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Beritashvili and Tolman: Pioneers of animal spatial behavior

Authors: *M. G. TSAGARELI;
Ivane Beritashvili Exptl. Biomedicine Ctr., Tbilisi, Georgia

Abstract: Ivane S. Beritashvili’s doctrine of image-driven or goal-directed behavior was established in the late 1920s. It bears a strong resemblance to the concepts of purposive behavior and “cognitive maps” developed in parallel by Edward C. Tolman and significantly anticipated respective modern concepts. J. O’Keefe and his disciples M.-B. Moser and E.I. Moser got Nobel Prize in last year for their discoveries of cells that constitute a navigation system in the brain. This fact brings us to the pioneers of the study of the animals spatial orientation that figuratively, ultimately provided the giant’s shoulders on which O'Keefe and Mosers stood to receive their award. In contrast to the orthodox behaviorists, Beritashvili and Tolman_in line with the theories of Gestalt psychology_upheld the holistic and goal-directed nature of behavior. In 1928, Beritashvili started studying feeding behavior by the method of free movements. His major contribution to the science of animal behavior was the demonstration of the universality of learning following a single presentation of an object vitally important to the animal: either a food object or a noxious agent. He postulated that following a single presentation of such objects, an “image” may be formed of them in the brain, and thereafter the behavior of the animal proceeds as if it actually saw the represented object. Beritashvili showed that such “image-driven” behavior has a strong spatial component, i.e., the image is projected into a definite point in space (Beritov, 1932, 1947; Beritashvili, 1965, 1971). Edward Tolman made several significant contributions to the field of experimental psychology. He thought of learning as developing from bits of knowledge and cognitions about the environment and how the organism relates to it. This was in contrast to the theories of B.F. Skinner and E.L. Thorndike thought of learning as a strict stimulus-response connection. To study learning, Tolman conducted several classical rat experiments. He examined the role that reinforcement plays in the way that rats learn their way through complex mazes. These experiments eventually led to the theory of latent learning which describes learning that occurs in the absence of an obvious reward. His idea presented in his book 'Purposive Behavior in Animals and Men' (1932), sought to demonstrate cognitive control
of learning was not restricted to the evolutionary capabilities of the apes. He strongly advocated
to theorizing that rats learn the place where they have been rewarded rather than the particular
movements required to get there (a demonstration of place learning). Tolman is generally
credited with the introduction of the term "cognitive map" (1948).

**Theme H Poster**

**021. History of Neuroscience**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 21.02SA/CC16

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

**Title:** Mirrors in old master and modern art and contemporary clinical and basic cognitive
neuroscience

**Authors:** *E. L. ALTSCHULER*¹, V. RAMACHANDRAN²;
¹Physical Med. and Rehabil., Temple Univ. Sch. of Med., Philadelphia, PA; ²UCSD, La Jolla, CA

**Abstract:** van Eyck’s Arnolfini Wedding (1434) is one of the greatest and most influential
paintings of all-time. It’s most striking feature is a convex mirror on the back wall of the room
showing reflections of the miraculously rendered chandelier, a window, fruit on its sill, scenes
from outside and most intriguingly two presumed witnesses to the nuptials at the (unseen) front
of the room. Numerous paintings over a half millennium influenced by van Eyck employed a
mirror (often convex) and many demonstrate important principles of modern neuroscience: A
Goldsmith in His Shop (Petrus Christus (?van Eyck student), 1449) and similarly The Money
Lender and His Wife (Quentin Matsys, 1514) use a small (convex) mirror on a table to show
scenes from outside of an unseen window so bringing physically far scenes into peri-personal
space—a useful tool and paradigm for clinical and basic neuroscience studies; in Parmigianino’s
Self-Portrait in a Convex Mirror (1524, painted on a convex panel) his hand in the foreground
due to optics is magnified compared with the arm, body and face: we found that similarly upon
viewing one’s hand through a magnifying glass (2007) the discrepancy of visually observed vs.
actual/experiential/propiroceptive size creates a sense of disembodiment; this effect is apparent
in de la Tours’ Penitent Magdalen (c. 1635/40, Met Museum) whereby the Magdalen can see the
reflection of a candle in a (plane) mirror she is facing but not her own reflection as she is sitting
offset to the left of the mirror (forgery?); (Magritte’s The Heeler (1933) and The Human
Condition (1933) use disembodiment effects, as does di Chirico’s Love Song (1914) which also
uses proportion distortion) (We showed (2007) using two mirrors that one can perceive to be standing outside of oneself.); Titian’s (c. 1555), Rubens’ (1614) and Velaquez’ (1647/51) Venus at a mirror; Caravaggio’s Narcissus (1598); Velaquez’ Las Meninas (1656); Picasso’s Girl Before a Mirror (1932); and Escher’s Still Life with Mirror (1934) and Hand with Reflecting Sphere (1935) (self-reflection made concrete). But these all show the reflection in the frontal plane of the mirror (and viewer)-even Caravaggio’s with subject and mirror (water) rotated 90 degrees. A true difference from van Eyck was not achieved until Escher's Magic Mirror (1946) which depicts the sagittal plane mirroring we introduced to treat phantom limb pain (VSR et al. 1995) hemiparesis following stroke (ELA et al. & VSR 1999) and other conditions (VSR & ELA 2009). New neuroscience may be suggested by Shakespeare's Macbeth V,i in which the audience watches the doctor and Lady Macbeth's lady watching Lady Macbeth and similarly in Dali's Painting Gala from the Back (1973).

Disclosures:  E.L. Altschuler: None. V. Ramachandran: None.

Theme H Poster

021. History of Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 21.03SA/CC17

Topic: H.01. History of Neuroscience

Support: NIH/NLM Grant G13LM011465

Title: The history of myelin

Authors: *A. I. BOULLERNE;
Anesthesiol., Univ. of Illinois at Chicago, Chicago, IL

Abstract: We can date the first incidence of myelin observation in 18th century by Anthonie van Leeuwenhoek, a draper from Delft in the Netherlands. He reported in a 1717 letter to the British Royal Society: “Sometimes I observed a nervule⋯ to be completely surrounded by fatty parts⋯ extending here and there from the spinal marrow”. Thanks to grinding his own lenses, he eventually became an outstanding microscopist. After his death his craft got lost and nothing happened for another century. In 1833, using a new ‘Chevalier’ microscope, Christian Ehrenberg in Berlin rediscovered myelin in teased nerve fibers. He described myelinated nerves as cylindrical tubes with four parallel lines and named the white matter medulla. In 1838, another Berliner Robert Remak distinguished nerve fibers surrounded by medulla with a distinct sheath.
and nuclei [myelin], from finer transparent fibers with no double border he called tubulus primitivus [axon]. In 1854, Rudolf Virchow in Berlin coined the word myelin based on the similar appearance of nerve medulla with Greek myelos for bone marrow. At the beginning myelin was a floating name. It became strictly associated to myelin only after Max Schultze in Bonn discovered in 1865 that osmium specifically stains it. Soon in 1872, Louis Ranvier in Paris reported the myelin sheath is discontinuous and displays stunning periodic interruptions, quickly named nodes of Ranvier. Myelin function remained elusive for a long time and generated wild speculations, although Virchow was the first in 1958 to hypothesize myelin sheath was an electrical insulator. Meanwhile its striking regularity across species triggered a systematic measurement of myelin thickness per axon diameter by Donaldson and Hoke at the University of Chicago in 1905. This was named g ratio by Schmitt and Bear in 1937, based on the birefringence optical property of myelin. Ralph Lillie suggested saltatory conduction as early as 1925, which was confirmed twenty years later in 1949 experimentally with complex equations by Huxley and Stämpfli. The lingering question of myelin origin remained a wandering guess until the generalization of electronic microscopy after the Second World War. Betty Geren in Boston in 1954 saw by EM that Schwann cell spirals myelin around the axon. Richard Bunge in 1962 showed the same for oligodendrocyte. It invalidated the pervasive belief, including by Ramon y Cajal, that neuron secretes myelin. Some features such as redundant myelin remain perplexing. The exquisite three-dimensional complexity of myelin continues to defy and drive research.

Disclosures: A.I. Boullerne: None.

Theme H Poster

021. History of Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 21.04SA/CC918

Topic: H.01. History of Neuroscience

Title: Albert von Kölliker: Founder of systematic histology and comparative embryology

Authors: *N. E. KINNEY;
Southeast Missouri State Univ., Cpe Girardeau, MO

Abstract: Rudolf Albert von Kölliker (1817-1905) was born in Zurich, Switzerland. He entered the University of Zurich in 1836 where he studied anatomy, zoology and botany. In 1839, Kölliker began three semesters in Berlin and attended lectures by Johannes Müller on
comparative anatomy and physiology. He was also trained in microscopy by Jakob Henle and in embryology by Robert Remak. In 1840 Kölliker bought a microscope and began an independent investigation of the spermatozoa of invertebrates. He discovered that spermatozoa came from sperm producing cells and demonstrated they were also cells. He received his PhD at Zurich in 1841 and his MD from Heidelberg in 1842. By 1847 he had assumed a full professorship at the University of Würzburg in physiology and comparative anatomy where he remained for the next 50 years. In his classic paper Neurologische Bemerkungen (Neurological Comments) (1849), Kölliker showed that “dark-bordered” (myelinated) fibers originate from nerve cells in both the central nervous system and peripheral ganglia. Thus he was the first to clearly demonstrate an indisputable connection between nerve cells and fibers (axons), an essential element of the neuron doctrine. He was also the first to precisely define the notion of neuron cell polarity in terms of differing basal and apical portions of cells. He made major contributions to embryology and histology, characterizing tissue structure and development in terms of Schwann's new cell theory. In 1884 he adopted Golgi's black reaction and applied the technique to his study of the brain, providing important support for the notion that neurons are the basic anatomical units of the nervous system. In 1896 Kölliker proposed the term “axon” which was quickly adopted. With Henle he studied lamellar corpuscles to which they gave the name “Pacinian corpuscles.” Kölliker's textbooks Mikroskopische Anatomie oder Gewebelehre des Menschen (Microscopical Human Anatomy and Histology) (1850) and Handbuch der Gewebelehre des Menschen (Manual of Human Histology) (1852) were the first of their kind and quickly became the standard. The fifth edition (1867) of his Handbuch lasted 30 years, the second volume so extensive that it effectively established the field of vertebrate central nervous system histology. Kölliker is often described as the founder of systematic histology and comparative embryology. The effects of his work were pervasive and enduring. Kölliker's research began at the inception of the microscopic study of anatomy and embryology, and he was the only one of the early histologists to survive into the twentieth century.

Disclosures: N.E. Kinney: None.

Theme H Poster

021. History of Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 21.05SA/CC19

Topic: H.01. History of Neuroscience
Title: Escaping the tyranny of Yerkes-Dodson: Creating and sustaining new complex behaviors - the ‘Frontopolar Cortex exception’ and human ascendance and survival

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

Abstract: In 1908, Yerkes and Dodson described research that suggested that across increasing levels of fear, performance on a complex learning task describes an inverted-U function while simple motor behaviors are enhanced. Given these dynamics, this author has proposed that if neophobia is the source of the fear, new behaviors will, if novel enough, evoke neophobic fear that will serve to reduce the expression of those same new behaviors and favor a return to old habits, i.e., behavioral homeostasis. Koechlin (2007) has, however, determined that humans are capable of sustaining new behaviors if those behaviors are seen as necessary for reaching a large goal, that is, a goal that is large enough to activate the uniquely human Frontopolar cortex (FPC). It can be predicted that when we recognize or imagine a large life goal (LLG), the FPC is activated and the new behaviors required to reach that goal can be initiated and sustained. Examining this FPC-exception, this author has previously described results in five human performance venues in which LLG’s were invoked to facilitate the acquisition of new, more effective complex behaviors, i.e., psychotherapy, academics, athletics, wellness, business/consumer behavior. If new carbon use behaviors are necessary for managing climate change, it would be helpful to understand what the LLG associated with an effectively managed climate consists of. In order to understand this climate management LLG, 300 parents of young children were asked anonymously to describe the ideal future for their children. When issues common to these descriptions were aggregated, an ideal LLG profile of their children’s future was revealed, i.e., a future characterized by low levels of stress, high achievement, economic success, and high levels of overall life quality. When, however, these same respondents were asked to describe what they realistically believe their children will experience fully 47% were entirely negative, describing intense fears that focused on global and political unrest, personal safety, economic stress, and overall negative life quality, with 67% stating that climate change was an important concern. Given these high levels of fear, the best chance for the creation of new, carbon-use behaviors would be to not invoke the fears of environmental catastrophe, but to consistently appeal to this group’s LLG of high life quality for their children. This author concludes that although, as some have suggested, the PFC emerged during the past 2.5 million years in response to the challenges of climate variability, it may be that the PFC's vulnerability to fear described by Yerkes and Dodson will keep it from saving us from ourselves.
**Abstract:** Political correctness is a concept that is practiced by many in the early part of the 21st Century. This seems especially true for scientific writing, which is currently characterized by rare use of the first person, customary employment of the passive voice, and often usage of qualifying phrases to soften statements. This was not always the case. One example where a scientific argument was personal and carried out in the open using publications concerned the interventricular foramen of Monro. Three generations of Monro’s continuously held the prestigious Chair of Anatomy at the University of Edinburgh from 1720 to 1846: Alexander primus, Alexander secundus, and Alexander tertius. Alexander secundus (1733-1817) was perhaps the greatest of the three. His most famous book: *Observations of the Structure and Functions of the Nervous System*, was published in 1783. Charles Bell (1774-1842) was also a Scottish anatomist that came from a family of doctors. For political reasons, he, along with his brother, John, was forced to leave Edinburgh for London. In 1802 he published a book, *The Anatomy of the Brain* that not only has some of the most beautiful neuroanatomical renderings of the time, it also specifically called Monro to task. The interventricular foramen is a passage that links the lateral ventricles with the third ventricle. Monro first described this communication in 1764 and gave a fuller account in his 1783 text. Here he was honest in pointing out that the presence of a communication between the ventricles was well known by others preceding him (even Galen). Monro then went on to claim that he described it in more detail than anyone before him and that prior descriptions had no value. This appears to have given rise to challenges from his contemporaries, especially those in London. In response, Monro had eminent physicians write letters that would leave no doubt that he well deserved the acknowledgement of an eponym, and he wrote a second article in 1797 that substantiated and defended his anatomical descriptions of these communications. The first written critique of Monro was in an appendix in Charles Bell’s 1802 book. It was more of a personal attack on Monro for presuming to describe something that was already well known than an attempt to show that he was mistaken, although he actually was. Monro described a direct communication between the lateral ventricles and a separate foramen opening into the third ventricle. Actually the lateral ventricles each separately open into the third ventricle with no direct connection. Even though he was vitriolic, Bell was right. Monro really does not merit the eponymous term since not only did he not discover the foramen, he incorrectly described it.
Theme H Poster

021. History of Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 21.07SA/CC21

Topic: H.01. History of Neuroscience

Title: Is the cortical column an organizational unit of the cortex? A historical reconstruction (1955-2015)

Authors: *P. HAUEIS\textsuperscript{1,2}; \textsuperscript{1}Berlin Sch. of Mind & Brain, Berlin, Germany; \textsuperscript{2}Max Planck Inst. for Human Cognitive and Brain Sci., Leipzig, Germany

Abstract: The cortical column was originally defined by Mountcastle as a vertical cell band with unimodal response properties in cat somatosensory cortex. Since then, it successfully guided brain research from Hubel and Wiesel’s ice-cube model to contemporary computational neuroscience. Recently, however, researchers have questioned the functional significance of these vertical cell bands. Commemorating Vernon Mountcastle’s death in January 2015, this study historically reconstructs the main achievements and challenges of 60 years of column research in three stages. In the first stage (1955-1981), the column gained the status of an organizational unit of the cortex because Mountcastle’s method of vertical electrode recordings was extended to primary visual, auditory, precentral motor and posterior parietal cortex in the cat and primate cortex. It remained initially unclear, however, whether vertical structures in other species (e.g. whisker barrel cortex) should count as columnar, whether columnar functions like orientation were always discrete, or present in the awake animal. In the second stage (1981-2005), results from new experimental methods challenged the column’s status as an organizational unit. Cytochrome oxidase (CO) staining revealed patches of unoriented layer 4 neurons, leading to a revision of the ice cube model of visual cortex. Optical imaging also recorded unoriented cells in “pin-wheel centers”, but a clear correspondence to CO patches could not be established. Computer models furthermore converged on simulating orientation as a dynamic network feature and not a stable cell property. The radial unit hypothesis of cortical formation finally suggested that the vertical cell bands may be a functionally insignificant by-product of ontogenetic development. Taking a lesson from history, three possible research strategies emerge in the current stage of column research. First, researchers can apply the column concept to locally variable structures without assuming an underlying uniformity of the cortex. Secondly, columns can be redefined based on their connectivity, combining the view of column function as network activity with novel neuroanatomical tracing methods. Thirdly, the
“canonical microcircuit” could replace the column as a basic unit of mesoscopic brain organization without assuming a vertical anatomical module. Depending on which option is chosen, contemporary approaches to map brain organization (large scale modelling, connectomics), need to be evaluated differently. By reconstructing and conceptually analyzing such issues, history and philosophy of neuroscience can actively contribute on-going research practice.

**Theme H Poster**

**021. History of Neuroscience**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 21.08SA/CC22

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

**Title:** Translating Morris water maze results across species and environments

**Authors:** *N. ATANASOVA;*  
Dept. of Philosophy and Religious Studies, The Univ. of Toledo, Toledo, OH

**Abstract:** Experimental neurobiology has been challenged for using multiple experimental protocols for the study of presumably identical phenomena. Some argue that this precludes the translation of laboratory knowledge across species and laboratory environments. Further, this may undermine the extrapolation of laboratory results to natural environments. The objective of this project is to make explicit the ways neuroscientists take relevant precautions to eliminate the potential problems of translation across species and environments. Historical case study and philosophical analysis were used in order to trace the development and the subsequent adaptations of the Morris water maze (MWM) apparatus in various experimental environments. Multiple protocols adopted by laboratories in Western Europe and North America were analyzed. The analysis was performed on methodological articles addressing the alternative MWM designs and the methods sections of research articles. The publications were selected according to two main criteria. First, they had to be representative of multiple variations on the MWM design and procedures. Second, they had to be indicative of how different methodological decisions reflected the difference in tested subjects. The methodological decisions were analyzed with respect to the corresponding objectives of the experiments utilizing different versions of MWM designed for different species. The results indicated that different versions of the basic design and the variations of the procedures used in MWM tests corresponded to the specific goals of the experiments. Researchers had clearly articulated reasons for preferring one design
over another. They were able to keep track of the differences between the specific goals of their studies and the goals of studies adopting different designs. Moreover, research articles reporting the results of MWM tests typically controlled for artifacts of the specific experimental setup by using alternative tests for the studied function/dysfunction and/or tests that would eliminate false positives and negatives due to prerequisite functions and abilities necessary for the tested behavioral effects. These results are significant because they show that, despite some worries raised recently by philosophers of neuroscience, the research community using MWM have well defined procedures for translation of experimental knowledge across different species and environments. This will ultimately help educating the general public as well as the academic community with non-science background that experimental neuroscience is a well-functioning tool for the production of valid and reliable knowledge.

**Theme H Poster**

**021. History of Neuroscience**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 21.09SA/CC23

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

**Title:** The historical brain specimens of C.F. Gauss and C.H. Fuchs, their mix-up and its implications

**Authors:** *R. SCHWEIZER*\(^1\), G. HELMS\(^2\), J. FRAHM\(^1\);
\(^1\)Biomed NMR Forschungs GmbH, MPI biophys Chem., Goettingen, Germany; \(^2\)MR Res. in Neurol. and Psychiatry, Cognitive Neurol., Univ. Med. Ctr., Goettingen, Germany

**Abstract:** In 1855 the anatomist Rudolph Wagner started a collection of brains of deceased Göttingen professors with the brain of C. F. Gauss (1777-1855). He was interested in the “typical differences in the windings of the hemispheres and the brain weights with the specific consideration of intelligent men”. This approach reflects a change of paradigm at the time, as anatomists moved from comparing brain weight and volume to a systematic description of gyri and sulci. But Wagner was the first in a line of research to preserve and study the brains of exceptional men to find a morphological counterpart to their extraordinary abilities. The best known examples in this line of research are the brains of V. Lenin and A. Einstein. Apart from the historical studies of R. Wagner and his son Hermann Wagner no further research was conducted on the brain of C.F. Gauss, mainly because the search of morphological signs of the genius in the brain became outdated and remains questionable. Recently it was found that the
historical jar labeled “C.F. Gauss” in fact contained the brain of C.H. Fuchs (1803-1855), another Göttingen professor (Schweizer et al. 2014). This serendipitous discovery was based on the occurrence of a divided central sulcus in the assumed Gauss brain. The first description of this rare, but distinct anatomical variation was made by R. Wagner in 1862, but in the brain specimen of the C.H. Fuchs (Alkadhi and Kollias, 2004). Comparing the depicted brains in Wagner’s publications with the preserved brains revealed that the brains of C.F. Gauss and C.H. Fuchs, probably accidentally, were exchanged and ended up in the wrong jars. This unexpected rediscovery allowed for a detailed MRI investigation of Fuchs’ brain showing that the connections between the pre- and postcentral gyri of both central sulci extend from the brain surface into the depth, resulting in divided central sulci (Schweizer et al. 2014b). So, the enduring scientific contribution of Wagner’s brain studies is less the investigation of “intelligent men”, but the thorough description and depiction of the gyral and sulcal patterns, including the identification of a rare variation. The coincidence that this variation occurred in a fellow professor, whose brain was preserved, provided the opportunity to follow up on Wagner’s descriptions with contemporary MRI methods. And apart from the lasting scientific value, this mix-up is a prime example for the fundamental rule in science to “never trust a label” and to “always check the original literature”.

Schweizer, R. et al. 2014, Brain, 10.1093/brain/awt296
Schweizer, R. et al. 2014b, Front Neuroanat, 10.3389/fnana.2014.00035


Theme H Poster

021. History of Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 21.10SA/CC24

Topic: H.01. History of Neuroscience

Title: Hieronymus Fabricius and the lateral fissure of Sylvius

Authors: *A. PARENT;
Psychiat. & Neurosci. Dept, Univ. Laval, Quebec City, QC, Canada

Abstract: Hieronymus Fabricius (Girolamo Fabrici or Geronimo Fabrizio) was born in Aquapendente, near Orvieto, Italy, in 1537. He studied medicine in Padua, under the learned tutorship of Fallopius (Gabriele Falloppio, 1523-1562), whom he succeeded as professor of
anatomy and surgery in 1565. Fabricius became a highly praised physician and surgeon, attending patients as illustrious as Galileo Galilei (1564-1642). We own him the first permanent anatomy theater built in 1594 and still preserved at the Palazzo Po in Padua. As a teacher, he attracted greatly promising students from all over Europe, such as the Englishman William Harvey (1578-1657), who became a close friend. Fabricius made several breakthroughs in the fields of phonation, vision, respiration, locomotion, fetus formation and vascularization. He acquired fame for his description of the valves present along the entire venous system in 1574, but his obedience to the Galenic tradition prevented him from discovering their true function; he saw them simply as a means to slow down the blood flow. His student Harvey correctly interpreted Fabricius’ finding and integrated it in the theory of blood circulation that he published in 1628. Fabricius wrote very little on the anatomy of the brain. However, around 1590, he attempted to integrate his major works into a single monumental treatise (*Totius animalis fabric theatrum*) accompanied by beautiful hand-painted color plates. One of these *Tabulæ Pictæ*, which Fabricius bequeathed to the Republic of Venice in 1615, provides a lateral view of the human brain that appears to be the very first illustration of the lateral fissure to which the name of Franciscus Sylvius (1614-1672) is commonly associated. However, Fabricius’ treatise was never published and his illustrations, devoid of identification or legend, remained buried in the San Marco library for 250 years, until the Italian neuroanatomist and medical historian Giuseppe Sterzi (1876-1919) rediscovered them in 1909. Hence, despite Fabricius' early depiction, it is Sylvius’ name that remained eponymically attached to the lateral fissure and fossa. Medical history has retained Sylvius’ concise but apt description of these human brain structures illustrated by an informative engraving. This contribution first appeared in a revised version of the *Anatomicæ Institutiones* of Caspar Bartholin the Elder (1585-1629) published in 1641 by his son Thomas Bartholin (1616-1680), who was Sylvius’ student in Leiden. Fabricius retired from teaching in 1613, after having served Padua University for nearly 50 years. He died in 1619, probably of poisoning by cupid relatives, and was ceremoniously buried in the Franciscan church of Padua.

Disclosures:  A. Parent: None.

Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.01SU/CC25

Topic: H.02. Teaching of Neuroscience
Support: Astor Foundation

Title: Worm School: a collaborative research project engages high school students in authentic research

Authors: *E. M. WATERS*¹, S. WALLACE², S. SHAHAM²;
¹Sci. Outreach Program, ²Rockefeller Univ., New York, NY

Abstract: At The Rockefeller University, the Science Outreach Program and the Laboratory of Developmental Genetics collaborated on a project offering New York City high school students the opportunity to engage in data collection for an ongoing research study. The aims of the collaboration were to provide an authentic, rigorous, and engaging research experience to a large number of students from under-served communities in New York City, and to facilitate large-scale data collection for the sponsor laboratory. The Worm School program involves three components: 1) introduction to the research question using a flipped classroom approach and a school visit by a Science Outreach Program staff member, 2) experimentation in the Science Outreach Teaching Laboratory performing research and collecting data, and 3) completion of data analysis in school and recommendations for rescreening. The scientific goal of the project is to understand the role of glial cells in memory formation. Behavioral adaptation of the nematode *C. elegans*, in response to prolonged exposure to the odor benzaldehyde, was used as the memory paradigm. Using established techniques, post-embryonic RNAi knockdown was used to downregulate the expression of 160 glia-enriched mRNAs. Animals were then assayed in a standard chemotaxis arena for adaptation defects. Candidate genes have been identified that are now under further study in the sponsor laboratory. More than 150 high school students in grades 9-12 have participated in the Worm School research program. The high school students showed immediate positive responses to the program that predict future long-term benefits through increased science self-efficacy and the validation of their interest in science and scientific careers.

Disclosures: E.M. Waters: None. S. Wallace: None. S. Shaham: None.

Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.02SU/CC26

Topic: H.02. Teaching of Neuroscience
**Title:** Engaging high school students in neuroinformatics projects

**Authors:** A. DELPRATO$^{1,2}$, *W. E. CRUSIO$^{1}$;  
$^{1}$Univ. Bordeaux and CNRS, Bordeaux (Pessac), France; $^{2}$BioScience Project, Wakefield, MA

**Abstract:** BioScience Project is a research oriented, non-profit organization. We offer high school students the opportunity to learn neuroinformatics by working as summer interns on ongoing research projects in the area of behavioral neuroscience. Students are also given the option to design a research topic of their choice in this domain. The student projects involve learning how to formulate and test hypotheses, navigate biological databases, data mining, data analyses and data visualization. Students are asked for a minimum 4 week commitment and need only a computer with an internet connection to participate. The projects are highly flexible and students can work from home on their own schedule. All communication and collaboration is done via the internet using an open-source learning platform and video conferencing. Here we present the internship design and the results obtained from our first group of students.

**Disclosures:** A. Delprato: None. W.E. Crusio: None.

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**Theme H Poster**

**022. Teaching Neuroscience in K-12**

**Location:** Hall A

**Time:** Sunday, October 18, 2015, 8:00 AM - 12:00 PM

**Program#/Poster#: 22.03SU/CC27**

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

**Title:** Neuroscience education, making a difference at Magruder high school in Montgomery County, Maryland

**Authors:** *A. J. FOBBS$^{1}$, D. A. TWOMBLY$^{2}$, T. CRUZ$^{2}$, R. SORESEN$^{3}$, P. WILLIAMS$^{4}$, M. BACHMAN$^{5}$, L. C. EVANS$^{6}$;  
$^{1}$MRMC, Dept. of Def., Silver Spring, MD; $^{2}$Eunice Kennedy Shriver Natl. Inst. of Child Hlth. and Human Develop., Rockville, MD; $^{3}$Natl. Inst. of Drug Abuse, Rockville, MD; $^{4}$Paul Williams and Associates, Washington, DC; $^{5}$Univ. of Maryland, College Park, MD; $^{6}$Col. Zadok Magruder High Sch., Rockville, MD

**Abstract:** The Magruder Neuroscience Program’s main focus is to introduce the students of Magruder High School to neuroscience using a unique format that requires hands-on participation. The program immerses the students in the various topics of interests presented by
neuroscientists from local institutions. Six exhibits are presented each day of the program. The topics presented at this year’s program were The Drunken Brain, Idea Mapping, Prosthetics, Cognition, Brain Function, and Origami. 120 students attended the program each day. Exhibits covered synaptic transmission, the evolution of prosthetics design, traumatic brain injuries effects on the brain, and use of complex geometric shapes to understand brain topography and memory enhancement. These students were from the Advanced Placement Psychology classes and the Anatomy and Physiology Classes at Magruder High School. The topics discussed by each presenter covered subject matter taught in their respective classes, which supports the curriculum. Students had the opportunity to experience hands-on demonstration of principles learned in the classroom. This method of learning enhanced the students’ educational experience at Magruder, empowered them to take academic command of the subject matter, encouraged critical thinking, and enhanced their appreciation for STEM related academics and STEM related careers. The second component of the Magruder Neuroscience Program is the Parent and Student Symposium. The symposium is designed to address community and social issues related to neuroscience, to aid parents with information to open lines of communication with their children about these issues, and to allow students to make wise and informed decisions when confronted with these issues in the community and amongst their peers.


Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.04SU/CC28

Topic: H.02. Teaching of Neuroscience

Title: Evaluation of five learning activities associated with live-cell imaging microscopy in a high school neuroscience curriculum for scientifically gifted students

Authors: *K. SUEN*¹, W. TANG¹, W. CHAN¹, C. CHANG²;
¹Po Leung Kuk Laws Fndn. Col., Hong Kong, China; ²Anat., The Univ. of Hong Kong, Hong Kong, China

Abstract: We established a pull-out neuroscience curriculum for scientifically gifted students in 2013. It was developed based on the Purdue Three-Stage Enrichment Model in which students experienced to be an advanced learner to conduct research-based learning (stage III) following a
series of mastery activities for understanding of basic neuroscience contents (stage I) and enhancement of problem-solving skills (stage II) (Suen et. al. 2013). We reported that brain cell culture was an effective learning activity for high school students to learn diverse knowledge and skills about neuroscience (Suen et. al. 2008). Live-cell microscopy has become a useful tool to acquire a better understanding of biological functions. In the present study, five new learning tasks associated with cell culture and live-cell imaging microscopy are developed as the mastery activities to help scientifically gifted students acquire some basic knowledge and research skills in neuroscience (stages I and II) prior to the implementation of research-based learning (stage III). These activities were designed to help students visualize the continuous stages of the growth, development and death of brain cells. The students were instructed to capture time-lapse micrographs using a live-cell imaging system to study (1) mitotic cell division of SH-SY5Y cells, (2) differentiation of SH-SY5Y cells by retinoic acid, (3) induction of cell death of SH-SY5Y cells by different kinds of toxins including oxidative stress inducer (e.g. hydrogen peroxide), ER stress inducer (e.g. thapsigargin), high glucose content and heavy metal (e.g. lead), (4) positional and structural changes in organelles which are stained with fluorescent dyes (e.g. ER tracker and mitotracker) and (5) expression of green fluorescent protein (GFP) in SH-SY5Y cells after transfection with the GFP gene. The effectiveness of each of the activities to promote student’s understanding on neuroscience knowledge as well as student’s interest to work on an independent research project is evaluated. Results indicated that the learning activities associated with live-cell imaging microscopy can promote the learning interest and scientific literacy of the gifted students. This suggests that learning tasks associated with a live-cell imaging system can be applied in neuroscience gifted programs in high schools.


Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.05SU/CC29

Topic: H.02. Teaching of Neuroscience

Support: SFN chapter grant

Penn State Neuroscince Institute

Title: Promoting neuroscience awareness in Central Pennsylvania
Authors: *K. VENKITESWARAN*¹, Q. VO¹, Z. NASSRALLAH², S. RAVI¹, A. BARBER², T. SUBRAMANIAN¹;
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²Ophthalmology, Penn State Col. of Med., Hershey, PA

Abstract: We report Central PA Chapter of SfN activities for raising neuroscience awareness in the past 10 years and its success. The Susquehanna chapter of SfN represented in the Central Pennsylvania the following geographic areas: Susquehanna River Valley, Cumberland Valley, Happy Valley and South Central Pennsylvania. This chapter had been inactive for many years before its revival in 2006. The authors initiated several efforts that made this chapter a major success in the past 10 years. We received a major boot with Grass Foundation lecture award, which allowed us to bring Dr. Mahlon Delong as a visiting professor for our inaugural yearly symposium and poster session. Associated events at the event were a Brain Awareness Day at the Whitaker Regional Science Center and daily screening of movies involving neurological disorders and a clinician driven discussion. In the following year we initiated the Central PA Regional Brainbee competition and this has grown from 3 to 21 school districts participating and a total of over 200 high school students competing. We emulate the national completion using written quiz, charades and human brain lab specimens. We received additional support with prize money for the winners at the brain bee offered by the PSU Neuroscience Institute. We also used this completion as a gateway to our summer internship program by offering the top 10 placed students an opportunity to work in the summer in an educational internship. Regional brain bee did tremendously influence to develop and retain the interest and passion towards neuroscience and prompted several winners to choose neuroscience for their undergraduate major in college. In addition, to promote neuroscience among yearly laboratory interns the students were required to write an initial proposal of work complete 10 weeks of internship research and to present their findings as a 10 minute presentation of the project to an academic audience. All interns also took an undergraduate level neurobiology course with laboratory component. Our success as measured by the number of interns who opted to choose neuroscience is outstanding. The annual symposium is attended by neuroscience programs from over 20 regional colleges and over 50 abstracts and poster presentations are presented every year. Overall, our effort for cultivating interest in the neurosciences and related fields is being received with tremendous enthusiasm, which encouraged us to present this overview to the SfN community.

Disclosures: K. Venkiteswaran: None. Q. Vo: None. Z. Nassrallah: None. S. Ravi: None. A. Barber: None. T. Subramanian: None.

Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A
**Time:** Sunday, October 18, 2015, 8:00 AM - 12:00 PM

**Program#/Poster#:** 22.06SU/CC30

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

**Title:** UCLA neuroscience outreach: growth of an effective community resource

**Authors:** C. Yaeger¹, N. Hardy¹, D. Alexander¹, R. Romero², C. Evans², W. Ge³, *E. M. Carpenter³; ¹Neurosci. Interdepartmental Program, ²Brain Res. Inst., UCLA, Los Angeles, CA; ³Dept. of Psychiatry and Biobehavioral Sci., UCLA Sch. Med., Los Angeles, CA

**Abstract:** UCLA’s Interdepartmental Program in Neuroscience and the Brain Research Institute conduct community outreach activities through Project Brainstorm, a graduate student-run club and undergraduate course, which promotes neuroscience education to K-12 schools in the greater Los Angeles area. Since its inception 9 years ago, more than 150 undergraduate and graduate students have participated in this program to reach hundreds of children. Project Brainstorm encompasses three main avenues of community outreach: classroom visits, Brain Awareness Week, and campus-based outreach programs. For classroom visits, undergraduate students design and implement a classroom lesson and an interactive activity to illustrate an area of study in neuroscience. Interactive activities include viewing a real human brain, comparative brain anatomy, brain injury and disease, and brain plasticity. For schools outside of UCLA’s immediate area, Project Brainstorm offers Brain Awareness Week, an annual event that brings students from LA schools to campus for a day of neuroscience-related activities. Participants partake in interactive laboratory tours and hands-on activities demonstrating fundamental neuroscience topics. For high school students, Brain Awareness Week also includes a mentoring session, where students can ask questions about pursuing science and attending college. For both classroom visits and Brain Awareness Week, written surveys are administered to all K-12 students before and after visits to judge the effectiveness of the program and whether an interest in neuroscience has been generated. Finally, Project Brainstorm’s resources are also used in local science outreach events hosted by other UCLA science departments, graduate students and faculty, student clubs, and local grade schools. Given the longevity of our program and continued interest from the community, we hope that our model can serve as a resource for other institutions how to create low-budget, interactive lesson plans to effectively convey neuroscience facts and research to diverse groups of K-12 students.

**Disclosures:** C. Yaeger: None. N. Hardy: None. E.M. Carpenter: None. D. Alexander: None. R. Romero: None. W. Ge: None. C. Evans: None.
Title: NeuroCamp: a UCLA Brain Research Institute outreach effort encouraging STEM education pathways for high schoolers

Authors: W. GRISHAM1, W. WALWYN2, E. CARPENTER3, *J. B. WATSON3, S. KU2, M. NELSON2, A. CARLSON4, D. SAXON4, I. DAHLIG5, J. CHANG1, S. LE1, N. ASKARINAM1, N. SCHOTTLER1;  
1Psychology, 2Mathematics, UCLA, Los Angeles, CA; 3Dept Psychiatry & Biobehav Sci., David Geffen Sch. Med. UCLA, Los Angeles, CA; 4WM Keck Sci. Dept., Claremont McKenna Col., Claremont, CA; 5Chem. Dept., Trinity Col., Hartford, CT

Abstract: NeuroCamp is an outreach effort of UCLA’s Brain Research Institute to local high school students to encourage them to pursue STEM education in college. NeuroCamp is staffed by volunteer faculty and lasts 2-3 weeks. Campers are treated to a laboratory session three days a week. Recent lab experiences included the molecular neuroscience of the Huntington’s gene, effects of drugs on synaptic action in the cricket nervous system, and neuroanatomy using both sheep and human brains. Our recruiting efforts have emphasized reaching both under-represented minorities and high-needs students attending LA-area public schools. Last year, 7/24 students (29%) were under-represented minorities and 16/24 (67%) attended public schools. Further, we have reached out to students in UCLA’s CalTeach program, which trains them to be K-12 teachers, to assist us with NeuroCamp. So our program is also serving to help prepare future science teachers. Over the last 3 years, we urged Campers to take an online quiz both before (“pretest”) and after (“posttest”) their NeuroCamp experience, and to fill out a post-camp evaluative questionnaire. Respondents were generally female (34 female, 9 male), which reflects the enrollment pattern. The pre/posttest consisted of questions based on neuroscience and biology content and reasoning, and it also contained items from the Cornell Critical Thinking Test. Campers showed a significant improvement on the neuroscience and biology items, but there was no improvement in scores on the Cornell Critical Thinking Test items. On the post-camp evaluative questionnaire, Campers reported that they were more eager to go to college as a function of their experience and that the NeuroCamp instructors inspired them to improve their academic performance, especially in high school science. Free response items showed that the participants realized from their peer-peer interactions that their college years were fast approaching. Interactions with mentors seemed both stimulating and inspiring to the participants. Overall comments were uniformly positive, and they frequently mentioned that exposure to the
college environment was an exciting and valuable experience. Clearly, NeuroCamp is serving both to encourage high schoolers to pursue STEM education and to help provide undergraduates interested in K-12 education with a genuine teaching experience.


**Theme H Poster**

**022. Teaching Neuroscience in K-12**

**Location:** Hall A

**Time:** Sunday, October 18, 2015, 8:00 AM - 12:00 PM

**Program#/Poster#:** 22.08SU/CC32

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

**Support:** NSF Award 1344285

**Title:** From participants to researchers: an interactive neuroscience program for high school students

**Authors:** *I. DAVIDESCO¹, L. KAGGEN¹, J. MCCLINTOCK², M. WESTERlund¹, M. OOSTRIK³, L. WAN⁴, M. DING⁴, D. POEPPEL¹,⁵, S. DIKKER¹,⁶;
¹Psychology Dept., New York Univ., New York, NY; ²Trevor Day Sch., New York, NY; ³Magdatt, Amsterdam, Netherlands; ⁴Univ. of Florida, Gainesville, FL; ⁵Dept. of Neurosci., Max-Planck-Institute, Frankfurt, Germany; ⁶Utrecht Univ., Utrecht, Netherlands

**Abstract:** As part of a crowd-sourcing neuroscience study aimed at understanding teacher-student brain-to-brain synchrony, we developed an interactive neuroscience education program for high school students. The first semester started with a neuroscience crash course that laid the foundation for the program, spanning from the cellular level through sensory and motor systems to data processing. The students were then taught how to record and evaluate data from wireless EEG headsets (emotiv) and participated in several classes in which their EEG activity as well as their teacher’s was recorded concurrently. In the second semester, the students became the researchers. They each contributed to forming one of several neuroscience-related research proposals, which were then presented in class, critically evaluated and eventually, one was selected by the students to be carried out in class. The students further developed the experiment, collected and analyzed EEG data under our guidance and finally presented their results. This program can serve as a model for hands-on neuroscience teaching in high schools and colleges.
Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.09SU/CC33

Topic: H.02. Teaching of Neuroscience

Support: Michigan Campus Compact Venture Grant - Cycle 43

Title: Firing on all synapses: A brain awareness program that inspires kids and enriches mentors

Authors: *K. J. THIEL, C. B. BANKS, F. BOLS, C. CROMBEZ, A. MILLER, A. SACKA, K. E. TAYLOR, K. J. VOGEL, S. ZAVEDYUK; Psychology, Madonna Univ., Livonia, MI

Abstract: Neuroscience is a widely under-represented topic in K-12 science curricula. Unfortunately, the term “neuroscience” carries with it the connotation of being a “hard” science, and thus educators and school administrators may feel it would be too intimidating of a topic to cover with young students. In addition to a lack of neuroscience education in the K-12 world, smaller universities that do not emphasize research may similarly fall short in providing their students with opportunities to gain a neuroscience background. Madonna University is a small, private liberal arts institution located in a suburb of Detroit, MI. Our students’ only opportunity to engage in the topic of neuroscience is to take an elective course called Behavioral Neuroscience that is cross-listed between the biology and psychology programs. Therefore, the goal of Madonna University’s Brain Awareness efforts was twofold: (1) to promote the field of neuroscience among elementary school students through the use of highly interactive presentations, demonstrations, and games; and (2) to enhance our own college students’ knowledge of the brain throughout the process. Student mentors from Madonna University’s Behavioral Neuroscience course and its Psychology Club were asked to think critically about how they could take something complex like the brain and make it interesting, fun, and easy to understand for elementary students. Ideally, through learning how to educate our youth on the brain, the college mentors will further reinforce their own understanding and appreciation of the subject. The college students devised a series of brain stations which allowed kids to see and touch real animal brains, play with clay and plastic models of the human brain, engage in games to help them understand the structure and function of neurons, and participate in demonstrations
explaining how their five senses work. In addition to a pre-program baseline assessment conducted on the elementary students immediately prior to the Brain Awareness activities, a post-program assessment occurred several weeks later in order to determine the long-term effectiveness of the program, and to gauge the kids’ lasting interest in the topic. Assessment questions were both subjective (e.g., draw a picture of a neuron) and objective (e.g., what is an action potential?) in nature. The results suggest that the kids retained an ample amount of neuroscience-themed information, and that they found the program to be both fascinating and fun. In addition, the college mentors reported significant gains in their own knowledge of the neuroscience topics and themes that they had taught.


Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.10SU/CC34

Topic: H.02. Teaching of Neuroscience

Title: NYC public education outreach in the brain sciences: A blueprint for developing new outreach programs

Authors: *F. D. UQUILLAS, K. BACHI, P. MALAKER, A. ZILVERSTAND, N. ALIA-KLEIN, R. Z. GOLDSTEIN; Icahn Sch. of Med. At Mount Sinai, New York, NY

Abstract: Third-party educational support and outreach in the brain sciences is a beneficial and valuable contribution for public education programs that can help inspire future physicians, scientists, and policy-makers. In the city of New York (NYC), such programs have been developed to foster and enhance one of the largest public school systems in the world. The NYC public school system comprises of 1.1 million students in more than 1,800 public schools, serving on average 26 (± 2) students per classroom (NYC Department of Education, City Level Summary Report, 2015). Examples of third-party supplemental programs include the Sinai Neuroscience Outreach Program (SNOP) from the Icahn School of Medicine at Mount Sinai, and the Columbia University Neuroscience Outreach (CUNO) program. Student volunteers for these programs comprise the backbone of most of these organizations, usually with support and advice from university faculty. Financial resources come from within the university institution, or from
other third-party non-profit organizations such as the Society for Neuroscience, the Dana Foundation, and the New York Academy of Sciences, amongst others. These programs are especially beneficial because they provide unique learning experiences for students such as brain dissections, comparative brain anatomy demonstrations across multiple species, and guest lectures from university faculty professors. Overall, these extra-curricular in-class sessions significantly contribute to a taxed school curriculum. The review presented here will focus on these neuroscience outreach programs, and aims to provide an understanding of their scope and potential. It also seeks to provide inspiration and preliminary guidance for jump-starting similar outreach programs either within NYC, or outside the bounds of the five-borough system. We compare these programs in their organization (kinds of board membership, volunteer membership, and financial support), and content offered (kinds of lessons), in addition to other components such as varying lengths of instruction depending on level of resources and volunteership (e.g., single lesson per semester vs. longitudinal once-a-month lessons per semester). Obstacles to note include instances where foundational or institutional support may not be easily attainable, yet these obstacles may sometimes be surpassed by joint efforts with school leadership such as non-profit Parent-Teacher Associations (PTAs), or district-wide board councils. Despite these obstacles, this overview intends to serve as a blueprint for starting a successful and wide-reaching neuroscience outreach program.

Abstract: Oberlin College neuroscience majors created an interactive workshop for middle school students designed to teach (1) the basic features of the human brain, (2) how the teenage brain differs from the adult brain, and (3) how drugs of abuse interact with the brain. During the semester, neuroscience majors learned and taught each about the many facets of the neurobiology of addiction through a senior capstone course of the same title. Course themes focused on the neurobiology of addictive drugs, but also included exercises and discussions pertaining to behavioral addictions and philosophical/societal issues. During the second portion of the course, the college students collectively designed and produced a workshop for 8th grade students at Langston Middle School in Oberlin, OH. The workshop involved hands-on activities that were designed to educate the middle school students about neuroscience basics, the teen brain and the effects of drugs of abuse. At one station students participated in a physical activity that elucidated the “tug of war” between the prefrontal cortex and the midbrain dopamine system. In another activity students built their own model neurons from craft materials while learning about different parts and functions of neurons. Vertebrate brain models and preserved brain tissue accompanied this “Build a Neuron” station. At a third station, students were able to stimulate neuronal activity in earthworms and crickets using the Spikerbox from Backyard Brains. At the final station students discussed how drugs of abuse influence brain function through a question and answer format. Collectively, the goal of the workshop was for the middle school students to begin to merge the neurobiology of the brain with a “drugs explained” message that extends beyond a “Just Say No” message. The efficacy of the workshop was assessed by pre- and post- questionnaires that queried the middle school students’ confidence with the topics covered. Assessments found that a large majority of students increased their average confidence scores between the pre- and post-assessments. Bolstered by positive feedback a second workshop was presented during the 2015 Oberlin College STEM Night.

Disclosures: S.C. Page: None. S. Robinson: None.

Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.12SU/CC36

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant R25DA033011

Title: Bloomin’ Brains: a summer neuroscience camp for middle school students
Authors: *E. H. CHUDLER*¹, K. M. STRAUS²;
¹Univ. Washington, Cnt Sensorimotor Neural Engin., Seattle, WA; ²Bioengineering, Univ. of Washington, Seattle, WA

Abstract: The Bloomin' Brains Summer Camp is a component of the Sowing the Seeds of Neuroscience program that aims to introduce brain research to middle school students and to encourage these students to pursue careers in science, technology, engineering and math. A series of eight hands-on experiments were developed with the help of middle school science teachers; these lessons are currently being used by teachers in California, Oregon and Washington. Five of these classroom lessons were adapted for a one-week summer camp (Bloomin' Brains Summer Camp) for middle school-aged children. A total of 51 middle school children (26 children in 2013; 25 children in 2014) have attended the camp. The five day camp starts with several ice breaker activities to help the campers get to know one another. Basic neuroscientific (e.g., neuroanatomy, neurophysiology) concepts are also demonstrated with activities, modeling and real brain specimens. Campers create extracts from several plants; these extracts are used in subsequent experiments including observing the effects on planaria movement, Lumbriculus heart rate and neural activity from cockroach leg nerves. Opportunities to tour the University of Washington botany greenhouse, medicinal garden, Hyde Herbarium and Center for Sensorimotor Neural Engineering are included in camp. Children also create a personalized scent from plant material, develop an herbal first aid kit and discuss the ethical use of animals. Ample time is provided for campers to ask neuroscientists questions about the brain and about careers in neuroscience. Post-camp surveys indicated that all campers agreed or strongly agreed with the statements: 1) I conducted real science experiments in a lab during this camp; 2) I got help when I needed it throughout the camp; 3) I felt really engaged with science during this camp; and 4) This camp showed me that creativity and curiosity are important in science. Significant gains in childrens' knowledge about careers in neuroscience, basic lab skills, and ability to conduct science experiments were also demonstrated.


Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.13SU/CC37

Topic: H.02. Teaching of Neuroscience
Title: Effects of teacher professional development and instructional practices on student knowledge of neuroscience

Authors: *J. M. Dubinsky*, K. Edwards, M. Hoelscher, M. Michlin, G. Roehrig

1 Dept. Neuroscience, 2 STEM Educ. Ctr., 3 Ctr. for Applied Res. and Educational Improvement, Univ. of Minnesota, Minneapolis, MN

Abstract: BrainU is a professional development program designed to promote enhanced understanding and application of neuroscience and its health-related issues into high school science. This research seeks to clarify the relationships between professional development experiences, instructional practices, and student learning for neuroscience content. High School teachers from two large partner school districts attended two summer 2-week intensive neuroscience professional development workshops to learn neuroscience using inquiry-based activities suitable for use in their classrooms. During the subsequent academic years, data were collected on students’ neuroscience knowledge in a pre- and posttest format, the level of professional development the teacher had completed through the BrainU program, observations of teacher implementation of neuroscience content, and student demographic variables. Hierarchical linear models determined that teachers who had undergone professional development in the BrainU program had students who performed better on average on the neuroscience posttest than those whose teachers had not participated in the training, even when accounting for student demographics. Additionally, the level of social support a teacher provided appeared to be related to how well students did on the neuroscience posttest. Although there were a limited number of teachers who participated in ongoing professional development and provided student data, there is some evidence to indicate that additional training did continue to impact students’ neuroscience knowledge positively ($t(8) = 2.09, p = .035$). Teachers cited competing district mandates as reasons for not being able to teach more neuroscience.


Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.14SU/CC38
Abstract: The Edmond and Lily Safra International Neuroscience Institute (ELS-IIN) at Macaiba city, Rio Grande do Norte state, Northeast of Brazil, aims to use science as a tool for social development. The ELS-IIN offers a well developed neuroscience/neuroengineering, rodents, marmosets and human research facility. This advanced facility opens a window for students from public school (equivalent K5-K9 US), undergraduate, graduate, as well as, young researcher, and international researchers. Since 2010, ELS-IIN has developed the Scientists of the Future Program, an educational program for public high school students that aims to develop scientific skills in a propitious advanced research environment. The Scientists of the Future Program (SFP) is also supported by National Institute of Science and Technology Brain Machine Interface (INCT-INCEMAQ) from Brazilian National Board of Science and Technology Development (CNPq). The students are gradually integrated into the process of scientific research from neuroanatomy to behavior, guided by master student and researcher facilitators. In the last two years, several students from the SFP applied for undergraduate courses and some of them started scientific education at ELS-IIN in a more advanced level. In 2013, ELS-IIN approved the first Master Program in Neuroengineering in Brazil (approved by Coordination of Superior Education of Ministry of Education CAPES/MEC). This pioneer Master Program in Neuroengineering has allowed students and researchers to interact in a multidisciplinary and translational effective way, addressing basic and clinical research, and aiming a high level scientific education for social development in Brazil. Therefore, ELS-IIN has effectively built an educational and scientific integrated environment for social development in the Northeast of Brasil.

Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.15SU/CC39

Topic: H.02. Teaching of Neuroscience

Title: Stereology in a biological context with the integration of mathematics, design and modeling: Synaptic structures and organelles to tissue tumors

Authors: *R. L. COOPER¹, M. SANDEN¹, A. S. COOPER², R. M. KRALL³; ¹Dept Biol, ²Div. Physical Therapy, Dept. Rehabil. Sci., Univ. Kentucky, Lexington, KY; ³STEM, Univ. of Ky, Lexington, KY

Abstract: The Next Generation Science Standards (NGSS) is being implemented in many states across the USA in middle and high schools. A focus of the new standards is application of knowledge to real life problems in authentic scientific inquiry with an active learning process. Construction of various types of models is also a key component. When researchers are examining mutations in proteins that alter ultrastructure of cellular organelles, synaptic vesicle size or location and synaptic area, knowing the error in measurements are important to understand if structural differences can account for altered function. The educational modules made of readily accessible materials help to allow students to take stereological measurements. The students can use the values they obtain to calculate a theoretical area or volume of objects, such as synaptic surface, vesicle volume. Once they observe the 3D object they can calculate the potential error in estimations of area or volume compared to a 2D model. The modules are designed as an inquiry and problem based learning experience for the students. Physical models created by students will help in understanding the various concepts and provide useful objects for aid in classroom discussions. In addition, the freeware “Sketch up” allows some computational interaction and computer design to help illustrate various points the students may wish to discuss. The software provides a rapid means of altering structures and rotating them in 3D space with no cost of supplies. Students learn on their own accord through inquiry, model building and discussion in regards to errors in measurement which can vary depending on the structure and number of sections. These concepts are common practice in histological sectioning and images
obtained in serial sections of transmission electron microscopy. Students will also learn that these concepts are important in authentic scientific investigations.


Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.16SU/CC40

Topic: H.02. Teaching of Neuroscience

Title: Expectancy of Joint and Divided attention during prediction errors between teachers and students

Authors: J. F. GOMEZ-MOLINA1,2, A. L. GOMEZ-MOLINA1,2, *C. A. PALADINI3; 1Intl. Group of Neurosci., Medellin, Colombia; 2Biol., Univ. of Texas at San Antonio, San Antonio, TX; 3UTSA Neurosciences Inst., UTSA, San Antonio, TX

Abstract: INTRODUCTION. Learning is driven by predicted errors and is facilitated by reinforcement learning mechanisms (Apps MAJ, 2015, Journal of Neurosc). The relationship between the teacher and a group of students present challenges to the teacher: attention has to switch between the group and the individual student in order to monitor the actions of both the collective and single subjects. In this process, expectancy and hopes of being monitored are important for the student. On the other hand, the dynamics of hope-not hope is similar to the dynamics of exploitation (keep going) vs. exploration (change paths) in computer science (Gomez et al. Abstract SfN 2012). We ask: What can be the optimal strategy for the teacher to maximize learning in the student? METHODS. Empirical analysis of teacher-student personal experiences. Mathematical analysis of reinforcement and machine learning methods in a teaching environment. RESULTS. Two types of student personalities are considered: Those that feel comfortable that the teacher focus attention persistently in their task (type A) and those that prefer only eventual sampling of errors by the teacher (type B). The best strategy for the teacher is to give enough "reward" (i.e. attention) to each type of student such that the last maximizes his/her expectations for the level of attention (reward) he/she feel comfortable with. CONCLUSIONS. In a generalized sense, being the focus of attention is a form of reward for some students and motivates them to learn. According to the personality of each student, a good teacher should maintain expectations of being attended in the students at the appropriate level to
keep them motivated. In this context, teaching can be studied as a reward seeking process similar to reward prediction error mediated by dopamine.

**Disclosures:** J.F. Gomez-Molina: None. A.L. Gomez-Molina: None. C.A. Paladini: None.

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**Theme H Poster**

**022. Teaching Neuroscience in K-12**

**Location:** Hall A

**Time:** Sunday, October 18, 2015, 8:00 AM - 12:00 PM

**Program#/Poster#:** 22.17SU/CC41

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

**Title:** Hands on activities that help teach brain awareness

**Authors:** L. TOWNLEY, B. S. M. OBAYOMI, I. SINAKEVITCH, *D. P. BALUCH; Sch. of Life Sci., Arizona State Univ., Tempe, AZ

**Abstract:** Kids love science, especially when given the opportunity to interact with hands on activities. Activity based learning allows students to physically and mentally explore concepts in a way that is more enjoyable than less interactive methods. Neuroscience, being a more specialized discipline, is not typically taught in k-12 schools. Providing opportunities for students to actively learn about neuroscience will instill a more memorable experience that will stay with them. In the Hands on Science/Brain Awareness event at Arizona State University, students are introduced to various branches of neurobiology through various activities. Within the Keck Bioimaging Laboratory, students have the opportunity to assemble microscope slides, which contain neuroblastoma cells labeled with fluorescent markers, and collect images using a confocal microscope to visualize the anatomy. In another activity students conduct live cell imaging of microbes in water and learn how diseases such as meningitis are contracted and can affect the brain and nervous system. A unique way to demonstrate anatomy and the cortical homunculus is by building multidimensional paper models. From these activities, the students can share their microscope images online at the ASU Hands on Science Facebook page (www.facebook.com/ASUhandsonscience) which provides a portal for ongoing education and gives them the opportunity to share their experience with friends and family.

**Disclosures:** L. Townley: None. D.P. Baluch: None. B.S.M. Obayomi: None. I. Sinakevitch: None.
Theme H Poster
022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program/#/Poster#: 22.18SU/CC42

Topic: H.02. Teaching of Neuroscience

Title: Brain awareness week and limbic learning

Authors: *N. R. MYSLINSKI, J. RO;
Neural and Pain Sciences, 8th floor, Univ. Maryland Sch. Dent. DNPS 8th Floor, Baltimore, MD

Abstract: Robert Frost once said of learning “What is required is sight and insight – then you might add one more: excite.” Sitting and reading about the brain may give you and me a thrill, but it is not very memorable for the average lay person. However, if they are exposed to the same information while singing a brain song, winning a neuroscience competition, playing a brain game, or crying at a movie about a child with a brain disorder, they will have a learning experience that will last a lifetime. We call this Limbic Learning, a new term referring to emotion-enhanced learning. The enhancement is dependent upon the limbic, or emotion circuits, of the brain, especially the amygdala which increases our ability to retain declarative memories that have emotional components. Brain Awareness Week (BAW), celebrating its 20th anniversary, uses limbic learning to teach, motivate and inspire youth around the world. Activities are limited only by the organizers’ imaginations. The Dana Alliance, the Society for Neuroscience, Neuroscience for Kids and the International Brain Bee (IBB) have been especially successful at using limbic learning to spread awareness of the brain. Outdoor brain games, such as Cochlear Hopscotch or Synaptic Tag, brain songs, such as the Dendritic Song or Brain Rap, indoor brain games, such as Brain Bingo or Neurojeopardy, and even brain jokes have the ability to produce excitement and laughter while learning about the brain. Even constructive fear can help learning when it comes to drug abuse and wearing helmets. The IBB has given high school students the excitement of seeing a real human brain, of being applauded by thousands of neuroscientists, and winning neuroscience competitions. Israel featured a series of brain-related film screenings. Portugal transformed a local shopping center into a BAW performance space. Nigeria broadcasted BAW programing on the role of the brain in learning and leadership to more than one million radio listeners. Turkey conducted laboratory visits, while India conducted a brain trivia initiative, complete with an orchestra performance. Argentina constructed a giant structure representing the brain in the center of Cordoba City. Inside the brain structure there were a number of different activities such as drawing pictures of the brain, short public lectures, and a brain-themed music and dance show. In Brazil, high school
and postgraduate students worked together to create robots that demonstrate sensorimotor integration. Even poetry can stir the motions to learn about the brain, as with Emily Dickinson’s words, “The brain is wider than the sky, for put them side by side, the one the other will contain with ease and you beside.”

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

Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.19SU/CC43

Topic: H.02. Teaching of Neuroscience

Title: Building neuroscience at Lake Forest College: integration of curriculum with public education, k-5 outreach, and peer learning

Authors: *S. G. CHIREN, K. A. HUBER, S. BELLO-ROJAS, S. K. DEBBURMAN; Neurosci. Program, Lake Forest Col., Lake Forest, IL

Abstract: Since Lake Forest College’s neuroscience major began in 2009, it has become one of the highest enrolled majors. With an early emphasis on creating a cohesive student centered community of scholars, the curriculum evolved to closely integrate three co-curricular goals: a focus on public education, K-5 outreach, and a peer learning community. In 2009, students formed Synapse, the neuroscience outreach organization, and in 2011, chartered Nu Rho Psi, the National Honor Society in Neuroscience. To achieve the first goal, these groups organize several public education opportunities: an annual Brain Awareness Week (BAW), an annual community seminar series featuring Chicago’s best neuroscientists, and scientific conferences each semester that feature capstone academic work from multiple courses. During the BAW each fall, which attracts an attendance of over 1000, students from multiple courses showcase exhibits, teach-ins, labs, and presentations throughout the week, nationally noted speakers highlight interdisciplinary connections with neuroscience, and the annual Robert B. Glassman Brain, Mind, & Behavior Symposium spotlights faculty, alumni, and student research in neuroscience. Each fall, students also raise significant funds for a rare pediatric neurological disease (PMD), and they participate in Chicago’s Annual Jones PMD Walk ‘n Roll. Student groups achieve the second goal by collaborating with First-Year neuroscience courses each semester to conduct an outreach with local elementary schools to engage “How our Amazing Brain Works,” which serves as a non-traditional final exam for those courses. Over 300 elementary school children have benefitted
from this effort since 2009. Finally, the Neuroscience Program achieves the third goal by instituting a semester-length program of student peer teachers and mentors in introductory-level neuroscience courses. Advanced students from upper-level courses serve as Peer Teachers and they work with first-year students to master neuroscience content and academic skill sets linked with writing and research, while Peer Mentors focus on broader first-year college survival skills, such as project planning, time management, group collaboration, linked with completion of multiple group projects successfully over the length of a semester. The Lake Forest College Neuroscience Program’s student-centered co-curricular emphasis supports a vibrant student scholar academic culture that has helped attract over 150 students to this discipline in a relatively short time, and it may serve as a model for institutions striving to achieve similar goals.


Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.20SU/CC44

Topic: H.03. Public Awareness of Neuroscience

Support: Wal-Mart

Title: Science after school--way cool!

Authors: *K. S. CURTIS; Dept. Pharmacol & Physiol, Oklahoma State Univ. Ctr. For Hlth. Sci., Tulsa, OK

Abstract: We capitalized on existing community partnerships, and strong institutional and programmatic commitment to deliver a semester-long, graduate-level course that focused on science outreach at a local elementary school. The course had a series of specific goals for both graduate students and 4th graders. For graduate students, the goals were to develop skills at scientific outreach activities through targeted readings and hands-on activities. More specifically, graduate students learned 1) to develop and deliver projects that are age-appropriate, could be completed in a semester, and did not rely on a ‘correct’ answer; 2) to instruct elementary students in laboratory methods and processes, including lab safety, operation of laboratory equipment, record keeping, trouble shooting, data management, and reporting of results; 3) to develop methods to communicate the results of outreach activities with the scientific and
educational communities, as well as with the general public; and 4) to identify and apply for funding sources for outreach activities. For the 4th graders, our goals were to ‘demystify’ science through a series of experiments that addressed dietary salt—from taste perception to the consequences of overconsumption. More specifically, in the course of these experiments, the 4th graders learned 1) the scientific method as a strategy for real-life problem-solving that requires curiosity and thinking skills, rather than years of scientific training; 2) experimental design, operation of laboratory equipment, data collection, and data interpretation, with an emphasis on reading comprehension and mathematics, as well as organization and prioritization; and 3) data presentation as a vehicle for practice with oral and written communication, capped off by an end-of-the-semester poster session which was open to family and friends. This semester-long experience is a novel approach that provided graduate students with hands-on training in developing and delivering science outreach at the elementary school level, while the relationships established with the 4th graders fostered experience with and enthusiasm about science in elementary students.

Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.21SU/CC45

Topic: H.03. Public Awareness of Neuroscience

Support: CAPES

Title: Núcleo de neurociências on brain awareness week of belo horizonte, minas gerais, brazil

Authors: *S. A. NUNES, M. F. D. MORAES, J. C. TAVARES, B. R. SOUZA, A. R. MASSENSINI, G. S. PEREIRA;
Univ. Federal De Minas Gerais, Belo Horizonte, Brazil

Abstract: In Latin America, the principal participants in the Brain Awareness Week (BAW) are Brazil, Argentina, Uruguay and Peru. This year we intended to increase the Minas Gerais Brazilian state participation by organizing several activities. The event was for free and were organized by professors, graduate and undergraduate students from the “Núcleo de Neurociência (NNC)” We offer three different activities, a workshop with four topics: brain structure, myths and facts about the brain, visual illusions, brain functioning and a place dedicated to kids, with several activities. We also promoted a cinema session, named "Popcorn and Neuroscience", where a movie was watched and discussions about Neuroscience were made. The third activity,
named "Controversial Coffee" was an open discussion about the use of animals in science and education. The first day happened in a public space from our University and the principal public was children. About 100 children participated of the activities. The other two days occurred in the “Espaço do Conhecimento”, a space dedicated to knowledge and localized in downtown. During these two days we achieved a very heterogeneous public, which was from approximately 80 people. Next year, we intend to improve and extend the activities offered and also to collect objective data that can help us to quantify the impact of BAW on people's life.


Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.22SU/CC46

Topic: H.03. Public Awareness of Neuroscience

Support: FAPESP

CNPQ

CAPES-PROEX

SBNeC

Title: “SOS: the brain in the park” at the brain awareness week: communicating and teaching neuroscience in Ribeirão Preto - Brazil

Authors: *L. D. GODOY¹, E. H. L. UMEOKA³, N. GARCIA-CAIRASCO¹²;
¹Physiol. Dept., Univ. of Sao Paulo, Ribeirao Preto, Brazil; ²Inst. of Advanced Studies, Univ. of Sao Paulo, Ribeirão Preto, Brazil; ³Neurosci. and Behavioral Sci. Dept., Univ. of São Paulo, Ribeirão Preto, Brazil

Abstract: Located in Ribeirão Preto, with >600,000 inhabitants, the Ribeirão Preto School of Medicine (FMRP) at the University of São Paulo is one of the major Brazilian places for Teaching and Research, due to the excellence of its Under-Graduate/Graduate Programs. With the growing field of Neurosciences dissemination, our School fulfills the Teaching-Research-Extension tripod. To promote Science-Society-Science communication, we at FMRP are positive
that the enhancement in communication between Academia and Society can avoid the establishment of wrong concepts, dogmas and stereotypes; and that scientific processes and critical view in science must take into account cultural aspects, questioning of social problems, research focus, as well as, ethics. Therefore, we take part in events such as the Brain Awareness Week (BAW) promoted by the DANA Foundation for Brain Initiatives. Since 2012, during BAW, efforts of students, professors, artists, biologists, neuroscientists, high school students and teachers are done to promote the Brazilian Brain National Week, officially supported by the Brazilian Society for Neuroscience and Behavior, offering free activities to the general public, with dissemination via press and digital media. Inside-Campus activities were laboratories visits, lectures, Neuroscience-Art workshops and exhibits, held mostly at the Medical School. More importantly, outside-Campus events were held in public parks, high schools and elderly homes. Our activity with greatest impact is called "SOS: The Brain in the Park". It was held all day-long in a downtown historical park. Encompassing community as a whole, audiences of all ages took part into guided recreational hands-on activities involving arts. Moreover, booths were settled to disseminate topics on neurorobotics, stress, stroke, memory, sleep and human brain anatomy. When Science-Society-Science communication is efficient it is followed by scientific production improvement with consequent social development. In our experience, Arts proved to be an extremely successful communication strategy. Therefore, we think that approaches which stimulate curiosity and creativity transform the society stimulating children to pursue science and promoting the removal of misconceptions. BAW represents an essential tool to academia for promoting direct feedback to the community in which it is inserted, thereby enhancing science social role. We estimate that hundreds of people had participated in our events, which seems a great outcome. Due to activities success we are looking forward for the BAW 2016, aiming at a higher social impact.


Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#Poster#: 22.23SU/CC47

Topic: H.03. Public Awareness of Neuroscience

Support: Mellon Foundation Civic Engagement Grant

Title: BrainSTEM: A neuroscience outreach program for high school students
Abstract: Neuroscience is often covered minimally or not at all in the high school (HS) science curriculum. The BrainSTEM program at St. Mary’s College of Maryland (SMCM) was developed to stimulate interest in neuroscience among HS students by engaging them in a series of hands-on, interactive experiences. The BrainSTEM curriculum was developed, implemented, and assessed by nine SMCM students taking a two-semester course sequence, Neuroscience Education and Outreach I & II (NEUR 310 & 311). Goals for the SMCM students in the Outreach course included solidifying their own knowledge of fundamental neuroscience content, developing and testing strategies for engaging pre-college students in neuroscience (via the development and implementation of the BrainSTEM program), and gaining experience in communicating neuroscience material to non-expert audiences. The BrainSTEM program was piloted this year with students from one local high school. Sixteen HS biology students in grades 9-11 participated in the free BrainSTEM program, which consisted of four weekly evening sessions. These 2-hour sessions included a mix of direct instruction (PowerPoint lectures, poster presentations), discussions (case studies), hands-on activities (dissection of sheep brains, construction of candy neurons), and review games (Jeopardy). All of these activities were designed, organized, and implemented by the nine SMCM students. On quantitative assessments given at the end of the BrainSTEM program, HS students reported that the program significantly increased their interest in the brain and nervous system (p < .001), and that they would recommend the program to other students (p < .001). They also reported a significant improvement in their knowledge and understanding of the brain and nervous system as a result of the BrainSTEM program (p < .001). The nine SMCM students who participated in the program as part of the Neuroscience Education and Outreach course overwhelmingly reported a positive and rewarding experience with the course and the BrainSTEM program, and agreed that course objectives were met. They reported increases in their understanding of core neuroscience content and its application; improvement in their ability to communicate scientific ideas; and substantial development of teaching and curriculum planning skills. Future plans for BrainSTEM include expanding the program to offer it to more students from any of the four local high schools.


Theme H Poster

022. Teaching Neuroscience in K-12

Location: Hall A
Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 22.24SU/CC48

Topic: H.03. Public Awareness of Neuroscience

Support: NIH Grant 5R25NS065777
2014 SFN Next Generation Award
NSF REU
NINDS ENDURE

Title: Bridge to Neuroscience Workshop: Taking neuroscience to high school and undergraduate students in Puerto Rico

Authors: *A. COLON-RODRIGUEZ*¹,², E. S. RODRÍGUEZ-TAPIA³, C. T. TIERNAN⁴, W. D. ATCHISON¹,²,³,
¹Pharmacol. and Toxicology, ²Comparative Med. and Integrative Biol., ³Neurosci. Program,

Abstract: Neuroscience as a discipline is rarely covered in educational institutions in Puerto Rico. In an effort to overcome this deficit we developed the Bridge to Neuroscience Workshop (BNW), a full-day hands-on workshop in neuroscience education. BNW was conceived as an auxiliary component of a parent recruitment program called Bridge to the PhD in Neuroscience Program (BPNP). The objectives of BNW are to identify promising students for BPNP, and to increase awareness of neuroscience as a discipline and a career option. BNW introduces basic concepts in neuroscience using a variety of educational techniques, including mini-lectures, interactive discussions, case studies, experimentation, and a sheep brain dissection. In the inaugural year (2011-2012 school year), BNW was presented at two host institutions, Universidad de Puerto Rico-Cayey (UPR-Cayey) and UPR-Arecibo, reaching a total of 75 high school and 75 undergraduate students. During the intervening years, BNW has undergone a series of transformations that continue to improve upon an already successful and influential educational program for underrepresented minorities. As of Spring 2015, we have presented 23 workshops, impacting 167 high school and 402 undergraduate students. In addition to the original host institutions, BNW has now been offered at UPR-Humacao, Pontificia Universidad Católica de Ponce, and Universidad Interamericana de Puerto Rico-Arecibo. In the last year, we have designed a website dedicated to providing information and resources about BNW, which has increased exposure and facilitated the recruitment and registration of participants. Lastly, we have modified our assessment tools to more comprehensively evaluate prior knowledge and how BNW improves student understanding of basic neuroscience concepts. A pre- and post-test was provided to each participant as well as an evaluation sheet. Our results suggest that both high school and undergraduate students have little prior knowledge of neuroscience, and that
participation in BNW improves not only understanding, but also enthusiasm for the discipline. Currently, our assessment has only been able to evaluate short-term effects (e.g. comprehension and learning). However we aim to develop methods capable of determining how participation in BNW impacts future academic and career decisions.

Disclosures: A. Colon-Rodriguez: None. E.S. Rodríguez-Tapia: None. C.T. Tiernan: None. W.D. Atchison: None.

Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.01SA/CC49

Topic: H.02. Teaching of Neuroscience

Support: Quinnipiac University

Title: The 27th northeast under/graduate research organization for neuroscience (NEURON) conference held at Quinnipiac University in Hamden, CT

Authors: *A. J. BETZ*, T. AHERN*, C. FRYE*, S. RASKIN*;

*Psychology, Quinnipiac Univ., Hamden, CT; *State Univ. of New York at Albany, Albany, NY; *Trinity Col., Hartford, CT

Abstract: The 27th NEURON conference was held February 22nd, 2015 at Quinnipiac University’s Center for Medicine, Nursing and Health Sciences. Quinnipiac now hosts the website (www.quinnipiac.edu/neuron) for the NEURON conferences which includes registration, abstract submission, archives of previous talks, resource links and image galleries. The keynote speaker was Dr. Rajita Sinha, Foundations Fund Professor of Psychiatry, Neurobiology and Child Study Center at Yale University School of Medicine. She is also chief of the Psychology Section in Psychiatry, and Deputy Director of Interdisciplinary Research at the Yale Center of Clinical Investigation. She is the Founding Director of the Yale Interdisciplinary Stress Center which was established in 2007 when she led an interdisciplinary group of basic and clinical scientists to set up a NIH Common Fund supporting interdisciplinary research on stress, self-control, addictive behaviors and overeating. Professor Sinha’s talk was titled “Stress in the Brain: Molecules, Neural Circuits and Stress-Related Disorders.” Her own research, with over 200 peer reviewed publications, has made discoveries on stress mechanisms that linking maladaptive behaviors to poor health outcomes. Her work has also developed and validated
novel stress reduction strategies that target these mechanisms. She and her colleagues use molecular, genetic, pharmacological, imaging, and other approaches to link the neurobiology of stress to emotional regulation. At the conference, students and faculty had three workshops to choose from hosted by local and extended faculty with deep expertise in their fields. These workshops included: Careers in Science Panel, Tweaking Brain Cells: Electroporation Techniques and Applications, and Voices in Brain Injury: What Health Care Professionals and Researchers Should Know. The Erskine, Tieman and Frye awards were given to faculty and students to honor their extraordinary talent as teachers and future neuroscientists. In addition, the conference has continued to growth with 96 posters representing 42 different institutions and 8 states. With continued local and regional support from faculty dedicated to student outreach and mentorship, NEURON has continued to expand beyond its original Boston locations to include greater representation from the northeast region.


Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.02SA/CC50

Topic: H.02. Teaching of Neuroscience

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

Authors: *L. A. GABEL1, A. J. STAVNEZER2, J. S. SMITH3;
1Psychology & Program in Neurosci., Lafayette Col., Easton, PA; 2Associate Professor of Psychology, Chair, Neurosci., Col. of Wooster, Wooster, OH; 3The Malcolm and Lois Field Endowed Chair in Hlth. Sciences, Dept. of Hlth. Sci., Saginaw Valley State Univ., University Center, MI

Abstract:
Faculty for Undergraduate Neuroscience (FUN) is the international society devoted to neuroscience education and research at the undergraduate level (www.funfaculty.org). This presentation will provide an overview of our organization, highlighting the work we have done over the past year focusing on undergraduate neuroscience. 1. Since 1992, FUN, in collaboration with its sponsors, has granted travel awards for undergraduate researchers to attend the annual SfN meeting and present their research. We will list the names, sponsors, and the location of the
posters being presented by the 2014 travel award recipients. 2. FUN coordinates an equipment loan program, providing researchers with the opportunity to borrow state of the art equipment from associated vendors. 3. FUN supports the online, peer-reviewed Journal of Undergraduate Neuroscience Education (JUNE), which is devoted to neuroscience instruction and the dissemination of laboratory techniques for use in undergraduate neuroscience curricula and was recently indexed in PubMed. 4. FUN collaborates with Nu Rho Psi, the national honor society in neuroscience. 5. FUN holds a triennial faculty development workshop that brings together educators to develop and share teaching best practices. 6. FUN supports regional undergraduate neuroscience meetings such as “MidBrains”, “SYNAPSE”, “NEURON”, and “mGluRs”. 7. FUN recognizes exceptional accomplishments in neuroscience education, mentorship, and service. 8. Finally, FUN supports communication and networking among its members through our newsletter and listserve. FUN members and others interested in undergraduate neuroscience education are encouraged to attend our annual business meeting and the FUN Social and Poster Session held during the 2015 SfN meeting. The time and location of these events will be listed on the poster. At the FUN Social, well over 100 undergraduate researchers and their mentors will present their work in a poster session. We will also honor the 2015 FUN Student Travel Award winners and sponsors as well as Educator, Mentor, and Service Award winners.

**Disclosures:** L.A. Gabel: None. A.J. Stavnezer: None. J.S. Smith: None.

**Theme H Poster**

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#: 23.03SA/CC51**

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

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

**Authors:** *G. A. MICKLEY*, L. A. BECKER, G. A. COUSENS, E. P. WIERTELAK;

Nu Rho Psi, Spartanburg, SC; Dept. of Psychology, Univ. of Evansville, Evansville, IN; Psychology, Drew Univ., Madison, NJ; Psychology, Macalester Col., Saint Paul, MN

**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 50 chapters across the
United States and over 2500 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. Members may also apply for travel grants to present their research at the annual Society for Neuroscience convention. Nu Rho Psi members participate in a variety of professional development opportunities such as national networking videoconferences and access online resources (e.g., “How-to Guide for Graduate school in Neuroscience”). 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/) or attend our informational session at the FUN booth during the 2015 SfN annual meeting.


Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.04SA/CC52

Topic: H.02. Teaching of Neuroscience

Title: Peer-reviewed and pubmed-listed innovative ideas for neuroscience education: the journal of undergraduate neuroscience education
Authors: *E. P. WIERTELAK*1, B. R. JOHNSON2, G. DUNBAR3;

Abstract: The Journal of Undergraduate Neuroscience Education (JUNE) is the peer-reviewed, PubMed listed electronic journal providing innovative ideas for neuroscience education, published by the Faculty for Undergraduate Neuroscience (FUN). JUNE presents articles in multiple formats, addressing a wide range of topics in undergraduate education, from teaching through resource reviews, to curriculum issues and the place of undergraduate education in SfN. Recent articles on teaching labs highlight innovative teaching methods, often offering a full package that allows readers to replicate the labs at their home institution. Some of these offerings include instructions for using available web resources or graphical computer simulations to support neuroscience instruction, creating a laboratory exercise using dark adaptation and the Purkinje shift, and for using Xenopus tadpoles to teach observational techniques in neuroscience laboratories. Other lab articles suggest modifications in crayfish preparations used to study neuromodulation in axons and synapses, or analysis of resources from the Allan Brain Atlas. JUNE often publishes articles on instrumentation innovations that allow instructors to create good quality, sophisticated instruments inexpensively. Recent articles on classroom teaching detail use of inquiry-based learning to augment outcomes in a lecture course. Other innovative articles describe the benefits of teaching writing in neuroscience courses, discuss the challenges of providing students with adequate laboratory experience in neuroscience, examine trends in undergraduate neuroscience education, and describe outreach programs. Media and book reviews have included timely and thoughtful assessments of textbooks, videos, and web-based resources for both classroom and laboratory teaching. These reviews assist educators in discerning if the resource is appropriate for their course as well as becoming more aware of the resources available. JUNE also has featured interviews with noted figures in neuroscience, discussions of curriculum development, reports on recent conferences, and editorials addressing issues of general concern in undergraduate neuroscience education. JUNE seeks submissions in any of these article formats. Go to www.funjournal.org/ for more details or to read and print articles for free.

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

Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM
Program#/Poster#: 23.05SA/CC53

Topic: H.03. Public Awareness of Neuroscience

Title: Grey Matters Journal: a unique approach to neuroscience outreach and education

Authors: *A. BOSMA-MOODY, L. SELBY;
Univ. of Washington, Seattle, WA

Abstract: Grey Matters Journal is a biannual neuroscience publication founded, produced, and directed by undergraduates primarily at the University of Washington. The journal encourages an interdisciplinary approach to neuroscience outreach and promotes effective communication among students in a variety of science, humanities, and art studies. As an organization, Grey Matters has a two-fold mission: first, to design an innovative neuroscience outreach model that promotes scientific literacy among both students at the undergraduate level and the general public, thus expanding the scientific community; and second, to foster development of professional, collaborative, and communicative skills among undergraduate students from a variety of disciplines. We have found that the coupling of illustrative art and design with challenging scientific concepts in a print publication enhances public interest and understanding of the information presented. Over the last year, Grey Matters has implemented several new approaches to our publication process and outreach model. We have instituted a graduate student review process for submitted articles to ensure accuracy among our published articles and further each author’s scientific development. Additionally, our second annual Evening with Neuroscience, a public outreach event where researchers speak about their work and host audience questions, had large numbers of attendees and very positive feedback. Moving forward, Grey Matters is working to grow the scientific community by fostering inter-institutional collaborations among undergraduate students and formalizing our efforts into an explicit template to serve as a unique, innovative model for neuroscience education and outreach. Our third publication featured an article from a student at the University of California, Los Angeles and we are partnering with students at this institution to develop a branch of Grey Matters on the UCLA campus. In order to realize our goal of growth, Grey Matters must develop a formal template for journal publication so partnerships retain the cohesive and unique nature of our current journal. With the input of authors, editors, artists, and designers, we are working to create an official guide for Grey Matters publications that can be distributed among our pilot partner universities and future collaborators.

Disclosures: A. Bosma-Moody: None. L. Selby: None.

Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media
Title: Students teaching students: Brain Awareness Week as a co-curricular addition to an undergraduate neuroscience program

Authors: *K. M. BARTLOW*\(^1\), H. R. LERNER\(^1\), B. MECHLIN\(^2\);
\(^1\)Biol., \(^3\)Psychology, Earlham Col., Richmond, IN

Abstract: This year, Earlham College began participating in Brain Awareness Week. Our program featured exhibits presented at the campus natural history museum, designed and presented by undergraduates in the Neuroscience program. Prior to the official Brain Awareness Week program, students involved with the Museum Studies program worked with the neuroscience students by offering constructive criticism on the neuroscience exhibits’ structure, and on the students’ communication strategies. Initial surveys of participating neuroscience students, as compared to a group of college year-matched neuroscience and biology majors who did not choose to participate, indicated that participating students had higher initial self-ratings of confidence in public speaking, as well as stronger interests in pursuing careers related to neuroscience and education/outreach (two-way ANOVA with n = 5 per group (see Table 1); p < 0.05 for each significant comparison using Bonferroni post-hoc test). All the neuroscience students who completed the post-event survey (n = 8 of 10 participants) provided positive qualitative feedback. The majority of respondents (75%) stated that participation in Brain Awareness Week improved their abilities in science communication/public speaking. In the future, we will continue to determine the effect of Brain Awareness Week programming on students’ science communication abilities. We will also work on devising strategies to increase participation in Brain Awareness Week among students with less confidence in their public speaking skills, as this program may help students improve their ability to orally communicate neuroscience content.

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Disclosures: K.M. Bartlow: None. H.R. Lerner: None. B. Mechlin: None.

Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.07SA/CC55

Topic: H.02. Teaching of Neuroscience

Title: Simulations of neuronal functioning using MATLAB in 1.5 hour undergraduate labs

Authors: *D. NICHOLS, A. F. GRANT, S. M. SHIELDSD; Psychology Dept., Roanoke Col., Salem, VA
Abstract: A primary utility of computational simulations in a neuroscience laboratory component is the reliability and controllability of the outcome. The current set of laboratory exercises utilize MATLAB and serve as an introduction to computational simulations for undergraduate students. Following along with the structure of the corresponding lecture class, the first lab involved simulations of Hodgkin and Huxley equations to explore action potential generation and firing rates, the second lab used simulations of integrate and fire neurons to explore the effect of single and combined EPSPs and IPSPs, and the third lab involved simulations of Hopfield memory networks to explore robustness of memory networks based on synaptic connections in the face of noise. The 23 students across 2 lab sections worked in groups of 2-3 on a shared computer in the classroom. Student learning was assessed with short pre-post surveys completed during each of the 1.5 hour lab sessions. Each pre-lab survey contained two concept specific questions, such as ‘How well do you understand the concept of different ions influencing parts of action potentials?’, using a scale from 0 (no understanding) to 10 (complete understanding), as well as one consistent tool specific question, such as ‘How comfortable are you with using Matlab — a command line computer programming software language?’ , using a scale from -5 (very uncomfortable) to 5 (very comfortable). In addition to repeating the exact questions in the post survey, changes in learning were assessed by directly asking ‘Please indicate how you feel this lab influenced your understanding/comfort level’ for each question on a scale from -5 (much less) through 0 (no change) to 5 (much more). Pre-post differences in the concept specific question ratings across labs ranged from 0.7 to 1.8 while reported changes in the concept specific levels of understanding ranged from 2.2 to 3.1, which were all significant at p<.02. Pre-survey comfort levels with using MATLAB were not significantly different from 0 for the first lab (-0.8) nor the second lab (0.7) with p>.1, but were for the third lab (2.2) at p<.001. Post-surveys consistently indicated an increase in comfort levels within the labs, though the magnitude of change decreased across labs (differences in ratings of 3.0, 2.3, 1.2; reported changes of 3.6, 3.1, 2.7). All together the surveys indicate that the students found the labs helpful in improving their understanding of the concepts and repeated exposure to labs using MATLAB increased comfort level with the software environment. The replicability and demonstrated effectiveness of the labs encourages their future use and they will be made freely available.

Disclosures: D. Nichols: None. A.F. Grant: None. S.M. Shields: None.

Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.08SA/CC56
**Topic:** H.02. Teaching of Neuroscience

**Support:** TLEF Grant

University of Alberta

**Title:** Web based simulator (Neuromembrane) for teaching neuroscience

**Authors:** *D. W. ALI*, G. FUNK, K. JONES;  
Physiol., Physical Educ. and Recreation, Univ. Alberta, Edmonton, AB, Canada

**Abstract:** We created a web-based simulator to supplement learning in introductory neurobiology courses at the University of Alberta. With this simulator, students (undergraduate and graduate) are able to visualize electrical communication within the nervous system in the form of ion flow across cell membranes. One can adjust cellular, membrane and voltage-gated channel properties to test how these changes affect parameters such as membrane potential, voltage-gated sodium and potassium channel activity and ion flow across the membrane. There are 7 primary “Home” settings for the simulator: a) Resting Potential, b) Action Potential, c) Voltage Clamp, d) I/V Simulation, e) EPSP, f) IPSP, and g) Integration, which can be accessed from the main page. The innovative and unique aspect of the software is the ability to simulate neuronal behavior via a user-friendly, interactive, flexible, graphical interface that allows users to rapidly change parameters and observe consequences. The simulator allows users to upload and download parameters that are set by the instructor so that they can accurately follow along with classroom instruction and assignments. Outputs are generated in the form of PDF documents and can be submitted as part of their classwork or homework assignments. The simulator is used in the classroom during lectures, in labs and in seminars and has been used as a focus for discussion, problem-based learning, and using technology as part of an active-based learning paradigm in a blended-learning environment (employing multiple media and teaching
methods i.e. whiteboard, Powerpoint, video and computer simulation tools).

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

**Theme H Poster**

**023. Teaching Neuroscience to Undergraduates: Simulations and Social Media**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 23.09SA/CC57

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

**Title:** Global learning in neuroscience: Scientific research, student career development and intercultural experiences

**Authors:**  
*M. G. RUSCIO, C. KOREY;*  
Psychology, Col. of Charleston, Charleston, SC

**Abstract:** The growing international and collaborative nature of neuroscience makes it imperative that students have experiences that prepare them to be successful in an international context. Undergraduate students in STEM fields represent one of the largest and most rapidly growing demographics for study abroad enrollment. We believe that the blending of three
elements: scientific knowledge, student career development and intercultural interactions are central to what global learning in neuroscience study abroad programs aim to achieve. Moreover, these are essential skills for the future academic and professional success of our neuroscience students. However, providing a high-quality and rewarding experience without stunting progression through the typically rigorous academic demands for developing neuroscience students presents unique challenges. Here, we provide three examples of incorporating global learning experiences at various academic levels. One example describes a freshmen spring break study abroad experience in Berlin, Germany which introduces the study abroad experience early in a student’s career and sets the stage for later, more extensive opportunities. The second example targets undergraduate upper-level neuroscience students (and related disciplines) through a summer study abroad experience working through the Faculty for Undergraduate Neuroscience. This course provides the opportunity to explore and engage in international neuroscience research in the laboratories and universities at Ludwig-Maximilians University (Munich) and Humboldt University/Charité Medical University (Berlin). The final example addresses an extended research exchange (approximately 3 months) for advanced undergraduates and Master’s level students with two partner institutions in Germany. We will present common challenges to developing successful programs and accurate methods of assessment of global learning skills.

Disclosures: M.G. Ruscio: None. C. Korey: None.

Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.10SA/CC58

Topic: H.02. Teaching of Neuroscience

Title: The potential contribution of IMPULSE to international medical undergraduate education

Authors: K. SASSER¹, R. SLEDGE¹, E. ARTZ¹, H. JOHNSON¹, E. MOORE¹, Z. KAPLAN¹, C. QUICK¹, S. SNOUSE¹, A. VORSTER², *L. JONES¹;
¹Honors Col., Appalachian State Univ., Boone, NC; ²Basic Med. Sci., Univ. of the Free State, Bloemfontein, South Africa

Abstract: University undergraduates in the U.S. interested in neuroscience, whether clinical or scientific, pursue many different majors and co-curricular opportunities. Serving as a reviewer for IMPULSE, a journal designed for undergraduates to publish and review neuroscience work,
is an example of these education enhancements. Internationally, however, most students with an interest in neurological topics are in undergraduate (immediately post-secondary school) medical studies and are consumed by their professional school work, leaving little time to learn about the research enterprise that is the foundation of their practice. However, random students in medical bachelor’s degree programs do join IMPULSE, and, at the University of the Free State (South Africa), faculty have been mentoring a team of neuropsychiatry-focused clinical students for the past five years. Individual students from around the world and the UFS group report that the opportunity to review original research papers and learn how to evaluate neuroscience manuscripts is a valuable addition to their neuro-related career plans. Data from an earlier survey (reported at SfN/FENS in 2013/2014) indicated that 85% of 46 respondents felt the experience improved their own writing skills. Over 75% felt it improved their literature research skills, while 99% felt it improved their article reading skills. Nearly 20% of these students were in M.D. or M.B. programs, while a further 25% were in Ph.D. programs after their IMPULSE time at the time of the survey.


Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.11SA/CC59

Topic: H.02. Teaching of Neuroscience

Title: FraidyRat: A realistic simulation allowing student experiments on the neuroscience of fear conditioning

Authors: *F. B. KRASNE, W. E. GRISHAM;
Dept Psychol, UCLA, Los Angeles, CA

Abstract: FraidyRat is a computer program that allows students to design and do realistic simulated experiments on fear conditioning and its neural bases. FraidyRat emulates many aspects of rodent fear conditioning: cue and context conditioning and extinction, blocking, renewal, consolidation, and other phenomena. The underlying mechanisms incorporate current ideas about actual neural mechanisms of fear conditioning. FraidyRat's behavior can be displayed as both graphs and animations. The cognitive processes and challenges presented to students in formulating hypotheses, designing experiments, and interpreting results are identical
to those that researchers engage in when doing real research. In effect students are doing "real" research, but on an imaginary (virtual) animal. Using a two-dimensional brain atlas, students can stereotaxically implant probes for tract tracing, recording single unit activity, stimulating regions electrically, infusing various drugs, and making lesions. Once students learn to use the program, it is up to instructors how much structure to provide. At UCLA, we usually pose specific questions for analysis, assign background reading, and work out aspects of the neural circuitry together as a class. Subsequently students design their own experiments to answer certain sub-questions and ultimately discern plausible explanations/circuits that can explain the experimental results that they have obtained. The program and student manual are free and can be accessed at https://mdcune.psych.ucla.edu/modules/frat. Faculty wishing the instructor manual, which provides many illustrative simulations and explanations keyed to the student manual, should contact the author at krasne@psych.ucla.edu.

Disclosures:  F.B. Krasne: None.  W.E. Grisham: None.

Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.12SA/CC60

Topic: H.02. Teaching of Neuroscience

Support: Robert H. Foote Fund

Title: Teaching introductory neurobiology online: new approaches to mastering the fundamentals

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

Abstract: Online instruction is a powerful tool for expanding opportunities to teach neuroscience. The foray into online learning is not without risks, however, as students’ needs for personal interaction with instructors and peers are more difficult to meet in the online setting. At Cornell, we have adapted the Department of Neurobiology and Behavior’s Introduction to Neuroscience semester-long core course as a six-week, online course. The mandate was to deliver the entire slate of material-- both lectures and discussion groups on topics included the cellular and molecular basis of cell signaling, neuroanatomy, neurochemistry, neural development, sensory systems, motor systems, decision making, and learning and memory-- in
such a way as to fully prepare students majoring in neurobiology for future courses. Online learning is frequently hampered by students’ difficulty maintaining attention in the absence of the physical cues of the lecture hall. In order to address this challenge, hour-long lectures were restructured into 5 to 7-minute discrete videos, each encapsulating a single topic. Each short lecture was followed by one to three multiple choice quiz questions which students had to answer correctly in order to unlock access to further material; incorrect answers triggered messages directing students to specific passages in the textbook or lectures to review. Discussions involving the entire student group included both face-to-face video chats and moderated message boards. Interactive web tools were used to provide students with opportunities to apply their knowledge and receive instant feedback. At the end of the six weeks, student outcomes were compared to those of students in the traditional semester-long course. We will explore how the tools developed for this online course can be applied to “flipped” in-person courses, in which web content can be integrated with classroom teaching to fully engage students raised in the culture of social media. Through online learning, new populations of students can be reached remotely, and traditional students can have their experience enriched by the adoption of interactive tools for individually tailored instruction.

Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.13SA/CC61

Topic: H.02. Teaching of Neuroscience

Support: Pervasive and Ambient Computing Lab Loyola University Chicago

Title: Mobile app for interactive demonstration of efficient visual and auditory neural codes

Authors: *G. H. MOE¹, M. V. ALBERT², K. LÄUFER², G. K. THIRUVATHUKAL², M. MAKARIOUS¹;
²Computer Sci., ¹Loyola Univ. Chicago, Chicago, IL

Abstract: We have created an Android app that conveniently demonstrates the relationship between efficient visual and auditory coding and the related neural processing in the brain. Our app allows students to select or capture various audiovisual stimuli and derive visual or auditory codes interactively. These codes can be directly compared to physiological receptive fields in
both modalities. Although the mathematical details of sparse or independent coding may be too technical for most audiences, the fact that a simple coding strategy can explain both visual and auditory processing is a fundamental insight from computational neuroscience. Understanding the 2D Gabor-like visual cortex simple cell responses as an efficient coding of natural scenes has been thoroughly studied. The user can capture pictures or select sample natural scenes to derive a visual code using independent component analysis (ICA) on randomly sampled pixel patches. The resulting linear filters are readily visualized as receptive fields. Similarly in the auditory domain, we provide environmental sounds, human speech, and harmonic animal vocalizations as input to generate gammatone filters; these filters resemble the response properties of neurons that make up on auditory nerve. Users can also record their own sounds and observe the effects on a receptive field representation of the resulting filters. This app is an interactive demonstration of how the same computation (in this case, ICA) can be used to explain the response properties of neurons in both visual and auditory processing. Most importantly, this app motivates students by using camera and microphone inputs to create educational and entertaining results — encouraging future students to consider the benefits of a computational approach to neuroscience.

**Disclosures:** G.H. Moe: None. M.V. Albert: None. K. Läufer: None. G.K. Thiruvathukal: None. M. Makarious: None.

**Theme H Poster**

023. **Teaching Neuroscience to Undergraduates: Simulations and Social Media**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 23.14SA/CC62

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

**Support:** NSF Grant IOS 1054914

**Title:** Computational neuroscience course projects - a high-impact teaching and learning approach

**Authors:** *S. OPRISAN;
Physics & Astronomy, Col. of Charleston, Charleston, SC

**Abstract:** Teaching undergraduate-level computational neuroscience is challenging mostly due to the breadth of prerequisites that include introductory biology, physics, mathematics, and computer science (at the very minimum). While we have exceptionally well-trained
undergraduates in the respective disciplines, there are only very few who cross the boundaries of their disciplines. At the same time, all educators emphasize that scientific progress emerges from the interdisciplinary interaction of researchers with diverse backgrounds who can effectively communicate with each other. In our biophysical modeling of excitable cells course, we introduced interdisciplinary research projects and assign mixed teams of physics and biology undergraduates with complementary backgrounds to facilitate discovery and learning. We showcase a few high-impact class projects that enhance team work and effective collaboration. For example, one team investigated the accuracy of photoreceptors implementation in the physiologist's friend chip developed by Tobi Delbruck at the Institute of Neuroinformatics in Zurich. The carried our experimental measurement and found that photoreceptors on the chip use temporal coding in addition amplitude for stimuli with the same duration but different contrast.

Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.15SA/CC63

Topic: H.02. Teaching of Neuroscience

Title: Pencil-and-paper neural networks: an undergraduate laboratory exercise in computational neuroscience

Authors: *J. A. WESTERBERG*¹, E. N. SUTTER¹, K. M. CRISP²;
²Biol., ¹St. Olaf Col., Northfield, MN

Abstract: Undergraduate neuroscientists struggle to understand and articulate the connections between cellular processes governing synaptic integration and excitability, and the higher-level cognitive processes of the brain. McCulloch and Pitts (1943) proposed a simple but computationally powerful model of a neuron as a binary threshold unit that can be used to bridge the divide between cellular processes and high-level computation. We have created a set of laboratory exercises in which students “train” neural networks using simple correlation matrices on paper. The model, based on the formalism by McNaughton and Morris (1987), allows students to teach the network associations between binary patterns. To assess learning due to this paper-and-pencil nerve net activity, students were given two ten-minute writing exercises. The pre-test writing exercise was conducted in class the day prior to the lab activity, immediately after a 10-minute introduction to the concept of the McCulloch-Pitts neuron model. The post-test writing exercise was conducted in class on the day following the lab activity. Students’ responses
were digitalized for quantitative analysis of word counts and frequency of term use, as well as for qualitative assessment of learning. The responses to the writing exercises were analyzed to evaluate the following learning outcomes: after the activity, students should have been able to use terms and concepts from neural network theory to discuss (1) how the brain extracts meaningful information from noisy inputs, (2) how the brain uses prior learning to complete information when presented with a partial cue, and (3) why the brain struggles to form correct associations among stimuli that are closely related. Overall, the change in the students’ use of language use in their responses suggests a transition from simply describing the phenomena illustrated by the example to explanations of a more mechanistic nature.

Disclosures: J.A. Westerberg: None. E.N. Sutter: None. K.M. Crisp: None.

Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.16SA/CC64

Topic: H.02. Teaching of Neuroscience

Support: NSF RCN-UBE Project #1344208

Title: Science Case Network: Creating a working group for case studies in neuroscience

Authors: *L. A. ROESCH, K. FRENZEL; Neurosci. & Behavioral Biol. Program, Emory Univ., Atlanta, GA

Abstract: Recent reports have highlighted our need to incorporate more active learning into our undergraduate teaching in order to best prepare and train our students for careers in science. Teaching with case studies is one mechanism for actively engaging students in the classroom, however there is a demand for more cases that emphasize neuroscience concepts. To meet that need, we recruited 20 undergraduate neuroscience faculty and, over the course of an academic year, guided the group in creating a set of new cases specific for topics in neuroscience. We met monthly via video chat to discuss issues in writing, implementing and assessing the case studies. By May 2015, the group had created nine new of cases in various stages of completeness. Participants all responded favorably to the workshop structure but also disclosed that the major barrier to participation was finding time for curriculum development. Future goals the group include continuing to implement these new cases in the classroom, publication of final cases to
the larger neuroscience community and possibly creating a national network devoted to creating case studies for teaching neuroscience.

Disclosures: L.A. Roesch: None. K. Frenzel: None.

Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.17SA/CC65

Topic: H.02. Teaching of Neuroscience

Title: Social Media: Creating a community online to enhance learning neuroscience in the classroom

Authors: *M. H. RAY;
Psychology, Alverno Col., Milwaukee, WI

Abstract: There is no question that the internet provides an abundant amount of information readily available to our students about the field of neuroscience. Some of the sources are creditable and reliable, but most are not. The internet, through social media, can provide our students with access to reputable scientific communities. Rheingold (2012) discussed the benefits of online collaborative communities to broaden our minds, as well as help us develop a skeptical approach to evaluating information. An introductory neuroscience course is an ideal place to introduce social media to students as a way to pursue career goals in the field of neuroscience and develop skeptical approaches to evaluating information about brain function. Social media also provides the opportunity to connect students to information outside of their specialties by engaging with fields such as English, history, education, communication, nursing, and biology. Connecting our students to these social media networks allows them to develop the multidisciplinary approaches they will need to be competitive in the market place. In both undergraduate and graduate courses, students learned to use online tools (such as, Google Blogs, Tweeter, Facebook) to create online communities. Because students are online, their work can be easily available to other faculty and students to review and share and provided an open forum to exchange ideas. I will discuss how establishing online communities can help develop resources to engage students in using social media as a professional network. I will also demonstrate several online tools that I have used successfully and discuss their implications at both the graduate and undergraduate levels.

**Disclosures:** M.H. Ray: None.

**Theme H Poster**

**023. Teaching Neuroscience to Undergraduates: Simulations and Social Media**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 23.18SA/CC66

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

**Title:** Encountering the "crisis of replicability" with undergraduates

**Authors:** *J. WONG¹, W. GRISHAM², A. ELIAZ³, S. JIANG², S. KU⁴, M. NELSON⁴, C. TSAI², M. GEARY², K. J. SCHAFF⁵;
²Dept. of Psychology, ³Interdepartmental Program in Neurosci., ⁴Dept. of Mathematics, ⁵Grad. Sch. of Educ. and Information Studies, ¹UCLA, Los Angeles, CA

**Abstract:** UCLA undergrads attempted to replicate published findings examining the hippocampus, amygdala, and whole brain in four different diagnostic groups of pediatric patients (Frazier et al. 2008). They utilized FSL on T1 MRI images of human brains obtained from CANDI Share via the Neuroinformatics Tools & Resources Clearing house (NITRC). Students analyzed volume differences examining the variables of sex, side, and diagnostic groups: bipolar disorder with psychosis, bipolar disorder without psychosis, schizophrenia, and healthy controls. Students used a variety of analytical techniques to examine the data. Students normalized the data as a proportion of the average brain. These normalized data and the raw data were used in a three-way analysis of variance (ANOVA) for three independent variables: diagnostic group, sex, and side. Raw scores were additionally analyzed using an ANCOVA, which covaried for age and brain size. The data yielded somewhat different answers depending on the analyses applied to them. Frazier et al. found a trend for a diagnostic group-by-sex difference in the left hippocampus. In contrast, the students’ ANOVA and ANCOVA on the hippocampal volume data revealed a main effect of subject diagnosis, a significant difference due to side, and an interaction between side and sex. Normalizing the data set for the average brain size yielded the same pattern as the raw scores in an ANOVA. In the amygdala, Frazier et al. found a diagnostic group-by-sex interaction in the left amygdala. In contrast, students’ analyses of raw or normalized amygdala data with an ANOVA revealed a significant effect of side and a significant effect of diagnostic category. In an ANCOVA, covarying age and brain size yielded no significant effects for any factor on amygdala volume. Frazier et al. found a sex difference in the size of the cerebrum. UCLA students similarly found a sex difference in the size of the whole...
brain but also found a difference in brain size due to diagnostic category. There were marked differences between our analyses and Frazier et al.’s. First, we used FSL to segment the brain regions whereas Frazier et al. used hand segmentation. Further, for reasons of expediency, we co-varied the size of the entire brain, including the cerebellum, whereas Frazier et al. used the cerebrum. The lesson may be that the so-called “crisis in replication” may be that applying different analyses and correction factors can yield a markedly different pattern of results.


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**Theme H Poster**

**023. Teaching Neuroscience to Undergraduates: Simulations and Social Media**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 23.19SA/CC67

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

**Support:** UCSD Neurosciences Graduate Program Support

San Diego SfN Grant

**Title:** NeuWriteSD: Using the group blog format to approach science communication in novel ways

**Authors:** *C. P. PROFACI, M. SAPIURKA, A. L. JUAVINETT; UCSD, La Jolla, CA

**Abstract:** Scientists are increasingly being called upon to communicate their work to the public, and Twitter, Facebook and blogging platforms have become key interfaces between scientists and the general population. However, scientists often lack training in the art of distilling their work to its most basic tenets and presenting it without scientific jargon. NeuWriteSD—a branch of the NeuWrite science communication organization—aims to change that trend. The organization is run entirely by a group of graduate students devoted to improving their own non-scientific writing skills while spreading their excitement for the inner workings of the human brain. In addition to writing blog-style posts on various topics and issues in neuroscience, members of the group have written short stories, collaborative fiction pieces, book reviews and interviews, all for a general audience. Members have also met with freelance writers, journalists, and public figures such as Alan Alda to discuss how to develop their communication skills and
most effectively share their writings. In addition to strengthening writing skills, participation in NeuWriteSD has allowed students to explore new and creative methods of communicating science to the public and ways to incorporate these skills into their future career goals. Given the ease of setting up a website, NeuWriteSD could serve as a model for other graduate programs to emulate, or could even expand to include undergraduate or high school students interested in science or science writing as a career.


Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.20SA/CC68

Topic: H.03. Public Awareness of Neuroscience

Support: HL112350

Title: Using social media as a neuroscience outreach and recruiting tool

Authors: A. DAGNER, *A. J. GRIPPO;
Dept of Psychology, Northern Illinois Univ., Dekalb, IL

Abstract: Many resources seek to bridge the gap between researchers and the public. Websites such as Time.com and CNN.com explain research in everyday terms, and many websites summarize a variety of research topics (e.g., Society for Neuroscience, National Sleep Foundation, National Institutes of Health). Another online venue that researchers can use to reach the public is Facebook, which is used by 1.3 billion people worldwide. We created a profile for our laboratory (Facebook profile name “Gripp Laboatory, Northern Illinois University”) as a strategy to reach both prospective students and the public with information about (a) our research projects and those similar to ours; (b) local colloquia, conferences, and other relevant events; and (c) general information about science and health written in an accessible manner. Currently we have 211 followers on our Facebook page, and we have recruited several students to our laboratory via the page. In addition, understanding what people read most on our page can inform strategies for reaching more people. Data were analyzed from 2011-2014 to determine which months had the most activity, and what type of posts had the most traffic (i.e., likes and comments). Although there were fewer posts in 2014 than in 2011, 2014 had more likes and comments per post than in 2011. The four highest traffic months on average
were December, May, April, and August (in descending order). The four highest traffic post categories were (a) Grippo Laboratory Member Recognition (accomplishments of laboratory students and trainees); (b) Conferences (summaries and pictures from local events); (c) Awesome Science album posts (summaries of scientific research); and Lab Member of the Month album posts (Grippo Laboratory member biographies). These data suggest that followers are particularly interested in posts that feature our lab and lab members, as well as summaries of interesting scientific information. Suggestions for future public outreach include featuring personal-interest stories about laboratory students, events, and activities; as well as tagging more people so that friends and family can be a part of the conversation. Additional items describing scientific research in language that is accessible to the public would also be advantageous. The use of social media is a valuable strategy for interacting with the public and recruiting students for training in neuroscience.

**Disclosures:** A. Dagner: None. A.J. Grippo: C. Other Research Support (receipt of drugs, supplies, equipment or other in-kind support); NIH.

**Theme H Poster**

**023. Teaching Neuroscience to Undergraduates: Simulations and Social Media**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 23.21SA/CC69

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

**Support:** BICA Society

**Title:** MAPPED repository: A comparative database of biologically inspired cognitive architectures (BICA)

**Authors:** *A. V. SAMSONOVICH*¹, C. LEBIERE², F. E. RITTER³;

**Abstract:** The disconnect between scientific schools of thought across the world is most notable in cognitive, neural, and computer sciences. The intersection of these fields is exactly where a powerful new approach has emerged recently, known as BICA. Several years ago, the BICA Society started a new initiative: to build an international community of researchers unified by the BICA Challenge - to create a computational replica of the human mind using solutions inspired by the brain. One of the key elements of the roadmap is a public online repository developed by
collective efforts. We call it the MAPPED repository (http://bicasociety.org/mapped), named by the following six components: Models, Architectures, People, Paradigms, Evaluations, and Dialogues. Here, Models are task-specific and are represented by research papers, code, archived presentations, reports, manuals, and other documentation. Architectures are task-independent and are formulated computationally, at any level: from algorithms and pseudocode to software packages, APIs, and online tools. People include the researchers and developers who are related or potentially related to particular BICA modeling approaches. Paradigms include methodology, tests, challenges, decathlons, testbeds, simulation environments, settings and procedures, research questions, hypotheses and predictions, measures, scales and metrics, measuring tools, evaluation protocols, statistical analysis methods, and visualization tools. Evaluations include empirical and analytic data resulting from tests, analyses, and comparisons of models to each other. Dialogues among research groups and schools of thought have been initiated and facilitated by the BICA Society and are archived in the repository in various forms, documenting peer-to-peer interactions among developer groups who disagree on terminology, interpretation of results, values and priorities for research, or are missing facts and knowledge that they want to learn from each other. Forms of dialogues include teleconferences, Wiki pages, webinars and Videopanels (http://bicasociety.org/videos/vp.html), discussion boards and workshops. Each BICA is mapped to these six components, and vice versa; therefore, the repository represents cognitive architectures and models in a universal format, facilitating comparison and learning of models. We encourage all BICA researchers to support us and contribute their materials and efforts to this initiative. Contact points include the authors and those who deserve credit for the idea and its implementation: Drs. Terrence C. Stewart, Antonio Chella, Kamilla Johannsdottir, Frank Ritter, and many others.


Theme H Poster

023. Teaching Neuroscience to Undergraduates: Simulations and Social Media

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 23.22SA/CC70

Topic: H.03. Public Awareness of Neuroscience

Support: Fund from Shanghai Municipal Health Bureau ZK2012A06

Fund from Shanghai Municipal Health Bureau XBR2013089

Title: Application of intelligent mobile terminal in cancer-pain management
Authors: *F. JIANG*¹, G. DING²;
¹Xinhua Hosp. Affiliated To Shanghai Jiao Tong U, Shanghai, China; ²Translational Institute for Cancer Pain, Xinhua Hosp. Affiliated To Shanghai Jiao Tong Univ. Sch. of Med., Shanghai, China

Abstract: Objective: The intelligent mobile terminals are very popular in all age groups. Whether this kind of devices with real-time self-assessment function could be used as a follow-up tool in the management of patients? This study was designed to evaluate the application efficacy of intelligent application program in the management of cancer-pain.

Methods: 120 patients with cancer pain symptom were randomly assigned into two groups (trial and control groups). For the trial group, intelligent application program was used to collect the data about cancer pain assessment, whereas the conventional methods were used for control group to follow-up. Results: During the 90 days’ follow-up, for the trial group, pain controlled days were 49.73 ± 2.54, which was significantly longer than that (37.00 ± 2.33) for the control group (p< 0.001). Moreover, the frequency of daily breakthrough pain was 2.98 ± 0.13 times for the trial group, which was significantly lower than that (4.10 ± 0.11) for the control group (p< 0.001). Conclusion: The whole range management of cancer-pain based on intelligent devise is conducive to better management of cancer-pain.

Disclosures: F. Jiang: None. G. Ding: None.

Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.01SA/CC71

Topic: H.02. Teaching of Neuroscience

Support: NSF IIS-1065489

NSF DMS-1010434

NIH 1R56NS087249-01A1

Title: Providing an ecologically balanced environment for maintaining the marine mollusc *Aplysia californica*, a model system for teaching electrophysiology

Authors: C. E. KEHL¹, *D. LYTTLE², H. CHIEL¹;
¹Biol., ²Biology, Mathematics, Case Western Reserve Univ., Cleveland, OH
Abstract: Over the last five decades, the marine mollusc *Aplysia californica* has served as a model system for analyzing the cellular and molecular mechanisms of learning, memory, and motivated behavior. During this time, *Aplysia* has regularly been used as a model system for teaching electrophysiology because of its large, pigmented, and readily identifiable neurons. One difficulty of using *Aplysia* for this purpose is that it is sometimes difficult to maintain the animals for long periods of time in good health, and it is also challenging to keep their tanks clean. How can one develop an environment for *Aplysia* that will keep them in good health while reducing the high maintenance costs of the animals? We have constructed a marine animal facility for *Aplysia californica* which attempts to mimic many of the ecological characteristics found in their natural environment, thereby increasing their robustness and reducing the need for human intervention. Macroalgae (e.g., kelp, gracilaria, sea grapes) is grown both in refugia and in the main holding tanks for the animals. This allows the macroalgae to sequester toxic nitrates, provides a recreational substrate similar to that of *Aplysia* in the wild, and provides fresh supplemental nutrition, increasing the health of our animals. In addition, an assortment of other molluscs and crustaceans (e.g., black turban snails and hermit crabs) eat algae or detritus, helping keep the tanks clean. In general, this creates a more chemically stable and healthy environment for our animals with less overall water usage, lower requirements for outside food, and less need for water changes and tank cleaning. Animals kept in these enriched environments remain healthy for many weeks, far longer than they did previously.


Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.02SA/CC72

Topic: H.02. Teaching of Neuroscience

Support: Albion College FURSCA and FDC

Title: An inexpensive and easily constructed running wheel for earthworms

Authors: *W. J. WILSON*, B. A. JOHNSON, M. M. WICKENS;
Psychological Sci., Albion Coll, Albion, MI

Abstract: Ever since Darwin, behavioral scientists have studied earthworms. Their low cost and easy availability make them valuable to high school or college psychology and neuroscience
courses. Responses have often been noted via visual observation. An alternative is to automate the recording of responses; some (Burns 2009, Marian 1982, McManus 1978) have used running wheels as a viable approach. We describe a running wheel based on easily available materials that has served us in laboratory-based courses in behavioral neuroscience, and in research on learning. We detail its construction, and provide data from studies examining escape learning (and the role of NMDA receptors) and circadian activity. The figure shows an exploded view of our wheel. It consists of a flying plastic disk (A) with a hole drilled in its center and a T-nut (B) glued to its exterior around the hole. A washer (C) is placed opposite the T-nut base and a machine bolt (D) is inserted through the washer and threaded tightly into the T-nut. The T-nut-bolt assembly is inserted into a skate bearing (E) that is pressed into a skate wheel (F). The wheel is snug-mounted in a hole drilled through a board (G); another bearing is mounted in the opposite side of the wheel. The machine bolt extends through this bearing. A nut (H) is tightened onto the machine bolt, securing it to the center portion of the second bearing. Configured in this manner the running wheel turns freely secured to the center of the bearings, while the skate wheel holding the bearings is secured to the wooden support. Rare earth (neodymium) magnets (I) are glued at eight evenly-spaced locations around the wheel, on the wheel's interior. Magnetic reed switches (J) are secured to the wooden base such that a single magnet closes each switch in turn before the next magnet reaches the first of the switches; this allows small movements of the wheel to be detected. The earthworm is inserted into a piece of vinyl tubing (K) cut to fit snugly inside the rim of the disk, and secured with transparent tape. Two spring-loaded binder clips (L) are used to balance the wheel (with the tube in place).


Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM
**Program#/Poster#:** 24.03SA/CC73

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

**Support:** Northeastern University Center for Advancing Teaching and Learning through Research

**Title:** From slices to loaf: Teaching neuroanatomical spatial relations by assembling structures within student segmented brain slices into 3D printed models

**Authors:** *R. W. SIKES, A. M. MARKOWSKI;
Physical Therapy, Movement and Rehabil. Sci., Northeastern Univ., Boston, MA

**Abstract:** Starting perhaps with the first brain sliced by Vesalius in the 1500s, students of anatomy have struggled identifying brain structures seen within cross-sections and understanding the three-dimensional (3D) shape and relative positions of the structures. In particular, the ventricular system, fiber pathways and brainstem nuclei are especially perplexing for students to learn and instructors to teach. Understanding anatomy based cross-sections has become increasingly important to neuroscientists and clinicians alike due to increasing use of magnetic resonance images (MRIs) and other brain imaging methods. Working with physical therapy students in their capstone project, we have developed a process that allows students with minimal training in computer-aided design (CAD) to segment (outline) brain structures in MRIs or brain slices using readily available CAD software. Furthermore they are able to 3D print these model inexpensively. Using this process our students segmented the ventricles from MRIs of normal and hydrocephalic brains. Their outlines were stacked into a virtual 3D rotatable model using AutoCAD software, which provides and extensible platform for merging the segments. This model is then 3D printed at the Northeastern University 3D Printing Lab. The process of segmenting the ventricles, students reported, improved their ability to identify the ventricles at each level of the nervous system and the 3D model helped them to see how the segments all fit together. These models also enhanced their understanding of ventricle pathology. Furthermore, our students evaluated this process by performing a pilot study (n=6) where volunteer classmates reconstructing the femur from MRIs. These models compared very well to a model constructed by experts. It was shown that this process could be generalized to other students and very different structures. Building on this pilot we are conducting a study this summer with a larger cohort (~100) who will segment key nuclei and tracts within the brainstem. Using a crowdsourcing approach, multiple students will outline the nuclei and tracts. Based on the pilot we hypothesize that the resulting models will produce an accurate 3D representation of these structures and improve performance on exams.

**Disclosures:** **R.W. Sikes:** None. **A.M. Markowski:** None.
SoLoArc: A free-field, multisensory localization tool for scientific inquiry in undergraduate education

Authors: J. A. WESTERBERG¹, A. R. BALHORN², R. S. TYSHYNSKY², *J. L. LOEBACH³;
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Abstract: Sound localization is often demonstrated in undergraduate classrooms using synthetic ITD and ILD cues presented via stereo headphones. Such an approach only tests localization in the azimuth, neglects elevation, and is highly artificial. We have developed a free-field audiovisual stimulus presentation device to engage undergraduate students in developing research skills while also exploring concepts in sensory neuroscience. Beginning as student-driven independent research project in a Cellular & Molecular Neuroscience course, the SoLoArc (SOund LOcalization Arc) is the result of a collaborative effort between students and faculty, and will be used as an instructional aide, and for student and faculty research. This project is the culmination of a successful teaching protocol (a two-semester design and build) coupled with the passion of a group of undergraduates. One approach to creating experimental devices is to commission them, leaving the design and construction up to the shop personnel. Our approach put it in the hands of the students, who were closely supervised and mentored by faculty. The eight-month build provided experience in experimental apparatus design, engineering, and fabrication. While such a pedagogical approach is often overlooked in the undergraduate curriculum, it can be an important part of teaching the scientific process. The SoLoArc is a 180° arc-shaped structure with a 4' internal radius. The interior surface of the arc has speakers placed at 5° intervals, allowing sound to be delivered from 180° in 5° increments. Lights are placed adjacent to the speakers at 2.5° intervals. Each speaker and light can be controlled independently via MatLAB. A participant, seated at the center of the arc, responds to the location of the stimulus by pointing a laser at a series of markers on the face of the device. The device may be oriented to test azimuth, front/back, or elevation localization. The SoLoArc has already been used as a teaching tool in the Sensation and Perception course, in which
students learn the physiological, neural, cognitive, and behavioral underpinnings of the senses. In the Sound Localization Lab, students compared stereo headphone sound localization to free-field localization with the SoLoArc in the azimuth to gain a practical understanding of spatial hearing. Preliminary testing of the SoLoArc reveals that it produces comparable results to sound localization apparatus utilized in professional labs and published papers. Ongoing research in the laboratory will test the effects of the pinnae shape, stimulus frequency, and amplitude on sound localization.

**Disclosures:** J.A. Westerberg: None. J.L. Loebach: None. A.R. Balhorn: None. R.S. Tyshynsky: None.

**Theme H Poster**

**024. Teaching Neuroscience to Undergraduates: Courses and Programs**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 24.05SA/CC75

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

**Support:** DIB

Universidad Nacional de Colombia

**Title:** Mechatronic engineering working for neuroscience. Olfactory event-related potentials

**Authors:** *M. J. ROJAS*¹, F. LEON²;

¹Salud Animal, ²Univ. Nacional Colombia, Bogota, Colombia

**Abstract:** In the literature there are no reports of olfactory evoked potentials nor olfactory event-related potentials (OERP), recorded from awake dogs under conditions of free movement. We have developed a system to register canine olfactory event-related potentials. A microcontroller PIC16F88 works for an oscillator, a power supply, and an activation circuit. Also, on a print-circuit board (PCB) have been installed the connectors for the sensors, a power supply, a solenoid, and the knobs for the use of the trimmers and a button to reset function. A piezoelectric sensor RC filter attached around the thorax of the dog by a Velcro belt generates a signal corresponding to the ventilatory movements; the resulting signal in the range of millivolts (mV) is read by the microcontroller. One trimmer with its respective controller knob sets up the activation threshold between 10 and 60 mV, and another one allows to setup the opening time for the electro-valve between 0 to 500 mS. The device receives continuously the analog signal
delivered by the piezoelectric sensor and compares it to the potentiometer setup in order to triggers the opening of the electro-valve, while the physiograph is recording the cortical electroencephalogram (EEG). The electro-valve controls the delivery of the olfactory stimuli from a small chamber connected to the air flow up to a cone placed right in front to the nose of the dog. EEG recording epochs of 1 S where averaged after stimulation with air, a commercial dog’s food sample, and isoflurane, respectively. The latency and amplitude for the first, and second peak of the OERP were: Commercial dog’s food (P1: 66.0 mS, 5.52 uV; P2: 277 mS, 25.23 uV), isoflurane (P1: 93.0 mS, 22.54 uV; P2: 552 mS, 39.28 uV). Our system device attached to a physiograph showed to be suitable for recording OERP from dogs.

Disclosures: M.J. Rojas: None. F. Leon: None.

Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.06SA/CC76

Topic: H.02. Teaching of Neuroscience

Support: University of Toronto Psychology Department

Title: Student dissociation of data in articles from those in textbooks

Authors: *S. WOOD;
Psychology, Univ. of Toronto, Toronto, ON, Canada

Abstract: Analysis of primary literature was integrated into a third-year undergraduate course that focuses on neurotransmitters and behavior. Roughly half of class time was spent discussing journal articles and half was devoted to lecture. The first article discussed contained data that had been used for a figure in the course’s required textbook. This was chosen as the first article specifically so students could better understand how data from textbooks are generated. The remaining articles were directly related to the lecture topics, but described data outside of what was covered in the textbook. The students were told that the midterm would consist of roughly 50% material from articles and 50% from lectures and textbook readings. In fact, the midterm had slightly fewer questions about the articles. In the class following the midterm, anonymous informal feedback was solicited from students in order to address any potential concerns, mid-semester. Students were asked to write responses to open-ended prompts regarding the midterm exam, format of in-class paper discussions, and the class, in general. Interestingly, although
discussing the proportion of article to lecture questions on the midterm was not prompted, 19 of 40 students spontaneously stated the false belief that the midterm consisted of more questions about articles than about lectures. In addition, most students appreciated the time spent on discussing articles in class, with one student pointing out that it was a helpful skill for other classes. A small number of students did not understand why class time was devoted to articles, as they thought class content was more important and separate from the articles. Reading primary literature is a key component for undergraduate Psychology and Neuroscience majors. The comments provided from informal student feedback suggest that the students in this course generally separate data found in articles from data found in textbooks. It is possible that these students believe textbook information to be true and testable, while data from articles are less critical in their understanding of the fundamentals of this field. However, students also expressed a general appreciation for discussing articles, in-class, as they found articles difficult to understand without guidance. While reading an article that provided data for a textbook figure seemed to be a valid, educational exercise, further should be done to help students make the connection between journal articles and textbook content.

Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.07SA/CC77

Topic: H.02. Teaching of Neuroscience

Support: UNC Center for Faculty Excellence

Title: Teaching undergraduate students how to "think like a neuroscientist" using a flipped classroom approach

Authors: *M. R. PENNER, K. S. GIOVANELLO;
Psychology Dept., Univ. of North Carolina, Chapel Hill, NC

Abstract: In the traditional lecture format class, the instructor typically functions as the primary disseminator of information. This traditional model for teaching has evolved, with more emphasis placed on active learning strategies and ‘flipped classrooms’ that shift instruction to a learner-centered model. In large college science classes, active learning strategies and structured learner-centered formats have been shown to improve learning outcomes for all students, especially first generation and minority students. Here, we describe a re-designed undergraduate class “Introduction to Neuroscience” offered at the University of North Carolina-Chapel Hill,
that has shifted from a traditional lecture class to a structured learner-centered class using on-line video instruction, and small group work within the classroom. The class enrolls 200-300 students, many of whom have a limited science background. To promote learning and scientific inquiry, structured assignments and activities were designed to help students "think like a neuroscientist" as they formulate questions, and design experiments aimed at answering these questions. The most exciting component of the course re-design is the use of an on-line video textbook of research methods used in neuroscience labs on campus. Essentially, the video textbook is like a virtual laboratory tour, focusing on how neuroscience gets done. These short videos (3-5 minutes) present a simple experiment, step-by-step, as it is performed in the laboratory. Next, a distinguished neuroscientist that uses similar methods to those in the instructional video presents some real data to the class. Finally, working within the classroom in small groups, students are prompted to design their own experiments. In addition to learning about neuroscience, students can appreciate how research gets done. This component of the class has many advantages for students. It is clear from previous offerings of this class that it’s difficult for students to really engage with data without having a solid understanding of how the data was collected. The approach described here aims to take the mystery out of the process, while also engaging students to "think like a neuroscientist" by designing their own experiments in a structured and supportive learning environment.

Disclosures:  M.R. Penner: None.  K.S. Giovanello: None.
face-to-face components. Studies of hybrid courses show similar student outcomes to entirely face-to-face courses. The question is, what course content is best handled online and what should be part of the face-to-face interaction? A “flipped classroom” approach is one answer. This teaching technique shifts the introduction or first exposure to learning topics outside the classroom so that class time can be spent exploring the topics in greater detail. There are a number of excellent online resources for providing students with a basic working knowledge of action potential generation for example. Then class time could be spent discussing the unique structure of voltage-gated sodium channels that facilitates action potential propagation, for instance. I have applied this approach to teaching both majors and non-majors neuroscience courses with and without accompanying labs and found it to be successful.

**Theme H Poster**

**024. Teaching Neuroscience to Undergraduates: Courses and Programs**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 24.09SA/DD1

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

**Title:** Active-learning through the incorporation of research into an introductory course: Strategies and challenges

**Authors:** J. M. OMELIAN, *S. I. SOLLARS;
Univ. of Nebraska at Omaha, Omaha, NE

**Abstract:** College courses that incorporate active learning are known to facilitate student understanding and retention of course material. As part of the educational experience for entry-level students at the University of Nebraska at Omaha, a mandatory introductory psychology course is linked with an active-learning research laboratory course. While only psychology majors are required to take the classes, they fit into the curriculum for other majors such as neuroscience, criminal justice, and general studies. For the past several years, students in the laboratory component of the course worked with live rats on operant conditioning procedures using automated Skinner boxes. During twice-weekly laboratory sessions, students progressed through six predetermined exercises with their rat, covering various aspects of operant conditioning, such as variable reinforcement, shaping and extinction. This novel course gave students access to skills such as animal handling, data collection, maintaining a laboratory book, and writing a laboratory report in APA style. It also facilitated training and discussions of the ethical considerations associated with research, and exposed students to the practical
requirements (e.g., patience and commitment) of scientific work. While the substantial advantages of the laboratory for enhancement of student learning were apparent, the lecture component contains a greater breadth of information across several areas of psychology other than learning theory. To address this issue, we decided to revise the course into a series of four modules. The new laboratory course has a broader scope, with focus areas mirroring the lecture material in human physiology, social behavior, cognition, and learning. Each module includes class time devoted to background and literature, training, experimentation, data collection, statistical analysis, and reporting. The aim of this revision is to continue to give students experience with research while simultaneously reinforcing a wider array of the concepts students are expected to master as a psychology or neuroscience major. University assessment measures in ethics training, writing, and critical analysis are inherent to the modules. While the new laboratory will no longer include work with a vertebrate animal model, we anticipate that students will continue to report gains in understanding of course materials, appreciation for research, and increased confidence in their own research abilities. Students’ academic and affective outcomes were assessed via survey in the previous version of the laboratory and we will continue to survey the students as the new course moves forward.

Disclosures: J.M. Omelian: None. S.I. Sollars: None.

Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.10SA/DD2

Topic: H.02. Teaching of Neuroscience

Title: Incorporating active learning strategies in an undergraduate Neurobiology course

Authors: *M. W. CHU; Biol. Sci., UCSD, La Jolla, CA

Abstract: Recent studies have shown that the use of student-centered active learning methods within the classroom can improve student learning (Freeman S, et al., 2014). In this poster, I will discuss the impact of incorporating active learning methods in an introductory neuroscience course. BILD12: Neurobiology and Behavior is a lower-division undergraduate course and serves as an introduction to the structure and functions of the nervous system for non-Biology majors. For the past several years, it has been taught in traditional lecture format; however as course instructor this summer, I am transforming this course to incorporate evidence-based
instructional strategies (EBIS). This includes a flipped classroom model with pre-class reading assignments. The course will also use peer instruction with clickers, where students will answer conceptual multiple-choice questions either individually, with peers, or in classroom-wide discussion. This poster will discuss the efficacy of employing EBIS based on comparisons with student performance in previous years.


**Theme H Poster**

**024. Teaching Neuroscience to Undergraduates: Courses and Programs**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 24.11SA/DD3

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

**Support:** FAPESP

**CNPq**

**Title:** Using active learning strategies to enhance student’s cognitive skill in science education

**Authors:** R. BARBOZA¹, R. S. MOREIRA¹, *M. FERRARI²;
¹Federal Univ. of Sao Paulo, Diadema, Brazil; ²Inst. De Biociencias - Univ. De Sao Paulo, Sao Paulo, Brazil

**Abstract:** Engaging undergraduate students in active learning strategies is fundamental to improve their cognitive skills i.e. the ability of acquire knowledge that involves the progressive building of learning skills, such as attending, memory and thinking. To help students become more actively engaged, we use an adaptation of teachable unit design by Meghan Ramsey and Jae-Hyush Yu from University of Wisconsin, Madison, with a group of undergraduate students in science education from Federal University of Sao Paulo, Diadema, Brazil. As learning strategy we use the reading of scientific papers, a collaborative learning activity, a mini-lecture, and a self-study task. These activities were divided in three distinct moments: 1) a pre-class activity where the students read the scientific paper and complete a homework assignment - in these case, the original scientific paper was used as primary resource to acquire new knowledge about several biological concepts; 2) a mini-lecture to provide relevant background information to the students; and 3) a in-class group work where the students discuss selected figures from the paper and presented their results to the class. To evaluate the results, we did a pre-test, evaluated the
homework assignment, and did a rubric to evaluate the formative assessment of students during the in-class activity. In addition, the students make a self-assess of their knowledge by completing the pre-class homework assignment and other self-assess after the in-class activity. Our result shown that this learning strategy helps the students to become more familiar with scientific experimental procedures and increase their knowledge. Moreover, the active participation of the students helps them to develop critical thinks and increase their scientific literacy. As secondary goal, the students become more skilled to reading scientific paper and to make multidisciplinary connections. The acquisition of these cognitive skills is fundamental to professional training science teacher for secondary education, since the future teachers have to develop the ability to acquire knowledge all type of source. As conclusion, our results indicate the positive effect of this set of learning strategy to engaging students in active learning process.


Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.12SA/DD4

Topic: H.02. Teaching of Neuroscience

Title: Teaching behavioral neuroscience and research methods using zebrafish

Authors: N. E. WREN1, C. M. VELEZ1, R. RYDER1, J. L. PIPERNO1, *M. E. HARRINGTON2;  
1Neurosci Prog, 2Smith Col., Northampton, MA

Abstract: We aim to introduce undergraduate students to research design by encouraging student-initiated experiments. Following a basic introduction to principles of experimental design using a textbook (Harrington, 2010), sophomore undergraduate students developed skills in reading primary journal articles before working in teams of 3-5 students to identify a topic to research using zebrafish embryos or adults. Zebrafish serve as an excellent model system for teaching neuroscience research design because embryos develop rapidly, growing from a single fertilized egg to a twitching embryo with a nervous system in less than 24 hours after fertilization. In this course, they allowed for experiments with adequate sample sizes, ease of drug delivery and a wide range of behavioral assays. Further, zebrafish prompted a wider range of questions than those tackled in prior years when students used mice for their experiments. Working from primary articles, each group designed an experiment that had never (to their
knowledge) been conducted before, and that made sense with respect to prior literature searches. Teams had to submit an abbreviated form for expedited approval by the Smith College IACUC. They also had to secure necessary equipment and provide information on chemicals to order. Most groups conducted a brief preliminary study prior to collecting their main data set. Behavioral observations were recorded and analyzed using EthoVision XT software (Noldus et al., 2001). Some students used a transgenic line of zebrafish with a circadian gene (per3) bioluminescent reporter and a plate reader (Tecan Infinite M1000 PRO) was used to measure circadian expression. Final reports were both a group poster at a local conference and an individual paper formatted for publication. Student response was assessed in weekly journal writings as well as pre- and post-course questionnaires. Students gained experience with experimental procedures while developing skills such as reading journal articles. Comprehension and critical thinking skills were assessed throughout the semester, and showed dramatic improvement. Most encouragingly, several student groups asked to continue their experiments beyond the time frame allotted, and one group plans to continue their work as independent research in the following semester.

Citations:


Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.13SA/DD5

Topic: H.02. Teaching of Neuroscience

Support: T32-EY-017878

T32-MH-014279

Title: Learning principles of scientific experimental design through student-centric journal club
Authors: *B. S. CARTER*1,2,3, D. E. HAMILTON3, R. C. THOMPSON3,4;  
1Neurosci., Oberlin Col., Oberlin, OH; 2Neurosci. Grad. Program, 3Mol. and Behavioral Neurosci. Inst., 4Psychiatry, Univ. of Michigan, Ann Arbor, MI

Abstract: Knowledge and application of experimental design principles are important components of scientific methodology, and experience with these skills is fundamental for participating in scientific research. However, undergraduates often enter the research laboratory with little training in designing and interpreting their own experiments, and these concepts need to be conveyed in an efficient manner. In the context of a research university laboratory, we created a journal club training exercise to address this need. Publications are a useful tool for informing students on the principles of experimental design as they present both results from individual experiments and the experimental progression in testing a specific research hypothesis. We instructed undergraduates on methods for interpreting scientific literature using an introductory screencast and a two-session group discussion journal club that worked through a series of lab data and publications. This targeted approach can be customized to individual laboratories and enables extensive student interaction with the concepts on a limited time scale. We found this approach to be a productive method for engaging students in learning principles of experimental design and further enabled them for success in laboratory research.

Disclosures: B.S. Carter: None. D.E. Hamilton: None. R.C. Thompson: None.

Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.14SA/DD6

Topic: H.02. Teaching of Neuroscience

Support: Howard Hughes Medical Institute through the Precollege and Undergraduate Science Education Program

New York State Regional Economic Development Council

Binghamton University Provost Office

Title: Freshman research immersion: transforming freshman into researchers
Abstract: A central feature of the national initiative to transform undergraduate STEM education is to engage students in authentic research experiences earlier in their college years. To this end, Binghamton University recently implemented the Freshman Research Immersion (FRI) program, a three-semester course sequence, to cultivate STEM interest in new students across STEM disciplines. Here we discuss the program overall and the neuroscience research stream, specifically. In our pilot year, students enrolled in one of three research streams (neuroscience, biofilms, or smart energy (chemistry/physics hybrid)), with 30 students per stream. Each research stream has a dedicated lab, newly renovated and well equipped for carrying out leading research within that particular stream. PhD-trained research educators oversee the daily work of students and teaching assistants within each research stream. In freshman fall semester, students are in a research methods course that focuses on quantitative reasoning and scientific communication. In the following semester, they begin real research on specific problems pertaining to their chosen stream. During the fall of their sophomore year, students spend the entire semester carrying out a research project of their own design, culminating in a public poster session on campus. The neuroscience research stream provides students with a diverse, multifaceted inquiry-based neuroscience research experience examining the intersection between neurodegeneration and neuroinflammation in animal models of disease using a number of behavioral and neurochemical techniques. Overall, the FRI program promotes excitement about science by allowing students to work together to tackle real research questions.


Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.15SA/DD7

Topic: H.02. Teaching of Neuroscience

Support: GLCA Expanding Collaboration Initiative

Title: A summer seminar series with five regional neuroscience programs
Authors: *J. R. YATES*¹, A. STAVNEZER²;
¹Psychology; Neurosci., Ohio Wesleyan Univ., Delaware, OH; ²Col. of Wooster, Wooster, OH

Abstract: We received funding from the Great Lakes Colleges Association (GLCA) Expanding Collaboration Initiative, funded by the Andrew W. Mellon Foundation, for a summer visit series among five regional Neuroscience programs. The aim was to provide significant and meaningful opportunities for conversation, collaboration, and education for GLCA Neuroscience faculty at the College of Wooster, Kenyon College, Earlham College, Ohio Wesleyan University, and Oberlin College. Participating faculty and their summer research students met five times, once at each institution. Faculty served as resident experts, teaching their specific research techniques to all other members of the group. By harnessing the breadth of research expertise within our consortium, we deepened the knowledge and hands-on experience of all faculty on several techniques. Not only will this enrich classroom and laboratory instruction, but knowing the research projects and techniques that are used in close proximity will allow for future research collaborations. Summer research students also benefited in meaningful ways with opportunities for professional development related to career planning, writing personal statements for graduate or professional school applications and public presentation of scientific plans and results, and learned all of the techniques as well. Program evaluation - add a quick sentence on what the results say.

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

Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program# Poster#: 24.16SA/DD8

Topic: H.02. Teaching of Neuroscience

Title: A undergraduate education module based on a research question: The effects of muscle injury on synaptic transmission, axon conduction and muscle physiology in relation to deep tissue injury

Authors: *A. THENAPPAN*¹, E. BURNS², M. VAUGHN³, E. DUPONT-VERSTEEGDEN⁴, R. L. COOPER²;
**Abstract:** This laboratory exercise is to determine the consequences of damage muscle influencing healthy muscle and neuronal function. Students can develop variations to the experimental models presented in this laboratory exercise. The preparations presented are of two motor units of two muscle fiber types (slow and fast) as well as a sensory-CNS-motor nerve circuit. These preparations are well known for student neurophysiology experimentation but novel to use for investigating an injury topic on muscle and CNS. In addition, this module lends itself for inquiry, team discussion, self-paced learning and focuses on authentic scientific research. These approaches are hall marks in student retention and understanding of novel concepts. The research question is based on understanding the physiological problems with deep tissue injury of skeletal muscle and/or neurons. Primary skeletal muscle damage can produce secondary effects which can increase the spread of the damage zone. This can be caused by the additive effects of intracellular contents, particularly the ion K+, released from crushed muscle cells. Consideration in the exposure time and effects of restoring normal [K+] o on the health of skeletal muscle and synaptic transmission has not been fully addressed. The synaptic responses return slower than recovery of skeletal muscle potential. At present we are conducting further investigations on the crayfish opener muscle and *Drosophila* larval body wall muscles as models for effects on synaptic transmission with muscle injury. It appears the axon becomes blocked in conduction with raised [K+] o which is likely due to the inactivation of the NaV channels. Thus, a nerve close to a site of injury may not necessarily be physically injured but conduction of electrical signals may be hampered, due to a localized raised [K+] o. The goal of these research studies is to use these findings to help establish rodent models and development of experimental paradigms which may lead to better treatment and assessment of DTIs in urgent care centers for humans.

**Disclosures:** A. Thenappan: None. E. Burns: None. M. Vaughn: None. E. Dupont-Versteegden: None. R.L. Cooper: None.

**Theme H Poster**

024. *Teaching Neuroscience to Undergraduates: Courses and Programs*

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program# Poster#:** 24.17SA/DD9

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

**Support:** University of British Columbia Okanagan Campus Innovations in Teaching and Learning Research Grant
Title: Introducing neuroscience-based clinical cases to large science undergraduate classes by using tutor-less problem-based learning method: effects on generic problem-solving skills

Authors: *A. Klegeris*\(^1\), S. Barclay McKeown\(^2\), H. Hurren\(^2\), M. J. Stuart\(^1\), L. J. Spielman\(^1\);
\(^1\)Dept. of Biol., \(^2\)Univ. of British Columbia Okanagan Campus, Kelowna, BC, Canada

Abstract: After entering the job market, most university science graduates will work in small group settings with colleagues that they do not choose. They will be required to independently navigate through large amounts of literature looking for reliable sources of information; prioritize their tasks and hypotheses, problem solve, network, work effectively in a team environment and evaluate the job performance of their peers. Although these skills are valued by both students and their future employers, most standard university curricula are mainly focused on delivering the course content, giving very few opportunities for students to work on these skills. A tutor-less method of problem-based learning (PBL) suitable for large undergraduate classes of up to 100 students was developed to model the above aspects of post-university real-world workplace experiences. This method has been successfully used in two upper-year biochemistry and pharmacology courses on the University of British Columbia Okanagan campus, Canada. Using this method, students are asked to work on various clinical cases, including those which are neuroscience-based, over a three week period using in-class randomly assigned small groups and additional independent research and study outside the classroom. Our studies demonstrate that this mode of instruction leads to increased student satisfaction and engagement. In addition, by using a generic problem-solving test tool that we have developed, it was shown that students taking a course, which uses large-classroom PBL, demonstrate statistically significant improvement in their generic problem-solving skills. This finding contrasted the data obtained from more than twenty other upper-year courses that were surveyed during a campus-wide study on the dynamics of undergraduate problem-solving skills. If these observations are confirmed in other universities, it could be concluded that most standard lecture approaches are not effective at improving student problem-solving skills, and that universities and individual instructors must take active strides to advance this critical skill set in undergraduate students. Supplementing lecture delivery in large classes with PBL-based clinical neuroscience cases could be one such strategy. The tool that we have developed for studies of the dynamics of generic problem-solving skills in various student populations is available by contacting andis.klegeris@ubc.ca.


Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs
**Title:** Searching for an index of states (sleep/alert-like), projections (Inward/Outward) and forms (Joint/Separated) of Attention in humans, ants and bacteria

**Authors:** *J. F. GOMEZ-MOLINA*¹, M. CORREDOR-RODRÍGUEZ², U. M. RICOY³, A.-L. GOMEZ-MOLINA⁴, F. LOPERA⁵, A.-A. A. RESTREPO-VELÁSQUEZ⁶;
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**Abstract:** INTRODUCTION. 1. Attention facilitates teaching and learning. 2. Shifts of spatial attention have been used to explain turning and locomotor slowing due to a stimulus in ants (Gomez and Renthal SfN-2007). 3. High/low levels of attention exist during wakefulness (alert/relaxed states) or during sleep (REM/NREM). Sleep-like states have been proposed in ants (REM, Cassill et. al. 2009), cortical modules (Gomez 1998, 2001), networks of neurons (Krueger 2008) and single cells. This is possible if we define attentional-like states in terms of genes, signaling molecules, sleep-like dynamics (e.g. sleep pressure) or in computational terms. 4. The attention can be projected outward (to the external world) or inward (inside the body or the mind). Two individuals mutually projecting simultaneously a fraction j of their outward attention to each other present joint attention. If j=0, the attention is separated. 5. Hyperscanning with mutual perception of movement has been proposed to improve joint attention in autism and schizophrenia (Gomez, Casanova and Gomez 2013). 6. Bacteria present states of activity and inactivity (sleep?) and “mutual attention” like quorum sensing. Given the similarity of these phenomena, we ask: Is there a common attentional index from bacteria to EEG-hyperscanning? 

METHODS. Behavioral observations. RESULTS. 1. In ants, fast prediction of behavior and joint attention might exist during the formation of bridges and antennation. 2. In bacteria, joint-attention might be slow but still exist. 3. An attentional index should increase with frequency, synchronization, j and 1/delay. DISCUSSION. 1. Artificial intelligence explain some but not all the behaviors of swarm intelligence. 2. Is the anterior mushroom bodies analogous to the frontal cortex in relation to attention? CONCLUSIONS. 1. Attentional-like phenomena are substrate-
independent and they can include insects and bacteria. 2. The reflexive property of mutual prediction and attention might imply indices able to describe self-similar process.

Fig. 1. Joint spatial attention between two ants before antennation. The sensory workspace of each attentional process is associated to an ellipsoid (yellow). Joint attention is associated to the common area in gray, so \( j > 0 \).

The characterization of these processes in simple creatures facilitate the understanding of learning and teaching in human environments.

REFERENCES TO OUR PREVIOUS WORK AND RELATED PAPERS:


Gomez JF, Casanova m and Gomez AL (2013) Interhemispheric defragmentation using EEG/ECG/EG-hyperscanning: designing rehabilitation for conditions with diminished socialization. Submitted to Clara DeRosier, American Society of Neurorehabilitation, ASNR. San Diego, 7-8 Nov. 952-545-6324. DOI.


Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.19SA/DD11
Topic: H.02. Teaching of Neuroscience

Support: Dept Neurobiology and Behavior, Cornell University

Title: The crayfish caudal photoreceptor: a non-visual photoreceptor embedded in a central nervous system

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

Abstract: The crayfish caudal photoreceptors (CPRs) are a bilateral pair of photosensitive, multisegmental abdominal interneurons with cell bodies in the last abdominal ganglion (A6) of the ventral nerve cord (VNC). They are sensitive to light and also receive mechanosensory input. CPR activity is thought to initiate backward walking and abdominal posture adjustments and to contribute to a crayfish’s tendency to hide in dark, protected spaces. They may also participate in the timing of circadian activity. A simple dissection removing tissue down the center of an isolated abdomen exposes the VNC and all the abdominal ganglia ventral-side up. To record CPR activity, a glass suction electrode is placed on the ventral VNC midline between abdominal ganglia, where the CPR axons run close to the VNC surface, and a small bubble of VNC is sucked into the recording tip. Under low light, a flashlight or microscope fiber optic directed onto ganglion A6 increases spontaneous activity of the two CPRs. Typical light response characteristics include: (1) response latency of seconds, (2) little adaptation during stimulation, and (3) continued strong firing for seconds after stimulation ends. In addition, the CPRs are very sensitive to water movements, even subtle ones from small table vibrations. Response recovery from a light flash may take several minutes. CPR responses to light, but not vibration, are very temperature sensitive. Freshly dissected preps typically have a high level of spontaneous activity, which may make it difficult to see CPR firing. One- to 2-day old preps kept in the refrigerator reduces spontaneous activity and enhances the photically-evoked CPR response over the reduced noise. Student exercises with this preparation include: examining light intensity-duration/response relationships, testing spectral sensitivity, finding the site of photo-transduction, measurement of conduction velocity with two suction electrodes, neuromodulation of the light response, effects on abdominal postural motor programs, and behavioral significance. This non-visual photoreception embedded in the central nervous system has attracted the attention of neurobiologists for over 80 years. There is a rich background literature to inspire a broad range of laboratory exercises and student projects in sensory physiology, neuronal integration, neuronal excitability, circadian rhythms, and the control of behavior by identified neurons. Some aspects of their physiology, such as neuromodulation, have not been studied in depth, so the CPRs offer opportunities for original student research.

Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.20SA/DD12

Topic: H.02. Teaching of Neuroscience

Support: NIH Grant 1R25GM107760

Title: Optogenetics in chick embryos as a platform for classroom-based, authentic research experiences for underserved undergraduate students

Authors: *A. A. SHARP*¹, S. FROMHERZ¹,², J. R. WHITAKER¹, K. S. RENZAGLIA²; ¹Dept Anat, SIU Sch. Med., Carbondale, IL; ²Plant Biol, SIU, Carbondale, IL

Abstract: The Southern Illinois Bridges to the Baccalaureate Program (SI Bridges) is an NIH-funded research education program for community college (CC) students designed to overcome income, racial and other disparities amongst student populations, and to provide a path to careers involving biomedical and behavioral science research. As part of the experience, we have designed an eight week Summer Research Institute (SRI). SI Bridges scholars are immersed in an authentic research experience where they design, conduct and report on experiments in chick embryos using optogenetics (Sharp and Fromherz, 2011; Sharp, 2015). Scholars (~10) work as a whole and in groups of 2-3 alongside SIU professors, CC instructors and a TA. A combination of experiential learning, self-directed learning and inquiry-based approaches are used to explore subject areas such as molecular biology, embryology, behavior, kinesiology and neuroscience. Initially, we use guided open inquiry exercises whereby scholars attain a basic working knowledge of both content and bench skills. Scholars then self-select into small groups to pursue projects that best suit their personal interests. Scholars engage in a variety of related professional training and development experiences, including how to conduct literature searches, approaches for scientific reading and writing, and resume-building. Further, we discuss various career paths and work with them to select future research mentors. At the end of the SRI, the scholars present posters and talks about their research to their families, friends and future research mentors. While scholars are motivated by the real possibility of their own research giving rise to a publication, we are careful to balance this with an understanding of the realities of scientific research. The scholars’ true gains are seen in their personal and professional development. With experiential research education in a “controlled” classroom environment, we are better able to ensure that scholars’ first research experiences will be positive. Our scholars achieve huge gains in
confidence, the ability to form positive professional relationships, and laboratory skills. Scholars develop a strong understanding of the scientific process and the enthusiasm to successfully engage in research in university laboratories. Cutting-edge optogenetic manipulation of embryonic behavior has proven to be a successful multi-faceted research platform with which to engage and launch future scientists with diverse interests from underserved backgrounds.

**Disclosures:** A.A. Sharp: None. S. Fromherz: None. J.R. Whitaker: None. K.S. Renzaglia: None.

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**Theme H Poster**

**024. Teaching Neuroscience to Undergraduates: Courses and Programs**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 24.21SA/DD13

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

**Support:** This project was in part supported by the Stress and Motivated Behavior Institute, UMDNJ

Richard Servatius, Director

**Title:** Enhancing the teaching of respiratory neurobiology using student based research that delivers enhanced carbon dioxide to participants while observing avoidance behavior and anxiety vulnerability

**Authors:** P. F. MARTINO\(^1\), *D. P. MILLER\(^2\), J. MILLER\(^{1,3}\), T. K. MULLARNEY-REGETZ\(^2\);
\(^1\)Neuroscience/Biology, \(^2\)Neurosci., Carthage Col., Kenosha, WI; \(^3\)VA Med. Ctr., Milwaukee, WI

**Abstract:** Neurorespiratory biology is one of the most challenging topics in physiology, and is most effectively taught through hands-on laboratory experience. Accordingly, a group at Carthage College and the Milwaukee VA Medical center has aimed to enhance undergraduate student learning of integrative neurorespiratory control concepts by embedding the teaching in an ongoing funded research project. The current project being used to teach these concepts investigates the relationship between a respiratory stress response and behavioral inhibition (BI) temperament. Organisms consistently high in behavioral inhibition (BI) learn avoidance faster and take longer to extinguish avoidance responding (e.g., in humans, Sheynin et al, 2014; in rat, Servatius et al, 2008). Rapid avoidance may indicate a predisposition for the development of Post Traumatic Stress Disorder (PTSD) and also resemble the prolonged avoidance behavior
after a stressful event observed in those diagnosed with PSTD. In our current study, human participants inhaled 7% carbon dioxide as a mild stress stimulant during avoidance acquisition and extinction. The results are analyzed based on BI status. As part of the research process, students are required to discuss how the acquired data relate to the mechanisms of respiratory chemosensitivity. This facilitates learning about the basic anatomy and function of chemoreceptors, and also allows the students to gain a comprehensive understanding of the physiologic effects of breathing elevated CO2, such as decreased arterial pH, increased rate of respiration, etc. Additionally, in order to better understand the gas laws taught in introductory chemistry such as Boyle’s Law, Henry’s Law, and Dalton’s Law, we chose to use a manual CO2 gas mixing method involving a tissot spirometer as used in many classical respiratory physiology experiments (Krogh, 1920). In summary, the fundamental purpose of this current research project is to teach students neurorespiratory biology through hands-on experience in the context of meaningful stress and anxiety disorder research. Students gain a comprehensive understanding of the neural circuitry of breathing, respiratory chemosensitivity and basic gas laws, as well as the ability to interpret and discuss physiologic respiratory data.


Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.22SA/DD14

Topic: H.02. Teaching of Neuroscience

Title: Investigating the behavioral and molecular mechanisms behind alcohol sensitivity and tolerance in Drosophila melanogaster in upper-level genetics and neurobiology courses

Authors: *J. A. SEGGIO, M. J. CARSON, J. A. ROLING, J. A. HICKS;
Biol. Sci., Bridgewater State Univ., Bridgewater, MA

Abstract: As many research labs around the world use Drosophila melanogaster as a model for studying the genetics of a wide variety of physiological and behavioral phenotypes including sensory pathways and drug metabolism, it is important for undergraduate students to acquire the basic skills used to investigate these important questions in this organism. In our upper-level genetics and neurobiology courses, we added to and modified the in-classroom "Carolina Biological Alcohol Tolerance Kit", which allows students to investigate how the presence of
Alcohol Dehydrogenase (ADH) is required for ethanol metabolism and viability in an ethanol positive environment. We modified the protocol by adding a third ADH phenotype ADH(F), which has increased enzymatic activity compared to both wild-type and ADH nulls, and by allowing the students to develop their own viability assay. We also added protocols that allow the students to test ethanol sensitivity and tolerance at both the larval and adult stages. Students are able to test for alcohol preference during the larval stages as well as investigating how larval exposure to ethanol affects locomotor activity during the adult stages with a Drosophila Activity Monitor. Additionally, students test the adults’ sensitivity and tolerance to alcohol using the aforementioned viability protocol as well as a vial climbing assay, which tests for motor coordination. Lastly, the students use gel electrophoresis to determine which genotypes have ADH enzyme present to determine if the molecular genetics matches their behavioral observations. This method uses a semi-quantitative assay by which proteins are first separated under native conditions (where the charge of the protein as well as its size affects migration) and then post-stained with a colorimetric stain for ADH activity. The combination of these assays correlates a physiological and behavioral phenotype (more or less alcohol tolerant) to an underlying molecular mechanism. After these labs are completed, students are encouraged to develop their own projects involving fruit flies using similar techniques that test a sensory, behavioral, physiological, or molecular process.

able to establish multiple associations using several educational tools. Moreover, fields of knowledge, such as neuroanatomy, neurophysiology and clinical neurology did not belong to the same term and discipline. In the last decade, however, several educational institutions in Brazil passed through curriculum changes in order to promote an interdisciplinary education in health sciences. As a result, neuroscience has been awarded in this process because it comprises all fields required for a full comprehension in neurology, including basic neuroscience.

Interestingly, the students using the new curriculum have became motivates to act along with the local community and the university hospital patients. Recently, a model of curricular structure marked by module rather than disciplines has been implemented in many ways. Health promotion, prevention of diseases and functional recovery are the tripod for the curricular matrix recommended by brazilian federal government. Teaching-learning strategies have included now, study group for discussion trends in neuroscience, observational activities in clinical neurology, as well as neuroanatomy laboratory, seminars, workshops and scale models of the nervous system. The integration of basic and clinical practices in neurology enhanced several academic extension programs which took an important part with the community. This population included caregivers and the patients with a neurological condition. It may be concluded that morphophysiology and practices in neurology have been progressively employed in Brazil and provides further skills for undergraduate medical students, supporting its effectiveness.


Theme H Poster

024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.24SA/DD16

Topic: H.02. Teaching of Neuroscience

Support: Howard Hughes Medical Institute Bioscience Education Grant

Title: Transforming connections for success in neuroscience and STEM: A new program for underrepresented and at-risk students

Authors: *N. G. SIMON¹, V. C. WARE²;
²Biol. Sci., ¹Lehigh Univ., Bethlehem, PA
Abstract: The demand for a technologically advanced workforce can be met over the next decade if current levels of attrition from STEM majors are addressed (P-CAST, 2012). Our HHMI-supported program goal is designed to improve retention in neuroscience and other bioscience-related fields through curricular reforms and research engagement in team settings. The program has two components that were guided by prior, successful HHMI-supported initiatives that significantly expanded interdisciplinary team approaches in the curriculum and research for undergraduates. 1. BIOCONNECT: COMMUNITY COLLEGE (CC) COLLABORATIONS TO IMPROVE STEM RETENTION. Agreements between research universities and CC can facilitate the successful transfer of CC students into a university environment. BIOCONNECT will (i) provide Lehigh-sponsored undergraduate neuroscience and bioscience-related interdisciplinary research, mentoring, and STEM student community building experiences for CC STEM students in preparation for graduation and/or successful transfer, and (ii) assimilate transfer students from CCs into the undergraduate research community culture. We expect that BIOCONNECT participants will show increased retention in neuroscience and other STEM majors, advance to CC graduation or transfer at a higher rate, and graduate in STEM. 2. RAPIDLY ACCELERATED RESEARCH EXPERIENCE (RARE): is a pre-admission-to-graduation science immersion program that will provide at-risk and underrepresented students with outstanding scientific skills and preparation for leadership in addressing the complex issues facing neuroscience and the life sciences. The program incorporates four dimensions that we believe are essential for success with students that are underrepresented: an innovative curriculum, a strong sense of identity as part of a community of scholars, addressing cultural issues that can contribute to low success rates, and an understanding of the commitment required to excel in neuroscience and STEM. RARE will test if a comprehensive, evidence-based 4-year approach will improve retention in neuroscience and STEM to >80% among at-risk and underrepresented students (our current STEM retention rate is ~50%). We will also learn about curricular and non-curricular practices that can be scaled to a broader STEM student population.

Disclosures: N.G. Simon: None. V.C. Ware: None.
**Title:** Heart rate conditioning in an undergraduate lab using an Iphone

**Authors:** J. SINGH¹, N. ZACCONÈ, J. MA², N. DESOUKY², K. BLYVERKET², *J. C. NEILL¹;
¹Psychology, Long Island Univ., Greenvale, NY; ²Psychology, Long Island Univ. - Post, Greenvale, NY

**Abstract:** We hypothesized that decreases in heart rates would be conditioned by practicing mantra-breathing association daily, and that an Iphone with a novel software application could provide inexpensive instrumentation. Method: S’s: Five students from Long Island University participated (one female, one male). Apparatus: Five Apple Iphones, and an app named Cardiio was used to measure heart BPM (beats per minute) by either illuminating the dominant index finger using camera flash on an IPhone or an Iphone camera was used by Cardiio App to measure BPM using optical analysis of facial blood flow. All data was recorded in Cardiio electronic history and recorded manually by each subject. Procedure: A baseline BPM was taken from each subject for at least three days in his/her home. The baseline procedure: subjects took their pulse daily during a one minute preliminary component (the A Phase), waiting 20 seconds (the B Phase), followed by taking one’s pulse again for one minute (the C Phase). All data, including the time of measure for the A Phase and C Phase was recorded by the Cardiio app. Subjects’ BPM were also measured in the lab either before or after treatment, so that researchers confirmed data reliability. After the Baseline Phase was taken for at least three days for each individual the treatment phase began. The treatment phase consisted of subjects taking their pulse daily during a one minute preliminary component (the A Phase) introducing a breathing-mantra response during the B Phase: holding one’s breath for 10 seconds, then saying “Ommm” while slowly expiring air for 10 seconds. All subjects then repeated a baseline condition, with no mantra or slow breathing. Pulse rate was measured during the A Phase and the C Phase. A large treatment effect was observed in the average BPM in 3/5 subjects. There were several confounding variables that could explain the lack of effect in 2/5 subjects. The first is medical history. A future experiment could be carried out to determine the effect of deep breathing techniques and mantras on those with hypertension or diabetes in their family history and those without. The measuring device (Iphone) may have been a confounding conditioned stimulus which raised the BPM. Future research could measure BPM with smart phones versus manual recording to determine whether the device was a CS that triggered arousal in some subjects.

**Disclosures:** J. Singh: None. J.C. Neill: None. J. Ma: None. N. Desouky: None. N. Zaccone: None. K. Blyverket: None.

**Theme H Poster**

024. Teaching Neuroscience to Undergraduates: Courses and Programs
**Location:** Hall A  
**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM  
**Program#/Poster#:** 24.26SA/DD18  
**Topic:** H.02. Teaching of Neuroscience  
**Title:** Incorporating an ERP project into undergraduate instruction  
**Authors:** *E. Nyhus, N. Curtis;* Bowdoin Col., Brunswick, ME  

**Abstract:** Electroencephalogram (EEG) is a relatively non-invasive, simple technique, and recent advances in open source analysis tools such as EEGLAB (Delorme & Makeig, 2004) and ERPLAB (Lopez-Calderon & Luck, 2014) make it feasible to implement EEG as a component in undergraduate neuroscience curriculum. We have successfully led students to design novel experiments, record EEG data, and analyze event-related potentials (ERPs) during a one semester laboratory course for undergraduates in cognitive neuroscience. First, students learned how to set up an EEG recording and completed an analysis tutorial using EEGLAB and ERPLAB to analyze data provided from an EEGLAB workshop (http://sccn.ucsd.edu/eeglab/workshop05/extended_cd/) which showed a greater N170 effect over right posterior electrodes for faces compared to objects. Students then learned how to set up a novel EEG experiment; briefly, they formed groups of four, designed an EEG experiment on a topic of their choice and programmed the design in EPrime. Group project topics included: categorization of unambiguous and ambiguous gendered faces, how emotional priming affects the oddball effect, how levels of processing affects memory encoding, how emotion affects decision-making, and how the frequency of words affects language processing by examining the P3, LPP, N400 and P600 ERP components. Over the course of two weeks students collected behavioral and EEG data on 20 subjects (fellow classmates). EEG was recorded with a 64-channel actiCHamp system (Brain Products, Munich, Germany). Each group then analyzed their behavioral and ERP data and presented their results both as a presentation and as a final paper. Upon completion of the group project students reported a deeper understanding of cognitive neuroscience methods and a greater appreciation for the strengths and weaknesses of the EEG technique. Although recent advances in open source software (EEGLAB and ERPLAB) made this project possible, it also required access to EEG recording equipment, EPrime, and Matlab. Future efforts should be directed at making publicly available datasets to learn ERP analysis techniques and making publicly available EEG recording and analysis software to increase the accessibility of hands-on research experience in undergraduate cognitive neuroscience laboratory courses.

**Disclosures:** E. Nyhus: None. N. Curtis: None.
**Theme H Poster**

**024. Teaching Neuroscience to Undergraduates: Courses and Programs**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 24.27SA/DD19

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

**Support:** Sr. Dorothy Stang Faculty Scholars Program

Notre Dame de Namur University Faculty Development Committee

**Title:** Hispanic-serving institution: taking neuropsychology students from the classroom to the community

**Authors:** *H. L. YOUNG;

Notre Dame De Namur Univ., Belmont, CA

**Abstract:** Although neuroscience as a discipline has begun to embrace public outreach, the focus of the outreach, however, largely consists of the dissemination of neuroscience findings by professionals or graduate students to the public. Service learning (community engagement, community-based learning and research) courses for undergraduates remain relatively rare. Within my own school, Notre Dame de Namur University, community engagement is reflected in the Mission statement and has been regarded as an essential component of the education of undergraduate students. Beginning in 2007, the Sr. Dorothy Stang Center for Social Justice and Community Engagement instituted a faculty scholars program to support the development of community-based learning and community based research undergraduate courses. The Community-Based Learning (CBL) in Neuropsychology was first offered to undergraduate students in the spring 2015 semester. This neuroscience course was taught in the Department of Psychology and required both Psychobiology and Cognitive Psychology courses as prerequisites. It was one of the first neuroscience courses to require outreach in the form of service that was not focused on K-12 education. The Neuropsychology course required 15 hours of service with a community partner that directly served various patient populations including cardio-vascular accidents, neurodegenerative disorders, spinal injury, autism spectrum disorders and traumatic brain injury. Community partners consisted of a memory care center, an adaptive physical education clinic and a special education kindergarten. The academic work of the course required readings including clinical case studies, empirical research and Neuropsychology textbook chapters. Assignments included traditional reading questions, journal entries, reflections and a semester project. Students were required to connect their service work directly to the course
curriculum. One example of this connection was through a reflection assignment focused on Primary Progressive Aphasia and transmodal creativity. Students exhibited a deeper understanding of the course curriculum when it related directly to their community engagement. For example, those students working with CVA patients had a much better comprehension of the lateralization of brain functions as demonstrated on their midterm exams. Students working in the adaptive PE clinic more rapidly understood concepts force (shear and tear) at the neuronal level, as compared to other students. Community engagement directly facilitated not only civic related learning outcomes, but also neuroscience learning outcomes.

**Disclosures:** H.L. Young: None.

**Theme H Poster**

**024. Teaching Neuroscience to Undergraduates: Courses and Programs**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 24.28SA/DD20

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

**Title:** Increased confidence in using primary literature is related to term paper length in an undergraduate group of Occupational Therapy students

**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 term paper based on primary neuroscience literature. In the past (Pack 2007, 2010) this group has demonstrated increased confidence (measured through use of quotations and number of primary references) in using the primary literature after a series of exercises designed to familiarize them with conventions regarding its use. This year, rather than 3000 words, the term paper assignment was revised from ~3000 to about ~800 words to accommodate a larger cohort. The same exercises were administered, but confidence in using the primary literature remained unchanged, and remained at lower levels than in previous years using the longer paper. The shorter paper, therefore, seems not to accomplish the goal of increased facility with the primary literature even in conjunction with familiarization exercises.

**Theme H Poster**
024. Teaching Neuroscience to Undergraduates: Courses and Programs

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 24.29SA/DD21

Topic: H.02. Teaching of Neuroscience

Title: A truly hands-on laboratory experience: Multisensory adaptations to teach introductory neuroscience to a visually impaired undergraduate student

Authors: *A. N. FRICKS-GLEASON, J. S. LAW;
Regis Univ., Denver, CO

Abstract: It is estimated that over 7.5 million adults in the United States have a visual disability. Less than 5% of this population obtain a bachelor’s degree or higher, and an even smaller percentage have degrees in the STEM fields. One major hurdle for visually impaired undergraduate students interested in majoring in a STEM discipline is laboratory courses. Lab courses traditionally rely on visual presentation of information and tactile adaptations are not readily available. Thus, visually impaired students are often limited to passive participation. They are asked to understand the theory, but are deprived of the hands-on experimentation their sighted classmates are provided. Of the accommodations provided for STEM learners with visual impairments, one of the most common is a sighted personal laboratory assistant. Unfortunately, if not carefully implemented, such assistants may diminish the laboratory experience for the student by encouraging reliance on description of visual information. Recent trends in STEM education suggest that multisensory lab experiences are most effective for all students, especially those with disabilities. Here we discuss our experience adapting an introductory neuroscience laboratory course for a visually impaired student. Working within a relatively limited budget, we were able to creatively implement adaptations that allowed the student to fully engage in the laboratory experience. We will discuss our methods for translating traditionally vision-centric exercises, such as dissections, microscopy, and behavioral pharmacology to a multisensory format.

Disclosures: A.N. Fricks-Gleason: None. J.S. Law: None.

Theme H Poster

025. Teaching Neuroscience to Graduate Students

Location: Hall A
**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 25.01SA/DD22

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

**Title:** A student-led graduate seminar familiarizes students with neuroscientific techniques and improves oral presentation skills

**Authors:** *D. J. DITULLIO*¹,², C. X. HE², A. M. ANDREWS²,³;

¹UCLA, Los Angeles, CA; ²Interdepartmental Program for Neuroscience, Brain Res. Inst., Grad. Program in Biosci.; ³Semel Inst. for Neurosci. & Human Behavior, Hatos Ctr. for Neuropharm., David Geffen Sch. of Med., Los Angeles, CA

**Abstract:** Students entering a PhD program in neuroscience must rapidly develop skills in critical reading, oral presentation, and select from an ever-expanding array of scientific techniques to address experimental goals. Three years ago, students in our UCLA neuroscience interdepartmental PhD program initiated a student-led seminar course in Neuroscientific Methods to expose first-year students to a wide range of techniques, complementing the core lecture courses in molecular and systems neuroscience and neuroanatomy. In 2015, the course continued to focus on understanding methodologies across many neuroscience subfields by critically reading primary literature. At the same time, we increased the course’s emphasis on oral presentation skills and peer-to-peer feedback. The two primary course goals for 2015 were as follows:

1) To give students background knowledge in a variety of neuroscience techniques that they will encounter during their thesis research and interactions with colleagues across subfields;
2) To improve students’ oral presentation and peer teaching skills through presentations of scientific papers on topics unfamiliar to each student.

The course met for 10 weekly two-hour sessions divided into cellular, molecular, and systems neuroscience units. Each week, two to three papers were chosen to provide an overview and application of specific techniques. Students chose two presentation topics outside their area of expertise. In the 2013 and 2014 courses, students presented only once during the course; for the 2015 course, students presented twice on different topics, enabling opportunities for improvement for the second presentation based on feedback on the first presentation from student instructors and peers. Presentations focused on methods and interpretations of key results. Advanced graduate students experienced in the methods being discussed attended each class session as experts to offer practical perspectives. Pre- and post-course surveys were administered to assess self-reported knowledge of neuroscience methods, as well as skills in oral presentation and critical reading of the literature. In addition, students received both aggregated peer feedback and instructor feedback on presentation content and style after each presentation. Results of pre- and post-surveys indicated that students felt that their knowledge of techniques and confidence in presentations significantly increased. These results reinforce the idea that a
student-led course is a valuable component of a graduate curriculum, while highlighting areas for further advancing this method of teaching for the 2016 course.

**Disclosures:**  D.J. DiTullio: None. C.X. He: None. A.M. Andrews: None.

**Theme H Poster**

**025. Teaching Neuroscience to Graduate Students**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 25.02SA/DD23

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

**Support:** MSMHA

University of Colorado Anschutz Medical Campus

**Title:** Dementia in 3D: A case-based instructional module exploring the impact of cerebral vascular anatomy in subcortical pathology leading to dementia

**Authors:** *J. BERGDEN*¹, J. H. CALDWELL¹, M. PASCOE², W. F. HUGHES¹,³;

¹Dept. of Cell and Developmental Biol., ²Univ. of Colorado Anschutz Med. Campus, Aurora, CO; ³Dept. of Anat. and Cell Biol., Emeritus Rush Univ. Med. Ctr., Chicago, IL

**Abstract:** Devastating effects of lesions in subcortical white matter (WM) are gaining attention with new advances in neuroimaging. The neuropathology of WM, already a focus in concussive or post-traumatic injury, has clear parallels with vascular dementias and multi-infarct disease. High resolution MRI, DTI and functional imaging help visualize the WM pathology of disconnection syndromes in stroke and multiple sclerosis and in the distributed pathology of Alzheimer’s and vascular dementias. This educational project advances the concept that perfusion insufficiencies in the cerebral vascular supply contribute to dysfunction in WM disease and may be a factor for co-morbidity in individuals with mild cognitive deficits that rapidly decline to dementia status. A case-based scenario was created to engage students in study of basic cerebral vascular topography and its relationship to cerebral architecture introducing the concept of a watershed zone. These regions of the brain located between major arterial vascular domains are particularly susceptible to perfusion insufficiency. The case-based scenario stresses cerebral vascular topography and its relationship to the architecture of subcortical WM, emphasizing the trajectory of fiber projections and association fiber systems through watershed territories at risk. Beyond gross topography, the module introduces elements of cellular
pathology, Wallerian degeneration and WM microstructure to demonstrate how small or multiple lesions can result in widespread dissociation of cerebral interconnections. This highly visual interactive piece features 3D models developed with 3D Slicer and Blender. The navigation displays image sequences progressively to build the concepts. Overlays and diagrammatic elements help visualize cerebral vessels in relation to WM fiber systems. For convenience and accessibility on mobile devices, module prototypes were converted to web-compatible (Flash and HTML5) versions. This project fills a gap in neuroanatomy education where students struggle to learn cerebral architecture in 2D space, gaining only a limited appreciated of the myriad subcortical fiber systems engaged in multi-site processing and memory acquisition and storage. The module provides a clinically relevant application that reinforces basic cerebral anatomy along with its vascular topography. The construct places classical elements into the context of post-traumatic injury and aging at the forefront of brain pathobiology and clinical scrutiny as new imaging methods evolve.


Theme H Poster

025. Teaching Neuroscience to Graduate Students

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 25.03SA/DD24

Topic: H.02. Teaching of Neuroscience

Title: Removing the barriers to managing both medical and illicit substance use in community practice settings: a thought experiment and educational tool development

Authors: *M. A. BEAZELY;
Sch. of Pharm., Univ. of Waterloo, Sch. of Pharm., Waterloo, ON, Canada

Abstract: Interventions designed to reduce harm associated with substance use have focused primarily on people who inject drugs. These include methadone maintenance programs, the distribution of clean needles, and supervised injection sites such as Vancouver’s insite facility. There are several reasons for targeting this most at-risk group for harm reduction interventions including risk of overdose when using opioids and the spread of infectious disease. Potential harm reduction interventions for substances that do not reach the level of the “highest risk” are less well-characterized, as are tools to manage the overlap between illicit and medically-indicated substance use. In addition, the knowledge level of health professional students and practitioners about illicit substance use is variable but generally quite low. The primary barrier to
applying current best practices and knowledge to illicit substance use is their lack of accepted medical indication. Without an indication as a starting point, analyses of the relative risk of use for various substances is not possible, and potential harm reduction interventions and opportunities to educate health professionals remain unexplored. We have recently carried out a series of “thought experiments” for specific illicit substances and classes of substances where the “indication” barrier was removed, and we proceed to describe, assess, and analyze their use as we would for a typical prescription drug or drug class. Using primary and secondary literature, as well as peer-to-peer sourced information, we proceeded to work through the epidemiology, patterns of use, pharmacology, motivations for use, subjective experiences, adverse effects, drug interactions, contraindications, and special populations for several drug classes. The outcomes of this approach include 1) the production of materials for health professional education or continuing education, 2) identification of potential drug-drug or drug-disease interactions between medically-indicated drugs and illicit substances and 3) provides a framework to identify opportunities to develop and research harm reduction interventions for health practitioners working in community settings.

Theme H Poster

025. Teaching Neuroscience to Graduate Students

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 25.04SA/DD25

Topic: H.02. Teaching of Neuroscience

Support: NSF IUSE grant #1441416 to WG

Title: Preparing a workforce to meet the challenges of large-scale data in neuroscience: The iNeuro Project

Authors: *W. E. GRISHAM¹, B. LOM², L. MCCAULEY³;
¹Dept Psychol, UCLA, Los Angeles, CA; ²Dept. of Biol., Davidson Col., Davidson, NC; ³Wind River Data Services, Lander, WY

Abstract: Large-scale data is becoming an exciting new tool, particularly in neuroscience. The research and educational potential of large-scale data can only become a reality if data are arrayed in usable manners, which will depend on the skill and expertise of scientists collecting, sharing, and analyzing the data. To address questions about preparing a workforce to meet the challenges of large-scale data, the iNeuro workshop was convened to consider and outline educational programs. This workshop, supported by the National Science Foundation, invited a
variety of stakeholders from library science, neuroscience, computer science, data science, science education, bioinformatics, and the NSF. At the workshop participants defined the problem, delineated skill sets neuroscientists working with large-scale data need, suggested and debated curricula, discussed existing and novel training programs, and discussed next steps in the formation of such training. Participants envisioned a neuroscience workforce using large-scale data will include several different job types: 1) data wranglers who manage data acquisition, 2) computational neuroscientists who use and analyze large-scale data with in-depth disciplinary knowledge, and 3) data curators who maintain data for long-term in shared repositories. All individuals will work as members of transdisciplinary teams, must be able to work across the many scales and modalities of neuroscience research, and understand experimental designs and workflows. Specific skill sets include bench research skills, computational skills, library science skills, strategic skills, and interpersonal and communication skills. Most participants felt that training programs emphasizing fluency with large-scale data are urgently needed, but that very few existing training programs emphasize/coordinate the desired curricula. Although graduate level training was envisioned for the requisite skill sets, preparatory curricula for undergraduates were also proposed to include computing, statistics, research methods, and introductory neuroscience. Graduate curricula included neuroscience, computer science (including languages, scripting, analysis, machine learning, and systems), data visualization and communication, library and information science, and math (including statistics and linear algebra). Proposed curricula at both levels emphasized learning via team-based, open-ended challenge projects in line with the Vision & Change report.

Full text of the iNeuro workshop report are available at:
https://mdcune.psych.ucla.edu/modules/ineuro

Disclosures: W.E. Grisham: None. B. Lom: None. L. McCauley: None.

Theme H Poster

025. Teaching Neuroscience to Graduate Students

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 25.05SA/DD26

Topic: H.02. Teaching of Neuroscience

Title: Data, tools and models of neuroscience on J-Node neuroinformatics platforms

Authors: *Y. YAMAGUCHI¹, H. KASHIOKA², T. MIYAKAWA³, K. TAKAO⁴, R. KANZAKI⁵, H. IKENO⁶, T. FURUICHI⁷, Y. OKAMURA-OHO⁸, S. SATOH⁹, T. IIJIMA¹⁰, S.

1NJC, RIKEN BSI, Wako, Japan; 2NICT CiNet, Osaka, Japan; 3Fujita Hlth. Univ., Toyoaki, Japan; 4NIPS, Okazaki, Japan; 5Tokyo Univ., Tokyo, Japan; 6Univ. of Hyogo, Himeji, Japan; 7Tokyo Univ. of Sci., Tokyo, Japan; 8RIKEN BReNt, Wako, Japan; 9Univ. of Electro-Communications, Chofu, Japan; 10Tohoku Univ., Sendai, Japan; 11Tokyo Metropolitan Inst. of Med. and Sci., Tokyo, Japan; 12Kyusyu Inst. of Technol., Kitakyusyu, Japan; 13RIKEN BSI, Wako, Japan; 14Osaka Univ., Osaka, Japan; 15Toyohashi Univ. of Technol., Toyohashi, Japan

Abstract: INCF Japan Node (J-Node) has developed web databases as neuroinformatics platforms. J-Node neuroinformatics platforms in total 13 cover neuroscience fields from molecule to behavior/cognition across species such as insects, rodents, and primate. They serve for instantaneous on-line use of neuroscience resources including data, tool and model. This poster demonstrate the contents and usage on the following topics: 1) big data of behavioral profile obtained from about 200 strains of genetically-engineered mice released at Mouse-Phenotype Database: 2) Integrative Digital Brain Atlases across species developed at Neuro-Imaging Platform, Invertebrate Brain Platform, Simulation Platform, ViBrism Database and Brain Transcriptome Database (former CDT-DB). In addition, the poster includes contents demonstration of Visiome Platform, Brain Machine Interface Platform, Cerebellar Platform, Dynamic Brain Platform, Comprehensive Brain Science Network Platform, Brain Science Dictionary, OpenNeuro and BSI-Neuroinformatics. All these databases have been developed by collaboration among J-Node PF committee members at universities and institutes all over Japan and J-Node secretariat, Neuroinformatics Japan Center. All web services of the above platforms are linked at J-Node Portal: http://www.neuroinf.jp


Theme H Poster

025. Teaching Neuroscience to Graduate Students

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 25.06SA/DD27

Topic: H.02. Teaching of Neuroscience
Support: NIDA Grant N43DA-14-1208 subcontract from Tietronix Software

Title: Interactive training software for designing, conducting and documenting rigorous preclinical experiments on drug dependence

Authors: *D. H. MALIN\(^1\), C. P. WARD\(^2\), S. A. HETHERINGTON\(^3\), J. J. IZYGON\(^2\), D. M. NGHIEM\(^2\), N. KELLING\(^2\), W. R. BURAS\(^3\);
\(^1\)Human Sciences,, Univ. Houston-Clear Lake Mail Code 265, Houston, TX; \(^2\)HSH, Univ. of Houston-Clear Lake, Houston, TX; \(^3\)Tietronix Software, Inc, Houston, TX

Abstract: There has recently been widespread concern about the waste of scientific resources due to poorly designed and non-replicable preclinical research in biomedical and biobehavioral sciences. This project was initiated by a call from the National Institute on Drug Abuse (NIDA) for interactive software to encourage best practices in designing and documenting rigorous and replicable preclinical research on drug dependence and addiction. The resulting software guides the user through an extensive series of choices that are necessary in the research processes, ranging from the initial conception of the idea, to conducting and documenting of the experiment. The module for each choice activity has background text that describes the methodological issues and some advantages and pitfalls of each option. There are then specific instructions for how to express the choice, sometimes supplemented by calculation functions. Some modules have links to external materials, including an online statistics text, to aid decision making. Following the instructions, the user documents his or her choice. The user is then prompted to move on to the next appropriate design activity. A record of all choices can be output. This record can serve as a framework for grant proposals, animal care and use proposals, presentations, articles and replication attempts by other researchers. It can also be used in training newer researchers in best research practices. Some typical issues addressed include evaluating the internal and external validity of animal models, identifying extraneous variables causing random vs. systematic error, dealing with experimental error through randomization, control, balancing, covariates etc., subject variability/designs for assigning subjects to conditions, multiple hypothesis error/post-hoc statistics, estimating adequate sample size/power analysis, balancing cohorts, experimenter bias/blind procedure, predetermined rules for excluding data, matching experimental designs with appropriate statistical tests, documentation sufficient for external replicability and best practices in data management.

Disclosures:  
D.H. Malin: B. Contracted Research/Research Grant (principal investigator for a drug study, collaborator or consultant and pending and current grants). If you are a PI for a drug study, report that research relationship even if those funds come to an institution.; Tietronix Software, Inc.  
C.P. Ward: B. Contracted Research/Research Grant (principal investigator for a drug study, collaborator or consultant and pending and current grants). If you are a PI for a drug study, report that research relationship even if those funds come to an institution.; Tietronix Software, Inc.  
S.A. Hetherington: A. Employment/Salary (full or part-time);; Employment,
Theme H Poster

025. Teaching Neuroscience to Graduate Students

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 25.07SA/DD28

Topic: H.02. Teaching of Neuroscience

Support: University of Saint Mary QUEST Grant

Title: Bringing neuroscience from classroom to the community

Authors: *R. XIA;
Dept of Physical Therapy, Univ. of St. Mary, Leavenworth, KS

Abstract: Neuroscience is a required course in doctoral physical therapy (DPT) curriculum. Being part of the core curriculum, this course is the first of a longitudinal thread of contents associated with the neurological system and with clinical management of populations having neurological disorders. In the DPT program at the University of Saint Mary in Kansas USA, the neuroscience course is offered in the spring semester of the first academic year. Specifically, this course is designed to provide future physical therapists with knowledge about the structure, organization, and function of the nervous system. Contents also include clinical correlates between the lesion in the nervous system and dysfunction, therapeutic interventions in management of signs and symptoms as a result of neurological disorders, and research evidence underlying effectiveness of treatment. In an effort to participate in the Brain Awareness Campaign in March 2015, all students who enrolled in the neuroscience course during the current semester delivered poster presentations throughout communities within the greater Kansas City areas such as nursing facilities, university libraries, community centers, and grade schools. A variety of topics were covered in students’ presentations including but not limited to “the creative brain,” “speech, language and brain,” “concussion,” “effects of stress on brain,” and “amyotrophic lateral sclerosis” etc. Research associated with respective topics was also presented in each poster. In summary, the impact and benefit of this outreach activity are multiple folds, e.g., promotion of increased public awareness and understanding of the importance and contributions to human health of the brain research, potentiality for advocating for research funding, and opportunities for students practicing how to communicate complex
materials with lay audiences and sharing the knowledge gained from classroom and laboratory with people of all ages in local communities.

**Disclosures:** R. Xia: None.

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**Theme H Poster**

**025. Teaching Neuroscience to Graduate Students**

**Location:** Hall A

**Time:** Saturday, October 17, 2015, 1:00 PM - 5:00 PM

**Program#/Poster#:** 25.08SA/DD29

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

**Support:** PAPIME PE300715

PAPIIT IN305715

**Title:** An analysis about the necessities of knowledge integration in neuroscience in a population of university students and professors

**Authors:** *D. B. PAZ-TREJO*¹², P. TORRES-CARRILLO¹, J. VAZQUEZ-RAMIREZ², P. ZARATE-GONZALEZ², H. SANCHEZ-CASTILLO¹²;

¹Univ. Nacional Autonoma de Mexico, Mexico City, Mexico; ²Sociedad Iberoamericana de Neurociencia Aplicada, Mexico City, Mexico

**Abstract:** The main goal of the course was to provide students with a general overview of cognitive processes from a molecular and behavioral perspective. These by linking neuroscience research in both molecular and cognitive areas in the pursuit of integration of knowledge. For this, we designed a 20 hours course with 14 experts from institutions that include the Neurobiology Institute (INB-México), the Universidad Católica de Temuco (UCT-Chile) and UNAM’s Psychology School. The course was hosted by this last institution and it was here where the call had more impact. However, we had on line transmission with constant audience. The course was supported by the “IBRO-LARC Short Courses funding”. We designed the course with 17 specialized conferences and 3 integration boards that had the purpose of recall the main ideas of the conferences, their meaning and to discuss that with the students. Thirty-eight aspirants send application. From these, 31 postgraduate and bachelor students from advanced semesters in neuroscience completed the formal registration. We applied a questionnaire before the course looking for the evaluation of the specific area of interest of students and their perspective of the importance of multi and transdiscipline. We also applied another version of
this questionnaire at the conclusion of the course. From PRE we have 22 questionnaires and from POST we have 18. From de 31 students that conclude inscription process, 2 never showed up. Of those who attended the course, 21 students had over the 50% of assistance and 8 students had below this 50%. From these indicators, we estimate a 61.29% of assistance volume and 67.74% of effective on-site audience. We also perform interviews to the academics with questions about the supposed cliff between neuroscience researches in molecular and cognitive areas. These materials were video recorded with the consent of the academics. From both perspectives, academics and students, it was noticed the need of scenarios where students and investigators can freely interact and the integration of knowledge in all Neuroscience areas. With all these and our data analysis, we conclude that the course was successful in achieving its goal and in providing a first approximation in the satisfaction of the presented needs.


Theme H Poster

025. Teaching Neuroscience to Graduate Students

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 25.09SA/DD30

Topic: H.02. Teaching of Neuroscience

Support: "The research leading to these results has received funding from the European Union Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 604102 (HBP)"

Title: Transdisciplinary education in the human brain project

Authors: *E. WINTERSTELLER, C. RIEDL, A. SARIA; Exptl. Psychiatry Unit, Med. Univ. Innsbruck, Innsbruck, Austria

Abstract: The European flagship research project “Human Brain Project” (HBP) was launched in October 2013. The innovative and transdisciplinary research approach of the HBP requires a convergence of education and training in neuroscience, medicine and ICT. As element of the HBP, the HBP Education Programme is developing and implementing a teaching strategy tailored to the project. In a situation in which ICT and the life sciences are converging and in which biology is ever more important for medicine, the specialist nature of current curricula makes it difficult for the HBP and for society to recruit personnel with the transdisciplinary skills they need. The HBP PhD Curriculum will consist of five syllabi. Three syllabi will cover the
three main research areas - neuroscience, medicine and ICT - and two syllabi will focus on complementary topics - research, ethics and societal impact as well as IPRs and translation and exploitation of research. The complexity of the consortium involving over 100 partners internationally requires innovative forms of online education in which webinars are complemented by face-to-face workshops. A recent survey among 159 students already working in the project indicates that 30% would for sure and 42.5% might enrol in a HBP PhD graduate school rather than enrolling in a PhD programme offered at the university they are affiliated with. Therefore we conclude that the strategy of the HBP Education Programme will be well received by the target community. It can be expected that knowledge transfer will be triggered across the project and with the broader scientific community, stakeholders and industry.

Disclosures:  E. Wintersteller: None. C. Riedl: None. A. Saria: None.

Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.01SU/DD31

Topic: H.03. Public Awareness of Neuroscience

Title: Neuroscience programs at IARPA

Authors: *R. VOGELSTEIN, A. H. RUSSELL, B. S. MINNERY;
Office of the Director of Natl. Intelligence, Washington, DC

Abstract: The Intelligence Advanced Research Projects Activity (IARPA) is an organization within the Office of the Director of National Intelligence that invests in high-risk, high-payoff research to tackle some of the most difficult challenges in the Intelligence Community. As part of this mission, IARPA sponsors several applied research programs that use multidisciplinary approaches to advance our understanding of cognition and computation in the brain. Recent and ongoing neuroscience programs include:

• Integrated Cognitive-Neuroscience Architectures for Understanding Sensemaking (ICArUS), which uses models to understand how the human brain is able to make sense of sparse, ambiguous data;
• Knowledge Representation in Neural Systems (KRNS), which seeks insights into the brain’s representation of conceptual knowledge;
• Machine Intelligence from Cortical Networks (MICrONS), which will reverse-engineer the algorithms of the brain to revolutionize machine learning; and
• Strengthening Human Adaptive Reasoning and Problem-solving (SHARP), which will develop non-invasive neural interventions for optimizing reasoning and problem-solving. IARPA is always seeking novel ideas aligned with our mission. If you are interested in working with IARPA through one of our existing solicitations, prize challenges, requests for information, or other mechanisms, please visit http://www.iarpa.gov/index.php/working-with-iarpa.

Disclosures:  R. Vogelstein: None. A.H. Russell: None. B.S. Minnery: None.

Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.02SU/DD32

Topic: H.03. Public Awareness of Neuroscience

Title: Society for neuroscience Ottawa chapter - continued growth and success

Authors: *K. FARMER¹, N. RUSTOM², S. SANTONI², S. KING², M. BEDARD², N. PROWSE², C. CRUMP², Z. DWYER², S. COATES², S. CHIN², S. BELLEVUE², J. HOWELL², E. ALI², K. DIXON², M. WELLMAN², R. WOODS², J. K. SZYSZKOWICZ², A. ABIZAID²; ¹Neurosci., ²Carleton Univ., 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 fourth annual edition of the “Brain and Mental Health Art Show”. A continuing and growing success, this show is hosted at a trendy downtown art gallery, and saw submissions from students at all levels from elementary school to graduate school, professors and medical doctors, and members of the community. Roughly 250 people attended the opening exhibition, and our silent auction raised $3500 for Ancoura, a local charity that provides low-cost community housing for individuals with mental illnesses. By bringing people from a diverse variety of backgrounds together, this event did a great deal to stimulate discussion and raise awareness about issues related to the brain and mental health. We also continued our successful Brain Awareness Week campaign, with over 60 volunteer presenters reaching approximately 3000 elementary and high school students in the Ottawa region. This year also marked the third annual Ottawa Brain Bee, where we bring together students from local high schools for a brain trivia competition. With respect our second and third aims, we are celebrating the start of Synapse, a new local ejournal connecting neuroscience students from across Eastern Ontario. Additionally, 2014 saw the
expansion of the Ottawa Chapter to include all major research institutions in Ottawa. 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 capital region. Over the course of our many successful events, our primary goal has been to bring the research community and the public sector together, thereby raising awareness about neuroscience research, mental health, and the beauty that we see in the brain.


Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.03SU/DD33

Topic: H.03. Public Awareness of Neuroscience

Support: CU Boulder Office for Outreach and Engagement

Title: Promoting child brain development and health through classroom neuroscience education

Authors: J. AYERS\textsuperscript{1}, A. VERBURG\textsuperscript{1}, D. GRIESE\textsuperscript{1}, L. MCWHIRTER\textsuperscript{1}, E. HOBBS\textsuperscript{1}, J. TORRES\textsuperscript{1}, C. KRAFT\textsuperscript{1}, B. NICKOLOFF\textsuperscript{1}, V. WILLIAMS\textsuperscript{1}, E. METZGER\textsuperscript{1}, D. FARRANT\textsuperscript{1}, B. ORTIZ TORRES\textsuperscript{1}, J. ROYTH\textsuperscript{1}, M. T. BANICH\textsuperscript{2,1,3}, M. K. LEBOURGEOIS\textsuperscript{1}, *N. K. SPEER\textsuperscript{1}; \textsuperscript{1}Intermountain Neuroimaging Consortium, \textsuperscript{2}Inst. of Cognitive Sci., \textsuperscript{3}Psychology & Neurosci., \textsuperscript{4}Integrative Physiol., Univ. of Colorado Boulder, Boulder, CO

Abstract: The University of Colorado (CU) Boulder’s Intermountain Neuroimaging Consortium (INC) is at the forefront of research on the role of healthy lifestyle choices such as good sleep habits and exercise in the prevention and treatment of brain-related illnesses and disorders. Given the importance of this research for our community’s health and well-being, the overarching goal of the INC’s outreach efforts is to bring CU research directly to the community through targeted neuroscience classes and local community lessons. In this program INC faculty, staff and a graduate student trained 14 CU undergraduates from neuroscience and related majors in classroom management and cognitive development. The undergraduate students then designed
and delivered targeted lessons to local elementary classrooms. Lessons focused on how information is transmitted to and from the brain, as well as ways that children can enhance their brain’s development and function through healthy lifestyle choices (i.e., sleep habits, exercise, nutrition, stress management, abstaining from drug use and brain injury prevention). Lessons were age-appropriate in content and activities. The undergraduate teaching team reached over 800 elementary students including many Title I schools, over 60 K-12 educators, and approximately 50 members of the public in the 2014-2015 academic year. The inclusion of undergraduates enhanced their educational experience and afforded a much broader outreach effort, expanding the reach of the program to more students, educators and community members than in the program’s previous year. Student and teacher responses were overwhelmingly positive. Teachers consistently rated the lessons as having a high degree of applicability and accessibility to their students, and spontaneously incorporated lessons into their own classroom routines. The program is expanding in 2015-2016 to include middle and high school classes, parents and educators. Additionally, we are looking for avenues to directly interact with and receive feedback from students and parents, to expand our marketing strategies to include a larger website and social media presence and to develop more concrete data collection tactics to measure how the lessons are informing kids’ choices around exercise, nutrition, sleep, stress management, and injury prevention. This program gives students the tools to make choices that enhance their brain’s health and development and enables them to incorporate this information into their everyday lives.


Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.04SU/DD34

Topic: H.03. Public Awareness of Neuroscience

Support: COLCIENCIAS 712-2013. 110156933548

Title: Retrospective study of mother-child attachment during the first year of life and its relation with development in preschool
Authors: J. J. LARA-AVELLA\textsuperscript{1}, J. CAICEDO-MERA\textsuperscript{1}, *Z. DUENAS\textsuperscript{2};
\textsuperscript{1}Physiological Sci., \textsuperscript{2}Univ. Nacional De Colombia, Bogota DC, Colombia

Abstract: One of the most important elements for human being development is the mother-child bond during the first year of life, given that this stage is related to a critical neurological maturation period. In Colombia common socioeconomic and cultural conditions such as the lack of economic resources, job instability, teenage motherhood, parental abandonment and family conflicts may influence early separation or poor consolidation of the mother-child attachment. The present project aims to assess the quality of mother-child bond, the parenting patterns during the first year of life and its possible impacts on the development of preschool children belonging to different schools in Bogotá D.C city (Colombia). Mothers of preschool-age children who participated in the study have different socio-economic strata. An instrument developed and validated by research group was applied in order to evaluate attachment. To assess possible effects of early attachment on preschoolers a standardized instrument named Abbreviated Scale of Development was applied to their teachers. Dimensions of scale include different areas such as cognitive, social, artistic abilities, acceptance of himself and adaptability to the environment. Results show that domestic abuse correlates with difficulties in learning and memory process of preschool-age children. On the other hand, maternal depression during pregnancy was associated with difficulties in social interaction and lower creativity levels in preschoolers. Shortest time of contact in mother-child bond was correlated with learning and memory troubles, problems in self-acceptance and internalization of habits in children. As conclusion, impact of quantity and quality of time devoted to mother-child bond during the first year of life could be evident in preschool development, affecting cognitive and social performance. These findings may be relevant to improvement of social and educative policies in Colombia.

Disclosures: J.J. Lara-Avell: None. Z. Duenas: None. J. Caicedo-Mera: None.

Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.05SU/DD35

Topic: H.03. Public Awareness of Neuroscience

Title: NIH contributions to the BRAIN Initiative
Authors: A. Adams¹, G. Farber¹, T. Insel¹, W. Koroshetz¹, M. Mott¹, K. Ramos¹, N. Talley¹, *S. L. White², A. Willard¹; ²Office of Scientific Liaison, ¹NIH, Bethesda, MD

Abstract: The Brain Research through Advancing Innovative Neurotechnologies (BRAIN) InitiativeSM is an ambitious undertaking aimed at revolutionizing our understanding of the human brain. Accelerating the development and application of innovative neurotechnologies will enable researchers to produce a dynamic picture of the brain that, for the first time, shows how individual cells and complex neural circuits interact in time and space. It is expected that application of these new tools and technologies, developed and tested in multiple species, will ultimately lead to new ways to treat, cure, and even prevent brain disorders. The National Institutes of Health (NIH) is one of five federal agencies involved in The BRAIN Initiative. With widespread input from the scientific community, the BRAIN Working Group of the Advisory Committee to the NIH Director developed “BRAIN 2025: A Scientific Vision.” A roadmap to achieve the long-term goals of the Initiative at NIH, BRAIN 2025 focuses on seven scientific priorities 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 our unique cognitive and behavioral capabilities. The NIH BRAIN Multi-Council Working Group (MCWG), which includes ex officio representatives from the other federal agencies as well as external scientific advisors from the 10 Institutes and Centers (ICs) that contribute to BRAIN at NIH, provides input and guidance for ongoing scientific plans. The NIH ICs supporting the Initiative include: NCCIH, NEI, NIA, NIAAA, NIBIB, NICHD, NIDA, NIDCD, NINDS, and NIMH. NIH Funding Opportunity Announcements (FOAs) 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. The scientific priorities highlighted in new FOAs for fiscal year 2016 will be outlined in this poster. Filling major gaps in current knowledge of the brain will require partnerships outside the federal government. Already partnering with private entities and academic institutions across the U.S., NIH hopes to further the goals of BRAIN through international agreements as other countries develop their own “Brain” initiatives. Additional details and updates on funding opportunities and events related to the NIH BRAIN Initiative are routinely published on the website www.braininitiative.gov, where visitors can access documents related to scientific planning for the Initiative, like BRAIN 2025, as well as links to efforts at other federal agencies and the projects of current awardees.


Theme H Poster
Title: Beware of food commercials on television, and TV programs without commercials are not trustworthy either: they can bias our attention to food and make us fat

Authors: *K. R. VIACAVA*¹, G. WEYDMANN², A. TIETZE², M. DUARTE², R. SANTOLIM³, B. FELIZARDO⁴, L. BIZARRO⁵;
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Abstract: Evidence indicates that repeated exposure to food commercials on television (TV) can trigger automatic consumption of food, increasing the risk of obesity. Investigating this issue has become a pressing matter not only to safeguard the population from the risk of exposure to misleading advertising, but also to support policy formulation more specifically related to the protection from unhealthy food marketing. Thus, the present study investigates the role of exposure to TV commercials for unhealthy food on attentional bias for food images. Participants were 54 young adults (18-25 years; 27 female; 18.50-24.99 BMI) who completed a Visual Probe Task in which pairs of food and non-food images concealed a probe (up or down arrow) for either 100ms, 500ms or 2000ms. A faster reaction time to the probe when it is preceded by an image of food indicates attentional bias. Questionnaires assessing subjective hunger (Grand Hunger Scale) and positive and negative emotions (PANAS) were administered pre and post one of three-20min TV programming conditions: “food commercial,” “non-food commercial,” and “no commercial.” We hypothesized that attentional biases for food images would (i) be present and (ii) be stronger in participants exposed to a high density of unhealthy food commercials on TV compared to controls. We found evidence of attentional bias for stimulus onset asynchrony (SOA) 100ms compared to 2000ms, F(2, 26) = 3.70, p = .03, in the “food commercial” group, thus confirming our first hypothesis. Our second hypothesis was not supported. Results also show that watching TV may increase subjective hunger regardless of TV programming, F(1, 45) = 31.63, p < .001, and alter emotions (changing positive, F(1, 45) = 26.88, p < .001, and negative, F(1,45) = 31.63, p < .001, valences toward a more neutral state). Exposure to food-related commercials seems more likely to affect subjective hunger, t(14) = -2.27, p = .03, though the same cannot be said about emotions. Altogether, these results represent an attempt toward...
identifying possible risk factors for increased energy intake in young adults, and provide additional subsidies for the formulation of protection policies.


Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.07SU/DD37

Topic: H.03. Public Awareness of Neuroscience

Support: NIH grant P60AA011605

Title: Brain Tricks - Sensation and Perception: an interactive exhibit for Brain Awareness Week and beyond

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

Abstract: Can you always believe your eyes? How about your senses of sound, touch and smell? For Brain Awareness Week, the UNC Bowles Center for Alcohol Studies sponsored the interactive exhibit “Brain Tricks - Sensation and Perception” at the North Carolina Museum of Life and Science in a hands-on laboratory exhibit area. Visitors entered the lab area and first explored the human brain by observing and touching a postmortem human brain as well as sheep, dog, shark and rodent brains. Scientists talked with visitors about brain function and which parts of the brain control various senses. At the second station, scientists showed visitors one way that the brain can trick our senses - in the McGurk effect, which demonstrates that what we see (lip-reading) can override what we hear (the sounds “Baa,” “Daa” or “Vaa”). This is a robust illusion that works even when you know what is going on! The third station used scented balloons to illustrate a Stroop-like effect - it is easier to identify an odor (cherry, lemon) when it is presented in a balloon of a congruent color (red, yellow) than if the color does not match the odor. We also had examples of optical and tactile illusions (e.g., the “Aristotle illusion” and the “dead hand trick”). The exhibit was staffed by >40 scientists and students from UNC and Duke University, and approximately 550 children and 200 adults came through the exhibit over 5 days! When asked their favorite activity, children answered “[the] brain, because it’s squishy and fun,” “I [heart] everything! The balloons smell so good!” and “I was quite fond of the auditory
illusion.” When asked what they learned, one child answered “your brain expects the obvious.” Next, we adapted the activity to an outdoor venue at the UNC Science expo, part of the state-wide North Carolina Science Festival. We showed animal brains in jars and had optical illusions. We added a perceptual size-weight illusion, where people will perceive a smaller box as heavier than a larger box, even when they are the same weight. We also used distortion goggles that shift visual perception in ways that mimic high blood alcohol levels and guarantee poor motor coordination on a bean-bag toss game. At all events, brochures from SAMSHA and the National Institute on Alcohol Abuse and Alcoholism were distributed and conversations on science outreach and brain health (wearing a helmet, eating healthy food, protecting our brains from drugs and alcohol) were encouraged. Funded by the Education Core of the UNC Alcohol Research Center (National Institute of Alcohol Abuse and Alcoholism, P60AA011605, “Molecular and Cellular Pathogenesis in Alcoholism: Education Core”, PI: Fulton T. Crews).

quality and nighttime release of anabolic hormones such as growth hormone and insulin growth factor. In the second outreach activity, high-level athletes from Crossfit Terminus in Atlanta, Georgia kept sleep diaries designed by the American Academy of Sleep Medicine (n=4). The diaries tracked hours and time of sleep, exercise, and recovery with cryotherapy. Coincidentally, sleep logs could control for Daylight Savings. The athletes averaged 8.5 h of sleep a night, which is in line with the recommended amount of sleep for adults (8.4 h), but far above the average of 6-7 h reported by the National Sleep Foundation. There was also a "weekend effect" in that the athletes slept 40 minutes more on the weekend, which is also common for the general population. Despite this extra sleep on the weekends, self-report of sleep quality did not change.

When days of cryotherapy were measured against hours of sleep and sleep quality, there was a statistically significant impact; the athletes slept more and had better quality sleep even when controlling for the weekend effect, exercise, and Daylight Savings. To conclude, education about healthy sleep hygiene combined with physiological recovery tools such as cryotherapy are essential for competitive athletes to maintain high volumes of training.

Disclosures: A.J. Brager: None.

Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.09SU/DD39

Topic: H.03. Public Awareness of Neuroscience

Title: Northwestern University Brain Awareness Outreach cultivates excitement for neuroscience within the Chicago community

Authors: L. K. SHANAHAN, N. M. FREDERICK, N. E. BUSH, E. B. RYAN, *S. R. MCIVER; Interdepartmental Neurosci. Program (NUIN), Northwestern Univ., Chicago, IL

Abstract: Founded in 2010, Northwestern University Brain Awareness Outreach (NUBAO) is a graduate student-led organization consisting of graduate and undergraduate students, postdoctoral fellows, and research staff representing a broad range of departments and academic programs at Northwestern University. NUBAO aims to educate the Chicago community about the brain through the use of fun, hands-on activities that demonstrate a multitude of neuroscience concepts. In an effort to reach a broader audience, NUBAO organizes a variety of events designed to bring neuroscience to K-12 students, science educators, senior citizens, and the
general public. 1) The Annual Brain Awareness Fair is an open house-style event for K-8 students and their families. It consists of several interactive booths that demonstrate a variety of neuroscience topics. 80 NUBAO members volunteered at this year’s Brain Awareness Fair, which was held in partnership with Lake View High School. The event featured 22 booths and attracted over 500 attendees from 50 Chicago neighborhoods, representing ~100 different schools. 2) Held in partnership with the Chicago Chapter of SfN, the Brain Awareness Teachers Workshop is a professional development workshop designed to inform K-12 science educators about neuroscience research and to provide them with the tools necessary to integrate neuroscience into their classrooms. Held for the third consecutive year, 16 science educators attended this year’s event where they learned about neuroanatomy, sensorimotor systems, motor adaptation, and learning and memory. 3) In a newly-established partnership with Walter Payton High School, NUBAO implemented a 16-week neuroscience seminar series where graduate students were invited to present on topics of their choosing, often related to their thesis work. The goal was to expose high school students to more complex neuroscience topics in an effort to inspire them to pursue higher education in neuroscience. The seminar series culminated in a field trip to various Northwestern laboratories, and a select group of students were chosen for summer internships in neuroscience research. 4) Finally, NUBAO initiated a new partnership with Willa Rawls Manor Home Apartments, a senior living community located in the Bronzeville neighborhood of Chicago. NUBAO presents short neuroscience talks, often focusing on healthy aging. Through this multi-tiered approach, NUBAO continues to make neuroscience accessible to all levels of the Chicago community, while volunteers benefit from the opportunity to communicate science to a broader audience.


Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.10SU/DD40

Topic: H.03. Public Awareness of Neuroscience

Support: Grant, Portland Alcohol Research Center, OHSU

Grant, WSU Vancouver College of Arts and Sciences

Grant, Regional Arts and Culture Council (Multnomah County)
$1/pint from Velo Cult (www.velocult.com) for public presentations

**Title:** NW Noggin: Collaborative brain/art educational outreach in the Pacific Northwest - students, scientists and artists teach and learn about neuroscience through art

**Authors:** *W. S. GRIESAR, J. LEAKE; Neurosci., Washington State Univ. Vancouver, Vancouver, WA

**Abstract:** Science requires significant public investment, and engaging the broader community is key to communicating discoveries and building support for research. Urban areas are often home to universities with research and education programs in neuroscience, along with schools teaching science to K-12 students. There are also art colleges, organizations, and vibrant arts communities eager to contribute to STEM educational efforts (STEAM). Yet despite a strong shared interest, these various students, disciplines and the broader public rarely interact. Here we describe a successful and innovative effort (nwnoggin.org) to involve them all in learning about the brain. There are positive reasons to get together. Graduate students, particularly at institutions without an undergraduate program, such as OHSU in Portland, Oregon, may struggle to gain teaching experience. They are less competitive for jobs that require classroom expertise. Undergraduates are curious about graduate opportunities in neuroscience, which may be lacking at their own university. They want to know what research involves, what experience they need to be competitive, and what studies are underway. The chance to work with graduate students teaches them about graduate school, and about currently funded research. Collaborative outreach also benefits undergraduates by reinforcing concepts learned in class. In addition, studies suggest that, in middle and high school, students are either excited or discouraged by science. Building enthusiasm for inquiry into the natural world, including the brain, can enhance interest. Efforts to reach the public about scientific discovery contribute to fascination, understanding and support for more research and education. Effective integration of art increases engagement, makes learning relevant, and allows students to explore scientific concepts by creating objects they share with family and friends. During the last academic year (2014-15), our students from OHSU, Washington State University Vancouver (WSU-V), Portland State University (PSU) and the Pacific Northwest College of Art (PNCA), developed and delivered their own short and long term courses to over 3000 academic priority K-12 students in the Portland/Vancouver area. In addition, we partnered with a Portland bicycle pub (Velo Cult) and offered monthly collaborative presentations from students studying neuroscience and art. These efforts informed more than 500 community members about research, and trained graduate students to more accessibly describe their work.

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

**Theme H Poster**
026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.11SU/DD41

Topic: H.03. Public Awareness of Neuroscience

Title: Two levels of consciousness to understand own life and brain systems - education program of “gnothi seauton - knowing yourself through your body”

Authors: *Y. ATOMI¹, M. SHIMIZU¹, E. FUJITA¹, T. ATOMI²-³, N. HIROSE³, K. HASEGAWA⁴;
¹Tokyo Univ. of Agr. and Technol., Tokyo, Japan; ²Dept. of Frontier Hlth. Science, Div. of Human Hlth. Sci., Grad. Sch. of Tokyo Metropolitan Univ., Tokyo, Japan; ³Dept. of Physical Therapy, Fac. of Med. Sci., Teikyo Univ. of Sci., Uenohara, Yamanashi Pref., Japan; ⁴Inst. of Space and Astronautical Sci., Japan Aerospace Exploration Agency, Sagamihara, Kanagawa Pref., Japan

Abstract: When we think about our human beings, life scientific knowledge is so important, however it has been not connected to our existence having two levels of consciousness, which are systems organizing memory-relating and body-mind relation. Education is essential for not only understanding ourselves but also formation of our knowledge itself as a basis of science. Previous methods of Humanities education can be divided into two types. The first is the method of knowledge transfer, and the second is the one with only practice. By either type of education method we cannot know own possibility and mechanism of self-learning and self-recognition, which may be characteristic of human beings to form a basis of science of consciousness. This study shows new type of education system to “know thyself (gnothi seauton), which has been introduced to 3000 first-year students of Japanese some universities from the academic year of 2006 until now. In particular we focus on and discuss the importance of two new fields of recently developed life and brain sciences that had not been academically recognized in the physical education learning. Only human beings can learn and realize ourselves through scientific visualization of “own action” and representation of their own activities with words. This method is based on understandings of two systems of life, such as cells in our body and body, both of which are a unity of living system. We are able to scientifically understand both and connect them through active motions/doing something planned to be understandable. Since both systems of cells and body (because we human beings belong multi-cellular organism) might be evolved under the gravity on the earth, force production with energy transformation against gravity is essential for sustain living conditions. Therefore the cytoskeleton including microtubule and actin filaments inside of the cell is essential for our living system connecting outer filamentous system like collagens, which make our body system. Principles of both life and
brain are “activity (use-, output-) dependent system, of which example at cellular level are gene
expression, protein synthesis and degradation workable under cell theory to keep homeostasis, as
well as body level, of which example softness, resilience, balance realizable and obtainable in
physical practice of yoga meditation and Tai-chichuan associating with consciousness. This new
management of oneself through action with scientific visualization of our body-mind system can
be regarded as “human sustainability” and constitute one part of the area of “Alliance for Global
Sustainability to keep earth environment”.

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

**Theme H Poster**

**026. Teaching Neuroscience: Community Outreach**

**Location:** Hall A

**Time:** Sunday, October 18, 2015, 8:00 AM - 12:00 PM

**Program#/Poster#:** 26.12SU/DD42

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

**Support:** NIH AR47410

**Title:** ARRIVE guidelines for pre-clinical animal studies are underused in excitatory amino acid
receptors and pain research

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

**Abstract:** Background: Guidelines for Animal Research: Reporting of In vivo Experiments
(ARRIVE) were created to improve research reporting and to decrease research redundancy with
animal models. These guidelines often have been under-utilized within animal pre-clinical
studies. In the current study, we examined the use of ARRIVE guidelines in the excitatory amino
acid receptor (EAAR) plus pain literature. EAARs are located on the peripheral terminals of
nociceptive sensory afferents and glutamate, released from afferents and other sources, activate
and sensitize peripheral sensory nerve terminals via EAARs. Aim: To investigate the use of the
ARRIVE guidelines in pre-clinical animal studies from the EAAR plus pain literature. Method:
PubMed was used to search Medline to obtain the primary studies with the following search
string: “((((((Excitatory amino acid receptors) AND Pain) AND Behavioral) AND Peripheral))
OR (((((Excitatory amino acid receptors) AND Pain) AND Behavioral) AND electrophysiology))
OR (((((Excitatory amino acid receptors) AND Pain) AND Behavioral) AND microdialysis))”.

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*Y. Atomi, M. Shimizu, E. Fujita, T. Atomi, N. Hirose, K. Hasegawa*
Two hundred thirteen Studies were located from this search and coded using the ARRIVE guidelines. **Results:** Initial analyses indicate a significant under-utilization of the ARRIVE Guidelines when reporting on study methodology. Several components of the ARRIVE guidelines were not fully utilized within the EAAR plus pain literature. **Conclusion:** The use of the ARRIVE guidelines is a relatively new and unused assessment tool for reporting animal research. Use of the ARRIVE guidelines would provide a more systematic means of reporting animal research. Further analysis of the use of the ARRIVE guidelines within other areas of pre-clinical literature also needs to be conducted.

**Disclosures:** B.K. Carr: None. M. Vassar: None. K.E. Miller: None.

**Theme H Poster**

**026. Teaching Neuroscience: Community Outreach**

**Location:** Hall A

**Time:** Sunday, October 18, 2015, 8:00 AM - 12:00 PM

**Program#/Poster#:** 26.13SU/DD43

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

**Support:** Bloomsburg University Curricular Enhancement Grant

DANA Foundation

**Title:** Bloomsburg University’s 5th annual Brain Awareness Week: Outreach to preschool, elementary, middle, and high school by undergraduates in central Pennsylvania

**Authors:** *J. A. JOHNSON, K. A. BYRNE, C. M. DUNN, F. L. ELEZOVIC; Psychology, Bloomsburg Univ., Bloomsburg, PA

**Abstract:** Bloomsburg University (BU) participated in its 5th annual Brain Awareness Week (BAW) in Spring 2015. We held 7 off-campus events at local schools within the community. 112 BU undergraduate Psychology majors (some double counted due to participating more than once) presented interactive brain-related activities to 383 local school students. For the preschool, we presented a total of 6 activities to 50 preschool students during 1-hour visits. Undergraduate Psychology majors presented the activities to small groups of 3 to 4 children. The activities included Match Card game, Mr. Egghead (helmet safety), Playing with Sound, Texture Hunt, Animal Brains (match weight to animal), and Ceramic Brains (coloring activity). At the elementary schools, we presented 6 activities to a total of 121 students during 1-hour visits. Undergraduate Psychology majors presented the activities to small groups of 3 to 4 students. The
activities included Brain Plasticity, Animal Brains, 3D Hand Drawing, Sheep Brain Anatomy, Mr. Egghead, and Taste and Smell. Students rated their overall enjoyment of the activities 9.64 (with 10 high) and Sheep Brain Anatomy was voted the most popular activity. We presented interactive activities to a total of 174 middle school students during 30-60 minute visits. Undergraduate Psychology majors presented the activities to small groups of 2 to 5 students. Activities included Zombie Brains, Mr. Egghead, 3D Brain Hand, Mirror Tracing, Phantom Limb Illusion, Visual Illusions, and Homunculus Mapper (http://www.maxplanckflorida.org/fitzpatricklab/homunculus/). Students rated their overall enjoyment of the activities 8.3 of 10, and chose Homunculus Mapper and Visual Illusions as the most popular activities. Our high school visit was part of a service-learning project completed by senior Psychology majors enrolled in a course called Mythbusters (taught by author JJ). 19 undergraduate students created posters based on the book Great Myths of the Brain by Christian Jarrett (2014). The activities included: Dreaming (the unconscious and lucid dreaming), Sleeping (adolescent habits), Decapitation and Consciousness, Neurogenesis, The Senses (More than 5!), Phantom Limb, 10% Brain Myth, and Visual Illusions. Each activity lasted about 5 minutes and was presented to groups of 2 to 5 students. 38 total high school students participated and rated the activities 8.9 out of 10. The Dreaming and Decapitation activities were voted the most popular. An on-line survey assessed attitudes of the Psychology majors who participated in BAW. 26 responded and rated their overall enjoyment 9.3 and their likelihood of participating in next year’s BAW 9.9 (both out of 10).

Disclosures:  J.A. Johnson: None. K.A. Byrne: None. C.M. Dunn: None. F.L. Elezovic: None.

Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.14SU/DD44

Topic: H.03. Public Awareness of Neuroscience

Title: Florianópolis’ Brain Awareness Week 2015: outreach children to elderly in south of Brazil

Authors: *A. GUERRA DE SOUZA, E. PAVESI, M. GIACHERO, C. H. DE PIERI, T. C. M. DE LIMA;
Univ. Federal De Santa Catarina, Florianópolis, Brazil
Abstract: The Pharmacology Department of Universidade Federal de Santa Catarina (UFSC) has been promoting the Brain Awareness Week (BAW) over the past four years in partnership with the Danna Alliance and Brazilian Society of Neuroscience and Behavior (SBNeC). We propose to propagate the basic knowledge of Neuroscience to general public in a local mall during the week, given to the success of our exhibition last year, reaching over thousand members of the community. Our BAW 2015 theme was “Do you know what goes on in your head?” which represent our general aim of getting people of all ages to understand how brain works in different situation, as well increase the curiosity about the perception and the senses. This year, besides the improvement of existing modules, we also included new activities, such as multigenerational games and a space to explore differences in synaptic transmission in the elderly. Volunteer students, as well postdocs of the Pharmacology Department at UFSC orientated the visitors about the brain function. The main addressed subjects were aging and neurodegenerative diseases, such as Parkinson’s and Alzheimer’s diseases, learning and memory, and sleeping. Popular psychology myths, drug addiction, and keeping an aging brain healthy were topics abundantly discussed. Books and videos related to neuroscience were available to visitors who were also encouraged to play memory and logic games. Puzzles, paintings, and drawings were accessible to children. People participated of two interactive stations; the first one consisted of a sensory station to explore hearing, touch, smell/taste, and sight with optical illusions. The second station was directed to observe the features of neuronal and glial cells and to understand the basic principles of synaptic communication, likewise the differences in the elderly brain. The members of the community reported enjoyment participating in the campaign and most of them mind to visit the University raising awareness about neuroscience research. Overall, Florianópolis’ BAW 2015 in the mall was a successful program that will continue through the years to bring neuroscience knowledge from children to elderly.


Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.15SU/DD45

Topic: H.03. Public Awareness of Neuroscience

Support: Morehead State University
Title: 2015 regional brain awareness program in eastern Kentucky

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

Abstract: Activities involved community outreach through lectures, presentations, and dissemination of science information. This year’s goal was to target over 1500 people in the Eastern Kentucky region, and we exceeded our goal through visits to schools (4th-12th grades) and a brain drawing contest (K-12th grades). In previous years, school visits were made to high schools (9th-12th grades). This year, school visits were further extended to elementary and middle schools. School visits included lectures on brain function, focusing on the effects of drugs on the brain and behavior, as well as distribution of educational materials on brain health and brain research. Educational materials were provided by the Society for Neuroscience, the Dana Foundation, and the National Institute of Health. The Brain Drawing Contest enhances brain awareness among students (K-12th grades), and it involves collaborative efforts among different groups in the community—parents, teachers, and administrators. As in previous years, we received over 800 entries, with themes specific to each grade. Judging was done by twelve student judges, eight faculty-member judges, and a community representative. Judging was based on originality, scientific accuracy, and overall design. Continuing participation and support from the community reflect an important impact of our regional program on Eastern Kentucky.


Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#Poster#: 26.16SU/DD46

Topic: H.03. Public Awareness of Neuroscience

Support: Mississippi Chapter of the Society for Neuroscience

The Dana Alliance for Brain Initiatives

Title: Expanding brain awareness week

Authors: L. GOLDEN\textsuperscript{1}, A. ROLLER\textsuperscript{1}, P. DAVIS\textsuperscript{2}, *M. A. LEA\textsuperscript{2}, J. DUNCAN\textsuperscript{1}, N. BOOKER\textsuperscript{1}, M. SCHMIDT\textsuperscript{1};
Abstract: A basic understanding of science is essential to modern life. In spite of this, neuroscience is often perceived as too complicated, too esoteric, and inaccessible to the uninitiated. To encourage curiosity, The Society for Neuroscience and The Dana Foundation created Brain Awareness Week (BAW) in 1996 to promote outreach events each year. Our Mississippi Chapter of the Society for Neuroscience has partnered with these organizations to make neuroscience approachable, understandable, relevant and fun to young people in our community. Here, we show our group’s most recent participation in BAW activities in 2015. A group of faculty and students from The University of Mississippi Medical Center (UMMC) and Millsaps College performed various activities and demonstrations for young children at Brown Elementary School and The Mississippi Children’s Museum in Jackson, MS. Some of our outreach activities included: 1) constructing paper brain hats depicting cortical regions and functions; 2) a microscope to visualize immunostaining of real neurons and give a sense of scale; 3) teaching the basic types and components of a neuron by building ‘play neurons’ with colored pipe cleaners; 4) displaying brains from various animals; 5) optical illusion demonstrations; 6) displaying MRI images; and 7) teaching brain electrical activity with live EEG signals. Overall, these activities engaged children’s interest and introduced various neuroscience aspects. These projects serve as models for others who wish to provide elementary-level education on neuroscience, or engage youths in BAW activities. These projects have continued our tradition of "edutaining" elementary-aged children through the fun exploration of the brain. In 2016, we will integrate clinical neurology with basic sciences in our "Time is Brain" campaign. We have identified other ways to engage a broader audience such as distributing brain games in local publications, trivia nights, and teaching elderly populations and their caregivers about brain health.

Support: NIH Grant T32 NS 041231-15

Title: Increasing neuroscience awareness in the capital across generations: BAW 2015

Authors: *E. BRIGNONI-Perez, S. M. ASHBURN, C. E. LEONARD;
Interdisciplinary Program in Neurosci., Georgetown Univ., Washington, DC

Abstract: One of the strongest pillars for the Interdisciplinary Program in Neuroscience (IPN) at Georgetown University (GU) is our commitment to education about neuroscience and its impact in society. In 2012 we restarted Brain Awareness Week (BAW) efforts at GU by welcoming 7th and 8th grade students from a public middle school in the District of Columbia. As part of our efforts to bridge the gap between the scientific and general communities, this year we expanded our outreach by offering for the first time the Annual GU Free Neuroscience Public Lecture. This inaugural event provided an opportunity for non-scientific individuals to experience three short and interactive talks about state-of-the-art research in neuroscience from distinguished professors at GU. Moreover, the attendees (over 80) had direct interaction with the speakers during a Q&A panel discussion as well as a reception, where they asked questions and posited ideas about brain research, social benefits, and educational initiatives. Volunteer graduate students from the IPN and other graduate programs included in the GU Medical Center Graduate Student Organization planned, coordinated, and executed the event in collaboration with the NeuroPolicy Affinity Group of the American Association for the Advancement of Science and the SfN-DC Chapter. In addition, during BAW we hosted two events targeting other populations who might not otherwise have direct access to neuroscience experiences. First, we welcomed approximately 100 students from the public middle school that we have been collaborating with since 2012 on the GU campus. After a group welcome, students rotated through seven hands-on stations, led by IPN students, to learn about the brain. Topics included human anatomy, animal behavior, neuron communication, reflexes, and more. Second, we organized a movie night for both undergraduate and graduate students from GU in which we screened a popular movie, Memento, to highlight the influence of neuroscience in film productions. We provided educational handouts comparing how the film portrays memory loss and what would actually occur, and future events will include a moderated discussion with a researcher in the field. Thanks to the tireless commitment of our GU students, faculty, and community, we have been able to successfully reach out to a broader spectrum of audiences, and we look forward to continuing this growth and improvement in the future.

Disclosures: E. Brignoni-Perez: None. S.M. Ashburn: None. C.E. Leonard: None.

Theme H Poster

026. Teaching Neuroscience: Community Outreach
Abstract: The FSU Neuroscience outreach program has become influential in Leon County, increasing neuroscience awareness every year. During the 2014-15 academic year, graduate students visited high school classrooms, hosted the ninth annual North Florida Brain Bee and fourth annual Brain Fair, supervised a collaborative undergraduate outreach event, and will participate in community educational events throughout the summer. In the fall, we visited 26 classes at five different high schools and used hands-on demonstrations to teach about the five sensory systems. In total, over 750 high school students were reached. The neuroscience students also coordinated the Friday Neuroscience Lectures, a free 9-week course to prepare high school students for the North Florida Brain Bee. Held in early 2015, the Brain Bee attracted 27 participants from two Tallahassee high schools and one high school in Atlanta, GA. With funding provided by our program and generous contributors, the winner of the competition was sent to compete at the USA National Brain Bee Championship in Baltimore, MD. The competitor, a high school senior, placed 34th out of 43 participants. In addition to our high school outreach, we held the Brain Fair, an open house event to educate K-12 children and their parents on basic neuroscience. Advertised with the theme, “Brain Safari”, the event had 19 different activity stations including interactive demonstrations to teach children and their families about the basic functions of the brain, neurons, sensory systems and the importance of neuroscience research. The Brain Fair attracted approximately 220 people from Leon County in combination with neighboring counties in north Florida and south Georgia. Further bolstering our efforts, we had significant contributions from two undergraduate organizations, the Neuroscience Undergraduate Student Association (NUSA) and Connecting Experimental Lab and Life Sciences (CELLS). With the incorporation of NUSA and CELLS, we have taken major steps forward in reaching more of the community. This year, both organizations jointly hosted their own event, the Undergraduate Brain Fair, where they exhibited demonstrations highlighting basic neuroscience to the undergraduates at FSU. The event reached over 80 students with 22 student members participating in the event. Lastly, our program is expanding our efforts into the summer, with participation in events geared towards helmet safety and workshops showcasing basic neuroscience to children. Supported by the 2014 SfN Chapter Grant, FSU Program i
Neuroscience, Congress of Graduate Students, Student Government Association, and contributions from faculty and private donors.


Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.19SU/DD49

Topic: H.03. Public Awareness of Neuroscience

Support: Gorrepati Foundation

Title: The 2015 United States regional brain bee championship and limbic learning

Authors: *J. D. GREENSPAN¹, S. C. TRYON², N. MYSLINSKI¹; ¹Dept Neural and Pain Sci., Univ. Maryland Dent. Sch., Baltimore, MD; ²Exercise Sci., Univ. South Carolina, Columbia, MD

Abstract: After two days of intense competition, the 2015 USA Regional Brain Bee Champion is Soren Christensen. The Brain Bee is a neuroscience competition for high school students. A record 52 Chapter winners from 33 states competed at the University of Maryland, Baltimore. Soren goes to Thomas Jefferson High School. He won a scholarship, a summer internship at a Georgetown University’s Department of Pharmacology & Physiology, and the right to represent the USA at the seventeenth International Brain Bee (IBB) Championship in Australia where he will compete against the regional champions from approximately 20 countries such as Australia, Brazil, Canada, China, France, Germany, India, Italy, Japan, Kenya, Korea, Malaysia, New Zealand, Romania, Singapore, Turkey, Ukraine, and others. The IBB Championship will be hosted by the Australasian Neuroscience Society, the International Society for Neurochemistry and the Asian-Pacific Society for Neurochemistry at their combined convention in Cairns, Australia (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 with microscopes, and a final question-and-
answer component. To advance to the USA Championship, Soren had to win the Washington, DC Chapter Brain Bee Competition coordinated by Emily Dilger of the Society for Neuroscience and hosted by the AAAS. Soren’s Patient Partner was Himal Bikma. “Patient Partners” is a new component of the USA Brain Bee where student competitors are matched with patients. If the student wins, then the partner also wins a financial prize. It focuses on the real purpose of the Brain Bee, helping the people with brain disorders. 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 30 World-Wide Regional Brain Bees. It utilizes Limbic Learning to motivate young men and women to learn about the brain, and inspire them to consider careers in the basic and clinical neurosciences. Limbic Learning is a new term referring to emotion-enhanced learning. The enhancement is dependent upon the limbic system, or emotion circuits, of the brain, especially the amygdala (See Limbic Learning Poster). Dr. Myslinski says, “We need future clinicians and researchers to treat and find cures for neurological and psychological disorders. We build better brains to fight brain disorders.”

**Disclosures:**  
J.D. Greenspan: None. N. Myslinski: None. S.C. Tryon: None.

**Theme H Poster**

**026. Teaching Neuroscience: Community Outreach**

**Location:** Hall A  
**Time:** Sunday, October 18, 2015, 8:00 AM - 12:00 PM

**Program#/Poster#:** 26.20SU/DD50

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

**Title:** The 2015 International Brain Bee championship

**Authors:** *D. SEMINOWICZ<sup>1</sup>, N. R. MYSLINSKI<sup>1</sup>, L. J. RICHARDS<sup>2</sup>;  
<sup>1</sup>Dept of Neural & Pain Sci., Univ. of Maryland, Baltimore, Baltimore, MD; <sup>2</sup>Queensland Brain Inst. and Sch. of Biomed. Sci., The Univ. of Queensland, St Lucia Campus, Brisbane, Australia

**Abstract:** Future neuroscientists from around the world met in Cairns, Australia to compete in the 17th International Brain Bee (IBB) Championship coordinated by Prof. Linda Richards. The Brain Bee is the preeminent neuroscience competition for teenage high school students. The event was hosted and sponsored by the International Society for Neurochemistry and the Australasian Neuroscience Society at their convention with the Asian-Pacific Society for Neurochemistry in August. Additional major sponsors included James Cook University, the University of Queensland and the Queensland Brain Institute as well as donations from individuals to support competitors from specific countries. Worldwide there are 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 (and their coordinators) were Australia (Linda Richards), Brazil (Alfred Sholl-Franco), Canada (Judy Shedden), China (Jiangjie Yu), Germany (Julianne R McCall), India (Seema Raghunathan), Italy (P. Paolo Battaglini), Japan (Tetsu Okumura), Kenya (Nchafatso Gikenyi), Korea South (Seong-Whan Lee), Macau (Thomas Lao), Malaysia (Jafri Malin Abdullah), Nepal (Sarun Koirala), New Zealand (S Louise Nicholson), Nigeria (Polycarp Nwoha), Poland (Elzbieta Malgorzata Pyza), Romania (Cristian Gurzu), Tanzania (Rashidi Mussa), United Arab Emirates (Sathy Parvathy), United States (Norbert Myslinski) and Wales (Vanessa Davies). The IBB’s purpose is to motivate young men and women to learn about the human brain, and to inspire them to enter careers in the basic and clinical brain sciences. Dr. Norbert Myslinski founded the IBB in 1998 with 12 local chapters in North America. 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. The 2016 IBB championship will be hosted by the Federation of European Neuroscience Societies at their convention in Copenhagen, Denmark.


Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.21SU/DD51

Topic: H.03. Public Awareness of Neuroscience

Title: Braintells: a teaching model for educating students and families on cognitive deficits

Authors: *S. O. AHMAD⁴, C. BRASIC-ROYEEN⁴, C. PROVAZNIK⁴;
⁴Doisy Hlth. Sciences: Office of Occup. Therapy, St. Louis Univ., Saint Louis, MO; ²Occup. Sci. and Occup. Therapy, St. Louis Univ., St. Louis, MO
Abstract: The Decade of the Brain sponsored by the US government has ended but has resulted in the general population of the US having a better understanding of the brain and brain function (1). There is a need, however, to go beyond the Decade of the Brain and continue to increase neuroscience literacy among the population (2) and among health care professionals (3). In this manner, they can monitor daily activities of clients and of populations and simultaneously monitor aspects of brain function of those involved (4). A novel method of monitoring aspects of brain function, “Brain Tells,” is presented in this paper as one tool for observational monitoring of individuals and populations. “Brain Tells” is adapted from poker parlance wherein a “tell” is a giveaway or information provider about the hand the card player is holding. Similarly, a “Brain Tell” is a giveaway or information provider that signals possible irregularity of brain function. Widespread dissemination of the model “Brain Tells” will enable occupational therapists to have one more tool in their toolboxes to monitor brain function of clients during daily activity. The model is based upon a mnemonic, BRAIN TELLS (B=behavioral change, R=excessive rage, A=excessive aggression, I=intimacy issues, N=numbness of feeling, T=tics and tremors, E=elevated levels of action, L=changes in language capacity, L=limited ability to discern danger to self or others, and S=signs of sympathetic nervous system dominance). Using the most common diagnostic categories of brain dysfunction in the US today (Alzheimer’s, epilepsy, multiple sclerosis, Parkinson’s disease, stroke, and brain injury), illustrative examples of use of the mnemonic for identification of potential brain irregularity will be presented. Finally, survey data gathered from the AOTA meeting on professional and caregiver utility will be presented. (1) Project on Decade of the Brain. http://www.loc.gov/loc/brain Retrieved June 6, 2014. (2) Egolf, D. E. (2012). Human communication and the brain. Lexington Books: Langam, MD. (3) Hamell, K.W. (2004). Dimensions of meaning in the occupations of daily life. Canadian Journal of Occupational Therapy, Volume 71, Number 5, 296-305. (4) Chiel, H.J., Beer, R.D. (1997). The brain has a body: adaptive behavior emerges from interactions of nervous system, body, and environment. Trends in Neurosciences, Vol. 20, Issue 12, December 1997, 553-557 (doi: 10.1016/s0166-2236(97)01149-1).


Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.22SU/DD52
**Topic:** H.03. Public Awareness of Neuroscience

**Title:** Assessment of “Get to Know Your Brain!”: A neuroscience educational outreach event

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

**Abstract:** “Get to Know Your Brain!” is a neuroscience educational outreach event designed to educate community members in the greater Oakland area regarding the brain. Overall goals for this program are to educate participants regarding basic neuroanatomy, neurophysiology and neurological disease states in order to make healthy lifestyle choices regarding brain health and safety. This outreach event has completed its 5th year and participant surveys have been given for each of the 5 years. The feedback from participant surveys was compiled and suggestions were implemented to enhance the program. Additional changes were made to the design and implementation of the outreach event due to observations of program coordinators and student volunteer feedback.

**Theme H Poster**

**026. Teaching Neuroscience: Community Outreach**

**Location:** Hall A

**Time:** Sunday, October 18, 2015, 8:00 AM - 12:00 PM

**Program#/Poster#:** 26.23SU/DD53

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

**Support:** QNRF/NPRP 6-089-3-021

**Title:** The paradox of arsenic: anticancer drug or toxicant?

**Authors:** *A. M. FLOREA¹, D. BÜSSELBERG²;*
¹Heinrich Heine Univ. Düsseldorf, Uniklinikum, Düsseldorf, Germany; ²Weill Cornell Med. Col. in Qatar, Doha, Qatar

**Abstract:** Arsenic is an important contaminant found in environment. Nevertheless, arsenic compounds (e.g. As2O3) are used for hundreds of years in human’s treatment. Arsenic effects are paradoxal: it is threatening for human’s health, especially upon chronic exposure that can induce the development of cancer; however, arsenic is used as drug against cancer. Nevertheless, arsenic positive and negative features still represent today a large unknown. Arsenic compounds are metabolically methylated inside of living cells, a process that is rather a toxification than a detoxification since the trivalent methylated arsenic compounds are more toxic than the
inorganic contra parts. Furthermore, arsenic is able to interfere with vital cellular processes such as calcium homeostasis and trigger cell death by apoptosis. Thus, a state of art overview on the interaction of arsenic with living organisms is shown.


Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.24SU/DD54

Topic: H.03. Public Awareness of Neuroscience

Support: World Federation of Neurology

Title: Introducing the multinational neurocysticercosis awareness campaign

Authors: *M. BORZELLO, S. CLARK, S. S. CASH, F. MATEEN; Neurol., Massachusetts Gen. Hospital, Harvard Med. Sc, Boston, MA

Abstract: Neurocysticercosis (NCC) is caused by Taenia Solium, commonly known as the pork tapeworm. Person-to-person transmission of T. Solium in endemic areas is likely the primary route by which the infection is spread. The current burden of NCC is undocumented since precise estimations of prevalence are unavailable in most countries. In several locations in Africa, Asia, the Western Pacific, the Caribbean, and Latin America, NCC is a leading cause of epilepsy and likely the most common cause of preventable epilepsy. In these same locations, neurologists are few if not entirely absent. NCC is a preventable condition and may be reduced by simple, often free, behavioral changes that lead to reduction of the transmission of T. solium. For example, basic hand-washing and food preparation cleanliness can significantly reduce transmission. Despite the obvious mitigating factor of education, a surprising lack of combined effort has been put towards cost-effective educational initiatives in the global public health community. To address this, we have launched a Multinational Neurocysticercosis Awareness Campaign in spring 2015, funded by an educational grant of the World Federation of Neurology. The primary aim of this study is to design and implement educational materials on prevention, transmission, and treatment of NCC for (a) the general public, (b) community health care workers, and (c) physicians, focused on countries where NCC is endemic. Use of popular cartoons, photographs, videos, and practical medical information have been incorporated into a campaign for physicians and patients. The secondary aim is to improve the network of
neurologists and neurology-focused generalists for creation of an international team, able to disseminate educational information for neurological patients. Thus far, materials are being organized for distribution to the Kingdom of Bhutan and Timor-Leste, and translation efforts are ongoing for Spanish-speaking populations in South America and the Caribbean. NCC requires a collective private-public partnership for successful elimination of T. solium, a reasonable and worthy goal that could lift the burden of preventable neurological disorders through basic awareness. We hope these efforts, currently focused on just one disease, may soon act as a model of crowdsourcing for neurologists and neuroscientists, so that educational materials can offset the severe lack of neurological care and information in resource-limited settings.

**Disclosures:** M. Borzello: None. S. Clark: None. S.S. Cash: None. F. Mateen: None.

**Theme H Poster**

**026. Teaching Neuroscience: Community Outreach**

**Location:** Hall A

**Time:** Sunday, October 18, 2015, 8:00 AM - 12:00 PM

**Program#/Poster#:** 26.25SU/DD55

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

**Title:** The AIRInforma experiment: peer-reviewed public dissemination of science in Italy

**Authors:** I. CRISTOFORI\(^1,2\), F. FORNERIS\(^3,2\), L. CASSETTA\(^4,2\), *G. GRASSELLI\(^5,2\), C. SALVI\(^6,2\), T. GRAVINA\(^7,2\);

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**Abstract:** Public dissemination of science is often negatively affected by biased, incorrect information distributed over the internet through social networks and blogs. In Italy, the lack of correct scientific information has generated several important issues, raising concerns by the international scientific community in several occasions over the past five years. Our association AIRIcerca (International Association of Italian Researchers, www.airicerca.org) has recently started a novel scientific dissemination initiative to the general public in Italy. The project is based on 1) direct involvement of researchers (with academic or industrial affiliation) in article
preparation and publication and 2) introduction of a peer-reviewing system similar to that applied in conventional scientific publishing. Our initiative, named AIRInforma (informa.airicerca.org) has already published more than 10 original articles and 3 meeting reports, in Italian language, about various fields of scientific research, ranging from social sciences to evolutionary biology, mathematics, and medicine. The editorial board is composed of approximately 20 Italian scientists working all over the world and voluntarily contributing to AIRInforma. Submitted manuscripts are evaluated by the editorial board and, if suitable, they are assigned to four non-anonymous reviewers selected by the editorial board for accurate evaluation. Two reviewers are selected based on their specific expertise on the topic presented in the manuscript (expert reviewers), and two are specifically selected as working on distant fields (naive reviewers). The purpose of naive reviewers is to provide feedback on the efficacy and clarity of the information for the general public. So far, AIRInforma has established a novel channel of scientific communication in Italy, receiving excellent feedback and reaching more than 8000 new unique visitors every month on our website and social network communication pages. Established collaborations with other scientific blogs will facilitate the expansion of our public and of our pool of authors, which is constantly growing. After the initial success of our initiative, we are considering to convert AIRInforma into an effective scientific publication by obtaining digital object identifiers for our articles to increase their impact, and facilitate their dissemination. We are strongly convinced that correct scientific information to the public will be more and more relevant in the future, and we are confident that AIRInforma will contribute solid milestones of correctness and scientific accuracy to the complex landscape of scientific communication in Italy.


Theme H Poster

026. Teaching Neuroscience: Community Outreach

Location: Hall A

Time: Sunday, October 18, 2015, 8:00 AM - 12:00 PM

Program#/Poster#: 26.26SU/DD56

Topic: H.03. Public Awareness of Neuroscience

Support: SfN Early Career Policy Fellowship

Title: New to science policy? The “Whys” and “Hows” of delving into the world of advocacy
Authors: *R. D. HENDRIX;*  
Dept. of Neurobio. & Developmental Sci., Univ. of Arkansas For Med. Sci., Little Rock, AR

**Abstract:** Current budget cuts to the funding of scientific advancement are affecting millions of people’s lives. This includes not only the hundreds of thousands of scientists that conduct cutting edge research, but also the public that reaps the benefits of utilizing these advances. The duties of being a scientist include keeping the public informed of the benefits of science and communicating to elected officials the importance of scientific funding. It is not always obvious to the scientist where these opportunities exist. Being a 2015 SfN Early Career Policy Fellow has allowed me to become familiar with the tools SfN provides to all neuroscientists interested in opening dialog with both the general public and elected officials. This year I took a more active role in my chapter’s Brain Awareness Day activities that resulted in greater graduate student involvement. A plan to boost attendance and increase chapter involvement next year seeks to greater incorporate social media. Social media sites are becoming crucial battle grounds for bridging the gap between scientists and the general public, and even our elected officials. Navigating how to use them effectively can serve as an easily accessible option to promote outreach. For example, as part of my fellowship, I attended my first Hill Day and was able to utilize social media throughout the day to capture the attention of the Senators’ and Representatives’ offices I visited. Hill Day is a worthy experience that opened up communication with staff in order to follow up and plan a laboratory site visit. While it may seem like a daunting task, nothing can replace the experience of seeing science first hand. Knowing what tools your institution and SfN provide can allow any neuroscientist to become an effective advocate.

**Disclosures:** R.D. Hendrix: None.

**Theme H Poster**

026. Teaching Neuroscience: Community Outreach

**Location:** Hall A

**Time:** Sunday, October 18, 2015, 8:00 AM - 12:00 PM

**Program#/Poster#:** 26.27SU/DD57

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

**Title:** Creating a unified voice to advocate for science

**Authors:** *M. W. MCNERNEY, S. FARRIS;*  
Early Career Policy Fellow Program, Society for Neurosci., Washington, DC
Abstract: Legislators in Washington, DC make crucial decisions about funding agencies that directly impact scientific research. Over the past 10 years, these agencies have experienced a decrease in purchasing power due to budgetary constraints. This is likely from a combination of the overall drop in the federal budget, increases in mandatory appropriations, and the lack of a constant dialogue between scientists and Washington, DC. As SfN Early Career Policy Fellows, our primary goal is to increase communication about neuroscience research among local scientists, members of the community, and legislators. This includes participating in the SfN-sponsored Hill Day to visit Congressional offices, speaking with local government officials, organizing events in the community, and utilizing social media. One effective way to bring together scientists and legislators is to host a science policy town hall. Your elected official can answer questions from scientists and create a meaningful dialogue about the benefit of scientific research to your community. Another critical component in advocacy is passing along advocacy advice and experiences to fellow scientists so we can create a louder and more uniform voice in Washington, DC. The SfN early career policy fellowship establishes an active advocacy network of scientists with whom to share progress and successes with. By continuing to advocate effectively, we can be sure that the community will hear our needs, and legislators will think twice before reducing funding for scientific research.

Disclosures: M.W. McNerney: None. S. Farris: None.

Theme H Poster

027. Ethical and Policy Issues in Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 27.01SA/DD58

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

Support: W&M Creative Adaptation Fund

Title: Supporting neurological difference on college campuses: the neurodiversity initiative at the College of William & Mary

Authors: *J. A. BURK, J. L. ZEMAN, K. A. WULF, J. E. ROBISON, C. L. DICKTER; Psychology, Col. of William & Mary, Williamsburg, VA

Abstract: Neurodiversity is an emerging civil rights movement that embraces and accepts individuals with neurological differences. Individuals with a variety of diagnoses, including Attention Deficit/Hyperactivity Disorder and dyslexia, could be considered neurodiverse,
although this movement largely originates from the autism community. Neurodiverse students represent a significant portion of the population on college campuses. A Neurodiversity Working Group has been developed at the College of William & Mary with the goal of supporting a campus climate that is more welcoming to neurodiverse students, by considering their unique strengths and challenges. Our Neurodiversity Working Group includes students, faculty, staff, administrators as well as representation from Residence Life and the Counseling Center. Bringing these groups to the same table helps to achieve a more complete picture about the experiences of neurodiverse students on college campuses. The Neurodiversity Working Group has focused on three domains: student activities, teaching, and research. Student activities have included invited speakers to campus along with student-led activities and workshops to support awareness of neurodiversity. For teaching, we developed a set of “Hidden Rules” PowerPoint slides that make implicit rules for interacting in a seminar more explicit and are continuing to develop more of these presentations for other settings. Further, we team-taught an interdisciplinary 1-credit course on Neurodiversity, including inviting several neurodiverse speakers. We teach this course at William & Mary as well as at our Washington, D.C. office. Finally, we conducted research to better understand the neurodiverse population at William & Mary, including stereotypes toward these individuals. Ongoing research studies are designed to assess executive function and emotional face processing differences between neurodiverse and neurotypical individuals. Future goals include building upon our course and programmatic development.


Theme H Poster

027. Ethical and Policy Issues in Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 27.02SA/DD59

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

Title: Research Integrity and misconduct

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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) and the Office of Research Integrity (ORI) of the U.S. Department of Health and Human Services (HHS). 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. 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). In recent times, with increasing public awareness, there has been a rise in the number and complexity of FFP research misconduct cases. In this poster, we will present the processes for NSF OIG and ORI in handling allegations and the investigational proceedings, notable trends, case study summaries, and forensic tools utilized for data and image analyses.


Theme H Poster

027. Ethical and Policy Issues in Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 27.03SA/DD60

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

Title: Cognitive testing and mental health policies: Translation concerns with mobile technology

Authors: *K. RUGGERI*¹², J. L. ANDREWS¹, S. MENON³, E. MARTIN³, Á. MAGUIRE³; ¹Dept. of Psychology, ²Dept. of Engineering, Engin. Design Ctr., ³Dept. of Engin., Univ. of Cambridge, Cambridge, United Kingdom
Abstract: Context: Policies regarding cognitive decline generally advise against national dementia screening programmes, though approaches such as incentivising diagnosis equate to de facto standard practice. There are concurrent calls for expanded use of mobile platforms in testing cognitive function, often replacing traditional tests completed on pen and paper in the presence of a professional. This work examines implications of such new practices, generating evidence on the impact utilising mobile platforms for testing cognitive function. It is designed as an original study to inform policy, emphasising key topics from cognitive psychology, neuroscience and psychometrics. Methods: A mobile version of an existing cognitive test was piloted and compared to a traditional pen and paper version, with a common comparator test for both groups. Sixty healthy participants (aged 50 to 79) completed both measurements. Differences were tested between overall outcomes, individual items, and relationship with the comparator. Results: Though populations had similarly positive cognitive function and showed no difference on the comparator, there were differences in overall scores between versions as well as within individual items. Some items were also not possible to translate directly into the mobile version, meaning direct comparison is not always appropriate. Conclusion: Cognitive tests on mobile platforms do not necessarily replicate items or findings from traditional versions, meaning new normative standards are necessary for even when items can be directly translated. Furthermore, these must fit ageing populations with significant variance in familiarity with mobile technology. The adaptation of items has further implications for regions of the brain actually being tested, and further research is required to assess not only what different areas of the brain are employed, but how this difference in activity relates to test outcomes. Greater understanding of the interplay and related mechanisms between auditory and visual systems, which are not well understood yet in the context of mobile technologies, is also required. The role of cognitive neuroscience will be critical in addressing these gaps as well as critical for policies that involve use of new platforms for testing cognitive function.


Theme H Poster

027. Ethical and Policy Issues in Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 27.04SA/DD61

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

Title: Ethical considerations in autism research
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Abstract: The rapid rise in autism diagnoses over recent years has been paralleled by a dramatic increase in autism-related research. While this surge in research has increased awareness of autism spectrum disorder and improved treatment options for patients, discussions amongst the research community about topics surrounding ethical issues related to autism research have been rather limited. The pace of current research makes it necessary to continually evaluate and discuss a number of ethical, social, and philosophical topics related to autism research. This poster will detail some of the questions and concerns related to both human and animal studies investigating the neural bases of autism spectrum disorder.

Theme H Poster

027. Ethical and Policy Issues in Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program# / Poster#: 27.05SA/DD62

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

Support: Royal Society University Research Fellowship (CM)

Title: Integrating neuroscience and health psychology to improve the effectiveness of behaviour change interventions

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Abstract: Many of society's most pressing and costly health problems can be substantially reduced or prevented if individuals can be helped to change their patterns of unhealthy behaviour. For example it has been estimated that obesity will affect ~50% of the US population by 2030 with a health care cost of over $50 billion per year [1]. Changing behaviours relating to diet and exercise are therefore of paramount importance for future societal health and wealth. Despite much research in recent decades, the science of behaviour change is still at an early stage and we are a long way from achieving the full potential of behaviour change approaches for improving health. Currently, the theory and research used to influence behaviour change interventions are rooted in the rapidly growing field of health psychology. At the heart of this approach are theories about why individuals behave as they do, which are then used to generate
ideas about which factors should be targeted in order to promote changes in behaviour. We argue that the effectiveness of behaviour change interventions could be greatly enhanced if insights and advances from research into the brain were better integrated into these approaches. Research in neuroscience addresses the biological basis of the processes that drive much of our behaviour. For example, brain imaging and other techniques have helped to elucidate the neural circuitry associated with engaging in risky behaviours, decision making, and social reasoning. Other studies have provided insights into how goal setting or the inhibition of undesired behaviours are implemented within the brain. These processes are exactly the target of behaviour change interventions. We argue that it is possible to make better links between health psychology and neuroscience in order to guide the development of more effective behaviour change interventions, and improve health. We will outline results of both systematic and narrative literature reviews that seek to identify: (a) the current level of integration of neuroscience into health psychology; (b) areas of neuroscience that demonstrate strong potential to improve the effectiveness of behaviour change interventions; (c) mechanisms and barriers relating to the necessary improvements in cross-disciplinary research activity.


Theme H Poster

027. Ethical and Policy Issues in Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

Program#/Poster#: 27.06SA/DD63

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

Title: Broadening participation in neuroscience STEM professions: Impact of disparities in federal funding for neuroscience training

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Abstract: Fifty years after the civil rights movement, the participation gap for underrepresented minorities (URM) remains a persistent demographic feature of the American STEM workforce (1-3). URM persons (African Americans; Native Americans; Hispanic Americans) are an untapped human resource that is predicted to comprise over 50% of the U.S. population by 2060.
Broadening participation in STEM professions through the achievement of postsecondary degrees has emerged as a national priority, and a necessity for retaining international research competitiveness. STEM training is typically an expensive and time-intensive venture that relies on the master-apprentice/mentor-protégé model for the transfer of disciplinary expertise and for professional socialization. Research presented here was undertaken to examine trends in the allocation of NIH awards for neuroscience research education over a 10 year period (2000-2014). The approach implemented text-based queries of NIH Reporter, a data repository that permits analysis of US government expenditures for biomedical research and education (~80,000 grants/year). CSV data files retrieved using keyword query terms such as “minority”, “cancer”, and “neuroscience” were analyzed using filters such as “%T32%” and “%R25%”. Data were analyzed to identify demographic funding gaps by assessing the relative funding for states and/or institutions with high numbers of underrepresented minorities. The data show that T32 and R25 awards for neuroscience research education are predominantly awarded to institutions and states where URM persons are few in number. For example, in 2014, 289 “neuroscience” T32 grants ($79,385,949) were awarded to 90 institutions of which only one is a minority serving institution (retrieved 05/06/15). Moreover, 10 metagateway institutions were recipients of ~35% of “neuroscience” T32 funds; none are characterized by high numbers of URM students and all but one have endowments in the billions. Therefore, policies that aim to increase the number of URM neuroscientists must address the paradox that due to funding disparities, URM students are unlikely to participate in NIH neuroscience research education grants under the current awards infrastructure.

(3) http://publications.nigms.nih.gov/trainingstrategicplan/theme4.htm

Theme H Poster

027. Ethical and Policy Issues in Neuroscience

Location: Hall A

Time: Saturday, October 17, 2015, 1:00 PM - 5:00 PM

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

Support: Sigma Xi Honorary Research Society Grant-in-aid

The National Science Foundation Graduate Research Fellowship

The University of Cincinnati Neuroscience Graduate Program
Title: Creating a connection: science advocacy amongst legislators

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Abstract: Neuroscientists are in an excellent position to explain to lawmakers the critical importance of scientific research to human health and economic development. As the majority of research is supported by taxpayer dollars, the scientific community is also obligated to communicate how this money is put to use and hopefully demonstrate tangible outcomes. Conversely, federally funded research dollars for the NIH and NSF have remained stagnate over the past decade. Scientific progress requires reliable, long-term and robust funding bases to achieve its goals. Scientists, therefore, must embrace taking on new roles beyond the lab bench to explain why and how scientific research is important to both legislators and the general public. Hosting a lab tour with a federal or state representative is one potentially fruitful avenue to advocate for scientific research. Scheduling and hosting such an event, however, may appear daunting, but following a general guideline and knowing what to expect can facilitate this process. First is to create a connection. To assist in this process, many universities have a government relations office, often located at the university or the state capital. Meeting with a representative from this office to go over the logistics of invitations, scheduling, a lab tour walk-through, etc., is extremely valuable. Next, an official letterhead invitation should be sent out to your representative(s), along with follow up phone calls. Scheduling a visit is often done months in advance, and these meetings are typically scheduled when congress is in recess and legislators are in their home district. Most congressional offices are receptive to such visits and can schedule the representative or a staffer for the tour. During the lab tour, you will want to begin with a short description of your research and why it is important in basic, non-scientific terms. Because most legislators do not have a scientific background, jargon and complex explanations should be avoided. Throughout the rest of the tour, you should have small “demos” to illustrate important tools for collecting data. At the end of the tour, one may want to further discuss advocacy-related issues in a conference room or office. Lastly, you will want to thank your representative for their time and include an invite for future interactions. A successful lab tour, along with many other activities, can help educate our lawmakers about how understanding the brain impacts society, with a particular focus on human health. Together, ongoing efforts in science advocacy will be critical for the future of neuroscience, both in terms of funding and the policies created which affect scientific research.

Disclosures: R.A. Makinson: None.
Assessing the impact of team, multidisciplinarity, and collaboration in neuroscience research publications

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Abstract: This study assesses the impact of multidisciplinarity and team size on collaboration. Collaboration has been identified by bibliometricians as having an integral role in research productivity and performance. Co-authorship has been previously studied in terms of single authorship, institutional, national, and international collaboration, but few publications have analyzed the combined impact of collaboration, multidisciplinarity, and team size on research quality. Neuroscience articles published in the United States between 2003 and 2012 were identified using the Elsevier database, Scopus. Team collaboration types were determined based on co-authors’ location and multidisciplinarity was determined by assigning a researcher to a discipline based on his or her publication history. Articles were considered either uni- or multi-disciplinary based the subject area(s) of the author(s). Multivariate analyses were then performed to test the effect of multidisciplinarity and collaboration on team size. This study found that large neuroscience teams benefit from having collaborators of different disciplines, while small teams performed better when all co-authors are neuroscientists. There were also subtle differences between collaboration types. In large teams, national collaborations were the most cited, followed by international collaborations, with institutional collaborations being the least impactful. This study suggests that the formulation of a team has significant impact on citations and that the relationship between multidisciplinarity, collaboration, and the quality of neuroscience research, depends on team size. It provides policy makers, funding agencies, and research administrators a quantitative means of assessing collaboration in the field of neuroscience.

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