can pretend they are scientists from the lab performing the research of interest for the course. Alternatively, the students can communicate "real" results from laboratory courses or the students' own independent research. While these assignments clearly align with communication- or writing-focused learning objectives for classes or departments, they can also be aligned with objectives focused on understanding concepts, interpreting results, synthesizing findings, and evaluating neuroscientific tools and techniques. These versatile assignments can also be adapted into student workshops. For example, students completing theses can learn how to write to their Congressman to support funding for their work. This type of workshop can also be incorporated into undergraduate-focused conference sessions. Advocacy-based assignments can support student learning while also engaging the student in important work for the scientific community.

Disclosures: M.L. Linden: None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.16SA/VV58

Topic: J.02. Teaching of Neuroscience

Support: Kentucky Science and Engineering Foundation (RLC)

Howard Hughes Medical Institute (#52008116)

Personal funds (RLC)

Title: Course-based undergraduate research experience (CURE) with online interactions for a neurobiology class in Iraq and in the USA: Alterations in synaptic transmission

Authors: *R. L. COOPER[1], Z. R. MAJEED[2], T. HICKEY[3], C. BALLINGER-BOONE[3], M. CORNELIUS[3], T. DONOVAN[3], H. GARRIGUS[3], E. HIGGINS[3], M. LABARRE[3], A. LARSON[3], M. MCNABB[3], N. MONTICELLO[3], R. SHUMARD[3], B. STOCKWELL[3], P. BOACHIE[3], A. HO[3], A. COOPER[3], M. MELODY[3], B. SLABACH[3];
[1]Dept Biol, Univ. of Kentucky Dept. of Biol., Lexington, KY; [2]Biol., Univ. Salahaddin, Erbil, Iraq; [3]Biol., Univ. of KY, Lexington, KY

Abstract: The goal in this project is threefold (1) address an authentic physiology research question for a neurobiology course as a group project for educational purposes; (2) To address the role of extracellular free Ca2+ in potentially contributing to synaptic depression with motor neurons expressing channel rhodopsins at the larval *Drosophila* neuromuscular junction; and (3) To address how short bursts of neural activity can have lasting effects on frequency of spontaneous vesicle fusion events. For this presentation the focus will be how we went about developing and implementing CURE with on-line interactions for experimentation, data analysis and delivery of educational content. The advantages and disadvantages of language barriers and level of knowledge base on the content will be addressed from the two interacting sites (Iraq and USA). Specific data analysis was handled by using a given set of software in order to have reliability and publishable data along with interactive, discussion based blogs on digital movies. The research questions have clinical implications as well as addressing effects of novel therapeutic techniques which are starting in humans concerning light activated ion channel rhodopsins in neural tissue. Hypercalcemia is also a factor with being in space (zero gravity) for long periods of time. Heightened or dampened neural activity can also alter Ca2+ homeostasis within the narrow synaptic clefts within the CNS and have effects on the presynaptic as well as postsynaptic function.

Disclosures: R.L. Cooper: None. **Z.R. Majeed:** None. **T. Hickey:** None. **C. Ballinger-Boone:** None. **M. Cornelius:** None. **T. Donovan:** None. **H. Garrigus:** None. **E. Higgins:** None. **M. Labarre:** None. **A. Larson:** None. **M. McNabb:** None. **N. Monticello:** None. **R. Shumard:** None. **B. Stockwell:** None. **P. Boachie:** None. **A. Ho:** None. **A. Cooper:** None. **M. Melody:** None. **B. Slabach:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.17SA/VV59

Topic: J.02. Teaching of Neuroscience

Title: Opinion of biomedical sciences students about an innovative style of teaching advanced medical neuroscience

Authors: *M. T. CASTANEDA[1], *M. T. CASTANEDA[1,2], H. E. RODRIGUEZ[2];
[1]Univ. of Tamaulipas, Matamoros Tamaulipas, Mexico; [2]Hlth. and Biomed. Sci., Univ. of Texas at Rio Grande Valley, Brownsville, TX

Abstract: Introduction: Innovative didactic techniques and learning strategies are important demands in the undergraduate Health and Biomedical Sciences program. In the Advanced Medical Neuroscience, these strategies are intended to create a positive attitude about learning a difficult area for some of our students, facilitate critical thinking and promote a cooperative learning environment with innovative teaching resources.
Objective: To determine the opinion of students regarding the teaching of Advanced Medical neurosciences with the inclusion of new teaching methods.
Methods: A questionnaire was administered to students in the Advanced Medical Neuroscience course at the end of the semester; they were asked to score each question using a Likert scale.
Conclusions: Based on the results, students gave satisfactory opinions about the inclusion of new methods of teaching. Most of the them stated that inclusion of different activities benefits the learning process, and can be more effective that the traditional lecture.
Key Words: Innovative teaching, learning strategies, evaluation

Disclosures: M.T. Castaneda: None. **H.E. Rodriguez:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.18SA/VV60

Topic: J.02. Teaching of Neuroscience

Support: NSF 1560061

Title: The successes and challenges of a multi-institution REU site

Authors: *A. STAVNEZER[1], J. R. YATES[2];
[1]Col. of Wooster, Wooster, OH; [2]Psychology; Neurosci., Ohio Wesleyan Univ., Delaware, OH

Abstract: We received funding from the National Science Foundation's Research Experience for Undergraduates, for a site shared among four regional Neuroscience programs. The aim was to provide significant and meaningful opportunities for research, conversation, collaboration, and education for students at the College of Wooster, Kenyon College, Earlham College, and Ohio Wesleyan University. In addition to their on-campus research, participating faculty and student participants met five times. The program started with a 3-day workshop at Ohio Wesleyan University, which included lab-group and whole-group activities focused on mentoring, professional development, and cohort-building. Visits followed to Earlham and Kenyon. At the visits, faculty served as resident experts, teaching their specific research techniques to all other members of the group. The program culminated with a 2-day research symposium at the College of Wooster. There was also a visit to the Neuroscience Graduate Program at The Ohio State University and Battelle Memorial Research Foundation to introduce students to graduate and professional opportunities. By harnessing the breadth of research expertise within our consortium, we deepened the knowledge and hands-on experience of all participants on several techniques. Student participants also engaged in professional development activities. Several successes and challenges were encountered in our first year and are informing our planning for year 2.

Disclosures: A. Stavnezer: None. **J.R. Yates:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.19SA/VV61

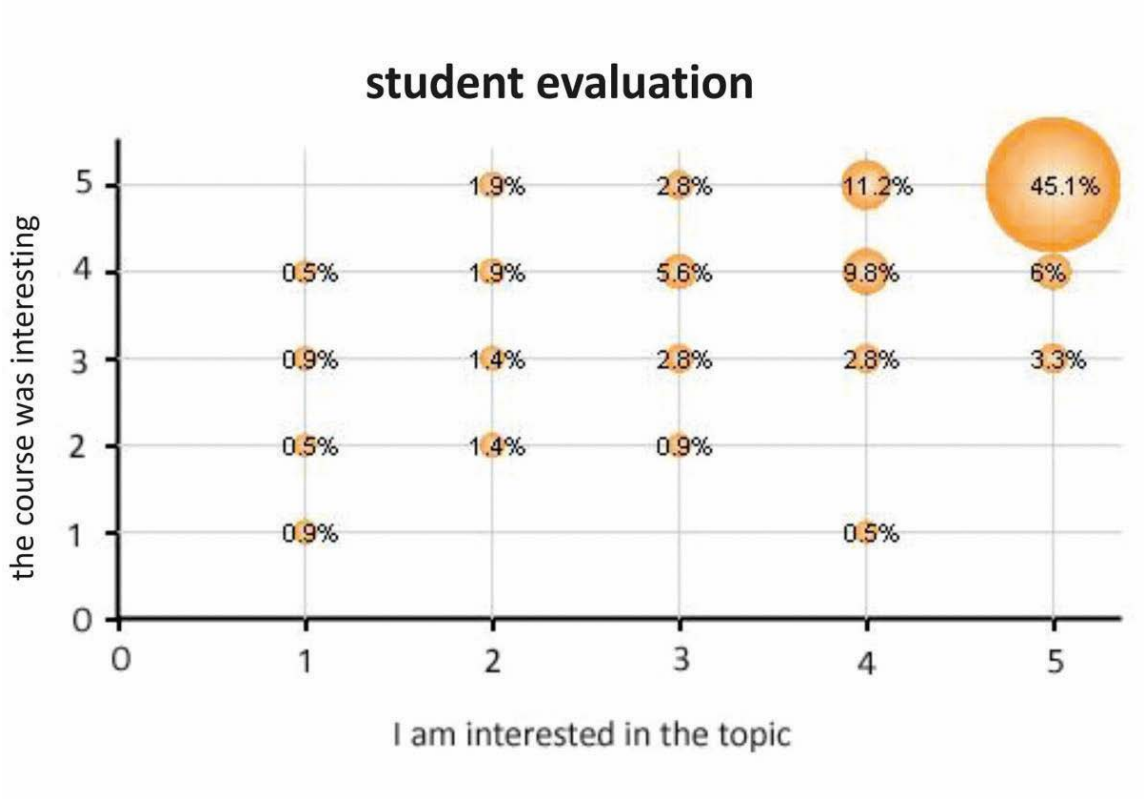
Topic: J.02. Teaching of Neuroscience

Title: Teaching neuroscience to undergraduate students through the history of the research

Authors: *Y. AMITAI;
Ben-Gurion Univ. of the Negev, Beer Sheva, Israel

Abstract: A lecture course was developed for a diverse undergraduate audience, without prerequisites or assuming any academic background. The course focuses on the history of the research into the principles of cellular neurophysiology, starting with Galvani and the notion of 'biological electricity'. Each lecture begins with the personal stories of the researchers and the scientific debates arising from their work. The social and cultural environment of the period is depicted, and their influence on the science is briefly examined. Subsequently, a description of the current state of knowledge is provided. In the process, students are introduced to relevant contemporary issues. For example, the story of Santiago Ramón y Cajal, his dispute with Camillo Golgi and the rise of the 'neuronal doctrine' is extended to describe today's perspective of neuronal circuits and the debate over the current 'human connectome project'. The course is

designed with several objectives in mind: 1) to familiarize the students with the concepts of biological preparations and biomedical experimentation, 2) to teach the basic principles of cellular neurophysiology, and 3) to encourage the students to think about social issues such as science funding, or the influence of religion and politics on scientific progress. Enrollment is limited to 120 attendants. Students' demographics typically include a significant number of computer science majors (around 25%), biology majors and psychology majors (around 10% each). The rest of the attendance consists of few students majoring in various other disciplines. Surveys and quizzes by means of Kahoot internet platform (https://getkahoot.com/) are used during each lesson to engage the students in discussion while noting attendance, and provide formative assessment. Summative assessment is done by a project of brief essays on a selection of topics. Student experience is notably positive. Interestingly, summary of student evaluations from the past 3 years demonstrates that their experience exceeds their preexisting interest in the topic (fig. 1).



Disclosures: **Y. Amitai:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.20SA/VV62

Topic: J.02. Teaching of Neuroscience

Support: Odyssey Internship Program at the University of Chicago to S.G.

Bill and Melinda Gates Foundation to A.B.

Title: Teaching quantitative skills via comparative neuroanatomy: Integrating the principles of Vision and Change into pedagogical practice

Authors: A. BURRE[1], S. GRETA[2], W. TOMITA[3], D. ROSTAMIAN[4], N. SCHOTTLER[4], K. UNO[4], *W. E. GRISHAM[4];
[1]Neuroscience, W.M. Keck Sci. Dept, Claremont McKenna Col., Claremont, CA; [2]Neuroscience, Grossman Inst., Univ. of Chicago, Chicago, IL; [3]Neurosci., UCLA, UCLA, CA; [4]Dept Psychol, UCLA, Los Angeles, CA

Abstract: As noted by Vision and Change (http://visionandchange.org/), biology relies on quantitative analysis and mathematical reasoning. Likewise, neuroscience is becoming more quantitative, and our instruction needs to reflect these changes. Methods such as linear regression need to be understood by our students as analytical tools. Here we present an exercise that utilizes 1) linear regression, 2) the log of variables, and 3) covariance, which is a means of controlling for variables.
Students explore the size of the hippocampus relative to the whole brain in 61 different mammalian species--from an anteater to a zebu. Students utilize a digital image library available via our website, https://mdcune.psych.ucla.edu/modules/cna, which also has the metadata and a tutorial guide to guide students through the module.
Students utilize free quantification software (ImageJ) as well as free statistical analyses software (JASP https://jasp-stats.org/).
Students examine the relationship between log hippocampal size and log brain size by constructing a scatterplot and finding the regression line. Since carnivores and primates are over-represented in our sample of mammals, students construct separate regression lines for these two groups and one for the remaining mammals. Students test whether the slopes of these three regression lines are different. Students also control for body weight by using it as a covariate. Lastly, students use an ANOVA to compare the proportion of the brain devoted to hippocampus in carnivores, primates, and the remaining mammals.
Students usually find that as brains get larger, the size of the hippocampus increases, but the proportion of the brain devoted to the hippocampus diminishes. Furthermore, the proportion of the brain devoted to hippocampus in primates and carnivores is significantly less than in our mammalian cousins.
Students showed clear gains in pre-posttest evaluations on items relating to the module, $t(29) = 6.17$, $p < 0.0001$, but not on a subtest of critical thinking, $t(29) = 1.16$, $p = 0.26$.
Affective/opinion data showed that students agreed that the module was interesting and stimulated them to think critically. Students generally agreed that they learned something about both comparative neuroanatomy and statistics.
Instructors should find this module easy to adopt at their home institutions by employing the

resources that we have provided.
Although we picked the hippocampus because it is easy for students to identify and quantify, any neuroanatomical structure that can be visualized with a Nissl stain can be employed as a focus of study.

Disclosures: **A. Burre:** None. **S. Greta:** None. **W. Tomita:** None. **D. Rostamian:** None. **N. Schottler:** None. **K. Uno:** None. **W.E. Grisham:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.21SA/VV63

Topic: J.02. Teaching of Neuroscience

Support: Office of Undergraduate Research and Creative Scholarship, California Lutheran University

Title: Development of neuroscience and animal behavior lab exercises on chemoreception using the aquatic snails, Lymnaea stagnalis and Helisoma trivolvis

Authors: *K. LONG;
Biol., California Lutheran Univ., Thousand Oaks, CA

Abstract: The freshwater pulmonate snails, *Lymnaea stagnalis* and *Helisoma trivolvis*, have been used in studies of the cellular basis of learning, memory, and feeding behavior. They are commonly used for electrophysiological experiments in undergraduate neuroscience labs due to their large neurons, well-characterized neural circuits, and ease of maintenance. In order to expand the use of *Lymnaea* and *Helisoma* in undergraduate neuroscience classes, I developed simple behavioral experiments using them and have conducted the exercises in introductory neuroscience, physiology, and animal behavior courses. Students study the feeding response of snails to 2% agar-agar pellets containing 20 mM maltose. Pairs of pellets (a control pellet and an experimental pellet) are placed at both ends of a test chamber (a rectangular 700 ml container with a Sylgard®-lined bottom). The pellets are fixed to the bottom using pins with colored heads - this ensures that students are blind to the identity of the pellets until the color code is revealed at the end of the exercise. Individual snails that have been fasted for 24 hours are placed in the center of each container containing 250 mls of artificial pond water. Snail responses (whether or not the snail is feeding on a particular pellet) are recorded every 5 minutes for 30 minutes. Class data on 12-20 snails are pooled and pellet identity is revealed. An online chi-squared program is used to determine whether observed differences in pellet choices are statistically significant. The basic protocol can be incorporated into a 2-3 hour lab on chemoreception, or performed in a lecture section. The large number of possible variables that can be tested using this protocol

makes multi-week, problem-based lab projects very feasible. For example, students have tested the effect of glutamate-containing pellets on the feeding response; glutamate inhibits feeding in both species, which is in keeping with its role as a neurotransmitter in the feeding central pattern generator network.

Disclosures: K. Long: None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.22SA/VV64

Topic: J.02. Teaching of Neuroscience

Title: The liberal arts in practice: A new neuroscience research course

Authors: *R. A. BERGSTROM;
Biol., Beloit Col., Beloit, WI

Abstract: The liberal arts stress the value of transferrable skills. Many students experience this deeply through a research experience with a faculty mentor. Student-faculty research is also a high-impact practice for undergraduates. We initiated a course-based research project to provide students the opportunity to learn the process and transferrable skills of research and basic concepts in neuroscience. The desired outcomes for this course were to 1) determine the feasibility of this type of research experience; 2) help students develop skills for success in research; 3) highlight the application of and transferability of research skills; and 4) complete preliminary experiments for a neuroscience research project. The work was approved by the Beloit College IRB. Eleven undergraduate students enrolled in a biology topics course were given the task of validating an EEG analysis algorithm for mice on human data. Students identified research goals every two weeks throughout the 15-week course. For each goal set, students wrote reflections that included analysis of progress and stumbling blocks and personal thoughts on the project and class. Class sessions included lab meetings, work time, student presentations on neuroscience concepts, and group discussions on the research project and process. Learning outcomes and student attitudes were assessed by the student assessment of learning gains and course undergraduate research experience surveys and other self assessments throughout the course. Students value the skills they gained related to the research, though some said that they did not gain substantial knowledge in neuroscience. The focus of the reflection documents was strategies for achieving research goals. It was noted that working in groups and navigating changing goals and group dynamics was important. Students made important research gains, including optimizing code, identifying human EEG data sources, developing a strategy for visual scoring of EEG, producing an in-depth literature review, developing a library guide, and preparing a database of methods for future research groups. These outcomes support offering the

course again in the future to get more students involved in the high-impact, liberal arts-related experience of research at the undergraduate level.

Disclosures: R.A. Bergstrom: None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.23SA/VV65

Topic: J.02. Teaching of Neuroscience

Title: Of roaches and men: A brief affordable demonstration which facilitates undergraduate understanding of the action potential

Authors: *D. M. CURLIK, II;
Psychology Program, York Col. of Pennsylvania, York, PA

Abstract: Understanding the biological basis of how the brain contributes to behavior is fundamental to the understanding of psychology. Despite this, many undergraduate psychology students often indicate a lack of interest in biopsychology courses, typically describing these courses as unimportant and/or intimidating. One of the most challenging topics for students in these courses is the action potential, and understanding how the action potential contributes to behavior. Numerous simulations and demonstrations have been developed to facilitate teaching of the action potential. However, many of these demonstrations are time and resource intensive, especially for instructors in a small liberal arts setting. Over the last several years a number of affordable techniques for demonstrating electrophysiology in the classroom have become available, including the Neuron SpikerBox and Human-Human Interface. The SpikerBox is a tool for recording from and stimulating the nervous systems of numerous invertebrate species, including the *Blaberus discoidalis* (Discoid cockroach), whereas the Human-Human Interface is designed to record from and stimulate the human nervous system. Here we report that one brief in-class demonstration and discussion using both the SpikerBox and Human-Human Interface facilitated learning about electrophysiology in undergraduate students enrolled in an introductory biopsychology course. Data were collected from 30 students, 22 psychology-majors and 8 non-majors. Prior to the demonstration all students had been exposed textbook readings, online quizzes, and three 75-minute lectures focused on understanding electrophysiology. To assess understanding of these electrophysiological principles all students completed a brief five question survey prior to, and after, one 75-minute in-class demonstration using the SpikerBox and Human-Human Interface. Prior to the demonstration students indicated that they did not understand how the nerve impulse was propagated, nor did they understand how the action potential underlies thoughts and behaviors. Following the demonstration all students (N=30) reported a greater understanding of how the nerve impulse is propagated ($p<0.001$), of how the

nerve impulse leads to neurotransmitter release ($p<0.001$), and of how the action potential underlies thoughts and behaviors ($p<0.001$). These results were also observed when only the data from Psychology majors were analyzed. Together, these results suggest that one brief demonstration, requiring minimal specialized equipment, can facilitate undergraduate student learning of basic electrophysiological principles.

Disclosures: D.M. Curlik, II: None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.24SA/VV66

Topic: J.02. Teaching of Neuroscience

Title: Teaching Python and MATLAB for insect behavior: A minimalist neural model with biologically realistic characteristics

Authors: *U. M. RICOY[1], J. F. GOMEZ-MOLINA[2], M. CORREDOR[3];
[1]Biol., Northern New Mexico Col., Espanola, NM; [2]Intl. Group of Neurosci. (IGN), Medellin, Colombia; [3]Biol. Inst., Univ. of Antioquia, Medellin, Colombia

Abstract: INTRODUCTION. Python and MATLAB are friendly programming languages with similar features. Insects are also living creatures that are accessible and can develop a rich repertory of behaviors in reduced spaces and laboratory environments. The use of these languages programs as well as research on insects are both ideal to teach students using low-cost resources (Ricoy, 2014). We propose here a reduced model of a neuron and network to illustrate teaching of neuroscience. The model was previously used to reproduce under certain conditions the basic signal processing of basic network motifs like lateral inhibition (1 Gomez-Molina and Restrepo, Abstract Event in honor to John Ritzel 2008).
METHODS. Programs in Python and MATLAB. Previous simplified neural models (1). Spontaneous rhythmic are modeled by trigonometric functions or probability distributions (uniform distributions initially). PRELIMINARY CONCLUSIONS. Combining small algorithms, linear functions with delays, and simple behaviors is a good teaching strategy to develop biological intuition of mechanisms and basic mathematical understanding of neural equations.

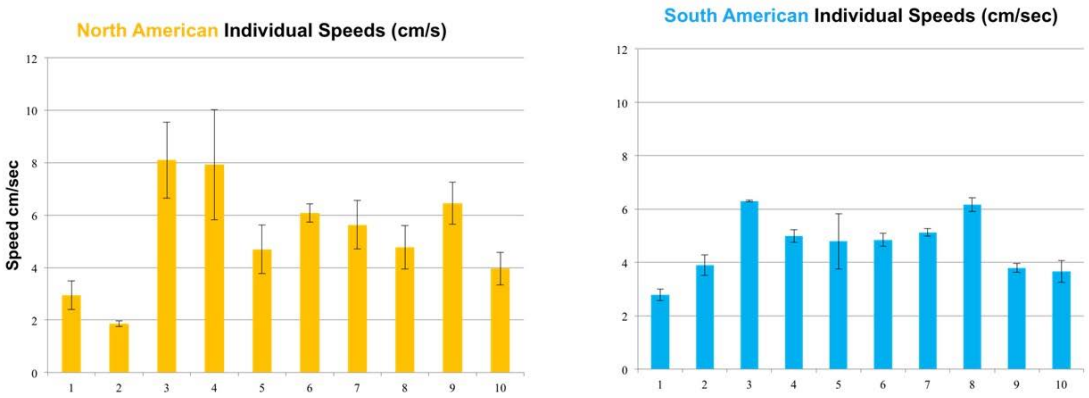


Figura 1. Individual Speed Comparison between North American and South America cockraches (speed units: cm/seg).

Disclosures: U.M. Ricoy: None. **J.F. Gomez-Molina:** None. **M. Corredor:** None.

Theme J Poster

023. Teaching Neuroscience in College I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 023.25SA/VV67

Topic: J.02. Teaching of Neuroscience

Support: Student Laboratory fees

Personal funds

Title: Experiences with course-based undergraduate research experience (CURE) to address authentic research questions for a neurophysiology laboratory class

Authors: *M. X. MATTINGLY, V. DAYARAM, C. MALLOY, Y. ZHU, R. MCNALL-KRALL, R. COOPER;
Biol., Univ. of Kentucky, Lexington, KY

Abstract: Over three semesters we have implemented CURE with a neurophysiology class. We will discuss the pros and cons of this activity. We hope to gain input from the participating audience and that they may learn from our attempts in this process. There were about 16 students and 1 TA in the advanced undergraduate and graduate college class with 8 electrophysiology set ups. The course taught basic neurophysiology principles with a variety of animal preparations. Three out of the 10 laboratory exercises were implemented with the goal of addressing authentic

research questions in the aims of publishing the findings in a peer reviewed scientific journal. The three sample projects were: (1) Pharmacological profiling of stretch activated channels in proprioceptive chordotonal organs of crab and crayfish; (2) The effect of CO2, intracellular pH and extracellular pH on mechanosensory proprioceptor responses in crayfish and crab; and (3) The effects of potassium and muscle homogenate on proprioceptive responses in crayfish and crab. Manuscripts summarizing the results from these three projects have now been submitted to journals for review. Issues with CURE have included: (1) Reliably of the data collection; (2) Equal participation by students; (3) Continued involvement in pulling together manuscripts after the course is completed. Pros of CURE for students include: (1) engagement in the research process; (2) developing and appreciation of research procedure and methodology; (3) stressing the importance of accuracy in data analysis (4) Experience in manuscript development

Disclosures: M.X. Mattingly: None. **V. Dayaram:** None. **C. Malloy:** None. **Y. Zhu:** None. **R. McNall-Krall:** None. **R. Cooper:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.01SA/VV68

Topic: J.02. Teaching of Neuroscience

Support: PAPIME PE307415

Title: Academic workshops: An approach to psychobiology and neurosciences for students at facultad de psicología, universidad nacional autónoma de méxico

Authors: *O. A. ROJAS RAMOS, P. M. LUNA-DAVILA, M. MORALES-RUVALCABA, M. BALDERAS-PLIEGO, A. ELIZALDE-MARTÍNEZ, J. E. GALLEGO RUDOLF, M. J. RAMÍREZ-FLORES;
Facultad de Psicología, Univ. Nacional Autónoma de México, Ciudad de México, Mexico

Abstract: As a result of the increasing rate of failure in the subjects related to Psychobiology and Neurosciences (PyN), mainly in the first semesters included in the General Training Area (AFG) in the Faculty of Psychology (FP), Universidad Nacional Autónoma de México (UNAM), the department of Psychobiology and Neurosciences (CPyN), through PAPIME PE307415 project, implemented the activity called: "Psychobiology and applied Neuroscience in Psychology: An approach through academic workshops". These workshops were developed in consequence of the previous work done by the CPyN, which found an apparent disconnection between students and basic concepts of physics, chemistry and biology, that significantly complicate the development of the disciplinary contents of Psychology and its relation with neurosciences. In order to contribute to the immediate incorporation of the student into the

formal curriculum of FP, the present study evaluated the impact of the workshops on 121 students (27 males and 94 females) applying a test before and after having taken the workshop, this test evaluated the accumulation of ideas that approximate each subject to a new knowledge, in this case, to bring students to the minimum necessary concepts of each workshop topic, with the firm intention of providing them with previous knowledge, considering that within this, there is a new factor called "alternative conception" or "preconception", that impact on the way in which the students will build their knowledge and, in terms of learning, preconceptions will precede the formation of new information characterized by making available useful knowledge to solve a particular problem when it is labeled as an specific knowledge. Through a Student's T-test for paired samples, significant differences between the means of the pre and post questionnaire scores were found for each workshop, thus, it can be conclude that the workshops will allow teachers to know the previous conceptions that students have of the basic knowledge about Neurosciences development and the understanding of Psychology, so that, they can directly influence these ideas and facilitate student's learning. Given the previous inference, one of the perspectives of the present study is to follow up the students who took the workshops and identify under what other contexts they have internalized the knowledge, norms and roles of this field and, in general, appropriate the set of concepts and models of the PyN.

Disclosures: O.A. Rojas Ramos: None. **P.M. Luna-Davila:** None. **M. Morales-Ruvalcaba:** None. **M. Balderas-Pliego:** None. **A. Elizalde-Martínez:** None. **J.E. Gallego Rudolf:** None. **M.J. Ramírez-Flores:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.02SA/VV69

Topic: J.02. Teaching of Neuroscience

Support: College of the Holy Cross Hewlett-Mellon Funds

Title: Flipping the classroom to address STEM concepts in an introductory neuroscience course

Authors: *A. C. BASU;
Psychology, Col. of the Holy Cross, Worcester, MA

Abstract: Neuroscience is a quintessentially interdisciplinary field for which it is necessary that students achieve broad-based proficiency in the sciences and quantitative reasoning. Interdisciplinary teaching and engaged learning are associated with desirable learning outcomes in STEM, as well as recruitment and retention of participants from underrepresented groups. Accordingly, at the College of the Holy Cross, faculty members from 5 departments contributed to the design of an introductory neuroscience course to serve 2 main interdependent learning

objectives: (i) interdisciplinary awareness and (ii) broad scientific proficiency. This 100-level course with no pre-requisites, targeted to first semester students, was first offered in fall 2016 through the College's Center for Interdisciplinary Studies. In contrast to previously existing courses at the institution, the focus of this course was on the application of scientific concepts from various disciplines at the level of an introductory science course for science majors. As such it introduced college-level scientific thinking as an entry point to further study in the sciences. Foundational concepts in biology, chemistry, physics, and mathematics required to build a working understanding of nervous system function were taught in 8 "flipped" class modules throughout the semester: Students viewed didactic material in the form of brief Panopto videos and completed accompanying written assignments as homework. In lieu of lectures, class meeting time was used for engaged learning activities in which students applied the basic STEM concepts to understand nervous system structure and function. Assessment of interdisciplinary awareness in this and two other different introductory neuroscience courses within the institution, a 100-level biology topics course for non-majors and a 200-level course in physiology and behavior for psychology majors was conducted using two previously published tools: (i) an open-ended prompt asking, "What is Neuroscience?"and (ii) a term-discipline relevance survey (Crisp and Muir, 2012). While students in the interdisciplinary Introduction to Neuroscience course did not gain interdisciplinary awareness according to the first measure, the term-discipline relevance survey did show an increase in interdisciplinary learning. The responses to the open-ended prompt revealed an increase in the number of levels of analysis included by this group. Longitudinal analysis of student outcomes with respect to academic performance, recruitment, and retention in STEM majors is planned.

Disclosures: A.C. Basu: None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.03SA/VV70

Topic: J.02. Teaching of Neuroscience

Title: Journal of undergraduate neuroscience education: A peer reviewed, open-access and pubmed listed forum for innovative ideas in neuroscience education

Authors: *B. R. JOHNSON[1], R. L. RAMOS[2], E. P. WIERTELAK[3];
[1]Neurobio. and Behavior, Cornell Univ., Ithaca, NY; [2]Biomed. Sci., NYIT-COM, Old Westbury, NY; [3]Neurosci., Macalester Col., Saint Paul, MN

Abstract: The Journal of Undergraduate Neuroscience Education (JUNE) is a peer-reviewed, PubMed listed and open-access journal published by the Faculty for Undergraduate Neuroscience (FUN). JUNE presents articles addressing a wide range of topics focusing on

undergraduate and graduate neuroscience education. These include course descriptions and their assessments by students, interviews with noted figures in neuroscience, laboratory exercises, outreach activities, and opinion pieces and editorial viewpoints on issues of general concern for undergraduate and graduate neuroscience education. JUNE manuscripts review media and print teaching resources to provide evaluations of textbooks, videos, and web-based material for both classroom and laboratory teaching. Also highlighted are discussions of curriculum and professional development, instructions for home production of inexpensive, high quality and sophisticated lab equipment, a series of "amazing" papers in neuroscience, tutorial reviews, and the feature, "Case Studies", that gives a context to core neuroscience principles. For example, recent articles in JUNE include editorials and opinion pieces on topics like: FUN at 25 years, student assisted course design, a student guide for attending the annual Society for Neuroscience meeting, and a discussion of engaged learning techniques using web-based, audience response systems. Recent full articles address a range of topics such as: a seminar course run by graduate students to teach experimental methods, the prominence of the neuroscience major for life science students, using social media to engage students and for public outreach, sophisticated simulation exercises addressing visual physiology, student driven experiments with *C. elegans*, behavioral observations of fruit fly behavior, hands on neural circuit construction with electronic simulators, and much more. In addition, latest issues include recent textbook reviews and a perspective on Jose Delgado's work on the neural correlates of aggression. JUNE seeks submissions in any of the above article formats. Go to www.funjournal.org/ for more details and free access to JUNE articles.

Disclosures: B.R. Johnson: None. **R.L. Ramos:** None. **E.P. Wiertelak:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.04SA/VV71

Topic: J.02. Teaching of Neuroscience

Support: Regis College Faculty Development Grant

Title: Lessons Learned: Design, hand-off and launch of a neuroscience major

Authors: *H. R. SABOLEK[1], M. BILOZUR[2], S. THRELKELD[3];
[2]Biol., [3]Neurosci., [1]Regis Col., Weston, MA

Abstract: Regis College is a small, private catholic university in greater Boston with less than 1000 undergraduate students. Regis is a minority-serving institution with over 40% of our students self-reporting as first-generation college students, and greater than 30% pell-eligible. In 2011, the Biology and Psychology Departments collaborated to develop a neuroscience

concentration. Our aim was to develop a small, sustainable, low-cost program using existing courses and limited resources that would allow us to build awareness of the field of neuroscience. As a result of program growth, collaborating faculty developed a proposal for a B.S. in Neuroscience within the newly formed School of Health Sciences during the 2015-2016 academic year. This program was guided by the blueprints outlined by (Wiertelak and Ramirez, 2008) and integrated community outreach, hands-on learning, student research and service learning throughout the curriculum to align with Regis College's mission. However, a number of challenges to developing a comprehensive program persisted including, limited and outdated infrastructure, a lack of start-up funds, full workloads for existing faculty, no active faculty research and no Institutional Animal Care and use Committee (IACUC). Strategic hiring of a new director with Neuroscience program development experience, ongoing grant funding, equipment and experience as an IACUC chair made implementation of the program practicable. Within the first year of the program's launch, students from the preexisting Neuroscience concentration became involved in on-campus research, underused laboratory space was identified and repurposed to create a Neuroscience laboratory and vivarium, an IACUC was formed, and five students were recruited into the new major. This poster will review milestones in program development and a number of challenges that remain as we grow the program, increase student involvement and move the entire campus toward a culture of student research engagement.

Disclosures: H.R. Sabolek: None. **M. Bilozur:** None. **S. Threlkeld:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.05SA/VV72

Topic: J.02. Teaching of Neuroscience

Support: University of Alberta TLEF

Title: Neuromembrane, web-based simulator for teaching neuroscience

Authors: *D. W. ALI[1], G. D. FUNK[3], K. E. JONES[2];
[2]Fac Physical Educ. & Rec., [1]Univ. Alberta, Edmonton, AB, Canada; [3]Physiol., Fac. of Med. and Dentistry, Univ. of Alberta, Edmonton, AB, Canada

Abstract: Undergraduate students have a difficult time understanding basic neuroscience concepts such as the factors that give rise to the resting membrane potential, the action potential, the direction of ion flow across the membrane and the action of voltage-gated ion channels (Na+ and K+). Hands-on dynamic simulations are a useful pedagogical tool for overcoming learning barriers. Therefore, we designed and built (in collaboration with a programming company,

Atmist Co.) a web-based simulator, called “Neuromembrane” using the Hodgkin Huxley models of ion conductances. The simulator allows students to see ion channel function and ion flow across cell membranes. Our goal was to allow students to alter key parameters of membrane function and make predictions in terms of ion channel activity, ionic currents, membrane potentials and synaptic activity. We wanted the simulator to be free and easily accessible, straightforward to use and easy to understand. In addition, we wanted students to easily upload or download their starting parameters and to print off results as PDF documents (for assignments). It is hosted on the web at the University of Alberta (https://neuromembrane.ualberta.ca/account/login) and is highly accessible via a Guest Login button. We wanted students to access the program from the internet via computer, tablet or smartphone and therefore chose not to build the simulator as a platform-specific application, but rather a web-based application. Programming modes include SciPy (open source) + Highcharts (JavaScript, free for educational purposes).
Neuromembrane has 7 Simulation Modes: Resting Potential, Action Potential, Voltage Clamp, Voltage Clamp I/V, EPSPs, IPSPs and Integration. We are currently improving the functionality of these modes and continuously adding to the program. The Neuromembrane Simulator has been used in classes at the graduate, undergraduate and high school levels. It has aided teaching and pedagogy by allowing students to see ion channel activity and ion flow across the membrane in a visually attractive and it has encouraged discussion and the ability to run thought experiments and make predictions about channel function has greatly aided learning in the classroom.

Disclosures: D.W. Ali: None. **G.D. Funk:** None. **K.E. Jones:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.06SA/VV73

Topic: J.02. Teaching of Neuroscience

Title: From semiotics to synapse: A multidisciplinary approach to addressing the neuroscience of learning

Authors: *K. S. HOLLOWAY;
Vassar Col., Poughkeepsie, NY

Abstract: The study of meaning occurs across academic disciplines. Capstone experiences in neuroscience provide an opportunity for students to bring their diverse proficiencies to address a focused question. This course explores several of the various methods used to explain and describe the means by which an arbitrary stimulus can come to elicit behavior. By examining the question of acquisition at several levels of reduction, beginning with the philosophical and

linguistic, moving through the “cryptic language of learning”, and culminating at neuroanatomical and cellular descriptions, students come to a deeper understanding of the mechanisms of learning. Further, the importance of this understanding is highlighted in several of the last class sessions as students apply learning about arbitrary stimuli to the study of animal behavior.

Disclosures: K.S. Holloway: None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.07SA/VV74

Topic: J.02. Teaching of Neuroscience

Support: NIH Grant NS080686

Title: Does the blueprint program for enhancing neuroscience diversity through undergraduate education experiences increase diversity in neuroscience?

Authors: *K. VAZQUEZ[1,2], V. QUINONES-JENAB[2], C. AOKI[3], R. MIRANDA[2];
[1]BP-Endure, Hunter College- CUNY, New York, NY; [2]Psychology, Hunter College, City Univ. of New York, New York, NY; [3]New York Univ., New York, NY

Abstract: Broadening the US scientific workforce is a national priority, given that diversity in research is associated with higher-impact science (Freeman & Huang, 2015). Diverse racial and ethnic groups, individuals with disabilities, and individuals from socially, economically, and educationally disadvantaged backgrounds are underrepresented in neuroscience. This disparity of participation by underrepresented groups drastically increases from undergraduate to doctoral programs. For the past 7 years, our NIH-funded Blueprint Program for Enhancing Neuroscience Diversity through Undergraduate Education Experiences (BP-ENDURE at Hunter and NYU) has sought to increase the number of underrepresented and socioeconomically disadvantaged individuals entering doctoral programs in neuroscience-related areas by providing research experience and professional development opportunities to undergraduates to help them become competitive for graduate school. The present study will use quantitative measures from our external evaluations to assess how well our program has achieved its goals of increasing diversity in neuroscience. Findings from this study may inform other neuroscience-oriented academic enrichment and professional development programs for underrepresented students to help increase the pipeline from undergraduate to doctoral programs in neuroscience.
Grant support: NS080686 to HC.
Key words: Diversity, underrepresented, training grants

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

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.08SA/VV75

Topic: J.02. Teaching of Neuroscience

Title: Interdisciplinary neuroscience applications: A capstone course

Authors: *C. L. FRANSSEN[1], A. FRANSSEN[2];
[1]Psychology, [2]Biol. and Envrn. Sci., Longwood Univ., Farmville, VA

Abstract: In 2015, we developed a new Interdisciplinary Neuroscience Studies minor at Longwood that emphasized connections between neuroscience and other disciplines across the liberal arts. The program has attracted students from a variety of disciplines, including Biology, Communication Sciences and Disorders, Criminology, and Psychology. As a capstone experience for this diverse group of students, we designed a course in neuroscience applications. The course is designed to demonstrate the breadth of the field, to help students make clear connections between the related sub-disciplines, and to prepare students for careers related to neuroscience. Students designed activities for Brain Awareness Week as a method of understanding how neuroscience outreach applies to the world around them. Students learned the intricacies of grant writing through a series of workshops that facilitated them through four drafts of a grant proposal that went through several levels of peer and instructor review. Moving topically through the course text, Scientists Making a Difference (Sternberg, Fiske, and Foss eds. 2016), students were challenged to think of innovations in behavioral and brain sciences from a first-person perspective, and then to summarize lessons learned from accomplished scientists as they might apply to the students' own futures. Through a series of workshops, students participated in extensive career preparation, creating and editing job application materials, learning about the intricacies of graduate school decision processes, and discovering hundreds of careers related to neuroscience requiring multiple levels of training and education. Here we discuss the course objectives, student outcomes from the inaugural class, and adjustments to be made in future iterations of the course.

Disclosures: **C.L. Franssen:** None. **A. Franssen:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.09SA/VV76

Topic: J.02. Teaching of Neuroscience

Title: One brain, many possibilities: Exploring the value of an interdisciplinary neuroscience studies program

Authors: M. M. ZENS[1], L. SPARROCK[1], G. S. LOWRY[3], *A. FRANSSEN[2], C. L. FRANSSEN[1];
[1]Dept. of Psychology, [2]Longwood Univ., Farmville, VA; [3]Economics, Business, and Accounting Dept., Randolph Macon Col., Ashland, VA

Abstract: With the development of our Interdisciplinary Neuroscience Studies minor in 2015, Longwood University (~4,600 undergraduates) became a part of the rapid proliferation of undergraduate neuroscience programs both within Virginia and nationwide. Our efforts have been rapidly rewarded; over 50 students from a variety of disciplines - Biology, Communication Sciences and Disorders, Criminology, and Psychology - have declared a Neuroscience Studies minor. This torrid pace of growth is both exciting and instructive. Longwood needs to continue development of interdisciplinary opportunities to keep up with the demands of current and prospective students. Our initial curriculum was designed with an intentional focus on connections between neuroscience and other disciplines across the liberal arts, as described in Wiertelak & Ramirez (2008). This interdisciplinary approach, incorporating social sciences and humanities with traditional STEM disciplines, is resonating well with our students, faculty, and administrators. Our first class of Neuroscience Studies minors graduated in 2017. We are now beginning the process of assessing the program. Here we discuss the growth of the minor from 2015-2017, the careers that our graduates are continuing onto, and considering the preparation that our minors have for life after Longwood. Further, we compare and contrast the design of our neuro-related curriculum with curricula of other Virginia schools and peer institutions with the goal of determining the benefits and drawbacks of our interdisciplinary Neuroscience Studies approach.

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

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.10SA/VV77

Topic: J.02. Teaching of Neuroscience

Title: Ethical neglect in undergraduate & graduate neuroscience programs

Authors: *P. W. TSANG[1], P. V. CHU[2], A. LAM[1,2,3], E. L. OHAYON[1,2];
[1]Green Neurosci. Lab., Inst. For Green and Open Sci., Toronto, ON, Canada; [2]Green Neurosci. Lab., Neurolinx Res. Inst., San Diego, CA; [3]Physicians Committee for Responsible Med., Washington, DC

Abstract: This presentation reviews the current state of ethics in neuroscience education and suggests ways that identified critical deficiencies can be addressed. Traditionally, the idea of ethics in neuroscience education may cover: [1] scientific values and attitudes; [2] policy/compliance for protection of subjects, both human and animal (research ethics committees, REC); [3] societal impact; and [4] personal conduct (Responsible Conduct of Research, RCR). The idea of neuroethics has expanded considerably in research and applications but remains narrow on several fronts and is almost entirely absent from formal educational requirements. In order to address these issues we are developing a green and open neuroscience curriculum (http://greenneuro.org/curriculum/). The curriculum is part of a wider initiative for pursuing new ways of studying the brain that are: (i) open (ii) sustainable (iii) eliminate animal experimentation (iv) remove military and commercial biases while (v) integrating with the community and (vi) supporting neurodiversity. To illustrate the need for the educational components we present the results of a survey of degree requirements in undergraduate and graduate neuroscience programs. Our survey covered over 20 universities in the US and Canada, and analyzed all Society for Neuroscience (SfN) Institutional Programs in the database that included both undergraduate and graduate programs. The degree requirements posted on publicly accessible websites were reviewed for ethics-related content. The data revealed that while dedicated courses exist, they are for the most part either a) a course required for professional clinical certification or b) not a mandatory course. Where non-degree courses are offered, they are almost exclusively either a) RCR mandated by the National Institutes of Health, or b) animal care courses required prior to the use of animals in research. In all cases, ethics is not deeply integrated across the programs. We did identify several instances (not listed in the SfN database) of courses being developed that address the broader ethical concerns but these were not mandatory parts of undergraduate or graduate degree granting programs. In summary, there appear to be significant deficiencies in ethics-related instruction in neuroscience undergraduate and graduate programs. Where ethics do appear, they mostly address REC and RCR and not broader neuroethics and ethical values. Although there is promising evidence of best-practices in non-degree electives, extension courses and training, the results point to an urgent need for more explicit requirements and the integration of ethics in neuroscience education.

Disclosures: **P.W. Tsang:** None. **P.V. Chu:** None. **A. Lam:** None. **E.L. Ohayon:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.11SA/VV78

Topic: J.02. Teaching of Neuroscience

Title: Pedagogical innovation of Art_X@Rensselaer to bridge neuroscience and arts education for college students

Authors: *A. A. WALF[1], T. HAHN[2];
[1]Cognitive Sci. Dept, [2]Arts Dept, Rensselaer Polytechnic Institute,, Troy, NY

Abstract: A newly launched pedagogical initiative at Rensselaer Polytechnic Institute (Troy, NY) is Art_X (Arts Across the Curriculum). This approach is aimed at bridging concepts of art in science/technology and science/technology in art in courses and other programming. Two examples are: Lighting and Mindful Practice (L.A.M.P.) project and Sensibilities: Writing Across the Discipline course. In the L.A.M.P. project, material related to the authors' classes "Deep Listening & Creativity" (Hahn) and "Stress & the Brain" (Walf) was jointly covered in several sessions; this had the effect to engage students in these topics in experiential and empirical ways. Notably, the majority of these students are Engineering majors, not those who major in Neuroscience or Arts. All students were instructed on the basics of the stress response and how it is measured with both lecture and experiential learning techniques in addition to one technique related to coping with stress, a mindful meditation practice called Deep Listening conceived by the late composer, Pauline Oliveros. Some class sessions were held in a high-technology Smart Conference room with dynamic light-emitting diode (LED) lights via a collaboration with the Lighting Enabled Systems & Applications (LESA) research group in the School of Engineering. Using the combination of a Deep Listening exercise and varying lighting conditions, and qualitative and quantitative measures of stress and cognitive responding, students were engaged in learning about these transdisciplinary research aims as they related to their course materials in an integrated and hands-on fashion. In addition to the students enrolled in the courses gaining a deeper appreciation of their respective course material, this project involved several undergraduate and graduate students directly in data collection, analysis, and dissemination. The Sensibilities: Writing Across the Discipline course was co-taught by Professors Hahn and Walf. It was held in The Curtis R. Priem Experimental Media and Performing Arts Center (EMPAC) and aimed to inspire students to cultivate writing skills through the theme of the senses/perception. Students observed unique presentations from scholars, scientists, artists and curators, providing rich experiences for in-class discussions and writing. Classes included reading science and art texts, as well as writing workshops to develop authorial voice and experimentation. These are just two examples of how Art_X has come to fruition in the past few years to use a transdisciplinary approach to engage students who otherwise may not be exposed to the latest approaches and findings in neuroscience.

Disclosures: A.A. Walf: None. **T. Hahn:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.12SA/VV79

Topic: J.02. Teaching of Neuroscience

Title: An arts-based critical approach to neurobiology, mental health, and social justice in the undergraduate classroom

Authors: *A. E. FINK;
GWS, UW-Madison, Madison, WI

Abstract: Basic principles of neuroscience are essential to the education of undergraduate students in scientific and pre-health tracks, but neuroscience is also an important part of general education. The neurobiology relating to mental health is an especially important topic for a number of reasons. Increasing proportions of undergraduate students report experiencing symptoms of psychological distress. Education in psychological and biological principles of mental health could be a part of effective coping and recovery at the individual level. Moreover, the experience of adverse life experiences and resulting psychological distress vary as a function of identity, including gender, race/ethnicity, class, sexuality and dis/ability. Courses that make the biopsychosocial basis of mental health and illness relevant and accessible to a wide range of students could be an important part of fostering well-being and academic success for students from diverse backgrounds, and creating healthy communities within and outside of universities. Additional ethical considerations come into play with regard to identity and power in this type of neurobiology classroom. First, historical disparities in opportunity within the sciences create an imperative for classroom environments that invite the participation of marginalized people. Second, the dimensions of power and identity that lead to health discrepancies need to be incorporated within any discussion of the social aspects of mental health. The neuroscience classroom thus presents an opportunity to create an inclusive, critical and transformative understanding of neurobiology and health for science and non-science majors alike. Here, I describe a novel course design that incorporates concepts ranging from basic cellular neurobiology to biological models of stress and traumatic memory with larger topics surrounding social power and identity. In this classroom, I use visual arts to foster generative learning of scientific material, as well as critical analysis to place it into social context. I describe important considerations and accomplishments from a first trial of the course in an interdisciplinary undergraduate classroom consisting of a mixture of biological and social science, pre-health, and non-science majors.

Disclosures: A.E. Fink: None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.13SA/VV80

Topic: J.02. Teaching of Neuroscience

Title: Reducing the cost of electrophysiology in the teaching laboratory

Authors: *R. WYTTENBACH[1], B. R. JOHNSON[2], R. R. HOY[3];
[1]Neurosci. & Behavioral Biol., Emory Univ., Atlanta, GA; [2]Neurobio. and Behavior, [3]Cornell Univ., Ithaca, NY

Abstract: Although electrophysiology is a fundamental part of neuroscience and there are many laboratory exercises suitable for undergraduates, the cost of equipment and material is often a barrier to including neurophysiology in laboratory classes. We have previously published designs for an extracellular amplifier, stimulator, stimulus isolation unit, and suction electrodes, but many low-cost tips and tricks have gone unreported. This poster will show how costs can be cut through substitution of consumer-grade for research-grade products, homemade equipment, and alternate sources for materials. We will present solutions for vibration isolation, electrode positioning, dissection tools and dishes, lighting, optics, electrodes, electrical noise reduction, and chemicals. We will also point out instances in which it may make more sense to purchase (or borrow) research-grade equipment.

Disclosures: R. Wyttenbach: None. **B.R. Johnson:** None. **R.R. Hoy:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.14SA/VV81

Topic: J.02. Teaching of Neuroscience

Support: HHMI Grant for Undergraduate Bioscience Education

Lehigh University

Title: Transforming connections for success in neuroscience and STEM: A new program for underrepresented and first generation students

Authors: *N. G. SIMON[1], V. C. WARE[2];
[2]Biol. Sci., [1]Lehigh Univ., Bethlehem, PA

Abstract: Demand for a technologically advanced workforce can be met by addressing attrition from STEM majors. Our HHMI program intends to improve retention in neuroscience and other

bioscience fields through curricular reforms, research engagement in teams, and enhanced mentoring. The current program draws on prior HHMI-supported initiatives that expanded interdisciplinarity in life sciences curricula and research opportunities for undergraduates. These were: 1) Biosystems Dynamics Summer Institute: a 10-week summer research experience for undergraduates as members of interdisciplinary teams comprised of faculty, grad students, and post-doctoral investigators. To date, 46 teams (159 undergraduates, 81 grad students, and 77 faculty) have participated. More than 80% of undergraduate participants entered graduate programs or STEM fields, 2) SEA-PHAGES: a group of >140 institutions that study phages to identify diagnostic tools and therapeutics for tuberculosis. Of 122 Lehigh SEA graduates, 85% are in STEM post-graduation, and 3) Curriculum Development: some 50 new or revised courses that are highly interdisciplinary and commonly feature course-based research experiences, including a publicly available introductory course. These programs are now institutionalized. The current HHMI program focuses on retention and graduation rates among underrepresented groups and first generation students. It includes 1. BIOCONNECT: COMMUNITY COLLEGE (CC) COLLABORATIONS TO IMPROVE STEM RETENTION: provides Lehigh-sponsored undergraduate neuroscience and bioscience-related interdisciplinary research, mentoring, and STEM student community building experiences for CC students in preparation for graduation and/or transfer. We expect BIOCONNECT participants will show increased retention, advance to graduation, and transfer to universities at a higher rate; 2. RAPIDLY ACCELERATED RESEARCH EXPERIENCE (RARE): a pre-admission-to-graduation science immersion program that provides participants with outstanding scientific skills and preparation for leadership in addressing the complex issues facing the life sciences. RARE incorporates four dimensions seen as essential for success in underrepresented and/or first generation students: an innovative curriculum, identification in a community of scholars, addressing cultural issues that contribute to low success rates, and an understanding of the commitment required to excel in neuroscience and STEM. RARE tests if a comprehensive 4-year approach will improve retention in neuroscience and STEM to greater than 80% among participating students (our current STEM retention rate in these groups is 50%).

Disclosures: **N.G. Simon:** None. **V.C. Ware:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.15SA/VV82

Topic: J.02. Teaching of Neuroscience

Support: Office of Academic and Student Affairs, University of Nebraska at Omaha. 2016-17 Assessment Mini-grant

Title: Programmatic assessment strategies across a major

Authors: *J. D. OMELIAN[1], B. O. RYALLS[2], S. I. SOLLARS[3];
[1]Psychology, Univ. of Nebraska at Omaha Dept. of Psychology, Omaha, NE; [2]Psychology, Univ. of Nebraska at Omaha, Omaha, NE; [3]Univ. of Nebraska At Omaha, Omaha, NE

Abstract: Programmatic assessment has been increasingly required as a necessary component of departmental annual reports. Strategies designed by the Psychology department at the University of Nebraska at Omaha (UNO) seek to combine individual faculty input along with national learning outcome standards. We designed a method of assessing student learning outcomes pertaining to major content domains (including ethics, statistical understanding and interpretation, APA style writing and mechanics, and research design and methodology). We created a set of 4 surveys, delivered via Qualtrics, to measure learning and attitudes across the major. Surveys were administered to all students enrolled in four of the required for psychology majors courses (Introduction to Psychology, Statistics, Research Methods and a Capstone Laboratory course). Each survey asked similar, but not identical, questions to assess content mastery at each educational level. The results were compared across the curriculum, creating a pseudo pre-test/post-test design; each upper level course serves as a post-test for the earlier coursework (e.g., survey results from the Research Methods pre-test provide information on learning outcomes from the prerequisite statistics course). This “pre-test only” design has several advantages. First, delivering the surveys during the first week of classes maximizes student response rates by capturing peak student attendance. Second, it reduces student exam fatigue by eliminating the end of the semester post-course evaluation. Third, this method encourages faculty buy-in as it does not evaluate individual teaching; the focus is on what the student population is retaining from each course as a whole, rather than from a particular instructor in a given semester. One of the goals of the assessment program is to evaluate nested impact coursework. In this context, nested impact refers to preliminary information delivered in the earlier courses and then built on in later upper-level course work. Based on the assessment design implemented here, we can ascertain if this type of preliminary information is retained or needs additional reinforcement throughout the curriculum. The results from the survey will allow the department to make adjustments in curriculum design which will be most impactful for students within the major.

Disclosures: **J.D. Omelian:** None. **B.O. Ryalls:** None. **S.I. Sollars:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.16SA/VV83

Topic: J.02. Teaching of Neuroscience

Title: Characterizing the undergraduate neuroscience major in the U.S.: An examination of course requirements and institution - program associations

Authors: A. C. GARRISON, K. M. PINARD-WELYCZKO, *B. S. CARTER;
Neurosci., Oberlin Col., Oberlin, OH

Abstract: Neuroscience is a rapidly growing field, and many colleges and universities throughout the country are implementing new neuroscience degree programs. Despite the field's growth and popularity, little data exists on the structural character of current undergraduate neuroscience programs. Defining the average neuroscience curriculum can be useful for a number of stakeholders, including institutions looking to improve or establish programs, students wanting to major in neuroscience, and employers hiring neuroscience graduates. Therefore, this study collected and examined data on existing undergraduate neuroscience major programs, including academic course requirements and institution characteristics such as size, financial resources, and research opportunities. Data was collected from institutions' neuroscience program websites and then analyzed to define the average curriculum and identify associations between institution and program characteristics. 31 variables covering information about course requirements, department characteristics, financial resources, and institution characteristics were collected from 118 colleges and universities that offer a "neuroscience" major. Statistical analyses were performed to identify significant correlations between the examined variables. Major findings include the average major requirements, the prevalence of research opportunities associated with neuroscience programs, and what types of institutions are currently most likely to offer an undergraduate degree in neuroscience. This research can be useful for informing a number of groups interested in undergraduate neuroscience training, including institutions looking to improve or establish programs, students wanting to major in neuroscience, and employers hiring neuroscience graduates.

Disclosures: A.C. Garrison: None. **K.M. Pinard-Welyczko:** None. **B.S. Carter:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.17SA/VV84

Topic: J.02. Teaching of Neuroscience

Title: Effective use of the literature is affected by topic choice in an undergraduate term paper

Authors: *A. K. PACK;
Utica Col., Utica, NY

Abstract: The Occupational Therapy cohort at Utica College takes a 200-level course in neuroscience, which includes a 3000-word term paper based on primary neuroscience literature. Students are allowed to choose any topic that relates to neuroscience, subject to approval by the instructor. In papers on topics identified as “clinical” (vs “primary science”), there was more use of review papers (mean 2.8 per paper vs 0.9), non peer-reviewed sources (mean 1.1 per paper vs 0.2), and sources related more to public health than to neuroscience, as defined by a handout given before the assignment (mean 3.1 per paper vs 0). The two main reasons for this appear to be availability of inappropriate sources, and difficulty focusing on science by the author. As clinical examples are important ways to motivate these students to write about science, ways of improving literature use are discussed that do not include eliminating clinical choices for paper topics.

Disclosures: A.K. Pack: None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.18SA/VV85

Topic: J.02. Teaching of Neuroscience

Title: Undergraduate students are able to apply their knowledge of the nervous system by performing mock neruological examinations

Authors: *P. YURCO;
Le Moyne Col., Syracuse, NY

Abstract: Approximately 90% of undergraduate biology majors at Le Moyne College are interested in a career in the health professions. This percentage likely approximates the national trend of biology majors. As a result, many students are primarily focused on the memorization of facts and are more resistant to critical thinking and problem-solving. As a way to motivate pre-health students to think more analytically, a mock "neurological examination" was utilized. Students worked in pairs to "exam" individuals portraying patients with specific disorders. The patients were composed of faculty and student volunteers not associated with the course that were given instructions to react certain ways during specific parts of the examination. Importantly, the patients were not told what their disorder was. Students were given careful instructions on the steps required to give the "neurological examination." Following the examination, students carefully considered any abnormalities and which structures were likely involved. Finally, based on their findings they made a diagnosis. Students were highly motivated to apply their newly acquired knowledge of the nervous system in a "real world setting." This technique was highly successful for requiring students to apply their knowledge in an analytical and sophisticated manner. Furthermore, this exercise allowed students to reinforce what they had

been learning throughout the semester as well as demonstrate to these future health care professionals the importance of being able to think analytically.

Disclosures: P. Yurco: None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.19SA/VV86

Topic: J.02. Teaching of Neuroscience

Title: Measuringstudent learning using closed book, timed exams versus open book, take-homeexams

Authors: *L. L. MCGREW;
Dept Biol, Belmont Univ., Nashville, TN

Abstract: Teaching strategies have evolved to incorporate changing technology, improve student engagement and include relevant skills but teachers continue to struggle with ways to assess student learning and improve retention. Is a closed book, timed test the best way to ensure that students' memorize information or does it encourage brain dumps? Does a take-home exam encourage deeper engagement with material or "googling" without really evaluating the results? Published studies show mixed results, suggesting that there are other important variables to consider: question type, student motivation and course goals. Over the past few years, I have incorporated both exam styles in upper level classes for science majors and in general classes for non-science majors. In some cases, I have also allowed students to collaborate on exam questions. A number of pedagogy studies suggest that group work improves student outcomes. While there is a legitimate concern that some students will not participate fully in the process, collaboration is important for exposing students to multiple perspectives and for helping to develop interpersonal skills. In order to improve accurate evaluation of participants' learning, I require each student to submit his own handwritten answers, to acknowledge the contributions of others, and to include a self-evaluation of his level of participation. While the population sizes are small and the data are not directly comparable, my results suggest that take-home exams produce deeper understanding and better retention.

Disclosures: L.L. McGrew: None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.20SA/VV87

Topic: J.02. Teaching of Neuroscience

Support: Carolina Center for Public Service

Title: Neural connections: A service-learning undergraduate class

Authors: *M. R. PENNER, C. L. LEBONVILLE, S. N. BROSSO, E. I. ULRICH, S. POWERS;
Psychology and Neurosci., Univ. of North Carolina at Chapel Hill, Chapel Hill, NC

Abstract: Service-learning is a teaching method that incorporates community involvement into the coursework. Through community engagement, students can develop a deeper understand of course materials, and may also develop a sense of civic responsibility. Service-learning pedagogy has the advantage of challenging and broadening traditional ideas about both teaching and learning. In the service-learning course described here, the roles of teacher, learner, and community partners are shared among the undergraduate students enrolled in the class, the faculty member teaching the service-learning class, and the community partners connected to the class. This undergraduate service-learning course was implemented to incorporate best practices in community engagement pedagogy with goals that were in direct response to community concerns: 1) Promoting science literacy within our community through hands-on activities, 2) Providing neuroscience-specific activities and content to fill gaps in K-12 educational settings, and 3) Promoting diversity and inclusiveness in science. Students enrolled in the course completed Introduction to Neuroscience or Biopsychology as prerequisites to establish a baseline of neuroscience knowledge. In class, students reviewed fundamental neuroscience concepts, completed quizzes to assess learning, and then applied this knowledge by designing hands-on neuroscience activities. Readings and discussion sessions with guests from the community were also utilized to identify specific barriers to neuroscience. Equipped with this foundation, students partnered with a community organization to deliver neuroscience lessons and activities. Each student enrolled in the class was required to complete a minimum of 30 service-learning hours, allowing each student to gain significant experience in the community. Critical reflection activities were utilized to help students thoughtfully process the impact of their community work. In partnership with The Carolina Center for Public Service, this award-winning course has been offered for two Spring semesters at the University of North Carolina at Chapel Hill. Students have positively rated their experience with this class, indicating that the structure of the course deepened their understanding of neuroscience, increased their awareness of the barriers many experience when engaging in neuroscience, and significantly increased their interest in community service and informal education. Thus, through structured integration of academic learning and relevant community service, this course enhances undergraduate learning of neuroscience without compromising academic rigor.

Disclosures: M.R. Penner: None. **C.L. Lebonville:** None. **S.N. Brosso:** None. **E.I. Ulrich:** None. **S. Powers:** None.

Theme J Poster

024. Teaching Neuroscience in College II

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 024.21SA/VV88

Topic: J.02. Teaching of Neuroscience

Support: NSF IOS-1252769

Title: Do I belong here? Belongingness, motivation and perceived communicative competence through active learning and author engagement in neuroscience

Authors: *E. E. JAHNER[1], K. A. RAZAK[2];
[1]Univ. of California Riverside, Riverside, CA; [2]Univ. California, Riverside, Riverside, CA

Abstract: Two years of an undergraduate course at UC Riverside on the neural mechanisms of animal behavior utilized ongoing active learning experiences as well as active engagement with scholars whose work was reviewed by the students. The program was evaluated in a pre-post test design evaluating not only knowledge gains, but motivation, sense of community belongingness and perceived communicative competence in the neuroscience field. Activities included analysis of animal vocalizations, neural coding mechanisms in cockroaches, as well as activities exploring how bats and barn owls localize their prey. During the final weeks of the quarter students discussed published articles with authors *via* live video. Authors and papers were chosen to represent methods that the students had learned in the previous weeks.
Using the Expectancy Value Model of motivation (Eccles, 2005; Winfield and Eccles, 2000), we surveyed students and found that students who participated in the course showed a large and significant increase in their expectancies for success in the field of neuroscience. Additionally, the way they value the material in the course increased, they saw the neuroscience information as more interesting, more reflective of who they were, and more useful for their future aspirations as the course proceeded. Importantly, the perceived emotional and cognitive cost associated with neuroscience studies was reduced making the field feel more accessible.
Secondly, efficacy in scientific skill is a critical component of belongingness as defined by Estrada Woodcock, Hernandez, & Schultz (2011). It has been linked to persistence, achievement, and tenacity in both experimental and naturalistic settings. Chemers, Hu, and Garcia (2001) applied efficacy theory to predict academic success and personal adjustment of first-year university students finding that achievement of academic goals, personal adjustment to college, and physical health were all strongly predicted by self-efficacy in their field. Increased confidence in a skill increases the likelihood that skill will be utilized and practiced (Bandura, 1997). A modified survey from Estrada et al., (2011) and Chemers et al. (2011), was used to evaluate communicative competence, and confidence in scientific skill as it pertained to neuroscience. Our analysis has shown that as students took this course, their confidence in

discussing neuroscientific concepts with peers, TAs, and professors showed statistically significant gains.
Activities, as well as the survey instruments will be discussed along with the importance of community belongingness, communicative competence, and motivation in program success.

Disclosures: E.E. Jahner: None. **K.A. Razak:** None.

Theme J Poster

025. Teaching Neuroscience As A Part of Graduate Education

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 025.01SA/VV89

Topic: J.02. Teaching of Neuroscience

Title: Designing multidisciplinary spiritual neuroscience elective course

Authors: *M. RAZA;
Baqiyatallah Univ. of Med. Sci., Tehran, Iran, Islamic Republic of

Abstract: Recent years have witnessed tremendous advancement of the understanding of various aspects of human brain function from purely experimental as well as other diverse disciplines. Modern techniques including high resolution fMRI together with studies on the impact of human religiosity and spirituality on behavior and brain function have opened new vistas of neuroscience research. Neurocellular, molecular, genetic, and network basis of spirituality and their impact on human behavior in health and disease are now unfolding and are focus of many scientific researches. Number of publications including reviews in peer reviewed journals dedicated to this special area of brain function is increasing. On the other hand, advances in other disciplines and application of new techniques have led to deeper understanding of brain function. From quantum physics to mysticism and from psychology to social sciences and culture, the mysteries of human brain including consciousness and spirituality are now explainable on the basis of diverse mechanisms. Neuroscience provides a reasonable, applicable and versatile scientific platform to explain human spirituality and spiritual basis of brain function from multidisciplinary perspective. This two unit course is specially designed to provide neuroscientific basis of spirituality and its correlation with various terminologies and concepts from other disciplines. These include molecular biology, psychology, neuropsychiatry, quantum physics, cosmology, philosophy, mysticism, social sciences and relevant religious texts. The course topics include: Spirituality and its meaning in different cultures, Areas of brain involved in spirituality, Spiritual function of Human Brain and modern imaging techniques, Meditation, Consciousness, Backward Rationalization, Cognitive Dissonance, Qualia, Telepathy and other means of extra sensory perception, Mirror touch synesthesia, Spiritual intelligence and quotient, Neuroscientific basis of various religious and mystical practices, Neuroscientific aspects of ethical and unethical human traits and Role of spirituality in treatment of neurological and

psychologic disorders. The significance of this course is obvious as it addresses the spiritual aspects of various phenomena prevalent in various disciplines and cultures and also presents their neuroscientific explanation to the course participants. It is expected that this course that has started on elective basis recently will find a place as a regular course in a major discipline at graduate level.

Disclosures: M. Raza: None.

Theme J Poster

025. Teaching Neuroscience As A Part of Graduate Education

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 025.02SA/VV90

Topic: J.02. Teaching of Neuroscience

Title: Adaptation of virtual environment for training of the wheelchair users with visual impairments supported by eeg

Authors: *E. S. SOUZA, SR[1], E. LAMOUNIER[2];
[1]ENGINEERING, UNIVERSIDADE FEDERAL DE UBERLANDIA, Santos, Brazil;
[2]COMPUTER GRAPHICS, UNIVERSIDADE FEDERAL DE UBERLÄNDIA, UBERLÂNDIA, Brazil

Abstract: Many difficulties are encountered by people with disabilities, when diagnoses are made up of more than one dysfunction, for instances, in the case of wheelchair users with visually impaired. In fact, this picture generate incapacity for the performance of them activities. The treatments of disabled patients are performed in an individualized manner according to the clinical aspects. People with visual and motor disabilities have restrictions to navigate independently. In this scenario of navigation require interactions, that requirement justify the use of Virtual Reality (VR). In addition, locomotion needs to have a natural control to be incorporated, based on such condition, Electroencephalography (EEG) shows advances in the area of health with spontaneous brain signals. This research demonstrate an experiments of a wheelchair adapted with support of VR and EEG for the training of locomotion and interaction individualized of wheelchair user with visually impaired, in order to provide an efficient interactions allowing social inclusion of patients considered unable. This project was based on follow criteria like natural control, feedback, stimuli, and safety. A computer rehabilitation system multi-layer was developed incorporating natural interaction supported by EEG activating the movements in the Virtual Environment and real wheelchair with experiments successfully performed. This research consists of elaborating a suitable approach for patient's wheelchair users and visual impairment. The results of this research demonstrated that the use of Virtual Reality

with EEG signals has the potential to improve the quality of life and independence of a wheelchair users who is at the same time visually impaired.

Disclosures: E.S. Souza: None. **E. Lamounier:** None.

Theme J Poster

025. Teaching Neuroscience As A Part of Graduate Education

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 025.03SA/VV91

Topic: J.02. Teaching of Neuroscience

Support: Baylor Undergraduate Research and Scholarly Achievement Award

Title: Mranats: Magnetic resonance-based adaptive neuroanatomy teaching software

Authors: *P. T. FILLMORE[1], M. PARHAM[2];
[1]Communication Sci. & Disorders, [2]Biol. Sci., Baylor Univ., Waco, TX

Abstract: The current work describes the creation of a software program (MrAnats: Magnetic Resonance-based Adaptive NeuroAnatomy Teaching Software) for teaching introductory neuroanatomy. With the advent of neuroimaging techniques such as magnetic resonance imaging (MRI), much has been learned about neuroanatomy and brain structure. However, many of these advances have occurred primarily in the realms of scientific research and clinical care, often without significant effect on the ways in which students learn about the brain.
For example, most textbooks offer fairly simple two-dimensional views of neuroanatomy and do not make use of modern three-dimensional visualization methods common in scientific applications. Additionally, in learning about the brain, there are many different sets of terminology and labels used, making it especially difficult for the new learner to see how the different organizational systems fit together. There is no widespread framework in use for comparing and contrasting these systems. Lastly, current research in learning theory has highlighted the inefficiency of some of the most popular methods of studying (e.g. highlighting, re-reading), and has suggested specific learning methods (e.g. iterative self-testing) that are the most effective use of students' time. The availability of tools to make use of these insights, however, is still lacking.
Thus, we describe a program which: 1) Leverages high-resolution MRI scans to visualize neuroanatomy interactively in three dimensions, 2) Presents the common labeling systems for human brain structure and allows for explorative comparing and contrasting, and 3) Uses current best-practices in learning theory to help students learn about the brain efficiently.

Disclosures: P.T. Fillmore: None. **M. Parham:** None.

Theme J Poster

025. Teaching Neuroscience As A Part of Graduate Education

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 025.04SA/VV92

Topic: J.02. Teaching of Neuroscience

Support: Mitacs Accelerate internships in partnership with Microsoft to support PH, TB

Equipment donated from Microsoft

A.S., K.J., S.M., R.P., R.R., and S.T. supported through the Microsoft Garage Program (Co-op) and BigPark Studios.

Title: Development and evaluation of a holographic neuroanatomy lecture

Authors: *P. J. HOLMAN[1], T. S. BODNAR[1], S. ALY[2], K. JACYNA[2], S. MAO[2], R. PLANTE[2], R. RAZAK[2], S. TOHIDI[2], C. KREBS[1];
[1]Cell. & Physiological Sci., Univ. of British Columbia, Vancouver, BC, Canada; [2]Microsoft Garage Program, Vancouver, BC, Canada

Abstract: The gold standard for neuroanatomy instruction involves the use of human brain specimens and prosections; however, this method is expensive and can be limited by the need to destroy superficial structures in order to reveal deeper ones. As such, there is a clear need for innovative visualizations and educational tools that supplement dissection and improve learning outcomes for students in many areas including health related disciplines. With technological advances in computer imaging and display devices, anatomy educators increasingly have a variety of options for delivering educational content. However, there are limitations to these approaches, which include challenges in accurately representing 3D structures, ease of use for instructors and students, as well as oversimplification or inaccurate information. With regards to neuroanatomy, students consistently struggle with integrating 2D images into a complex representation of the interconnected brain, and overlaying this understanding with important vascular and clinically relevant information. Increasingly, 3D technologies are being employed to help close this gap in student learning; however, not all 3D technologies are alike, nor do they offer the same instructional value.
The goal of the current project was to develop an augmented reality (AR) teaching tool that could be implemented in neuroanatomy instruction, and to evaluate its effectiveness in the classroom. In collaboration with Microsoft (BigPark Vancouver and Microsoft Garage Interns), an interactive lecture was developed using the HoloLens, a mixed reality headset offering the unique ability to blend virtual 3D content with the real world. Specifically, 3D reconstructions of basal ganglia nuclei were obtained from MRI scans and built into the teaching tool deployed on the Hololens. Taking advantage of the HoloLens gesture recognition input system, interactivity was optimized, allowing the 3D reconstructions to be manipulated with ease and built up

separately. In addition, we will evaluate the pedagogical efficacy of this HoloLens teaching tool for undergraduate students, as compared to traditional instructional methods.

Disclosures: **P.J. Holman:** C. Other Research Support (receipt of drugs, supplies, equipment or other in-kind support); Microsoft. **T.S. Bodnar:** C. Other Research Support (receipt of drugs, supplies, equipment or other in-kind support); Microsoft. **S. Aly:** A. Employment/Salary (full or part-time):; Microsoft. **K. Jacyna:** A. Employment/Salary (full or part-time):; Microsoft. **S. Mao:** A. Employment/Salary (full or part-time):; Microsoft. **R. Plante:** A. Employment/Salary (full or part-time):; Microsoft. **R. Razak:** A. Employment/Salary (full or part-time):; Microsoft. **S. Tohidi:** A. Employment/Salary (full or part-time):; Microsoft. **C. Krebs:** C. Other Research Support (receipt of drugs, supplies, equipment or other in-kind support); Microsoft.

Theme J Poster

025. Teaching Neuroscience As A Part of Graduate Education

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 025.05SA/WW1

Topic: J.02. Teaching of Neuroscience

Title: A survey on methods skills in cognitive neuroscience

Authors: *O. HAUK;
Med. Res. Council UK, Cambridge, United Kingdom

Abstract: Cognitive neuroscience is a highly interdisciplinary research area. Researchers have backgrounds in (cognitive) psychology, medicine, biology, engineering, computer science, physics, etc. While this is an exciting aspect of this kind of research, it also leads to serious challenges with respect to teaching appropriate scientific computing and data analysis skills, as well as communication among researchers from different backgrounds.
Here, we present results from an on-line survey of methods skills among over 308 participants (mean age: 30; 140 males), mostly students and post-docs working in the cognitive neurosciences. These results are intended as a starting point for an evidence-based discussion of current skills-levels in cognitive neuroscience, and for the development of future skills-oriented training opportunities. We chose 18 methods-related questions covering signal analysis, linear algebra, calculus, statistics and scientific computing. These questions addressed basic problems likely to occur in introductory text books, and relevant to neuroimaging data analysis.
Participants were given four choices from which to pick the correct answer, plus a “no idea” option. The survey was advertised via popular neuroimaging mailing lists. Data were analysed using logistic regression (with factors undergraduate degree, current degree, and gender) in the software package R.
Overall performance was at about 80% correct. It was particularly low (~50%) for the categories signal analysis and linear algebra. Not surprisingly, participants with an undergraduate degree in

methods-related subjects performed better (87% correct) than those with a background in psychology (66%) or biology (75%). Interestingly, even participants who rated themselves as experts in data analysis performed only at 81% correct. Males performed better than females (77% vs 68%). This effect was most pronounced among psychologists (71% vs 63%), but smaller and reversed for undergraduates from a methods background (87% vs 91%). Most participants indicated that they would like to receive more training on the topics covered by this survey.
In summary, even self-rated experts did not show ideal performance on questions related to basic aspects of neuroimaging data analysis. Performance varied considerably with undergraduate degree and gender. This will not only affect practical aspects of data analysis, but also the ability to choose optimal analysis methods and the interpretation of results. Our results suggest that cognitive neuroscience would benefit from more skills-oriented training opportunities, e.g. targeting essential aspects of neuroimaging data analysis.

Disclosures: O. Hauk: None.

Theme J Poster

025. Teaching Neuroscience As A Part of Graduate Education

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 025.06SA/WW2

Topic: J.02. Teaching of Neuroscience

Title: Neuro-quiz: Web-based neuroanatomy software

Authors: *J. L. KUBIE;
Cell Biol., SUNY Downstate Med. Ctr., Brooklyn, NY

Abstract: Over the past 20 our group has developed and enhanced Neuroanatomy Software for desktop PCs and Macs. The programs have been extensively used at Downstate; year-after-year, they have received rave reviews from medical, graduate and allied-health students. This year we explored making the software web (html)-based.
The potential advantages to web-based programs include: 1. Users do not need to download software (or upgrades). 2. Programs are available to any web client, including tablets. 3. Programs can be easily updated, adjusted, or added with no involvement of users. 4. Viruses, malware or computer contamination are not a concern. 5. Administrators can track users and usage.
There are possible drawbacks including 1. Slow interaction speed. 2. Overload with too many simultaneous users. 3. Limitations of web-based software. 4. Limitations of web-browser screen graphics.
Converting NeuroQuiz software to a web application has been successful. Previously, data sets were constructed from a separate program (QuizMaker) with copies incorporated into each

distributed program. For the Web application data sets are identical and a single copy of each is on the server. This means that we can use earlier data sets, unaltered. In addition the QuizMaker program can still be used. Finally, data sets can be changed or modified quickly and put on the server.
All features of the the desktop application work in Web NeuroQuiz. The core is a browser window that contains a two-way interactive atlas with a structure list and photo. Each structure names on the list is linked to a structure outline on the photo. Clicking on one invokes the pair. There are also two quiz modes: a “find it quiz”, where the user is asked to click on a named structure and a “name it quiz” where the user is asked to type the name of an outlined structure. All three modes work in the web version of NeuroQuiz. In addition two enhancements have been implemented. In “levels” the user can select beginner or advanced sets of structures. In “categories” the user selects groupings of structures based on functional systems such as “motor system” or "visual system".
Modules include human brain dissections, horizontal sections, coronal sections, an MRI atlas, a Pal-Weigert atlas and a sheep brain dissection. We hope the ease of use and availability NeuroQuiz will encourage Neuroscience Educators. In addition development of modules is easy and strongly encouraged.

Disclosures: J.L. Kubie: None.

Theme J Poster

025. Teaching Neuroscience As A Part of Graduate Education

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 025.07SA/WW3

Topic: J.02. Teaching of Neuroscience

Support: DGIST R&D Program 17-BT-01

Title: PyMUS: A Python based simulation software for virtual experiments of neuromuscular systems

Authors: M. KIM, *H. KIM;
Daegu Gyeongbuk Inst. of Sci. & Technol., Daegu, Korea, Republic of

Abstract: Understanding how the nervous and muscular system work together to produce proper movements is the fundamental objective of motor neuroscience curriculum. In this poster, we present a Python based simulation software, PyMUS, that may be used as an educational tool to efficiently demonstrate and explain physiological principles of neuromuscular mechanisms underlying biological movements. The PyMUS was designed and developed under Python software environment for three aims. First, the fundamental building-blocks comprising neuromuscular systems, a single motoneuron and muscle fibers and their connected form called

motor unit, can be modeled and simulated in a hierarchical manner. Second, electrical activities of motoneurons and mechanical behaviors of muscle fibers can be modeled and simulated based on biophysically plausible, physiologically realistic mechanisms for biological realisms. Third, input conditions for simulations of the selected model can be customized to demonstrate a variety of experimental observations reported in the literature. The additional feature of PyMUS includes an intuitive graphical user interface through which parameter values for the models and input signals can be easily adjusted to reflect a wide range of physiological conditions and simulation results can be displayed for selected model variables during simulation and saved in a file for offline data analysis as well. We hope that the PyMUS would be useful not only to the instructor for effective teaching but also to the student for practice and research outside of the formal curriculum.

Disclosures: M. Kim: None. **H. Kim:** None.

Theme J Poster

025. Teaching Neuroscience As A Part of Graduate Education

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 025.08SA/WW4

Topic: J.02. Teaching of Neuroscience

Title: MOOCS for medical education: Understanding the learner experience in medical neuroscience

Authors: E. VOS-WISSE[1], N. JANES[2], S. NAIDOO[3], K. MANTURUK[2], *L. E. WHITE[4]; [1]volunteer mentor, Wageningen, Netherlands; [2]Ctr. for Instructional technology, [3]Office of Curricular Affairs, [4]Duke Inst. for Brain Sci., Duke Univ., Durham, NC

Abstract: Massive open online courses (MOOCs) are a disruptive innovation that delivers courses from universities to anyone with internet access for free. Although this movement is barely five years old, MOOCs are predicted to have a transformative role across the continuum of higher education. In 2013, we launched a MOOC on the Coursera platform, called Medical Neuroscience, which was the first designed to be comparable in scope, depth and rigor to what first-year medical students would experience on campus. Here, we aim (1) to characterize the general demographic profile of our online learners; (2) to describe their experience in the MOOC and in a supportive learning environment (learnmedicalneuroscience.nl); and (3) to generate important questions that would focus future educational research.
We analyzed data available in Google analytics and the Coursera dashboard and deployed voluntary pre- and post-course learner surveys. More than 200,000 individuals visited the course from 193 nations (75% reside outside the U.S.) and all walks of life (58% were female; 42% spoke English as the first language; 63% were 18-34 years old). They spanned the educational continuum from secondary education students to professionals with terminal degrees in the

medical and science professions (74% earned bachelors degrees, 38% have taken the MCAT, and 7% were physicians). Physicians and non-physicians engaged course content and completed the course at similar rates, with no significant differences in ratings of course difficulty, pacing, and depth of content. More than 90% of both cohorts agreed that they were “happy with what they learned”, that the content was “engaging”, and that the course was “personally fulfilling”. A volunteer mentor (EVW) created LearnMedicalNeurosciece.nl to provide additional support to learners in the MOOC. This website features learning strategies, study tips, relevant news articles, community-building content, and curated links to open and copyrighted educational resources that relate closely to the course. In its first year, this site hosted nearly 66K sessions by 29K users from 172 nations viewing 141K pages.
At Duke and Duke-NUS, the MOOC and supporting website provide the foundation for implementing team-based learning courses in the neurological sciences. Health professions students around the world are using the MOOC to support learning in their own curricula. Thus, MOOCs can provide rigorous, medical school-caliber coursework, with robust learning outcomes, high ratings of learner satisfaction, and no cost to the learner, regardless of prior formal medical education or professional status.

Disclosures: **E. Vos-Wisse:** None. **N. Janes:** None. **S. Naidoo:** None. **K. Manturuk:** None. **L.E. White:** None.

Theme J Poster

025. Teaching Neuroscience As A Part of Graduate Education

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 025.09SA/WW5

Topic: J.02. Teaching of Neuroscience

Support: Ministry of Education (MEC)

Ministry of Health (MS)

Ministry of Science and Technology (MCTIC)

Title: Neuroengineering program in the Northeast of Brazil: Education and research for social changes

Authors: *E. MORYA, *E. MORYA;
Edmond and Lily Safra Intl. Inst. of Neurosci., Inst. Santos Dumont, Macaiba, Brazil

Abstract: Access and quality of education are keys to poverty reduction, and long term social changes. The Edmond and Lily Safra International Neuroscience Institute (ELS-IIN) at Macaiba city, Rio Grande do Norte state, Northeast of Brazil, has used neuroengineering as a tool for education, research, clinical application, and social improvement. The Neuroengineering

Program held at ELS-IIN, since 2013, has a unique translational facility from bench research to clinical intervention, mainly in brain-machine interface and neuromodulation, with animal models (rodents, and marmosets), and human. This advanced facility welcomes students from public school, undergraduate, graduate, researcher, and international researchers from several Brazilian regions, as well as, international collaborators. This pioneer Neuroengineering Program allows inter/multidisciplinary education and research interaction addressing basic and clinical research to stimulate thinking out of the box, a challenge that must be tracked. We developed a neuroengineering program with neuroscience and engineering that allows students with different backgrounds working together for education, advanced research, and social transformation.

Disclosures: E. Morya: None.

Theme J Poster

025. Teaching Neuroscience As A Part of Graduate Education

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 025.10SA/WW6

Topic: J.02. Teaching of Neuroscience

Title: Cell culture cross contamination: Causes, prevention and detection

Authors: L. R. TOWNLEY, *D. P. BALUCH;
Sch. of Life Sci., Arizona State Univ., Tempe, AZ

Abstract: Cell culture lines are a heavily utilized resource for conducting mammalian research but without validation, researchers cannot be certain that they are working with correctly identified cells. A study conducted by Amanda Capes-Davis and Ian Freshney in 2010 resulted in the development of a database that verified the cell lines most commonly used and provided by cell repositories. Because cell contamination had become widely prevalent, a group called the International Cell Line Authentication Committee was formed in 2012 to oversee and make public their findings as a resource to researchers [iclac.org/databases/cross-contaminations]. The database cites 488 cell lines and of those 451 are misidentified with no known originating stock. This database also identified 136 contaminants where 113 of those were confirmed to be HeLa. These results emphasize a problem recognized not only by researchers but also publishers and funding agencies prompting a call for the development of tools that can easily test and validate cell lines. This study focused on the potential cause of cross contamination and why cells such as HeLa, are one of the most documented offenders. Through this study, it was identified that cells such as Hela and mouse fibroblast cells can survive cold storage in refrigerated media and can easily recover and grow when placed in culture dishes while some cell lines such as neuroblastomas, are very sensitive to temperature and pH changes and cannot survive the enviormental change. Experiments such as these demonstrate how errors resulting from poor technique can cause cross contamination and introduces the idea that other cell lines, not yet

identified as contaminants, could also be part of the cross contamination problem. This poster will demonstrate how easy cross contamination can occur as well as highlight information about known contaminants, cell lines known to be contaminated and to avoid, how to prevent contamination and the validation tests used and required by some publishers and funding agencies.

Disclosures: L.R. Townley: None. **D.P. Baluch:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.01SA/WW7

Topic: J.03. Public Awareness of Neuroscience

Title: Network centric science

Authors: K. J. MANION, L. V. LONG, J. H. REUSING, *S. T. MANION;
Network Centric Sci., Baltimore, MD

Abstract: Network centric organizations represent a dynamic, growing, learning type of interaction among participants that focus on information sharing. This allows for better, faster, more efficient in advancement of knowledge and problem solving. By applying the network centric connectivity to neuroscience, we seek to accelerate science, networking both scientists and science advocates to increase the public's understanding and support of science, while increasing scientist's understanding of the public and the ability to communicate and implement new knowledge.

Disclosures: K.J. Manion: None. **L.V. Long:** None. **J.H. Reusing:** None. **S.T. Manion:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.02SA/WW8

Topic: J.03. Public Awareness of Neuroscience

Support: Northwestern University's The Graduate School: Community Building Grant

Northwestern University Interdepartmental Neuroscience

Title: Northwestern University Brain Awareness Outreach encourages neuroscience education in the Chicagoland area

Authors: *K. N. WARREN, I. STOJKOVSKA, L. K. SHANAHAN, N. M. FREDERICK, S. R. MCIVER;
Northwestern Univ. Interdepartmental Neurosci., Northwestern Univ., Chicago, IL

Abstract: Northwestern University Brain Awareness Outreach (NUBAO) is a graduate student-led initiative that aims to educate the Chicago community about neuroscience using fun, interactive activities and demonstrations. Founded in 2010, NUBAO includes graduate and undergraduate students, postdoctoral fellows, and research staff representing a wide range of scientific disciplines at Northwestern University. NUBAO organizes three major outreach events each academic year in an effort to reach audiences with varying levels of exposure to neuroscience topics. 1) The annual Brain Awareness Fair is an open-house style event where K-8 students and their families learn about the brain. This year's Brain Awareness Fair was held in a new location, Roger C Sullivan High School, where 84 NUBAO volunteers ran 23 interactive booths that demonstrated a variety of neuroscience concepts. This year's event currently has over 400 registered to attend from ~100 Chicago schools. 2) In partnership with the Chicago Chapter of SfN, NUBAO hosts an annual Brain Awareness Teachers Workshop. Held for the 4th consecutive year, the Teachers Workshop is a professional development event where middle school and high school science educators learn about neuroscience in a way that can be easily integrated into their classrooms. This year's event featured guest lectures about the effects of trauma on children's brain development and learning, as well as four teaching modules: neuroanatomy, chemical senses, the sensorimotor system, and motor adaptation. A record number of 40 science educators attended this year's event, and attendees earned continuing professional development units for participating. 3) For the third year, NUBAO partnered with Walter Payton High School to implement a 16-week neuroscience seminar series. Graduate students were invited to present an interactive lecture on a neuroscience topic of their choosing. The goal of the seminar series was to expose high school students to the exciting field of neuroscience research and inspire them to pursue higher education in STEM fields. In addition to the three initiatives described above, NUBAO participates in a number of satellite events over the course of the year. For example, this year NUBAO presented neuroscience demonstrations at STEM fairs across the city, including Unity Junior High School's STEM night, Cook County School District 104's STEM Expo, and the March for Science Chicago STEM Expo. Through this multi-tiered approach, NUBAO makes neuroscience accessible to various audiences in the Chicago community, and NUBAO volunteers benefit from the opportunity to communicate science on multiple levels.

Disclosures: K.N. Warren: None. **I. Stojkovska:** None. **L.K. Shanahan:** None. **N.M. Frederick:** None. **S.R. McIver:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.03SA/WW9

Topic: J.03. Public Awareness of Neuroscience

Support: UW Royalty Research Fund

The Dana Foundation

Seattle Children's Hospital

The Dean Witter Foundation

Title: BrainWorks: a television series about neuroscience for children

Authors: *E. H. CHUDLER[1], C. PODENSKI[2];
[1]Ctr. for Sensorimotor Neural Engin., [2]UW Video, Univ. of Washington, Seattle, WA

Abstract: The increasing incidence of neurological and mental illnesses in the U.S. and worldwide makes it likely that younger students will know someone who has been affected by a disease or disorder of the brain. The high economic costs, emotional and health impacts make it important that we continue to explore and understand the current and future implications of these disorders by creating a more neuroscience literate younger population and by increasing science literacy help students make healthier life-style choices and understand the importance of supporting biomedical research. Students need greater scientific and technological knowledge than they did before to function in today's society and economy. Yet, despite science and health education guidelines, STEM learning opportunities do not reach as many students as they should. Younger students rarely study the nervous system and teachers have difficulty finding effective neuroscience materials and media that are accessible, relevant, fun, and packed with real science information for a broad audience. Earlier exposure to accurate scientific and medical information helps students form positive and receptive attitudes about research and about career decisions. The BrainWorks television series was developed to address these issues. Currently there are three episodes of BrainWorks: 1) Introduction to the Brain; 2) Sports-Related Concussions and 3) Exercise and the Brain. In each 30-minute episode, viewers learn about the newest brain research and ways to protect the brain from injury. The programs have neuroscientists describe their research and then basic concepts are reinforced with engaging hands-on active demonstrations by young actors. BrainWorks was produced by UW Video who broadcast the episodes on cable television and through its other outlets including UWTV.org, Vimeo, Roku, Amazon Fire TV, e news, UW Today, UW social websites, YouTube Channel and University of Washington External Affairs and News & Information. The newest episode of BrainWorks (Exercise and the Brain) was nominated for a 54th Annual Northwest Regional Emmy Award in 2017.

Disclosures: E.H. Chudler: None. **C. Podenski:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.04SA/DP13/WW10 (Dynamic Poster)

Topic: J.03. Public Awareness of Neuroscience

Support: Richard Lounsbery Foundation

Kickstarter, 448 backers

Title: Neurodome: Immersive neuroscience education through exploring 3D brain data in digital domes

Authors: *J. A. FISHER;
Dept. of Physiol., New York Med. Col., Valhalla, NY

Abstract: We conceptualize and learn complex landscapes in large part through egocentric or "route-based" mapping, which is shaped by sensory experiences and landmarks discovered during spatial exploration. Immersive or "frameless" visualization environments such as dome projection or head-mounted display provide viewers with a route-based learning experience because they induce the feeling of physically moving through virtual environments, an effect that arises from a mismatch between visual and vestibular sensory cues. This effect has been leveraged in educational settings for conveying complex spatial concepts, particularly for teaching astronomy. However, despite the ubiquity of digital dome technology and its documented educational merit, its utility in depicting biological landscapes has remained largely unexplored. The Neurodome project, which was founded by a collective of scientists, educators, digital dome specialists, and astronomers, brings cutting-edge neuroscience into immersive display environments. Through our work with museums and universities, we have toured K-12 audiences as well as adult, lifelong learners through the brain in five continents. Here, we describe some of our work applying these concepts to real, three-dimensional neuroimaging data and the impact on audiences in informal science education settings. Overall, we have found that real-time, exploratory touring is effective for teaching complex, three-dimensional anatomical structures at scales that vary by up to four orders of magnitude.

Disclosures: J.A. Fisher: None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.05SA/WW11

Topic: J.03. Public Awareness of Neuroscience

Support: UMB Graduate Student Association

UMB University Student Government Assocation

Title: NOVA: Providing graduate students with outreach opportunities to Baltimore

Authors: *A. LABUZA[1], Q. BANKS[2], K. K. COVER[3];
[1]Physiol., Univ. of Maryland Baltimore, Baltimore, MD; [2]Univ. of Maryland, Baltimore, Baltimore, MD; [3]Univ. of Maryland Sch. of Med., Baltimore, MD

Abstract: It has become increasingly important for scientists to be able to communicate their work with the general public. University of Maryland, Baltimore's Neuroscience Outreach and Volunteer Association (NOVA) has provided graduate students with multiple opportunities to not only share their work, but to support the Baltimore community. Since NOVA's establishment in 2013 it has instituted four regular events along with taking part in various events around the Baltimore area. NOVA participates in Brain Awareness Week by teaching local high school and middle school classes for the day. In the fall, local students are invited to campus to tour laboratories and experience how scientists realy work. Monthly, we run BINGO for residential patients at Spring Grove Psychiatric Hospital, providing donations as prizes to the patients. We also regularly participate in a local children's museum's Healthy First Saturdays events. All of these events allow graduate students to help children from all ages develop an enthusiasm for science and to provide assistance to populations in need. In addition to helping those we serve, NOVA events also provide graduate students a chance to communicate their work with the general public. We frequently explain our projects to parents and students and need to learn to explain our science demos to young children. Therefore, NOVA members have improved their communication skills while supporting the local Baltimore community.

Disclosures: A. Labuza: None. **Q. Banks:** None. **K.K. Cover:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.06SA/WW12

Topic: J.03. Public Awareness of Neuroscience

Title: The international youth neuroscience association

Authors: *N. R. MYSLINSKI, *N. R. MYSLINSKI, A. SKVORTSOV, J. UMANS, J. NAIK, K. RYAN, M. SANO, M. PAJJURI, N. CHRAPLIWY, W. ELLSWORTH;
Neural and Pain Sciences, 8th floor, Univ. of Maryland Dent. Sch., Baltimore, MD

Abstract: The field of neurology needs to inspire and attract young students at an earlier age. The International Youth Neuroscience Association, or IYNA, is an international 501(c)(3) nonprofit run by students with a mission to advance the international collaboration of young neuroscientists from all backgrounds by educating them about the brain and inspiring them to fight neurological diseases. These goals are accomplished through several methods, including a journal of student-written work, several outreach programs, an international network of students and chapters, and, most importantly, the Modern Youth Education, Leadership, and Inquiry in Neuroscience (MYELIN) Initiative: an effort to develop comprehensive material for a high school neuroscience course. The IYNA is governed by an International Board of Directors, which is comprised of high school students and undergraduates, an Executive Structure, made up of exclusively high school students, and an Advisory Board, which is chaired by the IYNA's founder, Dr. Norbert Myslinski. Many of our officers and directors are former competitors in the International Brain Bee, which was also founded by Dr. Norbert Myslinski. We encourage all neurologists to support the IYNA. Any current neuroscience club that wants to become a formally recognized IYNA chapter or any individual who wishes to become involved with the IYNA can find information on our website at www.youthneuro.org, or contact us directly via info@youthneuro.org.

Disclosures: N.R. Myslinski: None. **N.R. Myslinski:** None. **A. Skvortsov:** None. **J. Umans:** None. **J. Naik:** None. **K. Ryan:** None. **M. Sano:** None. **M. Pajjuri:** None. **N. Chrapliwy:** None. **W. Ellsworth:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.07SA/DP14/WW13 (Dynamic Poster)

Topic: J.03. Public Awareness of Neuroscience

Title: NIH contributions to the BRAIN Initiative

Authors: A. ADAMS[1], *K. B. DUPRE[1], G. FARBER[2], J. GORDON[2], W. KOROSHETZ[1], M. MOTT[1], K. RAMOS[1], N. TALLEY[1], S. L. WHITE[1];
[1]NIH NINDS, Bethesda, MD; [2]NIH NIMH, Bethesda, MD

Abstract: The **B**rain **R**esearch through **A**dvancing **I**nnovative **N**eurotechnologies (**BRAIN**) Initiative® aims to revolutionize our understanding of the human brain by accelerating the development and application of innovative neurotechnologies. The National Institutes of Health

(NIH) collaborates with multiple U.S. federal and non-federal partners who are invested in the Initiative, as well as international groups. To guide NIH, the BRAIN Working Group of the Advisory Committee to the NIH Director developed "***BRAIN 2025: A Scientific Vision***." A roadmap to reach the long-term goals of BRAIN at NIH, ***BRAIN 2025*** focuses on seven scientific priority areas involving mapping the circuits of the brain, measuring the fluctuating patterns of electrical and chemical activity flowing within those circuits, and understanding how their interplay creates cognitive and behavioral capabilities. The NIH BRAIN Multi-Council Working Group (MCWG), which is comprised of scientific experts as well as *ex officio* representatives from federal agency partners, provides input and guidance for on-going scientific plans. The MCWG also includes a Neuroethics Division, which serves as a resource to help navigate ethical issues associated with BRAIN research. NIH Funding Opportunity Announcements issued for BRAIN are based on careful consideration of the recommendations of the ***BRAIN 2025*** report, input from the MCWG, and iterative discussions by trans-NIH staff and leadership.
Further, NIH facilitates regular interactions and collaborations across various BRAIN stakeholders by hosting an annual Investigators Meeting, co-sponsoring a public satellite event at the Society for Neuroscience conference each year, participating in the BRAIN Initiative Alliance (www.braininitiative.org) with other federal and non-federal organizations, and by participation of its BRAIN leadership and programmatic staff at interdisciplinary scientific meetings. This poster highlights scientific advancements, funding opportunities, and the myriad partnerships that constitute NIH's contribution to BRAIN. Additional details and updates on funding opportunities and events related to the NIH BRAIN Initiative are routinely published on the website: www.braininitiative.nih.gov.

Disclosures: **A. Adams:** A. Employment/Salary (full or part-time):; National Institutes of Health. **K.B. Dupre:** A. Employment/Salary (full or part-time):; National Institutes of Health. **G. Farber:** A. Employment/Salary (full or part-time):; National Institutes of Health. **J. Gordon:** A. Employment/Salary (full or part-time):; National Institutes of Health. **W. Koroshetz:** A. Employment/Salary (full or part-time):; National Institutes of Health. **M. Mott:** A. Employment/Salary (full or part-time):; National Institutes of Health. **K. Ramos:** A. Employment/Salary (full or part-time):; National Institutes of Health. **N. Talley:** A. Employment/Salary (full or part-time):; National Institutes of Health. **S.L. White:** A. Employment/Salary (full or part-time):; National Institutes of Health.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.08SA/DP15/WW14 (Dynamic Poster)

Topic: J.03. Public Awareness of Neuroscience

Support: 2016 Society for Neuroscience Chapter Grant Award (Rocky Mountain Regional Neuroscience Group)

Maggie George Foundation

Title: Because it makes me feel important: The power of lab coats and brain dissection in motivating at-risk youth through neuroscience outreach

Authors: *H. BENJAMIN[1], *H. BENJAMIN[1,3], M. STABIO[1,3], A. RICH[2];
[1]Dept. of Cell and Developmental Biol., [2]Dept. of Neurol., Univ. of Colorado Sch. of Med., Aurora, CO; [3]Modern Human Anat. Program, Univ. of Colorado Anschutz Med. Campus, Aurora, CO

Abstract: In Denver, Colorado, more than 65,000 students have been identified as "at-risk" in their prospects to transition successfully into adulthood and achieve economic self-sufficiency. About 40% of Denver students do not graduate from high school. As part of a collaboration effort with a local at-risk youth mentorship program, a middle school neuroscience curriculum was created at the University of Colorado Anschutz Medical Campus to motivate these students to stay in school, excite them about learning, and expose them to healthcare and science careers. A total of 81 students (53% male, mean age: 13.5 ± 0.6 yrs, S.D.) from six middle schools participated in one of six half-day programs at the medical campus. Collaboration with an existing local youth program, which was already immersed in the participating schools, greatly facilitated the coordination of recruitment, permission slips, chaperones, and other logistics; this freed neuroscientists to focus on curriculum development. The curriculum taught students the power and plasticity of their brains and encouraged them to make healthy choices for their brain. To keep students engaged, nearly all activities were hands-on, and no single activity lasted more than 20 minutes. Students rotated through lab stations including skull anatomy, brain dissection, brain MRI, and a demo of the Visible Human Project VHD Dissector. Students also practiced clinical role-play activities including the cranial nerve exam and CPR simulation. Since students often arrive to school without breakfast, the program included breaks, snacks and meals. To foster inclusion, students were provided teen-sized white lab coats and took a "team photo" with professors and graduate student volunteers. At the conclusion of the program, an open-ended paper survey was distributed that targeted four aspects of learning: can (self-perceived capability), will (measure of intention), want (enthusiasm), and like (preference). 94% of students reported feeling more confident in their abilities after the program. 57% reported feeling more confident because they learned or tried something new. 68% wanted to put on a lab coat again in the future. 63% said that their favorite part of the day was learning about, cutting, holding, dissecting, seeing or feeling a real brain. These results highlight the power of neuroscience outreach to empower students with confidence and enthusiasm for learning. Moreover, a model in which neuroscientists collaborate with local youth mentorship programs can be an effective approach to reach at-risk populations. The program will be renewed and additional public school groups will be invited to participate.

Disclosures: H. Benjamin: None. **M. Stabio:** None. **A. Rich:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.09SA/WW15

Topic: J.03. Public Awareness of Neuroscience

Title: The 2017 World Brain Bee Championship

Authors: *D. A. SEMINOWICZ, N. R. MYSLINKSI;
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 19th World Brain Bee (IBB) Championship coordinated by **Norbert Myslinski.** The Brain Bee is the preeminent neuroscience competition for teenage students. The event was hosted and sponsored by the **American Psychological Association** in August, 2017. Additional major sponsors from around the world supported competitors from specific countries. Worldwide there are about 150 chapter competitions, each one involving many schools. The Chapter winners then compete in their respective Regional Championships to earn the right to compete in the World 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, and a neurohistology exam. The regions competing were not known at press time, but the regions that sent their champions to the IBB Championship last year **were Australia, Brazil, Canada, China, Egypt, England, Germany, Grenada, India, Iran, Israel, Italy, Japan, Korea, Macau, Malaysia, New Zealand, Nigeria, Poland, Qatar, Romania, Taiwan, Ukraine, United Arab Emirates and United States. The Romanian Region came in first place in 2016.** The World Champion was **Ana Ghenciulescu,** a 16-year-old student of mathematics at the **"Mihai Viteazul" National College Bucharest**. Finishing in 2nd Place was The **Canadian Region Representative, Nooran AbuMazen**, of **Waterloo Collegiate Institute**. In 3rd Place was **New Zealand Region's Matthew Z.M Fulton** of **Auckland Grammar School.** In 4th and 5th Places were **Iranian Regional Champion Shayan Bagher Baragoori of Mirzakouchak Secondary School**, and **American Regional Champion Karina Bao of Little Rock Central High School.** 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. N. Myslinski** founded the IBB in 1998 with 12 local chapters in North America. An estimated 20,000 students compete annually. More than 100 newspapers, radio and television stations cover the IBB and the student competitors at each stage of the competition, and about 50 web sites are devoted to the Brain Bee. 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.

Disclosures: D.A. Seminowicz: None. **N.R. Myslinksi:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.10SA/WW16

Topic: J.03. Public Awareness of Neuroscience

Support: SFN Chapter Grant

Title: Society for Neuroscience Ottawa chapter: Continued growth and success

Authors: *K. FARMER, *K. FARMER, A. EDWARDS, A. PARIC, A. DEDEK, A. THOMPSON, C. PASTRANA, C. NESBITT, E. ALI, G. M. RURAK, J. LANDRIGAN, J. HOWELL, K. GOHEEN, K. V. VENTURA, K. CHANDLER, K. THIRUMAL, K. MALONE, L. THOMPSON HYLAND, M. MILTON, N. PROWSE, P. SHAIL, S.-B. PARK, U. SHANMUGALINGAM, Z. DWYER, A. ABIZAID;
Carleton University, Dept. of Neurosci., Ottawa, ON, Canada

Abstract: The Society for Neuroscience Ottawa Chapter has three main aims; to provide 1) community and 2) academic outreach programs, and 3) to form a consortium of neuroscience researchers in the Eastern Ontario region. With respect to our first aim, this year marked the sixth edition of the “Brain and mental Health Art Show”. A continuing and growing success, this show exhibits mental health themed art with submissions from students at all levels, professors and medical doctors, and members of the community. This year over 500 people attended the exhibition and we raised $5000 for ANCOURA, a local charity that provides low-cost community housing for individuals with mental illness. By bringing together people from a diverse variety of backgrounds this event stimulated discussion and raises awareness about issues related to the brain and mental health in our community. 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. This year also marked the fifth annual Ottawa Brain Bee, where we bring together students from local high schools for a brain trivia competition. This year saw the expansion of the Brain Bee to include year round clubs at multiple high schools, providing the students with weekly training sessions. Together with Carleton University, the University of Ottawa, and The Royal Hospital, the Society for Neuroscience Ottawa Chapter hosted 3 city wide research conferences, welcoming hundreds of neuroscience researchers to the Canadian National Capital Region. Over the course of our many successful events our primary goal has been, and remains to be, to bring the research community and the public together raising awareness about neuroscience research, mental health, and the beauty that we see in the brain.

Disclosures: **K. Farmer:** None. **A. Edwards:** None. **A. Paric:** None. **A. Dedek:** None. **A. Thompson:** None. **C. Pastrana:** None. **C. Nesbitt:** None. **E. Ali:** None. **G.M. Rurak:** None. **J. Landrigan:** None. **J. Howell:** None. **K. Goheen:** None. **K.V. Ventura:** None. **K. Chandler:** None. **K. Thirumal:** None. **K. Malone:** None. **L. Thompson Hyland:** None. **M. Milton:** None. **N. Prowse:** None. **P. Shail:** None. **S. Park:** None. **U. Shanmugalingam:** None. **Z. Dwyer:** None. **A. Abizaid:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.11SA/WW17

Topic: J.03. Public Awareness of Neuroscience

Support: PAPIME PE307415

Title: Fifteen years celebrating brain awareness week at facultad de psicología, universidad nacional autónoma de méxico

Authors: *J. E. GALLEGO RUDOLF, C. G. CURIEL-GUERRERO, M. MORALES-RUVALCABA, A. B. ALCÁNTARA-QUINTERO, E. Y. BOTELLO-ESTRADA, P. M. LUNA-DÁVILA, M. J. RAMÍREZ-FLORES, O. A. ROJAS-RAMOS;
Facultad de Psicología, Univ. Nacional Autónoma de México, Ciudad de México, Mexico

Abstract: Brain Awareness Week (BAW) is celebrated at the Facultad de Psicología (FP), Universidad Nacional Autónoma de México (UNAM) since 2002, being one of the showiest celebrations in this institution. The principal aim of the BAW at the FP is the diffusion of neuroscience research and applications, focusing on demonstrating the potential contribution of the psychologist work to this scientific field. Throughout these 15 years, the faculty has developed diverse activities that contribute to neuroscientific knowledge diffusion. At the beginning, the BAW activities were intended to reach only the FP student population, only 4 laboratories provided spaces to give open “lab tours”, and only a few students presented posters about their class activity. During the last 3 years, there has been a significant increase regarding the number of activities offered, the number of participants and the outreach of the BAW, opening the possibility for people from other Institutions, (even from outside Mexico City) to engage in these activities. The number of participant laboratories has spread to 16 on average, which englobe a wide diversity of research lines including sleep physiology, neurobiology of learning and memory, psychopharmacology, psychophysiology, behavioral genetics, brain plasticity**,** development, neurodegeneration and neuroendocrinology. Moreover, we have included research laboratories from other institutes of the UNAM or outside it. These spaces outline the relevance of interdisciplinary approaches to study brain function and its relation to behavior and cognition. Since 2006 several activities had been added to the BAW schedule,

including neuroscience related movie-debates, discussion tables and lectures. These activities have addressed different topics, focusing on assessing the relation between neuroscience and other psychology disciplines. Overall, the average attendees to these events are 492 (including an average of 51 people from outside Mexico City). Moreover, other activities had been recently added including the Ludic Day (LD) which intends to promote brain awareness by introducing didactic activities and neuroscience related games designed by students. The number of activities comprising the LD extends to 36 (2017) and included the participation of 173 students. LD provides a rich environment for the general population (including children) to gain an insight into neuroscience work. The BAW activities at the FP have built an interactive diffusion platform allowing students to integrate neuroscience knowledge acquired theoretically by engaging in these events and constructing a wider view of the role of the psychologist in neuroscience.

Disclosures: J.E. Gallego Rudolf: None. **C.G. Curiel-Guerrero:** None. **M. Morales-Ruvalcaba:** None. **A.B. Alcántara-Quintero:** None. **E.Y. Botello-Estrada:** None. **P.M. Luna-Dávila:** None. **M.J. Ramírez-Flores:** None. **O.A. Rojas-Ramos:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.12SA/WW18

Topic: J.03. Public Awareness of Neuroscience

Support: National Nature Science Foundation of China, 81572859

Chinese National Program on Key Basic Research Project, 2014CB910303

Shanghai Collaborative innovation center Grant, TM201521

Title: Development and testing of an intelligent pain management system on smart phone for chinese patients with cancer: Randomized controlled trial

Authors: *F. JIANG[1], Y. SUN[2], G. DING[3];
[1]Xinhua Hosp. Chongming Br., Shanghai, China; [2]Sch. of Med., Shanghai Jiao Tong Univ., Shanghai, China; [3]Shanghai Intl. Med. Ctr., Shanghai, China

Abstract: Background Cancer has become increasingly prevalent in China over the past few decades. Among symptoms pain has commonly been recognized as a most critical one that may also result in ineffective treatment of cancer. More than 30% cancer patients have experienced pain. We developed a mobile-based Intelligent Pain Management System (IPMS) to provide a low-cost and effective care for cancer patients. **Objective:** Our objective was to test if the IPMS could facilitate real-time pain recording and timely intervention among cancer patients with pain.

The system's usability, feasibility, compliance, and satisfaction were also assessed. **Methods:** A sample of 46 patients with cancer pain symptoms were recruited at the Oncology Center of Xinhua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Chongming Branch. In a pre-test, participants completed a pain management knowledge questionnaire and were evaluated with the baseline cancer pain assessment and Karnofsky Performance Status (KPS) evaluation. The participants were then randomly assigned into two groups (the trial group and the control group). After a 14 days' trial period, pain assessment was conducted once more. In the trial group, the data was collected using the IPMS. In the control group, the data was collected using conventional methods, such as phone interviews or door-to-door visits. The pain management knowledge questionnaire and KPS evaluation were repeated in both groups at the end of the trial. The participants were also asked to complete a satisfaction questionnaire on the use of the IPMS. **Result:** The average pain assessment times by IPMS was 2.37±0.53 per day. Both groups reported similar pain scores (3.28±0.68 of the trial group vs. 2.90±0.62 of the control group, $P = 0.06$) as well as the KPS scores (50.80±7.02 of the trial group vs. 50.95±7.40 of the control group, $P = 0.94$) at the baseline. At the end of the trial, the mean pain score of the trial group was 2.20±0.50, compared to a significantly higher score 2.95±0.59 of control group ($P < 0.001$). The ending KPS score was significantly higher of the trial group than of the control group (68.80±7.23 vs. 56.2±7.40, $P < 0.001$). As to the pain management knowledge score, there was a 2.96±0.61 increase in the trial group, compared to a 0.81±0.67 increase ($P < 0.001$) in the control group . **Conclusion:** The result demonstrated that IPMS was a feasible, effective, and low cost pain management tool for cancer patients. This study provided preliminary data to support the potentials of using IPMS in cancer pain communication between patients and doctors, and to provide real-time supportive intervention at a convenient basis.

Disclosures: F. Jiang: None. **Y. Sun:** None. **G. Ding:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.13SA/WW19

Topic: J.03. Public Awareness of Neuroscience

Title: NW Noggin: Synaptic community connections in the rural pacific northwest

Authors: *W. S. GRIESAR, J. LEAKE;
NW Noggin (PSU, OHSU, ...), Portland, OR

Abstract: Science needs investment, and engaging young people and the public explains discoveries and builds support for education and research. Integrating arts in STEM (STEAM) fosters engagement. Here we report on efforts to reach K-12 students and the public about brain research through arts in the rural Northwest. NW Noggin (nwnoggin.org) is an education non-

profit that organizes graduates, undergraduates, K-12 students, scientists and artists to collaborate, learn from each other, and excite people about brain research through the arts in both formal and informal settings. Our urban outreach volunteers (from Portland State University (PSU), Oregon Health & Sciences University (OHSU) and other Portland area campuses) have worked with over 14,000 academic priority students since 2012, presenting art projects and research in schools, museums, homeless youth centers, breweries, theaters, Congress, the Obama White House, and even bike shop pubs! In spring 2017, we hit the road with 10 volunteers from PSU, OHSU and WSU Vancouver. We spent three days in the rural Washington community of Davenport, meeting with every kindergartner through 9th grader in town! We discussed federally funded research on the brain and drugs, anxiety, depression, Parkinson's, Alzheimer's, the genetics of parenting behavior, the mathematical modeling of brain activity, adolescent brain development and other compelling topics. We made our own pipe cleaner neurons, and created beautiful brain cell prints. We were also joined in Davenport by the Manager for Constituent & Community Relations for Representative Cathy McMorris-Rogers, Republican co-Chair of the House Neuroscience caucus. Both her office and that of Representative Earl Blumenauer, the Democratic co-Chair, had invited our NW Noggin volunteers to present a briefing in Congress in spring 2016. In Davenport, we were the "brain people," offered free coffee all over town, and covered by the local newspaper. From the Congresswoman's staffer: "A sincere thanks for inviting me to spend time with your group in Davenport! NW Noggin is meeting a very unique but important need in communities across the PNW (and country) which we are very grateful for." We subsequently drove 14 volunteers to rural La Grande, Oregon for another popular day of research discussion and brain-related arts with 6th - 12th graders. Building excitement and awareness of discoveries in neuroscience through arts-integrated outreach across institutional, state, federal, partisan, urban/rural and generational lines trains new scientists to collaborate and communicate, and increases awareness and support for further investment in research and the arts.

Disclosures: W.S. Griesar: None. **J. Leake:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.14SA/WW20

Topic: J.03. Public Awareness of Neuroscience

Support: CAPES-PROEX

Program of Post Graduation in Psychobiology

Title: A little town, the second Brain Awareness Week and one objective: Expansion of the Neuroscience knowledge

Authors: *T. PRIZON[1,3], T. BRONHARA[2], J. L. LIBERATO[2,3];
[1]Fac. of Philosophy, Sci. and Literature of Ribeirão Preto, Univ. of São Paulo, Ribeirao Preto, Brazil; [2]Fac. of Philosophy, Sci. and Literature of Ribeirão Preto, Univ. of São Paulo, Ribeirão Preto, Brazil; [3]Inst. de Neurociência e Comportamento - INeC, Ribeirão Preto/São Paulo, Brazil

Abstract: The Brain Awareness Week (BAW), promoted by the Dana Foundation, is a worldwide campaign aimed at spreading and highlighting a state of research related to Neuroscience, providing the population a bit of knowledge produced in universities and research centers behavior and emotions. This initiative is also fostered by Brain and Behavior Brazilian Society (SBNeC). In this context, the Postgraduate Program in Psychobiology (PPGP) of the University of São Paulo considered it essential to expand this initiative beyond the boundaries of the city of Ribeirão Preto, a hub of Neuroscience Education and Research. The idea that arose in 2016 was welcomed by Sertãozinho, a little town with 121,000 inhabitants, located in São Paulo State. In 2017 the project expanded and added new places. During 2017 BAW, the PPGP laboratories presented activities related to their research in Sertãozinho spaces, such as public and schools (elementary, middle and high school), sports centers, Non-governmental Organizations and elderly cohabitation center. In 2017 the public profile extended to others categories: students of different ages (8-17 years), professionals in the education system, athletes, and also elderly people up to 60 years. Activities were designed to the specific publics, neurobiological questions were approached in an accessible way, bringing the listeners closer to the academic universe. The strong adhesion of participants in activities occurred because of specifics themes such as emotions, stress, learning, attention, memory, neurological diseases and treatments, drugs, speech and the mind non-human, in addition to participating with suggestions of themes in 2016 and in 2017 feel that they are an integral part of the event/program. Even though it is the second edition of BAW in Sertãozinho, there was a remarkable expansion, with a 40% increase in the number of places that hosted activities, compared to 2016. In addition, the number of participating laboratories increased about 25% and achieving approximately 600 people. Our success can be attributed to the huge efforts between coordinators of institutions in Sertãozinho and PPGP laboratories that enabled this brilliant collaboration. The subjects and the well-designed activities stimulated the curiosity about science and research. Moreover, the project stimulates more partnerships between society institutions and University.

Disclosures: **T. Prizon:** None. **T. Bronhara:** None. **J.L. Liberato:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.15SA/WW21

Topic: J.03. Public Awareness of Neuroscience

Support: Bloomsburg University College of Liberal Arts Curricular Enhancement Grant

Title: Undergraduate psychology majors provide school outreach program during Brain Awareness Week

Authors: *J. A. JOHNSON[1], J. BURKHARDT[2], T. HOGAN[2], A. SNYDER[2];
[1]Psychology, Bloomsburg Univ., Bloomsburg, PA; [2]Psychology, Bloomsburg Univ. of PA, Bloomsburg, PA

Abstract: Brain Awareness Week is an international initiative to raise awareness about the brain and neuroscience. We at Bloomsburg University have held BAW events since Spring of 2011. Our primary outreach program has included visits to local schools to teach students about the brain through fun, interactive activities. Similar to in recent years, this year three undergraduate Psychology majors (JB, TH, AS) led the initiative by creating new activities for preschool, elementary, and middle school audiences. In addition, 18 students enrolled in a Sensation & Perception seminar (with JJ) developed new activities for high school students. All new activities included a poster, a script, and a hands-on activity. Our preschool visit included 12 undergraduate Psychology volunteers teaching 20 children ages 3-5 about the brain. Activities included a coloring workbook, Play-Doh brain, visual illusions, helmet safety, memory game, and emotion game. The undergraduate volunteers valued the experience rating it a 9.5 out of 10 (*high*). The elementary school visits included 23 volunteers teaching 106 fifth graders about reflexes, proprioception, memory mnemonics, taste/smell, the eye, and sheep brains. Students enjoyed the experience rating it 9.5 out of 10. They favored the sheep brain and taste/smell activities and also learned the most from them. Volunteers valued the experience rating it 9.1 out of 10. Our middle school visits included 25 volunteers teaching 159 fifth to eighth graders about neurons, reflexes, procedural memory as well as parts of the brain using zombie, drawing, and guessing games. Students rated their experience 9.5 out of 10 and favored the procedural memory, neuron, and zombie activities. Students reported learning the most from the neuron activity. Volunteers valued the experience rating it 9.3 out of 10. The high school visit included 18 Psychology majors teaching 49 eleventh and twelfth graders about the influence of smell/sound/sights on taste perception, the phantom limb phenomenon, synesthesia, absolute thresholds, and the chameleon effect. Students rated the experience 9.3 out of 10. They preferred the activity about the influence of smell on taste and learned the most from it. Volunteers valued the experience rating it 8.8 out of 10. Overall, we were pleased with the program outcomes: undergraduate volunteers accrued a total of 335 service hours while teaching 350 local school students about the brain. The volunteers reported valuing the opportunity to work with and teach students, and the students reported a high level of satisfaction. We hope to continue to visit these schools in the future and develop other new, fun, and interactive activities.

Disclosures: J.A. Johnson: None. **J. Burkhardt:** None. **T. Hogan:** None. **A. Snyder:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.16SA/WW22

Topic: J.03. Public Awareness of Neuroscience

Support: Medical Research Council

Title: A *C. elegans* outreach activity for science festivals and school visits

Authors: *K. M. WEBSTER, ***K. M. WEBSTER**, R. C. TAYLOR, D. S. WALKER;
MRC Lab. of Mol. Biol., Cambridge, United Kingdom

Abstract: We have developed a series of novel, engaging activities to teach elementary aged children how we use *C. elegans* in neuroscience research. Our content, 'Worms are cleverer than you think!' is comprised of a series of modules that can be adapted for use in multiple contexts, ranging from science festival outreach events to visiting scientists in classrooms. Activities can be combined in a workbook or singled out as individual worksheets. The activities include:-An introduction to worms, using inexpensive, battery-operated microscopes, and a mutant matching game, using phenotypes such as Rol, Unc and Dpy.-A giant board game, in which children learn about the importance of senses. Children "move like a worm", using random (dice-determined) search and sensory input to find sweets, while dressed as a worm.-A simple egg-laying experiment, using videos, to illustrate how worms are used to study control of behavioural state and its relevance to mental health.-A video- and image-based illustration of how worms are used to study aging and age-related diseases. We hope that these activities will be useful to others seeking to use worms in outreach, and plan to make our resources publicly available to scientists and educators via an MRC hosted website.

Disclosures: K.M. Webster: None. **R.C. Taylor:** None. **D.S. Walker:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.17SA/WW23

Topic: J.03. Public Awareness of Neuroscience

Title: Brain awareness activities as a service learning experience for college students

Authors: *A. M. HUTTON KEHRBERG[1], J. BARBA[2], B. DONATHAN[2], E. KNAUSS[2], S. ROBERTS[2], O. RUDY[2], L. A. NORMANSELL[3];
[2]Neurosci. Program, [3]Psychology, [1]Muskingum Univ., New Concord, OH

Abstract: Many universities are encouraging the incorporation of service learning experiences into the college curriculum. These experiences should be useful for participants from outside the campus community while also encouraging the college students to relate the experience to their life outside the classroom (Bringle *et al.*, 2016). The benefits to the students of such experiences include increased academic performance, leadership, self-efficacy, and commitment to activism (Vogelgesang & Astin, 2000). Our neuroscience students have planned multiple brief service learning activities with different target age groups. Six students in one course (Cognitive Neuroscience) chose to attend the local high school's Advanced Placement Psychology class for two one-hour sessions. Eleven students in another course (Psychopharmacology) were allowed to choose between one-hour sessions at the local preschool, elementary school, or our university. The college students researched, planned, and implemented each of the activities in those sessions. We have also planned outreach activities to K-2 students through an after-school program that were volunteer, extracurricular opportunities for the college students. Before and after the experiences, the college students completed a series of surveys regarding their attitudes toward community outreach. Their responses were compared to introductory students who did not complete a service learning experience that semester. Of those who completed a service learning experience, 94% agreed that the experience was "*worthwhile*" and an "*integral part of the college course.*" Furthermore, those students who completed a service learning experience were consistently higher in their desire to be involved in future experiences that "*work to address a major social ill confronting our society*" [$F(1,35) = 13.63$, $p = .001$, $\eta^2_p = .280$], but also showed a greater increase in this interest in community involvement [$F(1,35) = 4.602$, $p = .039$, $\eta^2_p = .116$] as a result of the service learning experience. There was no main effect of time itself, [$F(1,35) = .112$, $p = .740$, $\eta^2_p = .003$]. These results suggest that service learning experiences are possible and beneficial in neuroscience courses.

Disclosures: A.M. Hutton Kehrberg: None. **J. Barba:** None. **B. Donathan:** None. **E. Knauss:** None. **S. Roberts:** None. **O. Rudy:** None. **L.A. Normansell:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.18SA/WW24

Topic: J.03. Public Awareness of Neuroscience

Title: The auditory system knowledge space in public domain internet sources

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

Abstract: Open source internet queries are a common tool used by specialists and non-specialists alike to retrieve information about scientific topics. Search engines provide internet

resources based on query processors that analyze, categorize, and rank collections of websites in order of relevance to the user. Commonly used search engines offer a large assortment of internet resources due to the variety of websites being indexed by query processors. Academic search engines allocate a smaller selection of internet resources as their query processors only look through and present scholarly literature including articles and books from credible sources. This work-in-progress aims to evaluate the prevalence of internet resources for auditory neuroanatomy using four search tools commonly implemented by the general public (Google, Bing, Yahoo!, and AOL) as well as two used primarily by scientists (Google Scholar and PubMed). Auditory lexicon terms that identify major anatomical landmarks of the auditory system pathway, from periphery to central nervous system, were used to query internet URLs using the six search engines. Preliminary results demonstrate differences in the relative number and relative ranking of URLs retrieved by auditory term queries with public domain search tools as compared with those retrieved with specialist search engines. These findings highlight disparities in knowledge of the auditory system by the general public and scientific communities and identify opportunity areas for scientific communication for the non-specialist.

Disclosures: S.S. Manshad: None. **E.E. Serrano:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.19SA/WW25

Topic: J.03. Public Awareness of Neuroscience

Title: The 2017 United States Regional Brain Bee Championship

Authors: *J. D. GREENSPAN, N. MYSLINSKI;
Dept Neural and Pain Sci., Univ. Maryland Dent. Sch., Baltimore, MD

Abstract: The Brain Bee is a neuroscience competition for teenage students. After three days of intense competition, the 2017 USA Regional Brain Bee Champion is **Sojas Wagle.** Fifty-one Chapter winners from 30 states competed at the **University of Maryland, Baltimore on March 17, 18 and 19, 2017**. Sojas is a 15 year old sophomore who represented Little Rock, Arkansas. He won a scholarship, a summer internship at a neuroscience lab, and the right to represent the USA at the nineteenth **International Brain Bee (IBB) Championship in Washington, DC** where he will compete against the regional champions from approximately 25 countries such as **Australia, Brazil, Canada, China, Germany, India, Iran, Israel, Italy, Japan, Korea, Malaysia, Nepal, New Zealand, Nigeria, Poland, Romania, Singapore, South Africa, Ukraine, United Arab Emirates and others.** The 2017 IBB Championship is hosted by the **American Psychological Association** (See IBB Poster). The Brain Bee tests a student's knowledge of the human brain, including such topics as intelligence, emotions, memory, vision,

Alzheimer's disease, Parkinson's disease, and many others. The USA Championship competition involves a neuroanatomy laboratory exam with human brains, patient diagnosis involving face-to-face interactions with patient actors, brain histology, and a final question-and-answer component. To advance to the USA Regional Championship, Sojas had to win one of the many USA Chapter Brain Bee competitions. He won the Central Arkansas Chapter competition which is coordinated by **Dr. Andrew James** and held at the **Little Rock Main Library**. Second place went to **Aarthi Vijayakumar** representing the **Minneapolis, Minnesota Chapter** coordinated by **John Paton** and **Janet Lyn Fitzakerley**. Third place went to **Amit Kannan** representing the **Indianapolis, Indiana Chapter** coordinated by **Bethany Neal-Beliveau.** Other Chapters that placed in the top ten are **East Lansing, MI, Rootstown, OH, Miami, FL, Glendale, AZ, Piscataway, NJ, San Diego, CA, and Hershey, PA.** The USA Regional Brain Bee was founded by **Dr. Norbert Myslinski, Department of Neural and Pain Sciences, University of Maryland Dental School**, and is one of more than 50 World-Wide Brain Bee Regions. Dr. Myslinski says, "We need future clinicians and researchers to treat and find cures for neurological and psychological disorders. The Brain Bee builds better brains to fight brain disorders."

Disclosures: J.D. Greenspan: None. **N. myslinski:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.20SA/WW26

Topic: J.03. Public Awareness of Neuroscience

Title: Brown Brain Fair: A community-oriented research exhibition

Authors: *C. PAPENDORP[1], M. A. WOODBURN[2];
[1]Brown Univ., Providence, RI; [2]Univ. of North Carolina at Chapel Hill, Chapel Hill, NC

Abstract: The Brown Brain Fair is the first-ever community-oriented showcase of brain research at Brown University. As opposed to a typical poster session that targets students and faculty in the field, Brown Brain Fair requires labs to make their research interactive and appealing to the public.
After two years of success, the Brown Brain Fair presents itself as an effective way to engage the community in current science research and inspire the next generation of scientists. The 2017 fair featured 29 exhibits, including five student groups, nine community organizations, and 15 labs. These labs were from a variety of departments: Neuroscience; Cognitive, Linguistic, and Psychological Sciences (CLPS); Engineering; and Molecular Pharmacology, Physiology, & Biotechnology (MPPB). An anatomy station allowed attendees to touch preserved human brains, and a microscope station gave participants a closer look at typical animal models like tadpoles

and zebrafish. Crowd favorite tables were the Berson laboratory, demonstrating optical illusions and retinal dissection, and the Virtual Environment Navigation laboratory, which allowed participants to try on virtual reality goggles.
Over 700 people attended the Fair, which ran from 10am to 2pm. Of these 700+, 34% were pre-kindergarten through high school, 18% were college students, and 48% were adults. After attending the Fair, one 2nd grade attendee resolved to "go to my school library and get books about brains"! The second annual Brown Brain Fair attracted nearly 200 more visitors than the inaugural event.
The Brain Fair serves as the culminating event of Brain Week RI - Rhode Island's celebration of international Brain Awareness Week. The Brain Fair and Brain Week RI as a whole received significant media attention in the Providence Journal, Providence Business News, Rhode Island Public Radio, Fox News Providence, News at Brown, and the Brown Daily Herald. The event was sponsored by the Office of the Vice President for Research, the CLPS Department, the Department of Neuroscience, the Office of the President, and the Brown Institute for Brain Science.
The Brown Brain Fair furthers the Brain Awareness Week's mission of neuroscience outreach and bolsters Brown University's reputation as a national center of brain research. The opportunity to practice science communication and advocacy benefits the presenters as well. Despite its enormous impact, the Brown Brain Fair is organized by a small group of undergraduate students. We did so by leveraging a network of graduate students, postdoctoral fellows, and principal investigators across the University. Thus, the "Brain Fair" is an easily replicable model for scientific outreach.

Disclosures: M.A. Woodburn: None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.21SA/WW27

Topic: J.03. Public Awareness of Neuroscience

Support: Dana Foundation

Society for Neuroscience Western NC Chapter

Title: Wake Forest University's brain awareness council: Growing science outreach in the NC Piedmont Triad community

Authors: *B. C. BECKELMAN[1], S. EWIN[2], A. DEAL[3], N. BEAN[3], D. E. WILLIAMS[3], M. MAUTERER[2], D. W. GODWIN[4];
[1]Neurosci. Grad. Program, [2]Physiol. and Pharmacol., Wake Forest Sch. of Med., Winston Salem,

NC; [3]Neurosci. Grad. Program, Wake Forest Sch. of Med., Winston-Salem, NC;
[4]Neurobiology/Anatomy, Wake Forest Sch. of Med., Winston Salem, NC

Abstract: The Brain Awareness Council (BAC) at Wake Forest University is a non-profit volunteer organization with a strong commitment to enhancing community knowledge on current neuroscience research, brain function and neurological disorders using accessible language and active-learning instruction. We reach students and lifelong learners of all ages and experience levels with regular school visits, Brain Awareness Week, the Neuroflix series, and other community events. All events are hosted by highly-trained graduate student volunteers in conjunction with local schools and museums. The BAC continuously evolves our outreach efforts to suit the needs of the NC Piedmont community by expanding to new audiences, including minority students underrepresented in STEM, NC policymakers, and adult learners.

Disclosures: B.C. Beckelman: None. **S. Ewin:** None. **A. Deal:** None. **N. Bean:** None. **D.E. Williams:** None. **M. Mauterer:** None. **D.W. Godwin:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.22SA/WW28

Topic: J.03. Public Awareness of Neuroscience

Support: American Association of Anatomists Educational Outreach Grant

Title: 99 Minutes of Neuro!: A neuroscience educational outreach program for health academy high school students

Authors: *B. A. PUDER;
Basic Sci. Dept., Samuel Merritt Univ., Oakland, CA

Abstract: “99 Minutes of Neuro!” is a neuroscience educational outreach event designed in partnership with faculty and graduate students enrolled at Samuel Merritt University (SMU) and teachers and students enrolled in the West Contra county health academies. Program goals for “99 Minutes of Neuro!” are to: 1. Create lasting partnerships with secondary schools in the California East Bay region. 2. Educate high school students regarding basic neuroanatomy, neurophysiology and neurological disease states in order to make healthy lifestyle choices regarding brain health and safety. 3. Train graduate students to instruct and communicate neuroscience information at an age appropriate level. 4. Provide positive role models and encourage high school students to pursue science and medicine careers. The three hour after school program was held at Samuel Merritt University and hosted high school health academy students and their teachers. The program consisted of dinner with a neuroscience introductory

talk followed by 11 interactive neuroscience stations facilitated by SMU graduate students. A workbook with worksheets for each of the 11 stations was created by SMU graduate students and was distributed to the high school students and their teachers. The workbook allowed teachers to review and reinforce key neuroscience concepts upon return to their high schools. Participants were encouraged to participate in an online survey to assess the quality and effectiveness of the outreach program.

Disclosures: B.A. Puder: None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.23SA/WW29

Topic: J.03. Public Awareness of Neuroscience

Support: P60AA011605

Title: Robo-Brain: An interactive exhibit for Brain Awareness Week and beyond

Authors: *D. L. ROBINSON, J. BESHEER;
Bowles Ctr. for Alcohol Studies, Univ. of North Carolina at Chapel Hill, Chapel Hill, NC

Abstract: For Brain Awareness Week 2017, faculty from the UNC Bowles Center for Alcohol Studies organized an interactive exhibit “Robo-Brain!” as a platform for the community to learn about neuroprosthetics, neuroscience and brain health. The main event was held at a local science museum, the North Carolina Museum of Life and Science (http://www.ncmls.org/), in a hands-on laboratory exhibit area. Visitors from across the region were introduced to the lab via a short video (continuously looped on a prominent LCD screen) illustrating how electrical signals from the brain are used to command muscle movements, and how electrical muscle potentials can be used to control movement of a plastic claw. Once visitors entered the lab area, they first explored the human brain by observing and touching a postmortem human brain, a sheep brain and a brain/skull model. Scientists talked with visitors about which parts of the brain control movement, and how electrical signals transmit information from the brain to muscles quickly. Next, visitors operated a robotic claw by contracting their own muscles, via an EMG interface (Backyard Brains Inc, Ann Arbor, MI). The visitors visualized their muscle potentials, and then used the claw to pick up a toy brain. Scientists and visitors discussed how neuroprosthetics could use a similar strategy to control a prosthetic hand by using electrical potentials from the motor cortex. Scientist volunteers were given detailed instructions on the activity and trained before their shift. The exhibit was staffed by 31 scientists and students and approximately 425 children and 205 adults came through the exhibit over the 5 days (4-6 hr/day). Next, we repeated the activity in a 1-day event at the Museum that was bilingual (Spanish/English). Finally, we adapted

the activity to an outdoor venue at the UNC Science Expo, part of the state-wide North Carolina Science Festival. At all events, brochures on underage drinking facts and prevention from SAMSHA and the National Institute on Alcohol Abuse and Alcoholism were distributed. 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 Information Dissemination Core of the UNC Alcohol Research Center (National Institute of Alcohol Abuse and Alcoholism, P60AA011605, "Molecular and Cellular Pathogenesis in Alcoholism", PI: Fulton T. Crews).

Disclosures: D.L. Robinson: None. **J. Besheer:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.24SA/WW30

Topic: J.03. Public Awareness of Neuroscience

Support: NSF CAREER IOS 1354408

The Dana Foundation

The American Physiological Society

Title: Service learning outcomes for Introduction to Neuroscience Undergraduates

Authors: *E. RHINEHART, J. BERRY-PROPST, S. CASSELLA;
Dept. of Biol., Susquehanna Univ., Selinsgrove, PA

Abstract: Service-Learning (SL) integrates meaningful community service with instruction and reflection to enrich the learning experience and teach civic responsibility. SL in social science classes enhances learning and facilitates inclusivity. Therefore, we tested the hypothesis that SL in introductory science courses would enhance student engagement, civic responsibility and course content mastery. We conducted annual elementary school outreach events. Undergraduate students used backward design strategies to create stand-alone modular lesson plans. The semi-annual 3 hour, events were open to the public and structured as "reverse science fairs". Data indicate that SL, in this context, facilitates student engagement and confidence in content mastery, especially in 1st year and 1st generation undergraduates. Assessments also revealed that underrepresented minority students in the sciences had greater gains in commitment to "future SL activities" and the necessity for "universities to perform community service". Therefore, SL, as a pedagogy in introductory biological/physiological sciences courses, functions as a student-centered, high-impact practice, giving students new views on the applications of classroom course content and enhancing civic responsibility, while also inspiring the next generation of

physiologists. Supported by NSF CAREER IOS-1350448, the American Physiological Society and the Dana Foundation

Disclosures: E. Rhinehart: None. **J. Berry-Propst:** None. **S. Cassella:** None.

Theme J Poster

026. Neuroscience Outreach Activities I

Location: Halls A-C

Time: Saturday, November 11, 2017, 1:00 PM - 5:00 PM

Program#/Poster#: 026.25SA/WW31

Topic: J.03. Public Awareness of Neuroscience

Support: Brain Repair and Integrative Neuroscience Program of the McGill University Health Centre

Concordia University Faculty of Fine Arts

Canadian Association for Neuroscience

McGill University

Montreal General Hospital Foundation

Visual Voice Gallery

Concordia University PERFORM Centre

Title: Engagement of neurosciences and the arts, the Convergence initiative

Authors: *C. A. ZAELZER[1,2], V. HENAULT[3], A. LESSARD[9], P. LANGSHAW[4], K. GLASSMAN[3], C. SWINTAK[5], N. KHALILI-MAHANI[11], A. BRASSARD[3], K. JUNG-HOO PARK[6], C. SALMON[10], B. FORGET[7], K. TOTH[12], R. DUCLOS[8], K. MURAI[9,13];
[1]Neurol., McGill Univ. Hlth. Ctr., Montreal, QC, Canada; [2]Covergence, Perception of Neurosci., Longueuil, QC, Canada; [3]Art History, [4]Design and Computat. Arts, [5]FOYER, [6]Film & Production, [7]Art Educ., [8]Concordia Univ. Fac. of Fine Arts, Montreal, QC, Canada; [10]Neurol., [9]Brain Repair and Integrative Neurosci. Program of the McGill Univ. Hlth. Ctr., Montreal, QC, Canada; [11]PERFORM Ctr., Concordia Univ., Montreal, QC, Canada; [12]Med., Univ. of Laval, Quebec City, QC, Canada; [13]McGill Univ., Montreal, QC, Canada

Abstract: Scientists' engagement on public outreach of science continues using a deficit model that employs a one-way communication of their findings. Researchers in the field of science communication have repeatedly found that this is ineffective. Public engagement is necessary, and that requires two-way communication (Cooper 2016). The broad consensus is that a two-way engagement can strengthen policy outcomes by pulling in more voices, building support for

science, and growing interest among youth. It also helps to encourage science careers, improving science knowledge and boosting the overall value of science to society (CSTA, 2003; RS, 2006; Commonwealth of Australia, 2010; Science Culture 2014). Art in popular culture has a strong influence in shaping most people's understanding of science and scientists. Films, novels, comics, illustrations, and other media are usually more appealing, and more memorable than formal scientific lectures. The arts can be a strong tool allowing the public to situate and see themselves in the complexities of scientific inquiry. Convergence is the process by which two different elements merge into a unified whole. It is the spirit of the Convergence initiative that in the last eleven months has placed together 16 neuroscientists on early steps of their careers from 12 different labs, plus 20 fine arts students of advanced cycles representing 14 different art disciplines. Four major organizations, plus the efforts of dozens of volunteers and entrepreneurs joined in the common goal of changing perceptions in the students and institutions involved towards each other work. In the process, we have made neuroscience research more accessible to a general audience using the arts as media for communication in three main art-neuroscience exhibitions. We have also achieved a transversal two-way engagement model of sharing knowledge between disciplines and shape a new vision of neuroscience and the arts between the participants. In this work, we present details of the project, the process, the methods, and the results of this unique experience.

Disclosures: **C.A. Zaelzer:** None. **V. Henault:** None. **A. Lessard:** None. **P. Langshaw:** None. **K. Glassman:** None. **C. Swintak:** None. **N. Khalili-Mahani:** None. **A. Brassard:** None. **K. Jung-Hoo Park:** None. **C. Salmon:** None. **B. Forget:** None. **K. Toth:** None. **R. Duclos:** None. **K. Murai:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.01SU/WW32

Topic: J.03. Public Awareness of Neuroscience

Support: K01MH108721-02

Title: Mybrainandme.org: An online tool to increase education and public awareness of neuroscience while building a data repository of participant-submitted neuroimaging and phenotype data

Authors: *S. P. PANTAZATOS[1,2], V. MAHAJAN[3], H.-Y. CAO[4], D. S. MARCUS[5];
[1]Mol. Imaging and Pathology Div., New York State Psychiatric Inst., New York, NY;
[2]Psychiatry, [3]Data Sci. Inst., Columbia Univ., New York, NY; [4]Data Sci. Inst., Columbia Univ., New York City, NY; [5]Washington Univ., St. Louis, MO

Abstract: Discovery science and the sharing of openly available neuroimaging and phenotypic datasets with the scientific community have made substantial progress in the past decade. In the genetics field, sites such as 23andMe have generated large and valuable data resources through user-submitted biological and phenotypic data collected online while simultaneously increasing public awareness and education of genetics. To our knowledge, no comparable, open-source project exists in the neuroscience domain. Here, we present MyBrainandMe.org, a website that provides free analyses, visualization and exploration of structural MRI scans to site participants for recreational and educational use, while aiming to generate a large and 'dynamic' neuroimaging data repository for the scientific community that allows new phenotype data to be collected online. The initial version of the site (release anticipated in Fall, 2017), allows participants to upload a T1 structural brain scan (i.e. a zipped dicom folder or nifti file) and within minutes visualize and explore their own 'brain-print'; a whole-brain z-score map of higher and lower grey matter volumes relative to individuals of comparable age and sex (the database is "seeded" with ~4K publically available scans). The site also applies machine learning-based prediction models to allow users to i.e. estimate their BrainAGE (difference between real and predicted age). The site uses all open source neuroimaging/psychology software including a secure XNAT 1.7 instance to manage storing and processing of neuroimaging data and a secure web stack (Python Flask and MySQL) that manages image uploading, user accounts, and serving static files. After a simple online application, researchers

would gain access to anonymized neuroimaging data and administer custom surveys and psychophysics assessments to site users. We anticipate the site will serve as a new recreational tool to educate and increase public awareness of neuroscience, while also generating a valuable and unique resource complementary to existing data sharing efforts.

Disclosures: S.P. Pantazatos: None. **V. Mahajan:** None. **H. Cao:** None. **D.S. Marcus:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.02SU/WW33

Topic: J.03. Public Awareness of Neuroscience

Support: PAPIME PE307415

Title: Open labs on neurosciences: Fifteen years of development in the disclosure of brain science in psychology

Authors: *K. B. VALENCIA[1], R. L. LÓPEZ-BEJARANO[2], C. G. CURIEL-GUERRERO[2], A. B. ALCÁNTARA-QUINTERO[2], M. MORALES-RUVALCABA[2], D. C. RODRÍGUEZ-CASTAÑEDA[2], P. M. LUNA-DÁVILA[2], M. J. RAMÍREZ-FLORES[2], O. A. ROJAS-RAMOS[2]; [1]Psicobiología y Neurociencias, Lab. De Neuropsicofarmacologia, UNAM, Ciudad de México, Mexico; [2]Facultad de Psicología, Univ. Nacional Autónoma de México, Ciudad de México, Mexico

Abstract: Open laboratories tours are one of the activities that are part of the Brain Awareness Week (BAW) commemoration in the Facultad de Psicología (School of Psychology; FP), on Universidad Nacional Autónoma de México (UNAM). The open lab visits begun in 2002 at FP, with the aim of bring the different research scenarios closer for the undergraduate psychology students. Over the years, it has been sought to students assimilate the work of the psychologist on neurosciences, and the opportunity to enter on these interdisciplinary fields of knowledge. Open lab visits have been modified in terms of their dynamics and organization, being a BAW activity uninterrupted in FP until the current march, 2017. Through statistical monitoring since 2002, we observed an increase in the number of laboratories, thematics and new headquarters, resulting in an increase of the demand. Whereas in 2002 only 4 laboratories offered visits, in 2008 this number increased to 7 with the attendance of 195 students. This growth has continued in the last three years and now there is a total count of 16 laboratories with an average attendance of 478 students. In addition, laboratories of other institutions have been continuously added, of which, 62.5% belong to the FP, and 37.5%, are laboratories are from external headquarters. According to the fields of knowledge available on FP related to neurosciences, the participating research spaces offer thematics as Neurobiology (56.2%), Psychophysiology (31.2%), Neuropsychology

(6.25%), and other related topics, including the programming of cognitive tasks, genetics and brain plasticity (6.25%). Growth has also been observed, in the number of hosts (they receive the visitors in every laboratory and explain the research carried out in there) per laboratory (87.27%). This activity has an impact in several ways, but is important as a means of contact between the students and the training sceneries within each laboratory, as well as an opportunity to perform social service or develop thesis. It is expected that these open lab tours to laboratories will have an even greater impact on future Brain Awareness Weeks.

Disclosures: K.B. Valencia: None. **R.L. López-Bejarano:** None. **C.G. Curiel-Guerrero:** None. **A.B. Alcántara-Quintero:** None. **M. Morales-Ruvalcaba:** None. **D.C. Rodríguez-Castañeda:** None. **P.M. Luna-Dávila:** None. **M.J. Ramírez-Flores:** None. **O.A. Rojas-Ramos:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.03SU/WW34

Topic: J.03. Public Awareness of Neuroscience

Title: Neuroscience outreach through the martial arts

Authors: J. D. CARTER[1], *K. D. MICHEVA[2];
[1]Camp Carter Intl. Karate Assn., San Jose, CA; [2]Molec Cell. Physiol, Stanford Univ. Sch. Med., Stanford, CA

Abstract: Outreach efforts are becoming an integral part of scientists' work. Whether it is sharing their own research, or communicating the latest scientific discoveries, scientists are increasingly interacting with the public in an effort to foster an appreciation of science and its contributions to society. However, much remains to be done in this respect.We propose a new format for neuroscience outreach through the teaching and practice of martial arts. Martial arts, such as Karate, Taekwondo, Kung fu, and others, are a very popular extracurricular activity for many students, and are also enjoyed by adults. While they are often perceived as exercise, and as ways of improving the body's coordination, agility, flexibility, and muscle strength, the practice of martial arts exerts a strong effect on brain health and development. In addition to the positive effects of general exercise on brain functioning, recent reports have also highlighted specific functional and even structural changes occurring in the brain of martial arts practitioners. On the flip side, brain injuries are also possible, especially during some martial arts competitions. This integral connection between martial arts and the brain allows for a natural incorporation of neuroscience teaching within a martial arts program. We have developed such a 'neuroscience-enriched' martial arts curriculum and are beginning to implement it at one Karate school, Camp Carter International Karate Association in San Jose, California. Benefits can be seen in students

as young as 4 years old and range from a general curiosity and excitement about how the brain works to a better understanding and practice of the martial arts, an increased knowledge in the field of neuroscience, as well as, for many students, an aspiration for a future career in science. Based on our positive experience, we will next work on developing a concise 1 hour program on 'Martial arts and the brain" that can be offered at other martial arts schools.

Disclosures: **J.D. Carter:** E. Ownership Interest (stock, stock options, royalty, receipt of intellectual property rights/patent holder, excluding diversified mutual funds); Camp Carter International Karate Association. **K.D. Micheva:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.04SU/WW35

Topic: J.03. Public Awareness of Neuroscience

Support: North Florida Society for Neuroscience Chapter Grant

Florida State University

Title: The Brain Awakens: Increasing neuroscience knowledge through educational outreach by FSU Neuroscience

Authors: *M. TABBAA, R. VAIDYANATHAN, C. STRONG, T. SULLENBERGER, L. ELVIR, B. CHELETTE, D. SHAUGHNESSY;
Florida State Univ., Tallahassee, FL

Abstract: The Florida State University Neuroscience Program Outreach has become a staple within Leon County, increasing neuroscience awareness every year. During the 2016-17 academic year, graduate students visited high school classrooms, coordinated and held a lecture series for high school students called the *Friday Neuroscience Lecture Series*, and participated in *Family Science Night*, an event held for K-8 children. Furthermore, we hosted the eleventh annual *North Florida Brain Bee* and sixth annual *Brain Fair*, and will participate in community educational events throughout the summer including the *Tallahassee Science Festival*. In the fall, we visited 4 different high schools and used hands-on demonstrations to teach about the five sensory systems and neuroanatomy. We also coordinated the *Friday Neuroscience Lectures*, a free 9-week course to prepare high school students for the *North Florida Brain Bee*. Held in early 2017, the *Brain Bee* attracted competitors not only from Leon County, but also from different cities in Florida and south Georgia. With funding provided by our program and generous contributors, the Florida Brain Bee winner was sent to compete at the *USA National Brain Bee Championship* in Baltimore, MD. In the spring, we held the *Brain Fair*. This free and

family-friendly event aims to increase awareness of neuroscience in the community and is especially geared for elementary school aged children. Graduate and undergraduate students across FSU departments had over 20 displays, interactive activities, and demonstrations of basic neuroscience. A free bike helmet giveaway also occurred at the event due to generous contributors; over 100 helmets were fitted and given away to children. This year's *Brain Fair* theme was "The Brain Awakens", a derivation off the recent Star Wars movie. After the *Brain Fair*, neuroscience graduate students participated in *Family Science Night*, a local community event hosted by the Tallahassee School of Arts and Sciences where scientists from across fields conduct interactive demonstrations for children as well as their families. Additionally, graduate students had an educational booth at the Tallahassee *March for Science* to showcase our support for science and increase our community presence. In the summer, the *Tallahassee Science Festival* attracts hundreds of community members of all ages and our program displays hands-on activity booths that aim to increase neuroscience knowledge and interest. Supported by the 2016 SfN Chapter Grant, FSU Program in Neuroscience, Congress of Graduate Students, Student Government Association, and generous contributions from faculty and private donors.

Disclosures: M. Tabbaa: None. **R. Vaidyanathan:** None. **C. Strong:** None. **T. Sullenberger:** None. **L. Elvir:** None. **B. Chelette:** None. **D. Shaughnessy:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.05SU/WW36

Topic: J.03. Public Awareness of Neuroscience

Title: The modification of an open source delta RepRap 3D printer to print cells

Authors: *D. FOSTER[1], M. CHAVEZ[2], P. D'HAESELEER[2,3], L. DOMPE[1], W. HARRIS[1], W. HUTTON[1], R. JOHNSON[1], L. KASPERSKY[1], H. KIM[1], W. LEE[1], M. LEE[1], T. MANZO[1], S. MOHANTY[1], A. PAN[1], G. ROY[1], B. TENG[4], C. TOBIN[1], D. WRIGHT[1];
[1]The LAB, Los Angeles, CA; [2]BioCurious, Santa Clara, CA; [3]Counter Culture Labs, Oakland, CA; [4]California State Univ., Northridge, CA

Abstract: The European Patent Office has called 3D printing the most significant advance in manufacturing since the Industrial Revolution. The technology has been applied to a myriad of disciplines. Noteworthy examples in neuroscience include the use of printers to make lab equipment and prosthetics. 3D printers modified to extrude cells as a print media are called bioprinters. Bioprinters are recognized as a potential tool by which tissues and organs might someday be fabricated outside of the body. Barriers faced by neuroscientists curious about possible applications of bioprinters include cost and training. Work is ongoing at a number of community biology labs nationwide to develop an open source bioprinter. We present here

progress in modifying both Cartesian and delta style RepRap 3D printers to extrude cell friendly gels. The hardware design and supporting software are open source. Adrian Bowyer's RepRap project has created a revolution in affordable 3D printing technology. We aim to radically lower the entry level barriers to bioprinting by developing an affordable open source design that can be built by any neuroscience lab with a minimum amount of cost, effort, and technical expertise.

Disclosures: D. Foster: None. **M. Chavez:** None. **P. D'haeseleer:** None. **L. Dompe:** None. **W. Harris:** None. **W. Hutton:** None. **R. Johnson:** None. **L. Kaspersky:** None. **H. Kim:** None. **W. Lee:** None. **M. Lee:** None. **T. Manzo:** None. **S. Mohanty:** None. **A. Pan:** None. **G. Roy:** None. **B. Teng:** None. **C. Tobin:** None. **D. Wright:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.06SU/WW37

Topic: J.03. Public Awareness of Neuroscience

Title: Making neuroscience accessible to parents of children with special needs

Authors: M. TURNER[1], *K. N. HUGGINS[2];
[1]Movement Lesson, LLC, Peoria, AZ; [2]Movement Lesson, LLC, Kingsport, TN

Abstract: The number of children diagnosed with Autism Spectrum Disorder (ASD) is currently at 1 in 68 or 1.46% of the population according to the CDC[1], creating a large population of society for which knowledge of neuroscience becomes important. At present the causality of autism is yet unclear and treatment can be difficult. Moreover, parents of children with these diagnoses can feel overwhelmed and undereducated in the diagnoses. Specific to ASD, there exist consistent movement markers that correlate with altered gait patterns and subsequent sensory difficulties[2]. As early as infancy, the development of movement in children with ASD diverges from patterns shown in neurotypical development. These divergent movement patterns coupled with the barrage of environmental stimuli on the system concomitantly impede the initiation of key components in short and long-term development. Infants that present with deviations in rotational response to their surroundings have concomitant complications with functional vision, grasp and gross motor skills. In working with the parents to explain how movements develop in neurotypical children and working with the child to create those experiences the gap between parental understanding and diagnosis can be bridged. We consider the detections of said movement markers in relationship to key milestone achievements with initial movement assessment, monthly and possible bi-monthly evaluations for those at higher risk, and offer initial functional movement stimulation. Research has shown that waiting until the child has failed to exhibit reach-to-grasp movement, characterized in children with autism, is too late to offer the differences needed towards neurotypical development[2]. These sessions create an

educational platform by which the children can learn more efficient ways to process movement and sensory information while giving the parents an understanding of how the brain works. Given that movement underlies the ability of a child to communicating, play, interact and otherwise develop it is a critical aspect of ASD to address. With successful intervention, many challenges facing children with ASD can be mitigated resulting in positive results for components of global delays.

Disclosures: M. Turner: None. **K.N. Huggins:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.07SU/WW38

Topic: J.03. Public Awareness of Neuroscience

Title: Neuroscience, technology advancement & the future of humanity: A collaborative approach to yield a better understanding & an improved outlook on human thought in the information age

Authors: *A. SELARIU[1], F. O. PETROZZI[2], P. SCANNELL[3], P. DUSSAULT[4], C. IRENE[5]; [1]Colorado State Univ., Fort Collins, CO; [2]Neuro Coaching, Rome, Italy; [3]The Emergent Brain Consortium, Washintong, DC; [4]The Emergent Brain Consortium, Quebec City, QC, Canada; [5]Univ. of Trento, Trento, Italy

Abstract: Human biological evolution and the evolution of technology started to diverge over the last few decades, with the latter following an exponential curve. The current technological revolution will bring disrupting changes to an unprecedented level over the next decades.
We are facing the necessity to tackle the complex issue of the evolution of the human brain as both the cause and the product of the exponential technological advancements. However, the issue is simply too large to be discussed within the boundaries of a single discipline.
Humans will need to develop an augmented intelligence to harness the technology around them in a way that will improve their quality of life, and enhance their ability to effectively cope with the incoming domination of artificial intelligence and robotics.
We propose to optimize human functioning at a global scale in the current technological landscape by promoting multi-disciplinarity, starting from neuroscience and borrowing language from other disciplines to create a common tongue for an intentional evolution.
Tools we aim to employ are 1) neuro coaching and 2) multidisciplinary synchronized networking events (e.g. World Café™) with the goal to create an educational framework centered on mental flexibility and sustained learning across all stages of life.
1)
Neuro coaching: a personal development conversation between a professional coach and a client

in which
a.
goals are defined as an already achieved state, and actions to achieve them are selected
b.
the client's brain functions are activated by the coach powerful questions (i.e. mirror neurons, amigdala, prefrontal cortex, Broca and Wernicke areas, etc.)
c.
the coach helps the client to go through paradigm shifts in personal beliefs or values
d.
the social and the rational-logic brain functions of both the coach and the client meet and co-create effective solutions
2)
"Synchronized" World Café™ events: organized simultaneously in various parts of the globe they
a.
allow heterogeneous groups of participants (i.e. students, parents, teachers, trainers, coaches, psychologists¸ neuroscientists, managers, etc.) to answer to powerful questions exploring the future of human thought
b.
facilitated by experienced coaches, the World Café™ initiative activates solution focus conversations on specific topics, synchronizes participants' brain functions, activates and generates a collective awareness aimed to move to concrete actions
c.
the outcomes of each World Café™ event will incrementally generate the following edition's powerful questions

Disclosures: A. Selariu: None. **F.O. Petrozzi:** None. **P. Scannell:** None. **P. Dussault:** None. **C. Irene:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.08SU/WW39

Topic: J.03. Public Awareness of Neuroscience

Title: Summative assessment of a high school human cadaveric and neuroanatomy dissection laboratory

Authors: *I. MICHES, C. A. BEST-POPESCU;
Cell. Neurosci. and Imaging Laboratory, Bioengineering, Neurosci. Progr, Univ. of Illinois At Urbana-Champaign, Urbana, IL

Abstract: The Cadaver Academy was started by physician and attorney Dr. Pliura, the McLean County medical society and LeRoy Public Schools in 2014. The course is the first and only ongoing cadaver dissection laboratory in the U.S. of its kind. The goal of the not-for grade-course is to inspire bright and mature high school students from rural areas into becoming the next generation of health care professionals. Enrollment is limited to 33 McLean County students taking advanced biology classes. The students attend two afterschool two-hour laboratory classes per week and take three exams. They perform gross anatomy dissections, utilize a peer teaching method, and attend break-out physiology and clinical correlations sessions. The course is interactive, hands-on, and riddled with a hidden curriculum. The students are introduced to the language of medicine, novel learning strategies, team skills, and a respect for human life. During the final class, we conducted a Likert-scale survey (54 MCQs) with open-ended response questions to ascertain student course perceptions. The assessment instrument was designed to evaluate the quality of the course, factors in learning (retention and performance), teaching, engagement and overall impact of the course. The survey was anonymous. Twenty-five students filled out a paper copy, and seven students filled out an on-line version of the course assessment. The instrument included questions that assess the extent to which the students voluntarily committed time and effort to their extracurricular Cadaver Academy-related endeavors. We used factor analysis and split-half reliability to determine the validity and reliability of the assessment. Overall, the course exceeded student expectations, had a significant impact on high school aged student learning gross anatomy and team learning. To sum it up, and in the words of one of the participants- “The most important takeaway from the experience was emotional rather than intellectual. Even though students are engrossed in learning the specific veins, arteries, muscles and bones of the cadaver, one should not forget that this was a living person. Working with the human body requires the utmost respect, attention and care — qualities that physicians should possess to a high degree.”

Disclosures: I. Miches: None. **C.A. Best-Popescu:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.09SU/WW40

Topic: J.03. Public Awareness of Neuroscience

Title: Five days travel through the brain

Authors: *R. C. ZEPEDA[1], A. G. GUTIERREZ[2], C. J. JUÁREZ-PORTILLA[1], J. CUETO-ESCOBEDO[3], G. GUILLÉN-RUIZ[3], T. MOLINA-JIMÉNEZ[3], J. C. GUEVARA-LÓPEZ[1], M. SALDÍVAR-LARA[3], M. A. MELGAREJO[4], L. T. HERNÁNDEZ-SALAZAR[1], J. F. RODRÍGUEZ-LANDA[3], B. BERNAL[1], G. R. ROLDAN[5], F. GARCÍA-ORDUÑA[1], E. MEZA[6]; [2]Biomed. Sci., [3]Inst. de Neuroetología, [1]Univ. Veracruzana, Xalapa, Mexico; [4]Facultad de Medicina, AV MEDICOS Y ODONTOLOGOS SN, Xalapa, Mexico; [5]Natl. Autonomous Univ. of Mexico, Ciudad DE Mexico, Mexico; [6]Univ. Veracr, Xalapa, Mexico

Abstract: In order to joint efforts to participate in the public awareness of neuroscience, the Biomedical Research Center, the Neuroethology Institute and the Medicine school, at the Universidad Veracruzana organized several events during the Brain awareness week 2017. Students, faculty members and researchers performed the activities, which consisted in Brain fairs, talks in high schools and public forums, and a mini symposium. Brain fairs consisted of workshops to kinder gardens children; where the kids could learn about some basic brain functions of animals and humans. Brief talks in high schools included themes related to genetics, brain plasticity, stress, circadian rhythms, hormones and behavior, neurobiology of sexuality and emotions, among others. Additionally, informal scientific talks were presented in a coffee theater, where people had the opportunity to interact with experts and converse with them about some concerns and made questions. These informal talks approach about neuroscience topics, including neurobiology of sexuality and fear, psychiatric disorders, depression and memory. The closing event consisted in scientific conferences at the Medicine school, in which undergraduate and graduate students learned about bio-robotics, neuro-immune interactions, addiction, brain sexual dimorphism, and neurobiology of sleep. During this week we reached about 500 kinder garden children, 500 high school students, 300 coffee talk participants, and 120 conferences assistants.

Disclosures: R.C. Zepeda: None. **A.G. Gutierrez:** None. **C.J. Juárez-Portilla:** None. **J. Cueto-Escobedo:** None. **G. Guillén-Ruiz:** None. **T. Molina-Jiménez:** None. **J.C. Guevara-López:** None. **M. Saldívar-Lara:** None. **M.A. Melgarejo:** None. **L.T. Hernández-Salazar:** None. **J.F. Rodríguez-Landa:** None. **B. Bernal:** None. **G.R. Roldan:** None. **F. García-Orduña:** None. **E. Meza:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.10SU/WW41

Topic: J.03. Public Awareness of Neuroscience

Support: NIH Grant 1R01GM111421

NSFC Grant 81572232

Title: Stroke 120: An stroke educational video in China

Authors: J. ZHAO[1], *R. LIU[2];
[1]Fudan Univ., Shanghai, China; [2]Dept. of Anesthesiol. and Critical Care, Univ. of Pennsylvania, Philadelphia, PA

Abstract: To reduce prehospital delay for stroke victims in China is very critical and urgent as it is one of the major factors for the highest mortality and disability rate in China. Our proposal to use Stroke 1-2-0 strategy for rapid stroke recognition and response is very timely. Immediately after the online publication of *Stroke 1-2-0* in Lancet Neurology[1], the Chinese Stroke Association (CSA) endorsed it on World Stroke Day, Oct 29, 2016. Massive media coverage by over 50 regional and national news agencies followed. China Central Television broadcasted a special introduction of *Stroke 1-2-0* nationwide. After a few hours of its broadcast, the social media account (weibo, something like twitter in China) for Chinese Central Television had over 101 million people reviewed the introduction of Stroke 1-2-0. A specific website (www.stroke120.org) and a social media Wechat public platform (Chinastroke120, www.wechat.com) were established to deliver the most updated information related to *Stroke 1-2-0*. A *Stroke 1-2-0* educational video is produced by us and is released to the public domain via our website (http://stroke120.org/animation/) and many other media platforms. After the successful introduction, we strongly feel that it is critical to create a video for a better understanding of the Stroke 1-2-0 program. In this short 1 min video, we deliver a clear message that stroke is an acute and severe disease that can cause life-long disability and even death if the disease is not treated in a timely manner. To have the disease to be treated in a timely manner, it is critical to recognize the stroke and trigger the medical emergency system immediately. How to recognize the stroke signs and symptoms are well presented using Stroke 1-2-0 strategy with very simple and easy understanding animations.The stroke 120 educational video was released on Feb 14, 2017. After its release, it is well accepted by the public domain, many hospitals started to broadcast through there broadcasting system. Some TV stations broadcast it multiple times per day. To date, the viewing of the stroke 120 education video in Tengshun video hosting site has exceeded 40 million. Such educational materials will have profound impact on stroke care in China. Reference: Zhao J, Liu R. Stroke 1-2-0: a rapid response programme for stroke in China. *Lancet Neurol* 2017; 16(1): 27-8.

Disclosures: **J. Zhao:** None. **R. Liu:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.11SU/WW42

Topic: J.03. Public Awareness of Neuroscience

Support: Quinnipiac University

Title: The 30th northeast under/graduate research organization for neuroscience (NEURON) conference held at Quinnipiac University in Hamden, CT

Authors: *A. J. BETZ[1], T. AHERN[1], V. FRANCONE[2], S. A. RASKIN[3], J. G. TRAPANI[5], C. A. FRYE[6], D. B. MCQUADE[7], S. A. MASINO[4];
[1]Psychology, [2]Med. Sci., Quinnipiac Univ., Hamden, CT; [4]Neuroscience/Psychology, [3]Trinity Col., Hartford, CT; [5]Amherst Col., Amherst, MA; [6]Psychology, Univ. Albany, Albany, NY; [7]Skidmore Col., Saratoga Spgs, NY

Abstract: The 30th NEURON conference was held on February 26th, 2017, at Quinnipiac University's Center for Medicine, Nursing and Health Sciences. Quinnipiac now hosts the website for the NEURON conferences, which includes registration, abstract submission, archives of previous talks, resource links, and image galleries (www.quinnipiac.edu/neuron). The 2017 keynote speaker was Dr. Susan Masino, Vernon Roosa Professor of Applied Science, Trinity College. Her talk was titled *Metabolic Therapy for Neurological Disorders: Back to the Future*. Dr. Masino's laboratory examines the neurobiological basis and mechanisms that underlie the effectiveness of the ketogenic diet, an almost 100-year-old therapy for epilepsy. Her research focuses on the utility of this diet for treatment of other disorders, such as autism spectrum disorder, substance abuse and depression. Her research group uses multiple methodological approaches, including *in vivo* electrochemistry and behavioral pharmacology. At the conference, students and faculty participated in four workshops, including: Careers in science panel; Using a simple circuit to learn about data acquisition, analysis, and Ohm's Law; Creating a Service Learning Project; Voices in Brain Injury. The Tieman and Frye awards were given to students to honor the quality of their work and poster presentations. For the second year, NEURON has partnered with *Nu Rho Psi*, the national neuroscience honor society, which offered a third student poster award. NEURON 2017 grew to 115 posters, representing over 402 different institutions and 8 states. A total of 338 faculty, students, and affiliates attended the conference. With continued local and regional support from faculty dedicated to student outreach and mentorship, NEURON has continued to expand beyond its original Boston locations to include greater representation from the northeast region

Disclosures: A.J. Betz: None. **T. Ahern:** None. **V. Francone:** None. **S.A. Raskin:** None. **J.G. Trapani:** None. **C.A. Frye:** None. **D.B. McQuade:** None. **S.A. Masino:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.12SU/WW43

Topic: J.03. Public Awareness of Neuroscience

Support: UT Health San Antonio Graduate School of Biomedical Sciences

San Antonio Life Sciences Institute

Title: Formation of WISDOM at UT Health San Antonio, a women in science group dedicated to development, outreach, and mentoring

Authors: *E. M. OCHOA[1], T. N. HOLMGREN[2], M. A. GUZMAN[3], R. KAUL[4], C. V. SHAFFER[4], T. EVANS[5], S. MOOBERRY[4];
[2]Physiol., [3]Microbiology, Immunol. & Mol. Genet., [4]Pharmacol., [5]Office of Career Develop. Grad. Sch. of Biomed. Sci., [1]UT Hlth. San Antonio, San Antonio, TX

Abstract: Approximately 50 percent of all biological science degrees are awarded to women but only 25 percent of science and engineering faculty positions in the United States are composed of women (National Science Foundation, 2017). Additionally, though young girls and boys in grade school show similar interest in science, this trend shifts greatly through secondary education and into college, where only 17 percent of women express interest in STEM (National Science Foundation, 2017). Often cited as reasons for this stark difference include discrimination based on sex, lack of support during training, and lack of relatable female role models (Martinez et al, 2017). To address these issues amongst not only the pre and post-doctoral trainees at UT Health San Antonio but also among the community at large, a group of Integrated Biomedical Sciences PhD students across a variety of disciplines including but not limited to Neuroscience, Cell and Molecular Biology, Pharmacology and Physiology, Microbiology and Immunity, and Cancer Biology came together to implement the formation of Women in Science, Development, Outreach and Mentorship (WISDOM). Through both outreach events and supportive, trainee-focused programming, WISDOM aims to encourage young girls to pursue STEM education as well as increase retention of women in STEM.

Disclosures: E.M. Ochoa: None. **T.N. Holmgren:** None. **M.A. Guzman:** None. **R. Kaul:** None. **C.V. Shaffer:** None. **T. Evans:** None. **S. Mooberry:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.13SU/WW44

Topic: J.03. Public Awareness of Neuroscience

Support: Russian Science Foundation Grant no. 15-11-30014

Title: First international early research career enhancement school on BICA

Authors: *A. V. SAMSONOVICH[1,2];
[1]Krasnow Inst. Adv Study, George Mason Univ., Fairfax, VA; [2]Dept. of Cybernetics, Natl. Res. Nuclear Univ. MEPhI, Moscow, Russian Federation

Abstract: FIERCES on Biologically Inspired Cognitive Architectures (BICA) originate from, and continue the spirit of the Early Career Researcher Workshop Track sponsored by Elsevier and held at BICA 2014 at the Massachusetts Institute of Technology in November 2014. This expansion of the great initiative now regularly complements the BICA conference series. FIERCES series started in April in 2016, and then continued as a summer school of young scientists held at the beginning of August 2017 in the Baltschug Kempinski hotel in Moscow, Russian Federation. With lectures available on video at bicasociety.org/videos and papers published in Springer's book series "Advances in Intelligent Systems and Computing" (indexed in Web of Science and Scopus), FIERCES is an invaluable resource for young scientists. So, why BICA? Because of their rapidly growing popularity in modern science and technology. 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 structure and function, 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 cost, so that an explosion of intelligent applications, from driverless vehicles to augmented reality, to ubiquitous robots, is now almost certain. The growth in these fields challenges the computational replication of all essential aspects of the human mind (the BICA Challenge), an endeavor which is interdisciplinary in nature and promises to yield bi-directional flow of understanding between all involved disciplines. Fierces on BICA, like its parent conference series, has demonstrated an impressive progress over years, while providing exceptional opportunities for scientific encounters and exchange of ideas in artificial intelligence, neuro- and cognitive sciences, as well as being a delightful event. FIERCES on BICA Series is sponsored by the Russian Science Foundation (Grant no. 15-11-30014) and jointly co-organized by BICA Society and by the National Research Nuclear University MEPhI (Moscow Engineering Physics Institute).

Disclosures: A.V. Samsonovich: None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.14SU/WW45

Topic: J.03. Public Awareness of Neuroscience

Title: University of Rhode Island brain fair

Authors: *S. MAY[1], T. DAVIES[1], W. E. RENEHAN[2], A. N. MOSLEY[3];
[2]George and Anne Ryan Inst. for Neurosci., [3]Grad. Sch., [1]Univ. of Rhode Island, Kingston, RI

Abstract: The University of Rhode Island (URI) participated in Brain Week Rhode Island, an initiative to increase public awareness of neuroscience research and education, by hosting the URI Brain Fair. The George and Anne Ryan Institute for Neuroscience sponsored the Brain Fair, which was attended by approximately 500 people of all ages from the local community. Attendees were encouraged to visit each of the 18 tables at the fair where they could learn about diverse neuroscience concepts and research areas through games and demonstrations. Table themes included executive functioning, memory, color vision, neuron anatomy, synaptic transmission, ocean therapy, movement coordination and balance, natural products as a source for new therapies, and the benefits of a Mediterranean diet on brain health. Seventy volunteers from the university participated in the event, including faculty, graduate students, and undergraduate students. Brain Fair volunteers reflected a multidisciplinary synthesis of neuroscience at URI, representing the Interdisciplinary Neuroscience Program, College of Engineering, and Departments of Biomedical and Pharmaceutical Sciences, Kinesiology, Psychology, Nutrition and Food Science, Cell and Molecular Biology, and Communicative Disorders. The URI Brain Fair rotated activities and presentations throughout the day, such as the Virtual Dementia Tour: A Walk in Their Shoes hosted by the Alzheimer's Association Rhode Island Chapter, Musical Play with the Brain in Mind and Making Sense of Music and the Brain hosted by the URI Department of Music, 3D Projections: Fly Through the Brain presented by the URI Department of Biomedical and Pharmaceutical Sciences, Migraine Education hosted by the Association of Migraine Disorders, and Yoga and Mindfulness hosted by the URI Department of Psychology.

Disclosures: S. May: None. **T. Davies:** None. **W.E. Renehan:** None. **A.N. Mosley:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.15SU/WW46

Topic: J.03. Public Awareness of Neuroscience

Title: Bridging the gap: Understanding neuroscience through symbiotic learning and community outreach

Authors: *C. A. WILLIAMS[1], ***C. A. WILLIAMS**[1], A. R. KUNZ[2], S. RODRIGUEZ[6], H. A. HAMILTON[7], J. L. JENSEN[3], A. L. POOLE[3], A. ANAYA[4], J. M. HAMLIN[3], J. J. SCHOEN[5], J. L. RITCHIE[3];
[1]Washington State Univ., Vancouver, WA; [2]Biochem., [3]Portland State Univ., Portland, OR; [4]Portland State Univ., Clackamas, OR; [5]Psychology, Portland State Univ., Portland, OR; [7]Biol., [6]PSU/NIH Build Exito, Portland, OR

Abstract: NW Noggin is a nonprofit integrative art and neuroscience organization that takes an innovative approach to education for people of all ages. Noggin operates through the combined effort of students, scientists, and artists from Oregon and Washington State. This approach provides volunteers with opportunities for involvement that include: outreach, teaching experience, public speaking experience, networking, and much more. This multi-institutional outreach facilitates collaboration between the community and institutions of higher education which can often be a difficult gap to bridge. In our efforts to teach the public, we are also teaching ourselves. As future scientists and educators in the making, we relish the opportunity to share our knowledge with a thirsty and curious public. During the Oregon Health & Science University (OHSU) Brain Fair in March 2017, Noggin hosted a table where members of the community approached us with questions that challenged and inspired us to think critically, and creatively, which further solidified our understanding of neuroscience. By the end of the day, we had gone through over 1200 gloves, which were utilized to hold real brains. Ultimately, we were stunned by the sheer volume of people who attended this event. Contributing to public understanding of neuroscience and psychology generates a sense of altruism within us because we value the contributions, and personal connections we make within our community. This was especially evident at Shahala Middle School in February of 2017 when Noggin provided brain demonstrations, and led students through the construction of pipe cleaner neurons. The students were attentive, respectful, and most importantly, engaged in the educational process. It was uplifting to see the eyes of our future generation light up with excitement as they got a closer look at real human brains. We believe that these experiences will remain with them as they continue on their academic journey. Whether that journey leads them to explore the sciences, or otherwise, is a prospect that makes doing outreach so rewarding. If we want to begin solving problems in the world, it starts with outreach. It’s through collaboration, and the proliferation of knowledge, that issues can be resolved. The work we do as volunteers fuels our own drive for scientific knowledge, and we hope to inspire the same in community members we interact with throughout our NW Noggin outreach.

Disclosures: C.A. Williams: None. **A.R. Kunz:** None. **S. Rodriguez:** None. **H.A. Hamilton:** None. **J.L. Jensen:** None. **A.L. Poole:** None. **A. Anaya:** None. **J.M. Hamlin:** None. **J.J. Schoen:** None. **J.L. Ritchie:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.16SU/WW47

Topic: J.03. Public Awareness of Neuroscience

Title: Inspiring young minds and building future scientists through Neuroscience outreach to the greater Los Angeles K-12 community

Authors: *V. SARAVANAPANDIAN[1], C. YAEGER[1], C. J. EVANS[2], W. GE[2];
[1]Neurosci., [2]Psychiatry and Biobehavioral Sci., UCLA, Los Angeles, CA

Abstract: In order to build a scientifically literate society, scientists should be able to communicate science to the general public. Sponsored by UCLA's Brain Research Institute (BRI), Project Brainstorm (PB) and Brain Awareness Week (BAW) are science outreach programs that aspire to impart neuroscience knowledge to K-12 students in the Los Angeles community. Both PB and BAW have been highly successful in utilizing a "learning through teaching" program, where all involved gain an increased understanding of neuroscience and improved scientific communication: underserved K-12 participants gain insightful, interactive exposure to neuroscience; undergraduates improve their teaching and communication skills and crystallize their neuroscience knowledge; and teaching assistants receive an opportunity to exercise their neuroscience expertise and leadership ability. PB is an undergraduate course where students design interactive and engaging lesson plans to teach a variety of neuroscience concepts, such as neuroplasticity, language, and synesthesia. In class, practice presentations provide undergraduates with constructive feedback from peers, graduate students and faculty and help improve their presentations and skills before school visits. BAW is an extension of PB, where over 100 UCLA students and faculty provide a full day of hands-on neuroscience activities, laboratory visits, and career guidance for low-income and low-opportunity K-12 students. In 2017, UCLA's PB and BAW have reached approximately 1,000 local low-income students in the Los Angeles area. We collected written feedback from K-12 students and teachers in the form of neuroscience quizzes and surveys before and following our visit. Preliminary analysis of pre/post-presentation surveys reveal that both PB and BAW have been effective in 1) teaching neuroscience to a young audience and 2) increasing interest in science education. Additionally, we are creating an online platform for the course, in which our tried and tested lesson plans and video presentations can be utilized in classrooms anywhere. This platform can also serve as a social network between scientists and the community to foster future outreach events. With continued efforts we hope to achieve a broad impact on society by raising scientific literacy and interest.

Disclosures: V. Saravanapandian: None. **C. Yaeger:** None. **C.J. Evans:** None. **W. Ge:** None.

Theme J Poster

027. Neuroscience Outreach Activities II

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 027.17SU/WW48

Topic: J.03. Public Awareness of Neuroscience

Title: Grey matters journal: A model for neuroscience education and outreach

Authors: *T. QIU[1], P. BARTLETT[2], S. GU[2], K. WEIL[2], E. GRATE[2], M. LINDSTROM[2], G. LENZ[2];
[1]Psychology, [2]Univ. of Washington, Seattle, WA

Abstract: Grey Matters Journal is an undergraduate neuroscience journal at the UW whose mission is two-fold: to educate the public about neuroscience through outreach events, review literature, and art, and to develop undergraduates into excellent science educators and communicators. Our journal practices an interdisciplinary approach to education: each issue is produced entirely by undergraduate students from a variety of fields and departments around the University of Washington. We operate on a quarterly production process, the model for which was presented at Neuroscience 2016, which streamlines development of high-quality content through weekly drafts and revisions of articles. We employ a multi-tiered leadership system, with experienced 'core editors' overseeing the development of articles and a leadership team that tackles projects related to publication, outreach, and expansion. Undergraduate artists create illustrations for each article that help expound complex scientific concepts and serve as an invaluable way to increase our reader's interest in important neuroscience topics. We promote neuroscience education in the community through our annual event, An Evening with Neuroscience (EWN), in which we invite prestigious neuroscientists from the University of Washington and the Allen Institute to participant in a panel to discuss current neuroscience research, and answer audience questions. This year, we put together a committee to develop a replicable protocol for planning and advertising EWN, developing new strategies for attracting audience members to our event. This resulted in our most successful EWN yet, drawing over 750 people into the auditorium. Going forward, we are working to widen our audience by diversifying our methods of outreach, including expanding our online presence and showcasing Grey Matters artwork at community events. Concurrently, we are in the process of expanding our organization to other college campuses and transitioning from a student organization to a non-profit organization. To analyze our growth, expansion, and success at achieving our mission, we gathered data from our members, readers, and from attendees of EWN. The surveys have shown indication of improvement in writing quality of our authors over time as evidence for professional development, as well as increased community interest in our outreach events and publications. This data should help us better understand the ways in which our organization is effective and where there is potential for further improvement so we may further develop our model for neuroscience education and outreach as we expand our organization beyond the University of Washington.

Disclosures: T. Qiu: None. **P. Bartlett:** None. **S. Gu:** None. **K. Weil:** None. **E. Grate:** None. **M. Lindstrom:** None. **G. Lenz:** None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.01SU/WW49

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

Support: NCAA DoD Mind Matters

Title: Concussion policy myths and their effect on self-report of concussion

Authors: *B. R. JOHNSON, M. HJALBER, T. M. RAMSEY, R. B. PECK, N. R. MOOREHEAD, T. E. HILL, C. A. FOSTER, C. J. D'LAURO;
Behavioral Sci. and Leadership, U.S. Air Force Acad., Colorado Springs, CO

Abstract: Introduction
Military service academy students may have a higher risk for concussion than a typical college student due to year-round physical training, military training, and athletics. Despite this risk, students may be less likely to self-report a concussion due to a perceived effect it may have on their post-academy careers. An unclear understanding of medical policies may contribute to this misperception. For example, at the U.S. Air Force Academy (AFA), a recent survey revealed that that cadet attitudes regarding self-report of concussion change over time. As freshmen, cadets have a high intent to self-report a concussion; however as seniors, cadets' willingness to self-report decreases – especially for cadets that want to become pilots. Anecdotal evidence suggested cadets believe that there is a "concussion rule", i.e., a medical policy that removes their medical clearance to become a pilot if they receive too many concussions. To investigate this a second survey was administered to AFA cadets to better understand their beliefs about concussion injury policies as well as general concussion knowledge.
Method
Cadets received a voluntary survey that addressed knowledge about concussion policies and concussion knowledge. 2204 cadets responded.
Results
82% of cadets believe in the "concussion rule", i.e., an AFA medical policy that requires the removal of their medical clearance to become a pilot if they receive too many concussions. When asked how many concussions would instigate this policy the mean was 3.76 concussions. In truth, no such policy exists.
Belief in this "concussion rule" significantly predicted intent to self-report a concussion ($R2 = .002$, $F(1, 2034) = 3.93$, $p < .05$). Cadets that believed in the "concussion rule" were less likely to report a concussion.
General knowledge regarding signs and symptoms of a concussion were less predictive of whether a cadet would self-report a concussion; however, knowledge regarding the health effects of a concussion was predictive. Specifically, intent to self-report a concussion was positively correlated with knowledge regarding, the increased risk to brain health if a second concussion

occurs before the first concussion heals ($r = .13$, $p < .001$), symptom duration lasting several weeks ($r = .12$, $p < .001$), and the effect of concussion on long-term health and well-being ($r = .13$, $p < .001$).
Future Plan
Interventions are planned to improve self-report of concussion including, a series of videos that address concussion policy misinformation; an educational program lead by AFA physicians that manage the pilot medical clearance program; a return-to-learn program to assist cadets with academics post-concussion.

Disclosures: B.R. Johnson: None. **M. Hjalber:** None. **T.M. Ramsey:** None. **R.B. Peck:** None. **N.R. Moorehead:** None. **T.E. Hill:** None. **C.A. Foster:** None. **C.J. D'Lauro:** None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.02SU/WW50

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

Title: Developing a national program to promote children's cognitive and mental well being in conflict afflicted Iraq

Authors: *J. M. RAJI KUBBA;
NA, Clearwater, FL

Abstract: Children in Iraq have been exposed to violence over the past fourteen years at unprecedented levels. Iraq has endured weekly and sometimes daily terrorist attacks that hardly get reported in the media. Millions of children fled their homes with their families or alone and became "internally displaced" living as refugees in Iraq making them even more vulnerable to abuse, under nutrition and inadequate living conditions[1]. During conflict, some children have lost their caregivers, siblings or other family members. This constellation of adverse events will affect their health and cognitive abilities for life.[2] Given the widespread incidence of such experience, a looming cognitive and mental health disaster is developing in Iraq. This is further aggravated by the fact that caregivers themselves such as parents and teachers are exposed to the same terrorizing events and they themselves are traumatized;[3] and all this occurs against a background of consanguineous marriages, near absence of the concepts of psychological counseling and therapy and a taboo that surrounds mental health. This study aims to develop a national program that helps children heal from the traumatic experience and rescues their cognitive and mental health. The program involves: 1) teacher and healthcare provider training, 2) parent/community training on how to create secure nurturing niches for children in order to recover from their experience, 3) developing methods to track children's progress in a non stigmatizing manner and 4) providing education and public awareness about the subject.

Working under conditions of political-social restrictions and non science driven policies, the issue has been brought to the attention of officials, health professionals, decision makers and community leaders via a constellation of seminars, consultations, lectures at universities and at private institutions, public community events and through the media. Through all these channels, a network of qualified personnel and interested volunteers is being established and may constitute a national aggregate that may implement the program.
[1] Iraq Humanitarian Response Plan. United Nations Office for the Coordination of Humanitarian Affairs. June 2015 p. 8. [2] National Scientific Council on the Developing Child (2010). *Persistent Fear and Anxiety Can Affect Young Children's Learning and Development: Working Paper No. 9*. http://www.developingchild.net. [3] Vijayalakshmi Ravindranath, Hoang-Minh Dang, Rodolfo G. Goya, Hader Mansour, Vishwajit L. Nimgaonkar, Vivienne Ann Russell & Yu Xin (2015) Regional research priorities in brain and nervous system disorders. *Nature* 7578 | 527 S198-S206

Disclosures: J.M. Raji Kubba: None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.03SU/WW51

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

Title: A Bayesian framework for disorders of consciousness research

Authors: *C. NEELY[1], A. PETERSON[2];
[1]Dept. of Psychology, [2]Inst. for Philosophy and Publ. Policy, George Mason Univ., Fairfax, VA

Abstract: Behavioral assessment is the gold standard for the detection of consciousness in patients diagnosed as being in the vegetative state; however, several studies reveal discordance between different examination methods (Schnakers et al. 2009). In some cases, discordance is as high as 43%. This raises concerns about misdiagnosis. Owen (2013) argues that neuroimaging should be included in the diagnostic battery for the vegetative state. Owen refers to a body of research that indicates brain activity can be elicited by command in patients that appear to be vegetative at the bedside. However, these studies have not avoided controversy. Some argue that these "brain actions" could be an artifact of unconsciousness processing (Klein, 2015; Bayne & Hohwy, 2014). One problematic feature of neuroimaging research on vegetative patients is that, to date, proof of consciousness is constrained by inferential statistics and null hypothesis significance testing (NHST). The frequentist NHST method poses two hypotheses to which data are compared. The NHST approach quantifies the chance of observing data given a theory, or *P* (D|T). Conversely, the goal of neuroimaging is to assess *P* (T|D), or the probability of a theory being true given observed data. This poses the problem of reverse inference, which is considered

a serious drawback in neuroimaging research in general (Poldrack, 2011). In this project, we present a Bayesian framework for neuroimaging research in disorders of consciousness patients. This model incorporates prior information from different neuroimaging modalities and likelihoods of mental activity occurring based on patterns of activation. We argue that this approach might circumvent the problem of reverse inference in disorders of consciousness research, and might contribute to improved diagnostic accuracy following brain injury.

Disclosures: C. Neely: None. **A. Peterson:** None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.04SU/WW52

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

Title: Mood disorders, suicide, and the impact of social media

Authors: *A. B. VAN DERVEER[1], J. L. LARIMORE[2];
[1]Neurosci., [2]Biol., Agnes Scott Col., Decatur, GA

Abstract: Mood disorders such as major depressive disorder, seasonal affective disorder, and bipolar disorder, affect approximately 9.5% of the United States adult population. It is estimated that at least 90% of suicides of teenagers and young adults are accompanied by one or more mental illness, with depression being the most common. Because social media gained popularity in the late 1990s, many of today's teenagers and young adults grew up using social media platforms. Following a similar trend, suicide has become the second leading cause of death among persons aged 10-24 years. The link between depression and suicidal tendencies is widely accepted, but some risk factors of suicide remain unknown. We hypothesize that there is a connection between exposure to social media, incidence of depression, and incidence of suicide among young people. For this study, we will be examining three primary social media sites: Facebook, Twitter, and Tumblr, and how the language around suicide and mood disorders correlate to an increase in mood disorders and the number of teenagers and young adults who die by suicide.

Disclosures: A.B. Van Derveer: None. **J.L. Larimore:** None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.05SU/WW53

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

Title: Are aromatase inhibitors inadvertently influencing bi/homosexual attraction and negatively impacting physical/mental health? How incomplete interpretation may be harming children

Authors: *S. GLISKE;
Dept. of Neurol., Univ. of Michigan, Ann Arbor, MI

Abstract: Although a number of subtle changes have been noted between brains of homosexual and heterosexual individuals, the most distinguishing feature is hyperplasia of the suprachiasmatic nucleus (SCN) (Swaab et al., 1990), focal to the vasopressin secreting cells in the dorsomedial shell, in homosexual men. Although SCNs in homosexual males had an overall shape more like a female SCN, the number of cells was nearly three times larger in homosexual males than heterosexual males or females. These results were consistent with a male rat model (Swaab et al., 1995), which showned that this hyperplasia can be caused by blocking aromatization of testosterone into estrogen during the time of SCN development (last trimester and first few months of life in humans). The published interpretation of this data is that genetic factors cause limited aromatization in utero and that sexual orientation is thus fixed at birth. This interpretation is incomplete, as other factors can limit aromatization, the effect in females has not been studied, and no data has been published to demonstrate whether aromatization blockers during other developmental stages can cause or exacerbate hyperplasia of the SCN. Additionally, health effects of hyperplasia of the SCN were not originally considered, although research since that time suggests this hyperplasia can negatively impact both physical and mental health (particularly depression, anxiety, and suicide). Thus, individuals may have their sexual attraction inadvertently influenced and/or have their physical/mental health impaired by use of aromatization inhibitors. More research needs to be done. In the mean time, however, aromatization inhibitors are routinely prescribed in children with early growth plate closure, without their parents being warned of these possible effects. This condition is especially common in children with congenital adrenal hyperplasia (CAH), a population that also tends to have a higher proportion of individuals later identifying as homosexual (at least in females). Note, influence on the SCN was neither directly nor indirectly measured in any FDA review for these medications. Additionally, there is a significant market for over-the-counter supplements that block or limit aromatization, with no warning nor public awareness concerning the possible influence on sexual attraction and health via the SCN. Thus, although the actual risk, dose/age response, and effect on SCN hyperplasia has not yet been quantified, children are being prescribed medications (and individuals are taking supplements) without being warned of the potential influence on sexual attraction and the impact on physical/mental health.

Disclosures: S. Gliske: None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.06SU/WW54

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

Title: Research misconduct investigations oversight at three federal agencies

Authors: *E. RUNKO[1], R. AMBALAVANAR[2], B. MOZER[2], S. KABAK[3], D. BANNERMAN[3];
[1]Office of Inspector Gen., Natl. Sci. Fndn., Arlington, VA; [2]Div. of Investigative Oversight, Office of Res. Integrity, U.S. Dept. of Hlth. and Human Services., Rockville, MD, United States, Rockville, MD; [3]Office of Res. Oversight, U.S. Dept. of Veterans Affairs Veterans Hlth. Admin., Washington, DC

Abstract: Research misconduct is defined by the Federal regulations as fabrication, falsification, or plagiarism (FFP) in proposing, performing, or reviewing research, or in reporting research results. The United States (U.S.) regulations, policies, and procedures related to research misconduct are carried out by several government agencies, including the Office of Inspector General (OIG) of the National Science Foundation (NSF), the Office of Research Integrity (ORI) of the U.S. Department of Health and Human Services (HHS) and the Office of Research Oversight (ORO) of the U.S. Department of Veteran Affairs (VA) Veterans Health Administration (VHA). NSF OIG is responsible for investigating allegations of research misconduct and for conducting inquiries and investigations into compliance with NSF rules, regulations and policies in relation to NSF proposals and awards. HHS ORI oversees institutional investigations of research misconduct allegations on U.S. Public Health Service (PHS)-supported research, including those of the National Institutes of Health (NIH). VHA ORO oversees investigations into research misconduct allegations at VA facilities. In this poster, we will present the processes for NSF OIG, HHS ORI, and VHA ORO in handling research misconduct allegations, the investigational proceedings and summarize imposed actions upon findings of research misconduct.

Disclosures: E. Runko: None. **R. Ambalavanar:** None. **B. Mozer:** None. **S. Kabak:** None. **D. Bannerman:** None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.07SU/WW55

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

Title: Considering sex as biological variable (sabv) in research: A primer for neuroscience investigators

Authors: J. M. WHITE[1], *C. HUNTER[2];
[1]Office of Res. Womens Hlth., NIH/ORWH, Bethesda, MD; [2]NIH NIDCD, Bethesda, MD

Abstract: The NIH policy on Rigor and Reproducibility (NOT 15-102 and NOT 16-011) highlights the importance of sex as a biological variable (SABV).
WHY? A systematic analysis of large databases has revealed that sex and/or gender remains an independent and important biological variable after controlling for age, comorbidities, scored risk factors and ethnicity because some genetic variants convey different risks in women and men. In addition, the over-reliance on male subjects has led to "default" biology, which may cause harm and miss opportunities to better health. In preclinical research, laboratories often only use male cells and animals to study diseases that effect both men and women; in clinical studies a 70-kg male is the standard point of reference. Consequently, 8 out of 10 drugs withdrawn by the FDA have had more adverse effects for women. **WHAT?** NIH expects that sex as biological variable (SABV) will be factored into research designs, analyses, and reporting in vertebrate animals and human studies. The SABV policy is to promote transparency, enhance rigor, and fill "gaps" in knowledge. However, the policy does not require specific methods, experiments to be powered to detect sex differences, or the doubling of sample sizes. It is important to note here that sex is not the same as gender.
WHO? The Office of Research on Women's Health (ORWH) at NIH is committed to disseminating information and resources to assist investigators with their consideration of sex and gender in research grant applications. We provide supplemental funding to grantees incorporating SABV in their research, and we promote the incorporation of SABV in research to increase transparency and rigor within the biomedical and science community. We will provide examples of how to avoid pitfalls in the design, analysis, interpretation, and reporting of research experiments and clinical trials in the field of Neuroscience

Disclosures: J.M. White: None. **C. Hunter:** None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.08SU/WW56

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

Title: Behavioral and social neuroscience research at the NIH

Authors: *D. M. GREENE-SCHLOESSER, *D. M. GREENE-SCHLOESSER;
OBSSR, NIH, Bethesda, MD

Abstract: The National Institutes of Health (NIH) mission is to fund and conduct research that will result in an improvement in health. The Office of Behavioral and Social Sciences Research (OBSSR), which is in the Office of the Director at NIH, serves to stimulate, promote and coordinate the behavioral and social sciences at the NIH. The OBSSR recently released its strategic plan for 2017-2021, which emphasizes, among other priorities, the continued integration of social and behavioral science with neuroscience. The NIH funds over $5.6 billion in neuroscience research annually. Of these neuroscience grants funded, approximately 24% include social and behavioral research aspects. Behavioral and social sciences research is a large, multifaceted field, encompassing a wide array of disciplines, and is defined by substantive areas of research that transcend disciplinary and methodological boundaries. Several key cross-cutting themes characterize social and behavioral sciences research, including; an emphasis on theory-driven research; the search for general principles of behavioral and social functioning; the importance ascribed to a developmental, lifespan perspective; an emphasis on individual variation, and variation across sociodemographic categories such as gender, age, and sociocultural status; and a focus on both the social and biological contexts of behavior. A portfolio analysis was performed to assess the overall funding landscape of the integration of social and behavioral research in neuroscience research funded by the NIH over the last 5 years. Trends in funding topics/areas are discussed and potential gaps in funding and areas of opportunity are explored.

Disclosures: D.M. Greene-Schloesser: None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.09SU/WW57

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

Support: Tasmania Graduate Research Scholarship

Title: Ethical considerations for gene therapy in people with Alzheimer's disease

Authors: *J. M. VIAÑA[1], F. GILBERT[2];
[1]Humanities Building, Sandy Bay Campus, Univ. of Tasmania, Hobart, Australia; [2]Ctr. for Sensorimotor Neural Engin. and Dept. of Philosophy, Univ. of Washington, Seattle, WA

Abstract: Alzheimer's disease is the most common form of dementia affecting more than 5.3 million people in the USA alone. FDA-approved drugs only provide temporary relief to memory

problems, and no disease-modifying therapies are currently available. Recently, results of the first in-human experimental trials involving *in vivo* gene therapy in people with Alzheimer's disease have been published. In this poster, we examine ethical issues associated with these trials in light of recent clinical and neuroscientific findings. In particular, we look at experimental trials involving stereotactic adeno-associated virus-mediated delivery of the nerve growth factor (NGF) gene in people with Alzheimer's disease. We identify ethical concerns related to translation justification, patient selection and recruitment, trial design, and treatment outcomes. Examining these issues allows us to understand pressing ethical and regulatory obstacles, and provide recommendations for ongoing and future trials of similar nature to ensure maximal protection of patients without compromising the scientific validity of experimental findings.

Disclosures: J.M. Viaña: None. **F. Gilbert:** None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.10SU/WW58

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

Support: HIAS15004 Hussman Foundation Pilot Grant

Title: Anticipatory Biomedical Ethics and Policy Implications for the Use of CRISPR together with gene drive in human brains

Authors: *M. W. NESTOR[1,2], R. L. WILSON[3];
[1]The Hussman Inst. For Autism, Sykesville, MD; [2]The Univ. Of Maryland, Sch. of Med., Baltimore, MD; [3]Towson Univ., Towson, MD

Abstract: Clustered regularly interspaced short palindromic repeats (CRISPR) genome editing has already reinvented the direction of genetic and stem cell research. For more complex diseases it allows scientists to simultaneously create multiple genetic changes to a single cell. Technologies for correcting multiple mutations in an in vivo system are already in development. On the surface, the advent and use of gene editing technologies is a powerful tool to reduce human suffering by eradicating complex disease that has a genetic etiology. Gene drives are CRISPR mediated alterations to genes that allow them to be passed on to subsequent populations at rates that approach 100% transmission.
Therefore, from an anticipatory biomedical ethics perspective, it is possible to conceive gene drive being used with CRISPR to permanently ameliorate aberrant genes from wild-type populations containing mutations. However, there are also a number of possible side effects that could develop as the result of combining gene editing and gene drive technologies in an effort to eradicate complex diseases. We critically analyze the hypothesis that the combination of

CRISPR and gene drive will have a deleterious effect on human populations from an ethical perspective by developing an anticipatory ethical analysis of the implications for the use of CRISPR together with gene drive in humans. We address the idea proposed by Kevin Esvelt that because gene drive genes would be so slow to spread in a population, there is time to create and release an "immunizing reversal drive" for the gene drive, thus rendering low risk in the immediate term. We couch our analysis in a practical ethics based on Robert Audi's moderate intuitionism. To complete our ethical analysis we overlay the properties of emergent ethics surrounding new technologies, namely George Lucas' "methodology of uncertainty". Finally, we outline a set of considerations for policy making surrounding of a CRISPR and gene drive system in humans and what ethical considerations should be taken into account by policy makers based on this analysis.

Disclosures: M.W. Nestor: None. **R.L. Wilson:** None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.11SU/WW59

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

Title: Biotech Patents in the Modern Era

Authors: *J. M. KUHN;
Intellectual Property Group, Marshall & Melhorn, LLC, Toledo, OH

Abstract: An overview of intellectual property law relating to biotechnology is presented. In particular, patent protection for biotechnology related inventions available in the United States and elsewhere is addressed. The effects of recent court and patent office rulings on biotechnology related patents are discussed. Specific tips for researchers to ensure their ideas are protected are provided.

Disclosures: J.M. Kuhn: A. Employment/Salary (full or part-time):; Marshall & Melhorn, LLC.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.12SU/WW60

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

Support: BMBF grant 01GQ1005B

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Boehringer Ingelheim Fonds

Title: Gender bias in scholarly peer review: Neuroscience vs other sciences

Authors: *D. BATTAGLIA[1], M. HELMER[2], M. SCHOTTDORF[3], A. NEEF[3];
[1]INS, Univ. Aix-Marseille, Marseille, France; [2]Dept. of Psychiatry, Yale Univ., New Haven, CT;
[3]Max Planck Inst. for Dynamics and Selforganization, Goettingen, Germany

Abstract: Peer-review is the cornerstone of scholarly publishing and it is essential that peer reviewers are appointed on the basis of their expertise alone. However, it is difficult to check for any bias in the peer-review process because the identity of peer reviewers generally remains confidential.
Here, using public information about the identities of 9000 editors and 43000 reviewers from the Frontiers multi-disciplinary series of journal, we show that women are underrepresented in the peer-review process and that editors of both genders operate with substantial same-gender preference (homophily).
We also show that the mechanisms of this homophily are gender-dependent. Homophily will persist even if numerical parity between genders is reached, highlighting the need for increased efforts to fight against subtler forms of gender bias in scholarly publishing. Indeed top down editorial policies aiming just at increasing the number of women peer reviewers will not heal "bottom-up" social network construction from the problem of homophily.
We finally compare the specific case of neuroscientific publications, prominent within the landscape of the Frontiers family of journals, vs other sciences.
References: Helmer, M. et al. (2017) Gender bias in scholarly peer review. Elife 6, 103

Disclosures: D. Battaglia: None. **M. Helmer:** None. **M. Schottdorf:** None. **A. Neef:** None.

Theme J Poster

028. Ethical and Policy Issues in Neuroscience

Location: Halls A-C

Time: Sunday, November 12, 2017, 8:00 AM - 12:00 PM

Program#/Poster#: 028.13SU/WW61

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

Title: Normative referents in neuromodulation: Global integration of self representation

Authors: *D. C. LARRIVEE[1], A. M. SUBURO[2];
[1]Toronto, CANADA, Intl. Assn. Catholic Bioethicists, Williamston, SC; [2]Univ. Austral, Pilar, Argentina

Abstract: Increasingly, global models of neural operation suggest the existence of a systemic network invested with protagonist features that is directed to neural and body integration, that is, the organizational dimension that secures the unity of the individual ontologically, biologically, and performatively. Model details vary, from brain-localized, radical predictive processing (RPP) (Clark, 2013), to fully enactive and embodied schema (Allen and Friston, 2016). Nonetheless, there is a broad consensus that neurotechnology procedures, with many different aims, might have the capability of profoundly changing the human self. Traditionally, normative value has been contingent to the individual. Liberal democracy, for example, is grounded on individual autonomy and its privileged exercise in the generation of the state. As a locus of value the individual is understood to possess an organismal unity that is corporally regulated and delimited, an operative dynamic that emerges from within, i.e., autonomously, and an interiority, i.e., subjectivity, designated self-integration, self-agency, and self-identification (Morin, 2017). These varied operations arise from the individual expressing dimensions that categorically qualify the self. Physical mechanisms mediating these operations constitute the neural self and represent a normative terrain that can be breached by neurotechnologies. In view of accelerating, neurotechnology development, this poster proposes that the adoption of normative principles preserving the integral functioning of self circuitries is a needed meta-ethical objective grounding ethical praxis. Accordingly, the identification and characterization of these neural substrates are necessary for establishing normative perimeters for neurotherapies or other neuromodulatory purposes. To date, significant work has advanced the identification of such self circuitries and of their related operations, which are beginning to clarify their dynamical organization (Raichle, 2011). To implement the use of such referents we propose their governance by principles invoking 1) ontological primacy, i.e., self constitutive, and 2) susceptibility to operational failure, e.g. brain dynamical operation is known to be maintained near criticality. This poster will consider the utility of these parameters in light of current neuromodulatory praxis and proposals.**References** Allen M & Friston K. (2016) Synthese. Clark A. (2013). *Behavioral Brain Sciences,* 36(3):181-204. Morin A. (2013). Frontiers Psychol, 8(280):1-9. Raichle M (2011). *Brains Top Down.* London:World Scientific Publishing.

Disclosures: D.C. Larrivee: None. **A.M. Suburo:** None.