



Neuroscience News

Twenty-Third Annual Neuroscience Poster Session



The BRI held its annual Neuroscience Poster Session in the Ackerman Union Grand Ballroom. Hundreds of students, faculty and staff participated, viewing over 150 posters on the latest research from UCLA's neuroscience laboratories and facilities.

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Message from Chris Evans, Director of the Brain Research Institute

The Brain Research Institute is a complex, multi-faceted operation that is considerably greater than the sum of its individual parts. It functions as a collection of specialized branches – research, education and outreach – working together in a diffuse way to make a powerful whole. When all these units work as they should, individually and in concert, much can be accomplished.

The human brain is just as complicated and ever-changing. If we apply ourselves to a particular task long enough, our synapses and neurons will form new circuits to perform more efficiently. As the BRI Director, it is my privilege to watch the synapses and neurons of the BRI transform a collegial sharing of ideas into specialized units – the Affinity Groups – that are dedicated to expanding particular fields of knowledge.

The BRI was founded to encourage inherent plasticity in its endeavors. It is fitting, then, that the latest innovation in cross-collaboration takes a step beyond the Affinity Groups in forming the new Neuroscience Integrative Centers of Excellence in the areas of Learning and Memory and in Neurogenetics. These are the first of what will be many multidisciplinary Integrative Centers designed to maximize areas of particular strength in neuroscience at UCLA.

In this issue we profile ICLM faculty member Dean Buonomano, a member of the Integrative Center for Learning and Memory, whose research has changed our conception of how the brain keeps time – a function underpinning our ability to understand language, appreciate music, and make sense of memory. Professor Buonomano is well known and respected among neuroscientists, and his recent book, "Brain Bugs," has raised his profile with the public at large with its examination of how the brain's flaws affect our lives.

As always, this issue of *Neuroscience News* offers a selection of some of the notable research that has emerged in the last few months from the laboratories of our members, as well as a sampling of the expert commentary they have offered to the media.

Neuroscience News aims to reflect the BRI as a community, as much as a scientific organization. I am pleased to note this issue welcomes 2011's incoming students to the Interdepartmental PhD Program for Neuroscience at UCLA (NSIDP), and features a recap of the lively reception they enjoyed at the NSIDP Retreat.

The BRI community extends off-campus as well. The Institute is host and co-sponsor of the Los Angeles Brain Bee, a competition encouraging high school students to learn about neuroscience. This year I am happy to report that Los Angeles winner Thanh-Liem Huynh-Tran went on to win the National Brain Bee in Maryland, and triumph to become the worldwide champion at the International Brain Bee in Florence, Italy.

Efforts to increase public awareness of neuroscience such as Dr. Buonomano's book are in keeping with the Brain Research Institute's work to foster excellence and innovation in the neurosciences, exemplified by its Integrative Centers, the NSIDP, and sponsorship of the Brain Bee competition. In this newsletter, you will find many more examples of such inspiring stories. We hope you enjoy them.



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Local Student Wins International Brain Bee

Thanh-Liem Tran sponsored by BRI for qualifying events

Most high school students come back from summer trips to Italy with souvenirs – paperweights in the shape of the Tower of Pisa, prints of the Sistine Chapel, and postcards of the canals of Venice. Thanh-Liem Tran came home with a much weightier memento in his suitcase: the trophy commemorating his triumph at the International Brain Bee, held this summer in Florence.

Tran, now a senior at the Cate School in Carpenteria, was the winner of the 2011 Los Angeles Brain Bee, which was hosted by L.A. City College and supported by the BRI and the USC Zilkha Neurogenetic Institute. As such, he qualified for the U.S. National Brain Bee in Maryland, and became the first Californian to win the national title.

The competition in Florence was held in conjunction with the International Brain Research Organization (IBRO) World Congress of Neuroscience. The participants came from 12 countries on five different continents, and were immersed in neuroscience even when not directly in competition.

Tran said that the time spent with his fellow competitors was inspiring.

“We all became great friends during the time we spent together during the 8th IBRO World Congress of Neuroscience. During the competition itself, the atmosphere remained a friendly one, and everyone was a good sport,” he recalled.

“I really enjoyed the final dinner with the other competitors and IBB coordinators. For a few hours, we forgot about the competition entirely and started discussing drivers’ licenses, final exams, Harry Potter, and other teenage concerns. It really goes to show that friendly competitions aren’t myths.”

The competition was nonetheless intense. Participants had to demonstrate a mastery of many fields pertaining to laboratory and clinical aspects of neuroscience. Contestants had to know their neuroanatomy, histology, and even conduct patient evaluations with actors. The experience was more challenging than either of the qualifying events in which he had previously competed.

“The difficulty level of the questions was turned up a notch. Not only were we expected to be familiar with a broader range of topics, but we were also expected to know them in much greater detail.”

Tran had ample resources to aid him in his preparations. His prize from winning the National Brain Bee included an internship at the NIH, and he had access to their library to pour over brain atlases and diagnostic manuals.

Tran is committed to participating in the Brain Bee organization in the future. His win and internship confirmed his passion for neuroscience, and opened his eyes to the breadth of the neuroscience community.

“I came into this competition thinking that there was only a small community of individuals who shared my fascination with the



Thanh-Liem Tran accepts the IBB prize from Brain Bee founder Norbert Mylinski

brain. This past year has been a real eye-opener. Not only have I seen how packed neuro conventions are and how many high school students from around the world participated in the Brain Bee but, now that I look for it, I’ve also noticed just how many of my classmates have also been captivated by neuroscience. In fact, so many signed up for the new neuroscience course offered at my school that it was impossible to schedule everyone.”

EDITORIAL INFORMATION

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BRAIN
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Memory Research of a Different Kind

Joel Braslow believes medicine needs to know its history

Even within the context of the breadth of research conducted by the 300 members of the Brain Research Institute, Professor Joel Braslow is unique. A practicing psychiatrist, Braslow is a specialist in the history of psychiatry and neuroscience, and the Director of the BRI Neuroscience History Archives and Center for the Study of the History of Neuropsychopharmacology.

“Ever since my residency, I have been interested in why we do what we do as clinicians. Studying history seemed like one way of understanding how we decide what is an illness and what isn’t, what needs clinical treatment and what doesn’t,” explains Braslow, “Clinical practices and our understanding of illness are products of history as well as of biology.”

Using that lens, Braslow is now examining history even as it is being made, examining how today’s public mental health policy shapes clinical care; specifically, he is the principal investigator of an NIMH-funded study examining the unfolding of the 2004 California Mental Health Services Act (MHSA). By introducing a tax on personal income over \$1 million, the MHSA resulted in the largest increase ever in California’s public mental health budget. Braslow and his colleagues are looking at the evolution of mental health policy represented in the MHSA, from its origins in politics and science to its actual impact on patient outcomes. With a small army of anthropology postdoctoral students and research assistants, they have collected thousands of documents, interviewed dozens of legislators, policy-makers, and administrators and followed a cohort of nearly 500 patients and 300 clinicians.

Braslow is working on a book that looks at mental health policy within a broad historical and sociocultural framework. Funded by a Robert Wood Johnson Investigator Award in Health Policy, Braslow plans to take an interdisciplinary approach to understanding mental illness.

“Understanding why we do what we do in both science and clinical practice requires that we look at how history and the sociocultural world shapes science and the policies that come from that science.” Such an understanding, Braslow hopes, will lead to both improved science as well as clinical practice.



Joel Braslow sees history as a way for physicians and clinicians to better appreciate the limits of their knowledge and understanding of mental illness.

History online

Dr Braslow’s projects aim to make the history of neuroscience and mental health care more readily accessible to the public. In addition to his published work, he (along with historian Marcia Meldrum) has developed two large-scale internet-based projects. One focuses on the history of the neurosciences and the other on the history of public mental health care. The project on the history of the neurosciences was funded, in part, by the American College of Neuropsychopharmacology. In collaboration with the Los Angeles Department of Mental Health (LAC DMH), Braslow co-founded the UCLA Center for the Study of Public Mental Health with fellow UCLA faculty member and DMH Deputy Director Kathleen Daley. With funds from LAC DMH, the Center has directed a number of projects evaluating the implementation of public mental health policies in Los Angeles County as well as the creation of the website on the history of public mental health care.

The Center for the Study of the History of Neuropsychopharmacology has considerable archival material online: their website is: <http://www.pendari.com/CSHN/index.aspx>.

The Center for the Study of Public Mental Health also has considerable archival and digitally recorded oral histories online at <http://www.pendari.com/DMH/>.

Buonomano on the Brain's "Bugs"

Unlike computers, version 1.0 of our brain is all we are going to get

The brain is a wondrous and complex organ, capable of incredible feats of perception and calculation. That's the good news. The bad news is that it is also flawed – prone to glitches for which we have no warranty.

That we are not even aware of the flaws in the operating "hardware" of our brain and how they affect the decisions and perceptions of the "software" of our mind is the overarching theme of Dean Buonomano's first book, "Brain Bugs: How the Brain's Flaws Shape Our Lives."

"We don't regularly acknowledge that everything we do – whether it's voting, or deciding what to eat, or planning for retirement – is directly traceable to the function and structure of the brain," said Buonomano, a Professor of Neurobiology and Psychology.

"We go through life with the view that we're making decisions using the mind, but forget that the mind is a product of the brain, and as a consequence of that we don't acknowledge the brain's imperfections. It's an astonishingly sophisticated organ and computational device, but it has many 'bugs.' I think neuroscience has to come more to the forefront in policy making and decision-making."

The book took Buonomano four years to write, and has received favorable attention from National Public Radio and the New York Times, which praised his work, calling it "lively" and "engaging."

Part of that energy might well have come from Buonomano's enjoyment of how much he learned while writing it. Much of the material covered – on advertising and economic choices, for instance – is well outside his normal field of learning and cognition.

Buonomano feels a greater understanding of neuroscience should be a priority for policy makers and educators, given how much of our decision-making is affected by mental glitches of which we are not even aware.

"The main message that I'd like readers to take home is that who we are as individuals and as a society is inextricably linked to the structure of the brain, and the brain – as astonishing as it is – is an imperfect device. We're being guided by that device without acknowledging its limits," says Buonomano.

"In a way, it's a call to distrust our brain, or at least to distrust some of the decisions it makes."

"Brain Bugs: How the Brain's Flaws Shape Our Lives" (W.W. Norton & Company) is available as a hardcover and e-book.



Excerpt from "Brain Bugs" - Chapter 6: "Unreasonable Reasoning"



"Both images of the Leaning Tower... are exactly the same, yet the one on the right appears to be leaning more. The illusion is non-negotiable; although I have seen it dozens of times, I still find it hard to believe that it is the same image. (The first time I saw it, I had to cut out a panel on the right and paste it over the left). The illusion is the product of the assumptions the visual system makes about perspective. When parallel lines, such as those of railroad tracks, are projected onto your retina, they converge as they recede into the distance (because the angle between the two rails progressively decreases). It is because your brain has learned to use this convergence to make inferences about distance that one can create perspective by simply drawing two converging lines on a piece of paper. The picture in the illusion was taken from the bottom of the building, and since the lines of the tower do not converge in the distance (height, in this case) the brain interprets this as meaning that the towers are not parallel, and creates the illusion of divergence."

BRI MEMBERS IN THE NEWS



Dr. David Hovda has been awarded the U.S. Army's highest civilian honor for his work helping the military diagnose, treat, and expedite the recovery of soldiers who have experienced traumatic brain injuries and their associated symptoms, which can include depression and other emotional problems. Dr. Hovda is a Professor of Neurosurgery, and Molecular and Medical Pharmacology and is the Director of the Brain Injury Research Center at UCLA. The award was presented on June 15th at Fort Meyer, in Arlington, Virginia. The Army cited Hovda as being "the key figure in the establishment of the National Intrepid Center of Excellence at the National Naval Medical Center in Bethesda, Maryland. His efforts demonstrate the interdependence of neuroscience and psychiatry in the treatment of brain injuries and their related disorders, to giving wounded soldiers the best care available.

Popular Praise for Reggie Edgerton's Work Treating Paralysis



The awards and honors earned by the members of the Brain Research Institute are not all bestowed by scientific or academic authorities. When Popular Mechanics Magazine gave Dr. Reggie Edgerton its 2011 "Breakthrough Award," it celebrated Edgerton's achievement of helping a paralyzed man - Rob Summers - walk again. Dr. Edgerton used an implant to feed electric impulses directly into Summers' spinal cord in order to train neural cells to control motor function. Edgerton's work was also featured in Ridley Scott's Science Channel series "Prophets of Science Fiction." The program described his lab as doing "groundbreaking research... [that] shows that fiction can become reality."

CONGRATULATIONS

Charles Appointed Luskin Chair in Migraine and Headache Studies



Dr. Andrew C. Charles, a Professor of Neurology and Director of UCLA's Headache Research and Treatment Program, has been named the Meyer and Renee Luskin Chair in Migraine and Headache Studies. This chair is the first in the country dedicated to headache research. The honor was established with a gift from Meyer and Renee Luskin, UCLA alumni who have made a number of generous gifts to UCLA, including a transformative \$100 million contribution in January 2011 to support academic programs and capital improvements. Migraine and other forms of headache are common disorders that cause either episodic or chronic disability in hundreds of millions of individuals worldwide.

Charles' laboratory uses brain-imaging and physiological techniques to investigate the basic biology involved in migraine headaches. Under his direction, the UCLA Headache Research and Treatment Program also performs clinical research on new therapies for headaches, educates health care providers about optimal diagnosis and treatment, and provides state-of-the-art clinical care for patients who suffer from these disorders. The purpose of the Luskin Chair is to support translational research aimed at bringing new therapies to patients who suffer from migraines and to improve the standard of care.

AWARDS AND HONORS

Foundation awards two BRI members

The Brain & Behavior Research Foundation has awarded **Kelsey Martin** and **Michael Fanselow** with National Alliance for Research on Schizophrenia and Depression (NARSAD) Distinguished Investigator Grants. The grants provide \$100,000 for a one-year study.

Dr. Fanselow is a Professor of Psychology and a member of the UCLA Brain Research Institute. This award will further investigations on the neural mechanisms of post-traumatic stress disorder, and the neural circuitry of PTSD fear memories.

Dr. Martin is a Professor and Chair of Biological Chemistry and a Professor of Psychiatry and Biobehavioral Sciences, the Eleanor Leslie Term Chair in Innovative Brain Research, and Co-Director of the UCLA-Caltech Medical Scientist Training Program. She studies the molecular mechanisms underlying synaptic plasticity, and hopes to identify therapeutic targets for cognitive impairments associated with specific mental illnesses.

Recognition for Distinguished Teaching

Patricia Phelps was one of six winners of the 2010-11 Distinguished Teaching Awards. Chosen by past recipients of this award, honorees are recognized for the respect and admiration they bring to the scholarship of teaching. Phelps, who was an early adopter of computer imaging to aid her anatomy lectures, was lauded both for the generosity with which she was willing to share the multimedia tools she developed, and for her commitment to engaging undergraduate students in her research. Many of those she mentored went on to win scholarships, fellowships, and academic appointments.



NIH Awards Cancer Researchers

BRI member **Utpal Banerjee**, the Irving and Jean Stone Professor and Chair of the Department of Molecular, Cell and Developmental Biology, has been awarded the NIH Pioneer Award, providing \$2.5

million over five years. Banerjee was one of 13 researchers nationwide, and one of five in California, to receive the NIH Pioneer Award which supports "individual scientists of exceptional creativity who propose pioneering — and possibly transforming approaches — to major challenges in biomedical and behavioral research," NIH officials said.

Institute of Medicine Honors Autism Researcher

Daniel Geschwind has been elected to membership in the Institute of Medicine (IOM) of the National Academy of Sciences. Membership in the Institute of Medicine is one of the highest honors conferred in the Health Sciences in the U.S. and internationally. Dr. Geschwind is a Professor in the Departments of Neurology and Psychiatry, the Gordon and Virginia MacDonald Distinguished Chair in Human Genetics, Director of both the UCLA Center for Autism Research and Treatment (CART) and the UCLA Neurogenetics Program, and Co-Director of the UCLA Center for Neurobehavioral Genetics. He uses genetic, functional genomic and neurobiological techniques to improve understanding of neuropsychiatric diseases, such as autism as well as neurodegenerative diseases.

Geneticist Recipient of Pediatric Research Award

The Society for Pediatric Research named **Eric Vilain** as one of two 2011 winners of the E. Mead Johnson Award, established in 1939 to honor clinical and research achievements in pediatrics. Vilain is a Professor of Human Genetics, Pediatrics and Urology at the David Geffen School of Medicine and Director of the Center for Society and Genetics at UCLA.

Vilain became interested in the biology of sexual development as a medical student in France, where he observed the care of children with sexual development disorders and started challenging the rationale for early genital surgery. His research explores the genetic basis of sex determination, sex differences in the brain and sexual orientation, including molecular mechanisms responsible for intersexuality in humans.

Seven New Members Join the BRI

Anne Andrews is a Professor of Psychiatry and Biobehavioral Sciences. Her research centers on understanding how the neurotransmitter serotonin modulates complex behaviors such as anxiety, stress responsiveness, and learning and memory. Her lab uses human and nonhuman primate cell lines, genetically engineered mice, drugs, neurotoxins, and environmental factors to probe the molecular bases of serotonin system function and the mechanisms of drugs used to treat psychiatric disorders. They use bioanalytical techniques, such as microelectrode voltammetry and microdialysis, to investigate serotonin neurotransmission.



Giovanni Coppola is an Assistant Professor in Residence in the Departments of Psychiatry and Biobehavioral Sciences and Neurology. His major research interest is in neurogenetics, with the long-term goal of understanding the genetic architecture of neuropsychiatric disorders. His group is resequencing neurodegeneration-related genes, and the whole genome, from a large series of patients with neurodegenerative conditions, including Alzheimer's disease and frontotemporal dementia. They are also collecting peripheral blood samples from patients with neurodegenerative dementia and studying global gene expression and methylation profiles using microarrays. In a related project, they are also using peripheral gene expression data in Friedreich's ataxia patients and animal models to characterize the effect of compounds with therapeutic potential.

Shafali Spurling Jeste is an Assistant Professor in Residence in the Departments of Psychiatry and Biobehavioral Sciences, and Neurology. She is a pediatric neurologist with post-doctoral training in developmental cognitive neuroscience, and has a particular interest in pursuing electrophysiological biomarkers in autism spectrum disorders (ASD). Her lab uses high density EEG and eye tracking to define cognitive phenotypes in young children with ASD and other neurodevelopmental disorders. She uses innovative methods to define predictors of outcome in the perceptual and cognitive domains of children with limited verbal abilities. Her lab is studying three main populations: (1) toddlers and preschoolers with ASD who are enrolled in an intensive treatment program at UCLA; (2) infants at high-risk for an ASD based on having an older sibling with ASD; and (3) infants with tuberous sclerosis complex, a genetic disorder associated with a high rate of ASD.



Martin M. Monti is an Assistant Professor in the Departments of Psychology and Neurosurgery. One of the most striking features of human cognition is the ability to generate an infinite number of ideas by combining a finite set of elements according to structure-dependent principles. This ability is most clearly displayed in language, but also characterizes other aspects of our cognition such as drawing inferences, performing mental arithmetic or cognition of music. To determine if language enables other types of structure-dependent cognition, Dr. Monti employs behavioral and fMRI tools in healthy volunteers and patients to address these questions.

He also focuses on brain processing and consciousness in vegetative

patients, to try to improve diagnostic procedures and to develop brain-computer interfaces (BCIs) that may allow patients to interact with their environment just by "thinking."

Roel A. Ophoff is a Professor of Psychiatry and Biobehavioral Sciences and Human Genetics with a particular interest in neuropsychiatric traits. His current projects involve molecular genetic and genomic studies of schizophrenia and bipolar disorder (among others). These studies include the analysis of genetic variation (DNA), gene expression profiling (RNA), and DNA methylation (epigenetic) in the context of phenotypic differences. A major challenge is whether the transcriptome and epigenome of whole blood cells is informative for brain-specific diseases. For this reason his lab incorporates brain-tissue-specific experiments in their studies. With the availability of new sequencing technologies, Ophoff increasingly applies high-throughput sequencing approaches that allow for more comprehensive capturing of genomic information. This is expected to dramatically change the scope and depth of data collection and emphasize the importance of integration of bioinformatics and classical human genetic expertise.



Jesse Rissman is an Assistant Professor of Psychology whose research explores the interplay of attention and memory, using functional magnetic resonance imaging (fMRI) to characterize the neural circuits that support these fundamental cognitive processes. Projects in his laboratory seek to elucidate how moment-to-moment changes in a person's behavioral goals can serve to sculpt neural activity within sensory cortices and the medial temporal lobe memory system, exerting a profound influence over what information gets encoded into, maintained in, or retrieved from memory. His work also examines how the act of bringing past experiences back to mind, via the neural reactivation of specific event details, can facilitate the generation of memory-based predictions that guide future behavior. Rather than simply using fMRI as a tool to isolate the functional contributions of individual brain regions, his research employs innovative analytical tools to characterize the dynamic interactions between brain regions, as well as to decode the informational content of distributed brain activity patterns.

Kate M. Wassum is an Assistant Professor in the Department of Psychology who is interested in motivated behavior, *in vivo* electrochemistry and addiction. She uses sophisticated behavioral paradigms, coupled with neuropharmacology and neurochemical monitoring techniques, to elucidate the precise neural mechanisms and systems that underlie discrete aspects of motivated learning and decision-making. She aims to extend our understanding of how disorders that are marked by maladaptive decision-making, such as obesity and addiction, result in such aberrant motivated behavior. Her lab uses several approaches in parallel and often in combination towards this goal, including *in vivo* electrochemistry, fast-scan cyclic voltammetry for real time online monitoring of dopamine, biosensors for near-real time neurotransmitter measurement (i.e. glutamate), neuropharmacology as well as instrumental and Pavlovian conditioning.

Second Annual Neurocamp Bigger and Better

Expanded three-week program introduces high school students to neuroscience



Bill Grisham does some on-the-spot tutoring with a group of Neurocamp students during a lab exercise in neurophysiology

There are probably no high school biology laboratories – not even in the toniest parts of Beverly Hills – in which students would have access to an MRI machine. Nor have many seniors graduated having had the opportunity to run a gel electrophoresis of DNA.

Such were the opportunities afforded a few lucky Los Angeles high school students this summer at the second annual Neurocamp, a project of BRI Associate Director of Outreach, Joe Watson.

“The idea is to give students something that is going to be very enlivening, in terms of their interest in science. We want to bring them in at that point in their high school career when they’re thinking about college and a career in the sciences. At the same time, we want the experience to be exciting and inspirational,” said Watson.

After last year’s two-week trial run with roughly a dozen students learning neuroscience fundamentals over two weeks, Watson and his collaborators expanded the program. The 2011 version hosted 25 students, who spent three weeks of their summer immersed in the theory and practice of brain imaging, neurobiology and neurophysiology.

The students, who were recruited from a variety of Los Angeles area high schools, receive high-level instruction, as well as the chance to learn and perform highly technical laboratory techniques such as reading MRI data, conducting polymerase chain reactions and cutting DNA from cells.

“What they’re getting at this camp is fun, but very challenging. We give them college level instruction,” said Watson.

This year, Professor Bill Grisham volunteered to teach the neurophysiology module at Neurocamp and devised a lesson in which students were asked to simulate neurons in a circuit. It’s challenging stuff, Grisham admits, but he has confidence in the students’ ability to master it.

“Someone told me high school students can’t possibly learn at this level, but after this year’s experience, I respectfully disagree,” he said.

That confidence was appreciated by Evelyn Kim, a senior from the Pilgrim School who signed up for the program in order to help clarify her future career.

“I’m not really sure what I want to do when I go to college, and this program gave me a lot more information about neuroscience,” she said.

“The first week we watched while other people performed an MRI, and then we got to analyze the data they gave us. That was pretty cool.”

Her campmate, Oscar Velasquez from the California Academy of Math and Science, was similarly enthusiastic about the opportunities for hands-on science, but also for the chance to learn with a different student population.

“You meet a lot of interesting people, and there is lots of diversity. The camp students have different backgrounds and ways of thinking. It’s a change from being only with kids like me,” he said.

That human connection is an important part of what Joe Watson hoped to foster when he established the Neurocamp program.

“It was really important to work hard and be enthusiastic, but also to make sure the students take care of each other as a collective group. So far the camp’s been a great success. And we’re really hoping for bigger and better things for the third camp, next year.”

Volunteer instructors for Neurocamp 2011 were Professors Bill Grisham, Jim Boulter and Jack Van Horn. The BRI would like to thank the members of the ARCS Foundation, who raffled off a ticket for Neurocamp at their annual gala, thus supporting the cost of one attendee.

**JOINT SEMINARS IN NEUROSCIENCE
WINTER QUARTER 2012**

*Sponsored by The Brain Research Institute, the Semel Institute for Neuroscience & Human Behavior, and the David Geffen School of Medicine at UCLA
The Neuroscience Research Building Auditorium (NRB)*

We begin promptly at 4:00 pm

January 10, 2012

ALCINO SILVA, Ph.D.

(Host: Stephanie White; sawwhite@ucla.edu)
Departments of Neurobiology, Psychiatry & Biobehavioral Sciences, and Psychology, University of California, Los Angeles

"Molecular and Cellular Mechanisms of Memory Allocation in Neuronal Networks"

January 17, 2012

EDWARD S. BOYDEN, Ph.D.

(Host: Tom Otis; OtisT@ucla.edu)
MIT Media Lab and McGovern Institute, Departments of Brain and Cognitive Sciences and Biological Engineering, Massachusetts Institute of Technology, Cambridge

"Optogenetics, Automated Electrophysiology, and Other Neural Circuit Tools"

January 24, 2012

RICHARD J. KRAUZLIS, Ph.D.

(Host: James Bisley; JBisley@mednet.ucla.edu)
Senior Investigator, Laboratory of Sensorimotor Research, National Eye Institute, National Institutes of Health, Bethesda, Maryland

"The Underbelly of Vision and Action: The Role of the Brainstem in Spatial Attention"

January 31, 2012

B.J. CASEY, Ph.D.

(Host: Nim Tottenham and David Jentsch; nimtottenham@ucla.edu)

Director of the Sackler Institute and the Neuroscience Graduate Program, Departments of Psychiatry, Neurology and Neuroscience, Weill Cornell Medical College, New York, New York

"Development of Fear-Related Processes: From Human Imaging to Mouse Genetics"

February 7, 2012

MICHAEL ROSBASH, Ph.D.

(Host: Larry Zipursky; LZipursky@mednet.ucla.edu)
Howard Hughes Medical Institute, and Department of Biology, Brandeis University, Waltham, Massachusetts

"Circadian Rhythms: Molecules, Neurons and Circuits"

February 14, 2012

JONATHAN A. JAVITCH, M.D., Ph.D.

(Host: David Krantz; DKrantz@mednet.ucla.edu)
Lieber Professor of Experimental Therapeutics in Psychiatry; Professor of Pharmacology, Center for Molecular Recognition, and Physiology & Cellular Biophysics, College of Physicians & Surgeons, Columbia University; Chief, Division of Molecular Therapeutics, New York State Psychiatric Institute, New York, New York

"The Membrane-Raft Protein Flotillin-1 is Essential in Dopamine Neurons for Amphetamine-Induced Behavior in Drosophila"

February 21, 2012

OLIVER HOBERT, Ph.D.

(Host: Ben Novitch; BNovitch@mednet.ucla.edu)
Howard Hughes Medical Institute, and Department of Biochemistry & Molecular Biophysics, Columbia University Medical Center, New York, New York

"Gene Regulatory Mechanisms Controlling Terminal Neuronal Differentiation"

February 28, 2012

TIMOTHY A. RYAN, Ph.D.

(Host: David Krantz; DKrantz@mednet.ucla.edu)
Department of Biochemistry, Weill Cornell Medical College, New York, New York

"What Your Brain Uses to Think: The Biology of Synapses and Their Control"

March 6, 2012

No JSN- Integrative Center for Learning & Memory Inaugural Symposium (See inset)

March 13, 2012

**The Brain Research Institute Twenty-Third Annual H.W. Magoun Lecture
Speaker TBD**

The Integrative Center for Learning and Memory (ICLM) Inaugural Symposium, March 5 & 6, 2012

The **Integrative Center for Learning and Memory (ICLM) Inaugural Symposium** will mark the inauguration of the new UCLA Integrative Center for Learning and Memory. The Center is a new academic unit that leverages UCLA's leadership in this area, and is designed to promote studies of molecular, cellular, systems and cognitive mechanisms of learning & memory.

The two-day schedule can be viewed at: http://www.bri.ucla.edu/bri_research/integrative_center_symposium_2012.asp

Twenty-Third Annual Neuroscience Poster Session



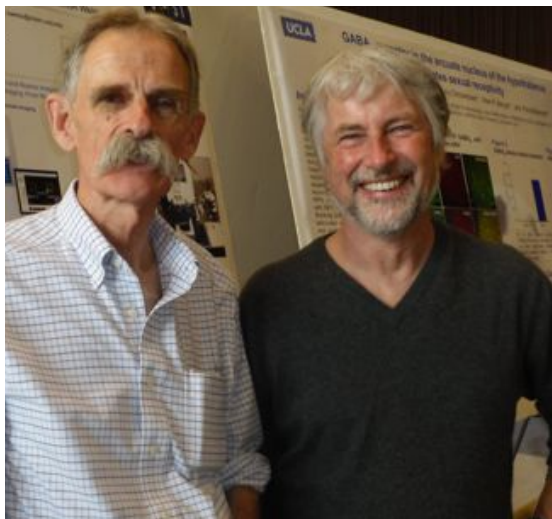
Once a year the Ackerman Union Grand Ballroom is transformed into a forest of posters, through which stroll hundreds of neuroscientists young and old, taking in the latest research on the brain from their UCLA colleagues.

As usual, the event was held in the wake of the annual Society for Neuroscience Meeting, so that members of the neuroscience community at UCLA can catch up on one another's work in a more intimate, collegial atmosphere. The relaxed mood belied the larger purpose of the event, however.

"Collaborative science is the way forward, and we all need to know what each of us is doing," said BRI Director Chris Evans.

It would appear that the neuroscience community is very much on board with that message. Over 150 posters representing a large portion of the BRI's research diversity were presented to a large and appreciative audience.

One of the visitors quite taken with the event was its keynote speaker, Nicholas Spitzer, Professor of Neurobiology at the University of California San Diego. Spitzer used most of the time before his lecture to review the posters. Once on stage, he prefaced his talk, "Activity-Dependent Neurotransmitter Respecification: Novel Plasticity," by complimenting the "energy" of the event.



Keynote speaker Nicholas Spitzer, shown with BRI Director Chris Evans, enjoyed a number of the posters on display before delivering his well-received talk on neurotransmitter respecification.

BRI/Semel Awards for Student and Postdoctoral Neuroscience Research

The Annual Poster Session is traditionally the time when the BRI presents a number of its in-house awards for notable research conducted by its students and postdoctoral fellows. Congratulations to the following recipients:

- Moriel Zelikowsky – Society for Neuroscience Graduate Student Travel Award
- Nanthia Suthana – Society for Neuroscience Postdoctoral Scholar Travel Award
- Kate Wassum – Brain Research Institute Scheibel Distinguished Postdoctoral Scholar in Neuroscience Lecture Award
- Anubhuti Goel, Andrei Irimia, and Olivier-Pierre Polack – Fine Science Tools Postdoctoral Scholar Awards
- Roshan Burns, Ranjit Dhaliwal, Spencer Moore, George Techiryan and Claire Tu - Brain Research Institute and Semel Institute for Human Behavior Undergraduate Student Travel Awards
- Aida Attar, Andrew Brumm, Michael Condro, Katy Cross, Prag Gad, Dylan Gee, Maria Jalbrzikowski, Milky Kohno, Kim LeBlanc, Elizabeth Reynolds Losin, Sarah Madsen, Angelica Morales, Florence Roussotte, Jeff Rudie, and Elif Sozmen – Brain Research Institute and Semel Institute for Human Behavior Graduate Student Travel Awards
- Fadi Issa, Takashi Kudo, Dahabada Lopes, Heidi Richardson – Brain Research Institute and Semel Institute for Neuroscience and Human Behavior Postdoctoral Fellow Travel Awards

New NSIDP Students Welcomed at Academic Retreat

The Interdepartmental PhD Program for Neuroscience (NSIDP) had its annual retreat to welcome the newest cohort of incoming students on September 24th. The event, organized by NSIDP graduate students and held at the UCLA Faculty Center, drew together professors, students and other members of the UCLA neuroscience community to enjoy an invited keynote speaker address, a panel discussion and the latest news from the labs.

“Our goals in organizing the event were to showcase the graduate student research that is being conducted by some of our students and to provide an opportunity for all of the NSIDP students and faculty to come together,” said Sarah Madsen, who co-organized the event with fellow graduate students, Kevin McEvoy and Thuc Le.

Madsen explained that this year’s event augmented its prior focus on neuroscientific content with an exploration of philosophical issues. The keynote speaker, Professor Adrian Raine from the University of Pennsylvania, spoke on neurocriminology – an emerging sub-discipline of criminology, which applies neuroscience techniques to probe the causes of crime.

Raine’s address, entitled “Neurocriminology: Scientific, Legal, and Ethical Implications,” gave an overview of the state of current neuroscientific knowledge of psychopathologies and the nature of how neural abnormalities or damage might contribute to criminal behavior. Raine emphasized a central issue: Does the knowledge that someone has a neurological abnormality correlated to criminal behavior have the power to excuse or mitigate that individual’s criminal behavior? As an expert witness who has testified for the defense in death penalty cases, Dr. Raine explored whether scientists should testify in such cases, given the impossibility of drawing definitive conclusions from the available data. His talk led to a fascinating panel discussion on “Neuroscience and Free Will.”

It was a winning feature of the event, according to co-organizer Kevin McEvoy.

“People seemed to relish the opportunity to have a great philosophical discussion with other intellectuals... something we don’t get to participate in very often,” he said. “Students and faculty were saying that it was the best NSIDP retreat they had been to recently. We had more faculty participation than we’ve had in years.”

The NSIDP retreat, however, did not neglect science in favor of philosophy. Incoming NSIDP students were given a preview of their future in the form of six lectures from their senior peers. The presentations covered everything from stem cells, to plasticity, to detecting autism through imaging. Speakers included graduate student researchers Gretchen Miller (Neil Harris lab), Scott Arno (Istvan Mody lab), Jeff Rudie (Mirella Dapretto lab), Rui Luo (Tom Otis lab), Wei Song Ong (James Bisley lab) and Andy Vosko (Chris Colwell lab).

The success of the event was a testament to the efforts of these students, as well as support from the NSIDP coordinators and professors.

“We all volunteered the time to organize the Neuroscience Retreat. We believe that this retreat is a necessary and fun way to showcase our research and to provide a stimulating environment for everyone from the freshmen to the continuing students and the professors,” said co-organizer, Thuc Le.



Introducing the Incoming NSIDP Students

[Back row, left to right]

Rachel Jonas went to Lehigh University and received a BS in Behavioral Neuroscience. At UCLA, she hopes to study addictive disorders by using imaging methods. *Fun fact:* Rachel’s grandfather wrote the Addams Family theme song.

Alexander Reeves went to UCLA and earned his BS in Neuroscience. He is interested in synapses, cells and circuits. *Fun Fact:* Alexander tied for 1st place in the 1982 Inter-Species Rock-Paper-Scissors Championships.

Andrew Thompson graduated from UCSB with a BS in Biopsychology and a minor in Anthropology. He is interested in receptor pharmacology, especially the dopamine and glutamate systems. *Fun Fact:* Andrew is a big fan of Broadway and has seen over 25 shows, many of them more than once.

Konstantin Bakhurin has a BS in Biology from University of Michigan where he trained in a molecular physiology lab. He is interested in studying circuits underlying rewarded behavior. *Fun fact:* Konstantin and Nobel prizewinner, James Watson, took the same course in Avian Biology... 62 years apart.

Tessa Harrison graduated from Georgetown University with a BS in Neurobiology. At UCLA she hopes to study neurodegenerative diseases, especially those causing dementia, using both neuroimaging and genetic methods. *Fun Fact:* Tessa has never lost a speedwalking race.

Ryan Guglietta earned his BS at McGill University and hopes to pursue molecular work in neuroplasticity. *Fun fact:* Ryan has an admitted phobia to smiling in pictures.

Don Julien graduated from the University of Missouri, Columbia with a BS in Biological Sciences. His research interests include developmental neurobiology and nervous system injury and repair. *Fun Fact:* Don still has one baby tooth that never fell out.

[Front Row, left to right]

Amy Baohan earned her BA in Neuroscience at Columbia University. She is interested in astrocyte physiology in the hippocampus. *Fun fact:* Amy lived in Norway.

Christopher Ching went to Pomona College where he earned his BA in Neuroscience and Philosophy. He is interested in multimodal neuroimaging of neurodegenerative disease. *Fun fact:* Everyone else in Christopher’s family went to USC.

Katherine Myers earned her BS from the University of Maryland in Biology. She is interested in the molecular mechanisms of synaptic transmission. *Fun fact:* Katherine drives a 1962 Ford Falcon.

Esther Nie went to Yale University, where she earned her BS in Molecular Biophysics and Biochemistry. She is interested in activity dependent plasticity in the context of neurorehabilitation, through definition of circuit-specific mechanisms of motor recovery after stroke. *Fun fact:* Esther crossed the Thai-Cambodian border on foot earlier this year.

Matt Anderson completed his undergraduate education at Stanford, earning a BS in Biological Sciences with a concentration in Neurobiology. He hopes to study cortical circuits. *Fun fact:* Matt’s favorite animals growing up were his two pet rats who, he says, were very social companions.

RESEARCH BRIEFS

Sound and Vision Work Hand in Hand

By *Stuart Wolpert and Divya Menon* UCLA Newsroom
December 08, 2011

Our senses of sight and hearing work closely together, perhaps more than people realize, a new UCLA psychology study shows.

"If we think of the perceptual system as a democracy where each sense is like a person casting a vote and all votes are counted to reach a decision — although not all votes are counted equally — what our study shows is that the voters talk to one another and influence one another even before each casts a vote," said Ladan Shams, a UCLA associate professor of psychology and the senior author of the new study.

In the study of how one sense can affect another, Shams, an expert on perception and cognitive neuroscience, and her colleagues showed 63 participants a large number of dots on a screen in two separate phases, with a break between the phases. In one phase, the dots moved around randomly; in the other, some of the dots moved together from right to left. In both phases, the dots were accompanied by sound.

Over a series of experiments, the researchers asked the participants to correctly identify the phase in which the dots moved together horizontally.

Participants were divided into three groups. One group heard sound moving from right to left as the dots moved from right to left, and they heard sound that remained stationary during the random phase. A second group heard the right-to-left sound during both phases. And a third group heard sound moving in the opposite direction — from left to right — during both phases. Then, each participant experienced trials in all three conditions.

As Shams expected, the participants were best able to identify the phase in which the dots moved horizontally when the sound moved in the same direction as the dots but remained stationary during the random phase. The researchers found that the sound that moved in the opposite direction neither enhanced nor worsened the participants' visual perception.

Surprisingly, the sound that traveled leftward both when the dots moved leftward *and* when the dots moved randomly — that is, sound that provided no useful information for choosing between the two phases — also helped people correctly choose the phase with the horizontal motion. Because the sound was identical in both phases, if the participants closed their eyes they, would have a 50-50 chance of successfully performing the task based on sound alone; with their eyes open, however, the interaction between sound and vision led to a significant improvement in detection of visual motion. Hearing enhanced seeing.

"Imagine you are playing ping-pong with a friend who serves the ball," Shams said. "You receive information about where and when the ball hit the table by both vision and hearing. Scientists have believed that each of the senses produces an estimate relevant for the task, and then these votes get combined subconsciously according to rules that take into account which sense is more reliable. This is how the senses interact in how we perceive the world. However, our findings show that the senses of hearing and vision can also interact at a more basic level, before they each even produce an estimate."

The study appears in the December issue of *Psychological Science*, a journal published by the Association for Psychological Science.

More here: <http://newsroom.ucla.edu/portal/ucla/sound-and-vision-work-hand-in-220261.aspx>

Brain Cells that Keep us Awake Identified

By *Mark Wheeler* UCLA Newsroom November 15, 2011

Bright light arouses us. Bright light makes it easier to stay awake. Very bright light not only arouses us but is known to have antidepressant effects. Conversely, dark rooms can make us sleepy. It's the reason some people use masks to make sure light doesn't wake them while they sleep.

Now researchers at UCLA have identified the group of neurons that mediates whether light arouses us — or not. Jerome Siegel, a professor of psychiatry at the Semel Institute for Neuroscience and Human Behavior at UCLA, and colleagues report in the current online edition of the *Journal of Neuroscience* that the cells necessary for a light-induced arousal response are located in the hypothalamus, an area at the base of the brain responsible for, among other things, control of the autonomic nervous system, body temperature, hunger, thirst, fatigue — and sleep.

These cells release a neurotransmitter called hypocretin, Siegel said. The researchers compared mice with and without hypocretin and found that those who didn't have it were unable to stay awake in the light, while those who had it showed intense activation of these cells in the light but not while they were awake in the dark.

"This current finding explains prior work in humans that found that narcoleptics lack the arousing response to light, unlike other equally sleepy individuals, and that both narcoleptics and Parkinson's patients have an increased tendency to be depressed compared to others with chronic illnesses," said Siegel, who is also a member of the UCLA Brain Research Institute and chief of neurobiology research at the Sepulveda Veterans Affairs Medical Center in Mission Hills, Calif.

Complete story here: <http://newsroom.ucla.edu/portal/ucla/brain-cells-responsible-for-keeping-218204.aspx>

Autistic Brains Develop More Slowly

By *Mark Wheeler* UCLA Newsroom October 20, 2011

Researchers at UCLA have found a possible explanation for why autistic children act and think differently than their peers. For the first time, they've shown that the connections between brain regions that are important for language and social skills grow much more slowly in boys with autism than in non-autistic children.

Reporting in the current online edition of the journal *Human Brain Mapping*, senior author Jennifer G. Levitt, a professor of psychiatry at the Semel Institute for Neuroscience and Human Behavior at UCLA; first author Xue Hua, a UCLA postdoctoral researcher; and colleagues found aberrant growth rates in areas of the brain implicated in the social impairment, communication deficits and repetitive behaviors that characterize autism.

Although most children with autism are diagnosed before they are 3 years old, this new study suggests that delays in brain development continue into adolescence.

"Because the brain of a child with autism develops more slowly during this critical period of life, these children may have an especially difficult time struggling to establish personal identity, develop social interactions and refine emotional skills," Hua said. "This new knowledge may help to explain some of the symptoms of autism and could improve future treatment options."

The researchers used a type of brain-imaging scan called a T1-weighted MRI, which can map structural changes during brain development. To study how the brains of boys with autism changed over time, they scanned 13 boys diagnosed with autism and a control group of seven non-autistic boys on two separate occasions. The boys ranged in age from 6 to 14 at the time of the first scan; on average, they were scanned again approximately three years later.

Besides seeing that the white-matter connections between those brain regions that are important for language and social skills were growing much slower in the boys with autism, they found a second anomaly: In two areas of the brain — the putamen, which is involved in learning, and the anterior cingulate, which helps regulate both cognitive and emotional processing — unused cells were not properly pruned away.

Complete story here: <http://newsroom.ucla.edu/portal/ucla/autistic-brains-develop-more-slowly-215407.aspx>

The Fly II: *Drosophila*'s Revenge

Cell paper gets celluloid adaptation



Halloween came early to the Gonda (Goldschmied) Neuroscience and Genetics Research Center, thanks to Associate Professor Dr. David Krantz. *Cell*, a major peer-reviewed journal, featured a recent paper from Dr. Krantz's lab as a "video abstract" on their website. The paper characterized a previously unknown neurotransmitter affecting the copulating and mating behavior of fruitflies. Since the Krantz lab identified the neurotransmitter in the mushroom bodies of the insect brain, the team dubbed their discovery "portabella." Krantz and lead study author Dr. Lisa Brooks enlisted Anna Grygoruk and Christine Serway, both postdoctoral fellows in the Krantz lab, to channel their inner *Drosophila* and act out the amorous activities of the insect. You can watch the video at <http://bit.ly/rUpord>

Neuroscience Quotables

"A person under significant stress is essentially accelerating the aging process at a biological level, and also at a genetic level."

~ Michael Irwin, on CNN as to whether the stress of the job causes Presidents to age faster. Irwin is the Norman Cousins Chair in Psychoneuroimmunology at the Semel Institute for Neuroscience and Human Behavior.

"You have personality. I like that."

~ Gary Mathern, Professor of Neurosurgery and Director of the Pediatric Epilepsy Surgery Program and Pediatric Neurosurgery Program, quoted in *The Oregonian* during a follow-up appointment with a 2-year old patient who had half his brain removed to stop a series of life-threatening seizures.

"We have lost the ability to self-regulate, at all levels of the society. The \$5 million you get paid at Goldman Sachs... that is the chocolate cake upgraded."

~ Peter Whybrow, Director of the Semel Institute for Neuroscience and Human Behavior, speaking to *Vanity Fair* in an article on the collapse of California's economy on how the wiring of our brains leads to poor decision-making.

We'd love you to keep in touch!

