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BRAIN RESEARCH INSTITUTE UCLA

Neuroscience News

The Gonda (Goldschmied) Neuroscience and Genetics Research Center

UCLA Alumni Make Major Gifts to BRI

Michael Gene Gaston, who received his BA and PhD degrees from UCLA, designated the UCLA Brain Research Institute as the sole beneficiary of his estate. As of September 2010, the BRI has received total distributions of $895,940 from the Gaston Trust to the Michael Gene Gaston Fund for Brain Research under the direction of Dr. Christopher J. Evans. Dr. Gaston's personal friends, Mr. Leonard A. Hampel, Jr. (UCLA Law School alumnus '64) and Mr. Ulrich H. Eckel (UCLA College alumnus '63), were instrumental in facilitating this generous bequest to UCLA. Mr. Hampel also donated $82,000 to the BRI in memory of Dr. Gaston for the same purpose.

Congratulations! Dr. S. Lawrence Zipursky Wins Columbia University's Spencer Award (P. 5)

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Message from Dr. Chris Evans, Director of the Brain Research Institute

More than most fields, neuroscience depends on collaboration to progress. This premise was a founding principle of the Brain Research Institute (BRI) at UCLA more than 50 years ago. The BRI was designed specifically to encourage scientists researching the brain in different fields to communicate with one another and, together, to train the next generation of interdisciplinary neuroscientists.

Questions in the neurosciences can only rarely be resolved by the tools available in just one field. As a result, many BRI researchers find themselves wearing more than one hat: molecular biologists rely on behavioral experiments to identify genes associated with psychiatric and neurological disorders, neurosurgeons apply immunological concepts to fight cancer, students use video-games to fight addiction.

The BRI itself is adapted to many different identities. It is a community of educators and students, of scientists and staffers, of volunteers and donors. Sometimes, all of these identities are to be found in one person such as the past BRI director Arne Scheibel profiled on page 2.

Above all, the BRI is a community of which you are a part. In this edition of *Neuroscience News,* you will be introduced to segments of the BRI community: scientists, doctors, high-school students, PhD candidates, and their projects. You will meet students who gave up the playing fields of summer vacation to learn more about the brain and also the professors who volunteered their time to instruct them. There are professors like Linda Liau and Tom Carmichael who combine clinical practice with medical research and whose eyes light up while discussing the prospect of making discoveries that will improve treatments for their patients. That enthusiasm is matched by the promising graduate students now with bright futures ahead of them.

Much of the work accomplished at the BRI depends on outside sources of funding, especially from private donors. For a student like Chris Culbertson, profiled on page 7, it can make all the difference in the world; the ARCS Foundation scholarship he received enabled him to complete his PhD and apply his skills to a new anti-smoking treatment.

Chris' story demonstrates how financial support to the BRI is doubly effective. It is an investment not just in people – be they students or world-class scientists – but also in translating ideas into reality.

We hope that you enjoy what you read here, and that this newsletter helps you learn more about the BRI.

INVESTING IN THE BRI

Advancing Brain Research through Planned Giving: Arnold B. Scheibel, M.D.

Dr. Arnold Scheibel joined the UCLA faculty as a member of the Department of Anatomy (now Neurobiology) and Department of Psychiatry (now Psychiatry and Biobehavioral Sciences) in 1955. He has dedicated 55 years of uninterrupted service to the University. At age 87, he finds his greatest satisfaction is exploring the nervous system and revealing its complexities with his students. Teaching full time at UCLA is both a privilege and a joy. "I relish interacting with students in the classroom, so retirement is not an option yet," he said.

Dr. Scheibel served as Acting Director (1987-1990) and Director (1990-1995) of the UCLA Brain Research Institute (BRI). Established in 1959 by prominent neuroscientists, the BRI not only conducts cutting-edge investigations, but also serves as a magnet for outstanding scientists, clinicians, and graduate students. Under his leadership, the BRI flourished as it became more integrated into the UCLA community. A renowned neuroanatomist himself, Dr. Scheibel developed the "Affinity Groups" that have provided a culture of collaborative science across campus and set the course for the BRI's current superior standing in multidisciplinary and team-based neuroscience. The annual H.W. Magoun Lecture celebrating a distinguished UCLA neuroscientist, and the annual Samuel Eiduson Lecture honoring an outstanding neuroscience graduate student were both initiated during his tenure.

In appreciation for UCLA's support over the many years of his career, and to advance scholarly work in the field of neuroscience, Dr. Scheibel has expanded his considerable legacy. He made a generous bequest through the Scheibel Foundation Trust to establish the Ethel Scheibel Endowed Chair in Neuroscience in the Department of Neurobiology, and the William Scheibel Endowed Chair in Neuroscience at the BRI.

"I hope that these two endowed chairs will help continue the tradition of bringing gifted and creative investigators to the neuroscience research and training programs at UCLA. After all, the brain is the ultimate source of our humanity, the instrument of our culture, and the key to our continued existence as a biological race," said Dr. Scheibel.

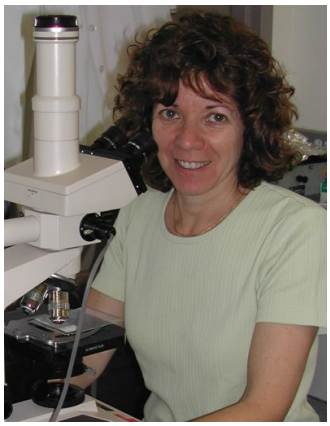
Changes in Microscopy Cores

By Mark Reynolds

The Brain Research Institute Core Facilities, essential to much of the joint research of the BRI, are seeing some personnel and organizational changes this fall. The cores are shared facilities that provide specialized equipment and expertise to UCLA researchers. They rely on user fees and University support for funding, as well as some private support, as with the Carol Moss Spivak Cell Imaging Center.

Sirus Kohan and Birgitta Sjostrand

BRI Director Christopher Evans says that the shared facilities of the cores are a critical, if under-supported, aspect of the Institute: "They are really important to research and to winning grants, publishing, and improving research strategies." Marianne Cilluffo, who took over the Electron Microscopy (EM) Services Center and the Microscopic Techniques (MT) Core in 2005 from Birgitta Sjostrand, has moved to another position in the University. "Marianne was outstanding in her abilities as director of the cores. Her scientific knowledge was extensive, as were her managerial skills" said Dr. Evans, "she will be missed."



Marianne Cilluffo

A familiar face to core clientele, former core director Ms. Sjostrand has returned on a part-time basis to the BRI, working alongside new core manager Dr. Sirus Kohan.

"Birgitta ran the BRI EM Services Center for many years and her services were very much appreciated by the neuroscience community," said Dr. Evans. Dr. Kohan explained that the EM facility on the sixth floor of the Center for the Health Sciences is open as usual to all BRI and UCLA staff. The EM Services Center and the MT Core can be booked online. The MT Core will focus on providing training for researchers looking to acquire microscopic skills, while still retaining a service capacity.

The MT Core is designed to be a resource for the research community at UCLA, and the planned changes are aimed at bolstering the BRI's ability to provide effective services for that mission. The MT Core will be staffed by Alex Bottini, formerly in the Department of Pathology and Laboratory Medicine, under the supervision of Professor Harry Vinters.

The EM Services Center boasts a JEOL 100CX transmission electron microscope and a Carl Zeiss 10C transmission electron microscope, as well as a Reichert Ultracut ultramicrotome, which are available for use by faculty or through the trained staff on-site, as appropriate. The MT Core offers training in a number of techniques including specimen preparation, various staining methods and sectioning. It boasts cryostats, microtomes and a digital imaging system.

"If people have a project and want to see us, we're here," said Dr. Kohan.
For more information on the BRI cores, contact sakohan@ucla.edu or visit http://www.bri.ucla.edu/bri_research/Core_Facilities.asp

IN ONE'S OWN WORDS

David Rousso, Ph.D. 2010 Samuel Eiduson Lecturer

It was not Dr. David Rousso's intent to be named the Samuel Eiduson Lecturer, one of the the highest honors for a UCLA neuroscience graduate student. It wasn't his intent to be a UCLA student at all – he came to the West Coast from the University of Michigan, accompanying his supervisor Dr. Bennett Novitch. Rousso hasn't regretted the decision, saying that his work has been able to follow paths that would not have been possible otherwise. Those paths led to his being named the 18th Samuel Eiduson Lecturer, established in honor of the former Chair of the Interdepartmental Neuroscience Ph.D. Program. This award honors extraordinarily meritorious contributions by a neuroscience graduate student during the course of his or her thesis research.

***Q:* What is the focus of your research here?**

David Rousso: I study the mechanisms controlling neurogenesis in the spinal cord and the formation of motor circuitry. For example, how do neural progenitors "know" when to differentiate, and what type of cell to become? And once new neurons are born, how do they make the right connections in order to form a spinal circuit capable of producing complex movement? These types of questions really fascinate me and are the central focus of my work.

Q: Why are you looking at the FoxP transcription factors?

DR: We had recently performed a microarray screen in search of genes important for motor neuron development, which identified Foxp1. Since FoxP genes were already known to be important in the development of other tissues, I began to analyze the gene expression pattern of the whole family at different stages of development in the spinal cord. This fairly straight-forward approach revealed that Foxp1, Foxp2, and Foxp4 have an intriguing cascade-like expression pattern, implicating their involvement in successive developmental processes, from progenitor cell maintenance and neurogenesis to neuronal subtype diversification.

Q: What have you found? What are the implications of your findings?

DR: I began working on FoxP1 first and found it was strongly associated with the formation of motor neurons that innervate the muscles of the arms, legs, and visceral ganglia. This finding was especially exciting, because it was not currently known how to generate these types of neurons from stem cells in vitro. After analyzing several genetic models, I was able to show that FoxP1 is critical for establishing motor connectivity to the limbs and viscera and is even sufficient to direct this process when ectopically expressed. More recently, I have been studying an earlier role for FoxP2 and FoxP4 in the regulation of neurogenesis. I have found that FoxP2/4 genes control important cell-adhesion molecules within neural progenitor cells, which can influence their neurogenic output. In other words, one of the ways neural stem cells are maintained throughout development is by their overall "stickiness" within the stem cell niche, and altering FoxP2/4 expression can either stall or accelerate their differentiation by directly affecting progenitor cell adhesion.

Q: What are the next steps of your research?

DR: There are several future directions that these studies open up. We are currently working on generating different lines of stem cells in which we can turn on or off FoxP1 and thus create a broader range of motor neuron subtypes than was previously possible in vitro. These cells could then serve as models for studying motor neuron disease. For example, in ALS [amyotrophic lateral sclerosis, also known as Lou Gehrig's disease], the limb-innervating motor neurons are the most susceptible to disease and are often the first to degenerate. If we can use FoxP1 to create these types of motor neurons in vitro, we will have a useful model for better understanding why this degeneration occurs, and how to possibly prevent it. In addition, we are investigating if FoxP2 and FoxP4 also play a role in the regulation of neural progenitors in the brain and if downstream molecules involved in cell adhesion might play a role in the later development of different neuronal subtypes.

Q: Do you believe there are therapeutic potentials for your research?

DR: Yes, definitely. Using stem cells for repair of damaged nervous tissue is an obvious ultimate goal, and anything we learn about how neurons are normally created and make functional connections has immediate implications toward achieving this goal. Based on my findings, FoxP genes could prove to be powerful tools for controlling multiple aspects of neural stem cell maintenance and differentiation in vitro, which could dramatically improve their therapeutic value.

Q: What does being the Eiduson Lecturer mean to you?

DR: I can't state enough what an honor it was to receive this award and be invited to speak in the neuroscience seminar series. Like most graduate students, I spend most of my time just trouble-shooting the minutia of why an experiment didn't work, so it's extremely gratifying to have my work appreciated by the broader neuroscience community at UCLA.

FACULTY FOCUS

Rebuilding the Brain After Stroke

Dr. S. Thomas Carmichael Finds that the Brain can be Helped to Heal Itself

By Mark Reynolds

Stroke is the most frequently occurring brain injury and is the leading cause of disability in adults. Yet it's commonness offers hope: Millions of people lose a great deal of function through stroke – language, motor control, memory, but many recover at least some, and sometimes all, of those functions.

For Dr. S. Thomas Carmichael, Associate Professor of Neurology, that phenomenon is a signpost pointing to potential treatments for stroke and possibly other brain injuries. Strokes are caused by a clot in a blood vessel in the brain, which leads to a deprivation of oxygen and glucose and therefore cell death downstream of the blockage. That the brain can restore function after stroke indicates that there is a sequence of events that allows the neural circuitry to repair and re-wire itself. The therapeutic potential of this ability, if harnessed, is potentially enormous. But first, it needs to be identified and understood, and that's where Dr. Carmichael and his lab come in. He explains that when someone loses function in their left arm after a stroke, they may regain that function over a period of time. In the brain, that repair translates into new circuits firing in regions next to the stroke-damaged area. But how that occurs is a mystery.

Dr Carmichael reviews data with MD/PhD student Elif Sözman in his laboratory.

"We know that during recovery after stroke, brain areas that are adjacent to the damage take on new functions. This region appears to hold the key to understanding recovery: How does one area take on some of the function that was lost? We know that one way that this recovery process occurs is through the formation of new connections in the brain."

Dr. Carmichael's lab is attempting to characterize the complex molecular signals that are released in the wake of a stroke that lead to the formation, or sprouting, of new connections. In a term, he is trying to determine the "sprouting transcriptome."

This transcriptome – (borrowing the suffix of words like genome and biome) is the unique set of molecules that the genome activates to form new connections in the adult brain after stroke.

"Something tells the neuron to go into a growth state, and form a new connection. If we identify the essential molecules involved, we can move closer to identifying a pharmacological product that can stimulate new connections," explains Dr. Carmichael.

The transcriptome appears to comprise between 500 and 600 molecules and perhaps 200 genes that are directly implicated in forming these connections.

"The fun part of this field is that it's pretty anti-dogmatic. The dogma for connections in the brain is that you're born with a certain number of connections, they develop until late childhood, they remain strong and well-formed until early adulthood and then it's downhill," he says. "The dogma is the same for neurons as for their connections – you're born with a certain number, and then you slowly lose them with age. Studies of neuro-repair after stroke have shown that both of these dogmas can be wrong."

However, the dogmas did exist for a reason. Usually, the adult brain expresses molecules that limit neuronal growth and the development of new connections – a good thing, lest the brain re-wire itself into a dysfunctional mess. Furthermore, the 500-600 molecules in the post-stroke transcriptome include vital ones that wall off the damaged area by forming scar tissue, as well as cleaning up the affected area.

If the transcriptome is to yield a neuron-regenerating therapy, it will have to be administered in the context of this delicate and finely tuned orchestra of molecular signals. Drop in a growth promoting molecule at the wrong time, and you might impair the brain's ability to seal off the stroke-damaged area or induce an abnormal and deleterious process of reconnection.

"There are least two keys to taking this understanding of a sprouting transcriptome in stroke and translating it to a new therapy for recovery. The first is to know when the initial death and destruction stop and when recovery begins, so that you don't deliver a repair therapy at a time in which the brain may still need to limit cell death. Second, any therapy that enables the brain to grow and form new connections must be carefully administered within a neuro-rehabilitation paradigm. Such formation will need to be shaped, or guided, within the regions that are assuming new functions and producing recovery. This process may be done if these connections can be shaped by patterns of limb use, language function, and cognitive operations that are not working well after stroke and are stimulated in rehabilitation," according to Dr. Carmichael. It would be a risky strategy to turn on a growth state in the adult brain without carefully instructing that brain to form new connections in the appropriate circuits. Mis-wiring could create adverse neurological connections leading to seizures or dystonia (abnormal body movements).

As an alternative to developing drugs that might stimulate the brain's own repair systems after stroke, Dr. Carmichael is pursuing a potential therapy using stem cells, funded by a grant from the California Institute for Regenerative Medicine (CIRM). In this approach, the Carmichael lab is studying the transplantation of stem cells into regions of damage after stroke.

Cont'd page 5

Carmichael con't "The field of stem-cell therapy for stroke has hit a bit of a wall, because most of the cells that are transplanted into the brain die," explains Dr. Carmichael. "Those that do survive often just sit there and do not interact with surrounding tissue." He and collaborators from UCLA engineering and stem-cell biology are using new tissue engineering approaches to produce a special matrix, or hydrogel, that provides for greater survival and functional repair from transplanted stem cells. The work shows great promise to lead to a new therapy for stroke victims.

"Working with a stroke stem cell team between my lab and Stanford University we have shown that the research is solid; it does help mice and rats recover. We don't have to do any further discovery studies to see if it works in these models of stroke. But it takes a lot of money, time, and safety testing to get it into a Food and Drug Administration-approved application. These steps are crucial in the final stages from discovering a therapy to moving it into the clinic. This grant from CIRM provides the support to our group here and at Stanford to make this translation."

Even at the brink of what may prove to be a leap forward in neurological recovery, Dr. Carmichael remains very modest about the scope of scientists' efforts to repair the brain. While the complicated animal models and stem-cell approaches are at the very cutting edge of medical science, he sees them as crude implements indeed.

"You look at the elaborate and beautiful brain circuits, such as [those] drawn by classical anatomists, and you think there's no way I'm going to rebuild an exquisite network of millions of circuits, even in one small area of recovering brain, however, our and others' work has shown that you only need a partial effect on damaged circuits to re-establish function—one doesn't need to reproduce or rebuild the original brain circuitry. It's not that we're building a new brain, but that we're forming some degree of re-connection to areas of injury that might facilitate function."

OUTREACH TO THE COMMUNITY

NeuroCamp: Brainy Summer Camp

By Mark Reynolds

Dr. Jim Boulter lecturing NeuroCamp students.

It is summer camp in Franz Hall, but campfires have been replaced with Bunsen burners, and wildlife sightings with rodent spinal cords. The inaugural NeuroCamp saw 10 students, drawn mainly from local high schools, enjoy a crash course of lectures and hands-on exercises covering some of the fundamentals of neuroscience.

"I was really enthusiastic about this program because it offers a whole branch of science that our school doesn't usually study. So I was really excited to get into neuroscience," said Catherine Haber, a student from Harvard Westlake School who participated in the two-week camp while volunteering in a UCLA neuroscience lab.

NeuroCamp is the brainchild of Professor Joe Watson, the BRI's Associate Director for Outreach. Students who signed up were all volunteer interns in UCLA neuroscience labs. For two weeks, they met for three hours every afternoon in a teaching lab in the basement of Franz Hall to learn from Professors Bill Grisham and Jim Boulter.

Dr. Grisham taught the first week, focusing mainly on neuroanatomy. He volunteered both because he's a believer in education and because the work was a natural extension of his ongoing development of digital teaching materials at the college level, for which he has a National Science Foundation grant. Much of the curriculum was adapted from a similar course he teaches for upper-division undergraduates.

"[The NeuroCamp students] are very good. In many ways, they are indistinguishable from many of my juniors and seniors at UCLA," Dr. Grisham said.

Dr. Boulter said teaching to such a disparate class was a challenge. "Some of these students are high-school sophomores and have never taken a biology class. They all seem very appreciative, very game, very courteous."

The preliminary NeuroCamp should provide a solid foundation for the years to come, said Professor Watson. "I could not have been happier with how the very first summer UCLA NeuroCamp turned out. You are only as good as the people working with you, and in this case faculty Bill Grisham and Jim Boulter and staff Natalie Schottler and Melissa Moran made it all happen. I cannot wait for next year."

Participant Christina Chung, an incoming UCLA freshman, was pleased with the range of lab experience she gained from NeuroCamp.

"It was good to do hands-on projects; we could practice what we were learning and see it under the microscope," she said.

Added Ms. Haber: "From PowerPoint to our hands!"

More: http://www.bri.ucla.edu/bri_education/scienceoutreach.asp

Congratulations

Dr. S. Lawrence Zipursky, Distinguished Professor of Biological Chemistry, is one of two recipients of the 33rd Annual W. Alden Spencer Award, given each year by the College of Physicians and Surgeons at Columbia University in New York. Professor Zipursky was honored along with Marc Tessier-Lavigne. The prestigious award recognizes outstanding research contributions in neural science. Professor Zipursky is the first recipient of the prestigious award to come from UCLA. He gave a lecture entitled "Cell Recognition and Wiring the Brain" at Columbia in November at the award presentation.

The World Molecular Imaging Congress has created an award in honor of a UCLA professor of molecular and medical pharmacology. The **Jorge R. Barrio Award** for the Best Clinical Translational Research Abstract recognizes Dr. Barrio's achievements and contributions to the field of molecular imaging and includes a $3,000 prize; it was presented at the 2010 Congress held in September in Kyoto, Japan. He received a special award in tribute to his years of as editor-in-chief of the journal *Molecular Imaging and Biology* and his contributions to the field of molecular imaging.

Dr. Christopher Giza, Associate Professor of Pediatric Neurology and Neurosurgery, was awarded $175,000 for the development of new treatments for traumatic brain injury from the Today's and Tomorrow's Children Fund (TTCF). Organized in 2006, the TTCF was born out of the belief that by pooling their donations, a group of committed individuals can award a major gift annually to support the work of pediatric faculty whose research benefits the patients at Mattel Children's Hospital UCLA.

ALUMNI PROFILE
Linda Liau, Scientist and Surgeon

By Mark Reynolds

As a neurosurgeon and academician Dr. Linda Liau is, in many ways, the embodiment of the Brain Research Institute's goals; she is a highly accomplished scientist and a proponent of translational research. Perhaps it is not surprising that she is a proud product of the BRI.

Dr. Liau came to UCLA in 1991, after completing medical school at Stanford University. Though well on her way to a rewarding career as a neurosurgeon, she elected to enroll in the BRI-associated Interdepartmental Ph.D. Program for Neuroscience.

"One of the things that led me to obtain my PhD was that in 1994, my mom died of metastatic breast cancer. I felt the need to be able to conduct research in order to be as effective as I could be as a doctor," explained Dr. Liau.

After earning her doctorate in 1998 under the mentorship of Dr. Jeff Bronstein and former BRI Director Dr. Alan Tobin, she joined the UCLA faculty. She divides her time between her lab and her patients, with halves of her career focused on combating brain cancer.

It is a difficult disease to treat for a number of reasons. Brain tumors are often hard to reach with pharmaceuticals, as they are sheltered by the blood-brain barrier. They are also hidden from much of the body's own immune system. Finally, they present a challenge in that unlike some other kinds of cancer, even a single tumor is not always made up of a single type of cell.

"Brain cancer is a very heterogeneous disease – there won't ultimately be one type of treatment for everybody," said Dr. Liau.

Accordingly, her lab is simultaneously investigating different approaches to combat brain tumors. One is to develop a vaccine against brain cancer by priming the body's own immune-response to tumors. Dr. Liau explains that such an approach would not be employed in a broad-based way like flu vaccines. Because brain tumors are "multiforme" – that is, they are not made up of a uniform type of cell and they spread in unpredictable ways, cancer vaccines will need to be individually targeted. The Phase-II trials of the vaccines she has developed are designed to be administered after a tumor has been surgically removed, in order to prevent its return.

Another approach is the identification and characterization of the metabolic properties of brain tumor cells, which can differ from healthy cells in important ways. By exploiting signature metabolic differences, she and her her team may make it possible to disrupt tumor proliferation and malignant progression.

"The cure is not going to be found using a single approach," said Dr. Liau.

Her research in the Gonda (Goldschmied) Neurosciences and Genetics Research Center is enriched by her medical activities across the street at Ronald Reagan UCLA Medical Center. Many of the tissue samples that are the basis for her experiments come from her patients. Her workplace environment at UCLA and within the BRI is also key to the success of her science.

"I really like the people here, as well as the shared core facilities. It allows for good collaborations in research and clinical trials," she said.

Be Part of the Next Era in Neuroscience:
Bring High-School Students to Our Labs

The scientists of the Brain Research Institute at UCLA make new discoveries about the brain every day. The future of neuroscience holds great promise. By introducing local high school students to the brain at NeuroCamp, we hope to ensure that this future will be shaped by the brightest minds.

About NeuroCamp

The first annual NeuroCamp was held in summer 2010. The pilot project included 10 volunteers drawn from local high schools interning in UCLA neuroscience labs. Students spent several hours attending lectures by UCLA professors and mastering a wide variety of laboratory techniques crucial to modern science. This intensive two-week course exposed the students to the basics of neuroanatomy and molecular biology.

"I was really enthusiastic about this program because it offered a whole branch of science that our school doesn't usually study," said Catherine Haber, a student from Harvard Westlake School.

Professor Joseph Watson, BRI Associate Director of Outreach, already has plans to offer NeuroCamp next summer with an expanded third week covering brain imaging and also to enroll more students from schools in disadvantaged areas. He welcomes the opportunity to meet potential BRI donors who might wish to sponsor NeuroCamp.

You can help develop this great program!

Your donation of any size could change the life of a promising student - and make a difference to neuroscientists exploring cutting-edge research on the brain and nervous system at the BRI. To make a gift online, visit https://giving.ucla.edu/bri. If you would like to write a check, please make it payable to The UCLA Foundation – BRI Fund #9028 and mail it to:

Fernanda Valentino
Associate Director of Development, Neuroscience
10945 Le Conte Avenue, Suite 3132
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For more information, contact
Fernanda at: (310) 206-7038
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DONATIONS IN ACTION: ARCS FOUNDATION

Second Chances and "Second Life"

By Mark Reynolds

Ph.D. candidate Chris Culbertson has had an interesting academic history – an undergraduate degree completed at UC Santa Barbara, a stint in Australia, and a Ph.D. under two different supervisors at UCLA. As in the famous Chinese saying, "interesting" can sometimes be a curse.

When Mr. Culbertson, whose research applies immersive video-game technologies to addiction therapy, lost his first UCLA supervisor to Baylor University, he lost the funding stability that came with him. He was able to secure a new mentor in Professor Arthur Brody, but it was a period that could have been devastating for an up-and-coming graduate student researcher.

Fortunately, Mr. Culbertson had the support of the ARCS (Achievement Rewards for College Scientists) Foundation, which has provided him with significant financial backing throughout his PhD studies.

ARCS Scholar Chris Culbertson

"This support has been amazing," says Mr. Culbertson, who is currently preparing his Ph.D. dissertation. "It really was key for my work, particularly as I was changing mentors. I would not be where I am today without it."

The ARCS Foundation is dedicated to furthering science and technology through education. It provides scholarships – a minimum of $10,000 each – to students who have distinguished themselves academically. Funding comes from private donors, including individuals and corporations, as well as other foundations and trusts.

The BRI is one of the primary beneficiaries of ARCS Foundation generosity in California. In addition to giving dozens of worthy students scholarships over the years, the Foundation also has supported BRI Outreach activities like Project Brainstorm that brings schoolchildren to the BRI to visit neuroscience labs. Professor Michael Levine, BRI Associate Director for Education, said that the ARCS Foundation's long-standing support of the BRI has made it an important partner in fulfilling the BRI's mission.

"Over the years, the ARCS Foundation has supported many of our students. Our ability to offer that kind of assistance has a real impact on how effective we can be in encouraging and training the next generation of neuroscientists," said Dr. Levine.

Mr. Culbertson's research aims to improve therapies to treat addiction. For people trying to quit smoking, the hardest part can often be coping with the cigarette craving, which can happen with seemingly little warning and overwhelm whatever mental defenses the addict has constructed.

Mr. Culbertson has developed a tool to help clinicians, therapists, and their patients cope with and conquer their cravings using the popular on-line video game "Second Life." The problem, he explained, is that addiction cravings are often set off by environmental cues: A favorite café or layover at a public transit station might be a trigger to light up. Cognitive behavior therapy requires developing mental strategies to overcome these cravings.

"It is really hard to elicit these responses in a hospital setting," explained Mr. Culbertson. His approach is to construct a virtual reality café - or bus-stop – with which to simulate the smoker's particular triggers. With the triggers set off in this way, patients can learn to control and resist their desire to light up.

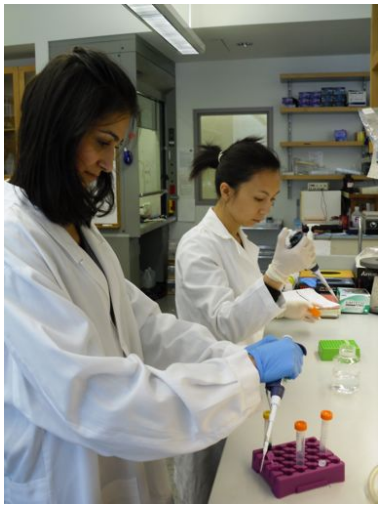
While initial studies have been in controlled clinical environments, the technology shows promise as a cessation aid that could be accessed at home by anyone with an Internet connection.

Mr. Culbertson incorporates similar technologies into functional magnetic resonance imaging studies to measure the relative effectiveness of smoking-cessation strategies. In these investigations, patients using Zyban (an anti-smoking drug), cognitive behavior therapy, or a placebo were exposed to a video designed to induce craving, while their brain patterns were recorded.

"The Zyban patients showed significant brain changes, not just in the reward area, but also the area responsible for motivation to seek reward," explained Mr. Culbertson.

Be Part of the Next Era in Neuroscience:

Enhance our Student Diversity



The Brain Research Institute attracts the best and brightest young minds from across the country and around the world, but its mission calls for greater efforts. The breadth and depth of the BRI's scientists' experience and knowledge are the bedrock of our success. By providing exceptional minority students with research experience through BRI-SURE, we aim to ensure that these strengths are enhanced in the next generation of scientists.

About BRI-SURE

The BRI sponsors a Summer Undergraduate Research Experience (BRI-SURE) program for Minority Access to Research Careers (MARC) Scholars. BRI-SURE is a summer training program for exceptional students interested in pursuing neuroscience research careers. The program is designed to provide a rigorous, in-depth research experience to prepare participants for top-quality Ph.D. and M.D./Ph.D. programs in the neurosciences.

BRI-SURE seeks students from either underrepresented or economically disadvantaged backgrounds and selects participants based on academic achievement, leadership, and commitment to diversity.

You can help develop this great program!

Your donation of any size could empower a promising student - and enhance the work of the many neuroscientists exploring pioneering research on the brain and nervous system at the BRI. To make a gift online, visit https://giving.ucla.edu/bri. If you would like to write a check, please make it payable to The UCLA Foundation – BRI Fund #9028 and mail it to:

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Neuroscience Program Spans Decades and Departments

By Mark Reynolds

Neuroscience packs a lot of meaning into its four syllables – encompassing cognitive and molecular approaches, physiology, neurobiology, signaling, and neural repair. For students contemplating graduate degrees in the field, the scope can be overwhelming and intimidating. Graduate degrees pursued in one department that might not otherwise be brain-science-focused might leave neuroscience graduates isolated from the rest of their field.

Since its inception in 1968, the Interdepartmental Ph.D. Program (IDP) for Neuroscience has been designed to provide a more encompassing understanding of neuroscience for graduate students.

Dr. Arnold Scheibel, who has been involved in the program from the start and currently teaches neuroanatomy, credits its founding to former BRI Associate Director for Education Sam Eiduson, who was described as a "strong proponent" of education. As Dr. Scheibel recalls, in the early days, the program lacked its own curriculum and instead "parasitized" from existing courses in other departments. The approach was not popular with students, and so in the late '80s, the switch was made to a dedicated neuroscience course structure.

"It was a more popular and effective mechanism, not only for training our students, but for getting to know them and having better interaction with them. We had all the obvious advantages of a highly interdisciplinary group of instructors who in general knew each other," he said. The collegial approach was key to the program's success.

Dr. Michael Levine, BRI Associate Director for Education, has been the Chair of the program for seven years. He said that the Neuroscience IDP is one of the largest at UCLA, drawing expertise from more than 150 faculty in departments in the David Geffen School of Medicine at UCLA, the College of Letters and Science, and the Harry Samueli School of Engineering and Applied Science, and the Schools of Nursing and Dentistry. He explained that in the first year, the program is broad, incorporating coursework on molecular and cellular approaches, developmental neurobiology, neurophysiology, neuroanatomy, and systems neuroscience, such as learning and memory. A committee drawn from a number of different departments with neuroscience components helps design the curriculum.

"The reason for an interdepartmental program is because the discipline is represented across many departments," he said. "It allows a more seamless approach to neuroscience than if there were a single department."

The diversity of experience is built into the classes. In addition to attending those led by professors representing different neuroscience specialties, students are expected to complete lab rotations in at least two different departments. This arrangement helps to ensure a wide range of lab experience and also knits together the UCLA neuroscience community.

"Students can work through multiple laboratories; usually they do so when they want to learn different techniques. In that sense, the students help integrate the community," said Dr. Levine.

As the long-time student affairs coordinator for the Neuroscience IDP, Suzie Vader is often the first contact and most consistent presence students have with the program. She said that the Neuroscience IDP currently has 85 students enrolled, with a new class of 15, on average, joining each year. It's a highly competitive program, receiving applications from around the country and world.

Those who are accepted to the Interdepartmental Ph.D. Program for Neuroscience encounter a cadre of dedicated instructors, says Dr. Scheibel.

"Each instructor who teaches in the program does so voluntarily in addition to his or her own departmental assignments. It's a labor of love for us all."

In Memoriam
Anesthesia and Research Pioneer Dr. Eva Kavan

Dr. Eva Kavan with a photo of BRI founder Dr. Horace Magoun.

The BRI notes the sad news that Dr. Eva Kavan passed away on Saturday, October 23, 2010, at 94 years of age. Dr. Kavan was known to many in the UCLA neuroscience community as a spirited woman with a strong sense of self.

She came to UCLA in 1956, after she earned her doctorate degree in medicine at Charles University in her native Prague, Czechoslovakia. At UCLA she joined the first team in the Western United States performing open-heart surgery with a heart-lung machine. Dr. Kavan was a pioneer in providing anesthesia, utilizing the electroencephalogram to perform important research on the effects of the heart-lung machine on brain function during open-heart operations. She is also remembered in the BRI by the "Eva Mary Kavan Prize for Excellence in Brain Research," which she founded as an annual award to encourage a talented graduate student to pursue scientific research on the brain.