How the Center of Behavioral Neuroscience is Decoding Prosocial Behavior

Cover Story Pg. 9
Dear members of the Brains & Behavior (B&B) community,

I am pleased to report that the B&B Program is doing well and getting stronger.

The Interdisciplinary Committee (IDC), which includes Elliott Albers (Core NI), Mukesh Dhamala (Physics & Astronomy), Anne Murphy (Core NI), Diana Robbins (Psychology) and Andrea Scarantino (Philosophy), is crucially supported by Liz Weaver and has been hard at work over the past year to introduce some improvements and new initiatives.

The first area we addressed concerns the representation of different department viewpoints in the B&B Program. Although some departments get their representatives elected on the IDC, not every department manages to do so. We have thereby created an Ambassadors Program that allows each department to select a representative that will function as a liaison with B&B.

The primary purpose of B&B Ambassadors is to make sure that the needs and proposals of each department are conveyed to the B&B program, and that relevant information is distributed among B&B faculty and fellows. They will also be the point person for them.

The second area we addressed concerns the administration of the Brains & Behavior Program. In the Fall of 2012, we distributed a questionnaire to the eight GSU departments that are currently offered only to our Fellows, the annual Retreat and distinguished lecture series.

The third area we addressed concerns the distribution of B&B Seed grants. We had a very competitive application process last year, and funded eleven seed grants. The names of the grant recipients can be found at the following address: http://www.neuroscience.gsu.edu/seed_grant.html. Congratulations to all seed grant recipients!

One issue that came to our attention is that there is significant disproportion between the number of applications we receive from different departments. To address this problem, starting this year we will allow seed grant funds to be used for course buy-outs. We hope that this incentive will make the competition appealing to departments generally not involved in the seed grant process. This will hopefully further raise the quality of the submissions and ultimately increase the chances that winning proposals get external funding.

The fourth area we addressed concerns data collection about the life and GSU career of B&B Fellows. Thanks entirely to a major effort over several months by Liz Weaver and Rob Poh, we now have a top-of-the-line database of B&B Fellows, which will allow us to keep track of their performance and career trajectory much better than before. In addition, utilizing Google map technology, we have developed an interactive Brains and Behavior Alumni Network called BaBAN.

Finally, B&B is excited to be hosting several new professional development opportunities for the Fellows over the next months in order to supplement their formal graduate training with real world hands-on practice. Liz Weaver and Rob Poh will be the point person for them.

I conclude by thanking all members of the Brains & Behavior Program for their continued efforts. Even though much work remains to be done, these efforts are paying off, and we are making significant progress.

Best,
Andrea Scarantino, IDC Chair
Associate Professor
Department of Philosophy
Neuroscience Institute
Georgia State University

Welcome to the 2014 Winter issue of the Brains & Behavior Potential! We hope you enjoy our new layout and design, as we welcome a larger reader base and reach out to the entire University. For those of you just joining us, Brains & Behavior Area of Focus, also known as B&B, is an interdepartmental program that promotes research collaborations and dialogue through graduate courses, lectures, grants, and much more. Researchers and students involved in this program span across the departments of biology, chemistry, neuroscience, computer science, mathematics & statistics, philosophy, physics & astronomy, and psychology. The five central components of this program are the B&B Scholars Program & Fellowship, the Distinguished Lecture Series, Seed Grants, and the Seminar Class.

In this issue, we want to direct your attention to our cover story (pg. 9-14) about the new era of the Center Behavioral Neuroscience here in Atlanta. Please also check out what our faculty and students have been up to recently (pg. 5, 15). If you have a story or news you would like to share, please don’t hesitate to contact me at eweaver1@gsu.edu.

Please take a look at our events (pg. 1-2) and spread the word on upcoming events. Brains & Behavior recently expanded its purview in the arena of professional development. Although the professional development seminars are currently offered only to our Fellows, the annual Retreat and distinguished lectures are open to the public.

Thank you for your interest in the Brains & Behavior Area of Focus at Georgia State University.

Sincerely,
Elizabeth Weaver
Brains & Behavior Assistant Director
Editor, The B&B Potential

Special thanks to Hannah Shin, Assistant Coordinator, who was invaluable in the layout and design of this issue.
Leslie Vosshall, Ph.D.  
Rockefeller University  
“Human sweat & insect repellants: the molecular biology of mosquito olfaction”

2013 Walk to End Alzheimer’s
Team Brains and Behavior

Todd Sacktor, M.D.  
SUNY Downstate Medical Center  
“Enhancing, erasing, and tracing long-term memories by targeting PKMζ”

Professional Development Workshop I
Interview Skills

Tallie Baram, M.D., Ph.D.  
UC Irvine  
“Modern life stress & your brain: memory, synapses, mechanisms”

Paul Kenny, Ph.D.  
Icahn School of Medicine at Mount Sinai

Rita Valentino, Ph.D.  
UPenn School of Medicine  
“Stress, arousal, and sex differences”

Professional Development Workshop II
Securing External Funding

Gary Lynch, Ph.D.  
UC Irvine

Ralph Greenspan, Ph.D.  
Kavli Institute for Brain & Mind, UCSD  
“Gene interactions and Behavior: Network upon Network”

B&B Retreat @ Loudermilk Center

Paul Kenny, Ph.D.  
Icahn School of Medicine at Mount Sinai

Call for 2014 Undergraduate Scholar Nominations

John Rinzel, Ph.D.  
New York University  
“Perceptual dynamics in an ambiguous world”

Florian Engert, Ph.D.  
Harvard University  
“The neural basis of operant learning in larval zebrafish”
B&B SEED GRANTS
CALL FOR 2014 APPLICATIONS
FEBRUARY 1, 2014

THE POTENTIAL | 3

1. Geert J. De Vries, Ph.D. neuroscience
   $30,000
   “Sexually dimorphic effects of immune challenge on development of social behavior”
   Co-PI
   Remus Osan, Ph.D.

2. Charles Derby, Ph.D. neuroscience
   $29,170
   “Development of experimental and computational tools to study the aquatic origin of allation using the Spiny Lobster as an animal model”
   Co-PI
   Remus Osan, Ph.D.

3. Kim Huhtman, Ph.D. neuroscience
   $29,927.04
   “Mechanisms of stress-induced social avoidance: the role of NPY and BDNF”
   Co-PI
   Remus Osan, Ph.D.

4. Heather Kleider, Ph.D. psychology
   $9,500
   “Vivid imaging of false events leads to false memories: comparisons of neural activity show differences in rejection and acceptance of imagined events”
   Co-PI
   Tricia Z. King, Ph.D.

5. Robert Latzman, Ph.D. psychology
   $25,025
   “Variations in dopaminergic genes among chimpanzees (pan troglodytes): associations with empirically-derived dimensions of personality”
   Co-PI
   William Hopkins, Ph.D.

6. Anne Murphy, Ph.D. neuroscience
   $30,000
   “Role of glia in the development of morphine tolerance”
   Co-PI
   Robert Latzman, Ph.D.

7. Remus Osan, Ph.D. mathematics & statistics
   $29,974
   “Comparative analysis of mechanisms underlying critical period closure”
   Co-I
   Tricia Z. King, Ph.D.

8. Sarah Pallas, Ph.D. neuroscience
   $29,974
   “Comparative analysis of mechanisms underlying critical period closure”
   Co-I
   Tricia Z. King, Ph.D.

9. Diana Robins, Ph.D. biology
   $30,000
   “Disruption of social cognition circuitry in autism spectrum disorders”
   Co-I
   Tricia Z. King, Ph.D.

10. Aaron Roseberry, Ph.D. psychology
    $27,000
    “Cellular regulation of mesolimbic dopamine neuron activity by melancortins”
    Co-PI
    Zhi-ren Liu, Ph.D.

11. Jenny Yang, Ph.D. chemistry
    $30,000
    “Developing novel contrasts agents for MR imaging of malignant brain tumor”
    Co-PI
    Mukesh Dhamaia, Ph.D.
Faculty Highights

neuroscience

Dr. Elliott Albers received a $3.4 million John Templeton Foundation grant to study positive emotions.

Dr. Bradley Cooke received the $650,000 National Science Foundation (NSF) Faculty Early Career Development award, one of only 18 awarded by the NSF’s Division of Integrative Organismal Systems in the last year.

Dr. Kyle Frantz was awarded a five-year, $544,320 grant from the National Institute of Mental Health to fund an intensive summer research program for high school students and science teachers in metro Atlanta called ION/Teach (Institute On Neuroscience).

Dr. Kim Huhman has a new R01 grant from the National Institute of Health. This five-year, $1.8 million grant is for research that may lead to improved strategies for treating and preventing mental health problems associated with exposure to social stress.

Dr. Anne Murphy found methods to improve machine’s effect on managing pain. The results made it into the Journal of Neuroscience and GSU news. http://bit.ly/1BQVfPs.

Dr. Walt Wiczynski has received a five-year $499,209 National Science Foundation grant to form a Research Coordination Network focused on advancing the field of sociogenomics.

Dr. George Graham spent the summer at Oxford University teaching a course on philosophy and psychiatry entitled “Mind, Value and Mental Health.” He was also awarded a grant from the Center of Theological Inquiry to support work on his new book project, Abraham’s Dilemma: Religious Experience, Spiritual Delusion, and Moral Well-Being. In addition, he was interviewed by Oxford University Press on YouTube: http://www.youtube.com/watch?v=FAC-VIFHLY. Finally, Dr. Graham helped publish and was a listed author and co-editor of The Oxford Handbook of Philosophy & Psychiatry: http://ukcatalogue.oup.com/product/9780199579563.do

physics & astronomy

Dr. Richard Briggs is a new faculty member of the Physics Department. Dr. Briggs joins the department as a full professor and B&B faculty member with tenure and a senior 2CI hire in Human Neuroimaging. He will help lead GSU’s efforts at the Center for Advanced Brain Imaging (a joint venture with Georgia Tech) and grow our expanding program in Neuropyschics.

Three B&B Computer Science faculty members have won Student Technology Fee awards totaling $113,288. The winners, along with their project titles and amounts awarded, are:

- Dr. Yingshu Li, Wireless Sensor Nodes for Course CSC 8223, $7,440
- Dr. Sushil Prasad, Upgrading Linux Heterogeneous Cluster to Support Introduction of Parallel and Distributed Computing Topics into Undergraduate Curriculum, $90,000
- Dr. Michael Weeks, Tablet and Embedded Computing, $15,848
- Dr. Yi Pan has been appointed a Distinguished University Professor by Georgia State University President Mark Becker. Dr. Pan was nominated for the appointment by Dr. William Long, the dean of the College of Arts and Sciences.

Dr. Sushil Prasad won a $1.1 Million National Science Foundation Grant for Curriculum Center. The grant, which runs for three years, provides continued funding for his efforts to create a parallel and distributed computing (PDC) curriculum for undergraduate computer science and computer engineering students.

Dr. Eric Friginal & Dr. Ying Zhu are co-winners of the 2013 Georgia State University Instructional Innovation Award, which honors outstanding innovations in teaching that result in improved learning. They won the award for developing an online text visualizer called Text X-Ray that helps students with vocabulary and grammar.

Dr. Eddy Nahmias has two forthcoming publications co-authored with former Brains and Behavior fellows, both dealing with neuroscience and free will.

Dr. Andrea Scarantino became editor of The Emotion Researcher, the newsletter of the International Society for Research on Emotions (ISRE).

mathematics & statistics

Dr. Remus Osan received the 2014 Early Career Award of the Mathematical Biosciences Institute (MBI). He will spend most of his time in Spring 2014 at MBI of the Ohio State University to conduct his research.

Dr. Jessica Turner is a new faculty member of the Psychology Department. Dr. Turner joins the department as a B&B Faculty member and joint member of Psychology and Neuroscience. She is a 2CI hire in Neurogenomics and Neuroimaging.

Dr. Dr. Nicole Vincent was recently hired by the Philosophy Department as part of the 2CI Neuroethics cluster. She has been an organizer for a number of conferences and workshops, including two dealing with the theme of Law and Neuroscience. She is also currently involved in creating the Atlanta Neuroethics Consortium, a new initiative which draws together faculty from Georgia State, Emory, and Georgia Tech working on the ethical, social, and legal implications of neuroscience research.

Dr. Mukesh Dhamala won a US National Science Foundation CAREER Award and used a seed grant to expand work on seizures, which made GSU news. http://bit.ly/1lgigw.

Dr. Tricia King was selected to participate in the American Psychological Association’s Leadership in Women Program.

Dr. Eddy Nahmias has two forthcoming publications co-authored with former Brains and Behavior fellows, both dealing with neuroscience and free will.

Dr. Andrea Scarantino became editor of The Emotion Researcher, the newsletter of the International Society for Research on Emotions (ISRE).

Dr. Dan Weiskopf has been named as an associate editor for the British Journal for the Philosophy of Science, focusing on the areas of philosophy of cognitive science and neuroscience.
A male Bluebanded goby, *Lythrypnus dalli*, cares for eggs in his nest, while the alpha female is courting him. A synergy of social context and androgens regulates agonistic behavior during naturally occurring female to male sex change.

This watercolor by Devaleena S. Pradhan (Biology B&B Fellow) was selected to be the cover for the January issue of *Hormones & Behavior*.

**The Potential**

Inspired by the hard work of our Brains & Behavior Fellows like Natasha and in order to encourage further submission of individual or programmatic fellowship grants for external funding (e.g., NRSA Fellowships, NIH doctoral training grants, Autism Speaks Grants), the Brains & Behavior program is working on updating its policy regarding funding. Under the future guidelines, Brains & Behavior hopes to provide monetary incentive to B&B Fellows who receive external funding. More information will be available about these policy changes soon, so stay tuned!

If you don’t want to wait any longer and want to learn how to apply for external funding, we have you covered! To help our Fellows along this path, we are offering a workshop at the beginning of next semester.

**What:** “External Funding: A guide to utilizing one of the most comprehensive databases of external funding, COS Pivot Training 101”

**When:** Friday, January 24, 2014 from 11am-12:15pm.

**Where:** To Be Determined.

**How:** RSVP now to Liz Weaver at weaver31@me.com.

Psychology B&B Fellow Natasha Ludwig received an external grant from Autism Speaks. She will examine the effectiveness of nonverbal measures of social understanding as a way to reliably identify ASD in toddlers. In doing so, she seeks to help develop a more practical and accurate screening method for toddlers who show early signs of autism and/or have an older sibling on the spectrum. Such streamlined methods are critically needed as early screening for ASD becomes more common.

**Natasha Ludwig**

**Mentor:** Diana Robins, Ph.D.  
**Agency:** Autism Speaks  
**Award Type:** Weatherstone Predoctoral Fellowship  
**Grant Amount:** $59,000  
**Grant Term:** 2 years

**“Exploring Social Attribution in Toddlers At Risk for Autism Spectrum Disorder (ASD)”**

Psychology B&B Fellow Natasha Ludwig received an external grant from Autism Speaks. She will examine the effectiveness of nonverbal measures of social understanding as a way to reliably identify ASD in toddlers. In doing so, she seeks to help develop a more practical and accurate screening method for toddlers who show early signs of autism and/or have an older sibling on the spectrum. Such streamlined methods are critically needed as early screening for ASD becomes more common.
Neuroscience Brains & Behavior faculty member, Dr. Elliott Albers, heads up the Center for Behavioral Neuroscience (CBN) and aims the Center at studying positive emotions.
Some of you have been at Georgia State University long enough to remember when the Center for Behavioral Neuroscience (CBN) first opened its inter-institutional doors to Atlanta in 1999. It was a bright day for many scientists and universities in the Atlanta area.

With funding from the National Science Foundation and the Georgia Research Alliance, CBN was originally run at Emory University. Its presence there, and elsewhere, was transformative. With new hires, funding, and administrative structure, the Center flourished and built never before trottled bridges between Emory University, Morehouse College, Morehouse School of Medicine, Clark Atlanta University, Georgia Institute of Technology, Spelman College, and Georgia State University both in research, and also in science education. Funding for the CBN from the National Science Foundation (NSF) was limited to 10 years, but the legacy of the CBN continued. Together, both Brains & Behavior and the CBN aided in the development of Georgia State’s own Neuroscience Institute (See infographic to right).
Fast forward to today, B&B faculty member and director of the CBN, Dr. Elliott Albers, has headed up a new initiative for CBN. With a $3.4 million grant from the John Templeton Foundation to study how the brain expresses positive emotion, things are looking up for the Center. Delving into how the brain expresses and understands positive emotions and prosocial behavior is an exciting venture for the CBN and one its ready to embrace. Staying true to CBN’s original inter-institutional roots, this particular collaboration is one between Yerkes National Primate Research Center, Zoo Atlanta, Emory and GSU. Scientists at these institutions will be coming together, sharing ideas, and utilizing cutting-edge research techniques and technology to examine such social behaviors as cooperation, compassion, and empathy. Specifically, the team will be comparing and contrasting non-human primates and their human counterparts both on a behavioral and molecular level, hoping to understand whether there is evolutionary conservation of prosocial neural circuits across species. In particular, the team will be investigating whether the neuropeptide oxytocin is active, not only in humans, but also in non-human primates; and if so, the team will explore the mechanism by which this hormone regulates positive emotions.

In addition to supporting the collaborative research mentioned above, the Templeton grant is funding a science education expo at Zoo Atlanta. The event is set to have interactive booths, manned by CBN grad students and faculty, designed to teach the public about positive emotions and prosocial behavior. This is a new event in regard to content, however, the idea is not. The CBN has long been involved in science education for K-12 students, as well as for middle and high school teachers. Faculty and staff at all CBN institutions host selected students and teachers for their mentored research. In addition, the program includes an annual Neuroscience Expo at Zoo Atlanta, summer Brain Camps for middle schoolers, and Teacher Professional Development Workshops.

The IQN/Teach program is an intensive summer research program for high school students who excel in science, as well as for middle and high school teachers. Faculty and staff at all CBN institutions host selected students and teachers for their mentorships. In the research, the program welcomes, orientation, workshops, and closing symposium are currently held at Georgia State, Emory’s Psychology Department, and the Yerkes National Primate Research Center.

Dr. Frantz also heads up the undergraduate summer research program, BRAIN (Behavioral Research Advancements In Neuroscience), as well as NETwork (Atlanta’s Neuroscience Education and Training program), a two year paid undergraduate assistantship for diverse student groups. Another CBN science educator, Dr. Laura Carruth, notes that her goals concerning science education align with those of the CBN. She hopes that these programs “raise awareness about science careers among young people, provide advice on professional development, develop practical research skills, increase students’ confidence in their ability to study science and do research, and potentially contribute to a diverse and well-prepared biomedical research workforce.”

Brains & Behavior has many more faculty involved in this new era for the CBN. Although there are too many to mention here, more information about membership and other details can be found on CBN’s website: http://www.cbn-atl.org.

If CBN wants to look at an exquisite model of human prosocial behavior, as defined by cooperation, ironically, it should look no further than its own collaboration through dialog, research, and education, across universities and across disciplines; very prosocial indeed.

“MOVING FORWARD, THE CBN AIDS TO MAINTAIN THE EXCELLENT PROGRAMS MADE POSSIBLE BY CONTRIBUTING FACULTY AND SENIOR TRAINEES, TO EXPAND TO NEW INITIATIVES SUCH AS THE UPCOMING ATLANTA SCIENCE FESTIVAL, AND TO ESTABLISH NEW WAYS TO RECOGNIZE AND PROMOTE BOTH RESEARCH OUTPUT AND MENTORING ACCOMPLISHMENTS.”

-DR. KYLE FRANTZ
Lei “Ray” Zhong  
B&B Alum 2013

After driving 3,500 miles across the country in our chock-full SUV, my wife and I finally made it to the west coast. In September, I started the post-doc experience in Dr. Lu Chen’s lab at Stanford University, School of Medicine. I’m studying the mechanism of experience-dependent homeostatic synaptic plasticity in visual cortex, using mouse as a model system. This project may promote our understanding of normal and impaired cortical function. Although it is a very competitive and new environment, the knowledge, skills, and techniques I learned in Dr. Vincent Rehder’s lab allowed me adapt and start my project quickly. One thing worth mentioning is that our lab works closely with two other prominent labs: Dr. Thomas Sudhof, the fresh Nobel Laureate, and Dr. Robert Malenka, famous in the field of learning and memory. The three labs together are called a Tri-Lab with more than 70 research scholars. This nurturing environment enables me to learn and access state-of-the-art techniques and cutting-edge research.
Brains & Behavior uses Google Map technology to connect and keep in touch.

Initiated a little over a year ago, the Brains and Behavior Alumni Network (BaBAN) is an interactive Google Map application that houses information like alumni, department, current job position and institution, research advisor, and contact info. Today, over 50 B&B alumni are part of BaBAN.*

*BaBAN is password protected. All current B&B Fellows and alumni are given access to BaBAN on request. The map on the right does not reflect the real locations of B&B Fellow alumni.
How did you decide to work at Janelia Farm Research Institute?

I was aware of the advantages of doing research at Janelia before I was given the opportunity to move here. In fact, I explored the possibility of postdoc position at Janelia as I finished my PhD at GSU. Moreover, while moving to Vienna was a really nice bonus, the driving factor in my initial move to Austria was to work with Barry and his research group. Therefore, the decision to join the group in Janelia was an easy one.

What exactly do you do there?

The major focus of the lab is to study the neural circuitry underlying the courtship behaviors of Drosophila melanogaster. D. melanogaster individuals – as well as many related Drosophila species – display a suite of innate courtship behaviors that are crucial to successful mating. The lab studies these sexually dimorphic behaviors from the sensory to motor level. My main interest is to understand how male courtship behaviors are generated in the complex Drosophila brain. We are able to utilize the ever expanding library of genetic tools in conjunction with classic electrophysiological techniques to study the neural basis of these behaviors.

Where have you been since you graduated from B&B/GSU?

After graduating, I accepted a postdoc position with Barry Dickson’s group at the Research Institute of Molecular Pathology (IMP, http://www.imp.ac.at/) in Vienna, Austria. Shortly after I arrived, Barry accepted an offer from the Howard Hughes Medical Institute to move his group to the Janelia Farm Research Campus in Ashburn, Virginia (http://janelia.org/). I was able to spend a year in Vienna before moving to Janelia with Barry and four other group members in October 2013.

It’s such a unique research facility. What’s it like to work/live there?

I haven’t been here long, but can give some general impressions. From a research standpoint, it’s a pretty great place to work. Everyone here is funded entirely by the HHMI so there is no concern with obtaining grant money. Additionally, there is a tremendous support staff here with a primary concern of helping the researchers get what they need to do their work. These factors free up a great deal of time that can be transferred to the research process. Similarly, the HHMI funding lessens the pressure to publish which can allow work on slower, more complex questions without worrying about a potential lag between manuscripts. These factors can be an issue for postdocs looking for faculty positions, but are great when considering research alone. What seems to be the most unique thing about Janelia is that I am surrounded by international experts conducting research that is directly related to my work. Being around great people is not uncommon to my past, but here I am around a large number of great people that focus on the same research questions. There is almost certainly someone here with exactly the expertise needed for any problem I may encounter. This really helps the research process and allows for a great deal of collaboration between the research groups.

Thank you so much Josh and keep in touch!

*To reach Josh Lillvis at Janelia Research Institute, please contact Liz Weaver at eweaver1@gsu.edu.

The B&B Summer Scholars Program provides summer fellowships to selected undergraduates to support their research efforts in faculty laboratories. At the end of the summer, all students participate in a poster symposium to present their research. Prospective B&B Scholars are required to have a 3.0 GPA or better, be current GSU undergraduates in good standing, and have a faculty nomination. Please email Liz Weaver with any questions; eweaver1@gsu.edu.

“Effects of a caspase inhibitor on naturally occurring cell death in the mouse brain”

Morgan Mosley from Dr. Nancy Forger’s lab in the Neuroscience Institute at Georgia State University.

CALL FOR NOMINATIONS
APRIL 1, 2014!