

BRAINWAVES

NEUROSCIENCE TRAINING PROGRAM

FALL 14

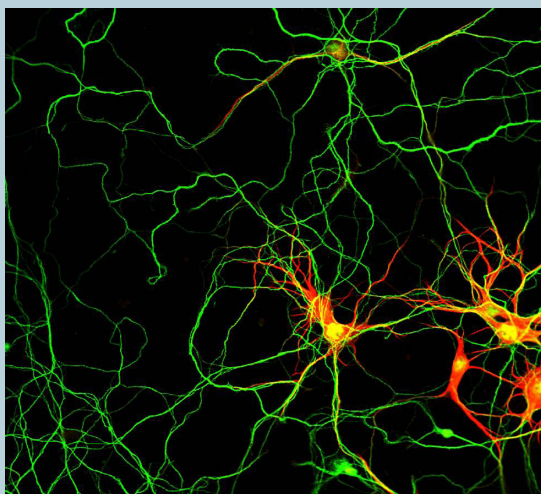
UW-NEUROSCIENCE TRAINING PROGRAM SOCIAL AT THE SOCIETY FOR NEUROSCIENCE CONFERENCE

Date: Sunday, November 16 2014

Time: 6:30 pm-8:30 pm

Location: Room 4,
Renaissance Hotel
Washington, DC

Hors d'Oeuvres will be served



This image shows dissociated embryonic rat hippocampal neurons. Antibody staining: SMI-312 in green (pan-axonal neurofilament marker) and MAP2 in red (microtubule associated protein 2 localized to dendrites). (Courtesy of Ed Chapman's lab)

NEW STUDENTS

This fall we welcomed 10 new students to the program

Sara Berman (MD/PhD)

B.S. Harverford College
Major Professor: Sterling Johnson

Joshua Cruz

B.S. University of California-Davis
Major Professor: Rotating

Cole Korponay (N&PP)

B.A. University of Pennsylvania
Major Professor: Rotating

Elizabeth Kiernan

B.S. & M.S. College of William & Mary in Virginia
Major Professor: Jyoti Watters

Andrew Merluzzi (N&PP)

B.A. American University
Major Professor: Rotating

Andrew Miller

B.S. University of Wisconsin-Madison
Major Professor: Rotating

Jacob Miller

B.A. City College of San Francisco
M.S. San Francisco State University
Major Professor: Rotating

Nicholas Moran

B.A. Knox College
Major Professor: Matthew Banks

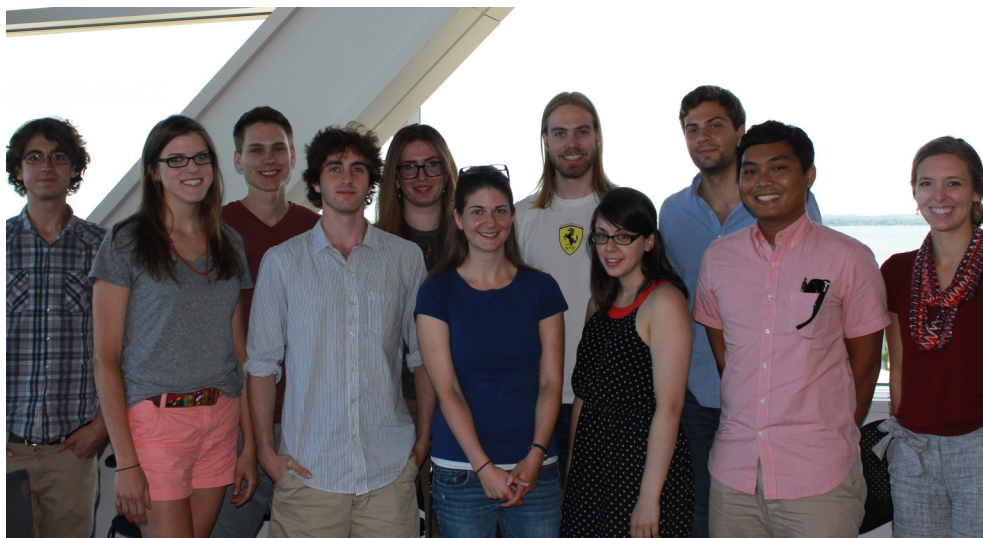
Sasha Rosser

B.S. George Mason University
Major Professor: Rotating

Caitlin Short

B.A. Grinnell College
Major Professor: Rotating

**N&PP denotes students in the Neuroscience and Public Policy Program*



NEUROLOGICAL SURGERY PATIENTS HELP SHOW HOW BRAIN REACTS TO STRESS

By Susan Lampert Smith of UW Health

Madison, Wisconsin - Brain scans of patients with injuries in an important regulatory region in the brain are helping neuroscientists understand how the brain reacts to stress and deals with uncertainty.

Dr. Michael Koenigs, associate professor of psychiatry at the University of Wisconsin School of Medicine and Public Health, said all four patients had shown personality changes before neurosurgery to remove brain tumors in the region of the brain known as the ventromedial prefrontal cortex (vmPFC).

This part of the brain is considered crucial to regulating mood and social functions, and theories based on rodent studies suggest that people with vmPFC damage should be more anxious and fearful.

However, functional magnetic resonance scans of the patients after their tumors were removed suggest that the top-down model of vmPFC control of emotional response may be incorrect.

"It seems to be more complicated than what researchers have generally thought," Koenigs says. "We're concluding that the interaction among brain regions is more complex and that the prefrontal cortex plays a more multifaceted role in regulating emotion."

A Better Understanding of the Brain's Circuitry

"This is the first time anyone has been able to look at causal interactions in this circuit in a human study." - Michael Koenigs

In the first study, published in the *Journal of Biological Psychiatry*, researchers looked at what effect a damaged vmPFC would have on the amygdala, the brain's fear center. While their brains were being scanned, the patients looked at photos that were either neutral (a landscape, for example) or aversive (a picture of an injured person). Nineteen healthy people served as controls.

As predicted by the theory, patients with damage to the vmPFC had much stronger amygdala response to the negative images

than the control subjects. However, this did not result in them feeling more fearful, nor did the aversive pictures elicit the normal change in their heart rates.

"This is the first time anyone has been able to look at causal interactions in this circuit in a human study," Koenigs said. "It shows that the basic top-down model of emotion regulation is too simple."

The second study, published last week in the *Journal of Neuroscience*, looked at how the damaged brains coped with uncertainty by tracking the activity of the insula, which plays a role in anticipation. Studies by UW's Dr. Jack Nitschke and others have shown that uncertainty and excessive worry about potential future events is a hallmark of anxiety disorders.

(Cont. on page. 4)

NEW FACULTY



Edward Hubbard

Assistant Professor,
Department of Education Psychology
Educational neuroscience; numerical cognition; multi-sensory processing; synesthesia



Wen Li

Assistant Professor,
Department of Psychology
Characterize sensory-cortex-based processing of threat information



Marc Wolman

Assistant Professor,
Department of Zoology
Genetic basis of behavior, neural circuit formation and function

N&PP CANDIDATES SUMMER INTERSHIPS

Two Neuroscience & Public Policy students, Annie Racine and Princess Ojiaku, spent the summer completing internships as part of their dual-degree requirements.

Annie Racine, a third-year student in Sterling Johnson's lab, completed an internship this summer at "Policy Matters Ohio," which is a non-profit research institute based in Cleveland, Ohio. Annie spent the majority of the summer researching trauma-informed care practices in schools across the nation, interviewing Ohioans about local care practices, and writing a policy brief on trauma-informed care in schools that will be published this fall.

Princess Ojiaku, a third-year student in Richard Davidson's lab, completed an internship for the MacArthur Foundation this summer. During her internship, Princess worked on civic media and democracy, immigration, housing rights, income inequality and demographic differences in wealth. Most of her time was spent researching the current political conversation surrounding these topics and writing policy briefs on the actions that other entities were taking in relation to them.

Please see our website for more information on Annie and Princess's internships: http://ntp.neuroscience.wisc.edu/documents/NandPP_Summer_2014_Internships.pdf



Taken at the 2014 Neuroscience Training Program annual picnic.

AWARDS & RECOGNITIONS

Congratulations to the following students and faculty for their achievements:

Congratulations to Robin Fropf, Annie Racine, and Aditya Rayasam for winning the Neuroscience Training Program Travel Awards!

Craig Atwood was awarded the Undergraduate Mentoring Award for Biological Sciences.

Robert Dempsey was recently invited as a Visiting Professor to the 2nd International Congress on Minimally Invasive Technique in Neurosurgery in Xi'An China.

Meyer Jackson was awarded the Emily M. Gray Award from the Biophysical Society for contributions to biophysics education.

Corinne Jones received the New Century Scholars Doctoral Scholarship from the American Speech-Language-Hearing Association.

Andrew Merluzzi received a fellowship position through the American Society for Pharmacology and Experimental Therapeutics.

Annie Racine was awarded the National Science Foundation Graduate Research Fellowship Program Honorable Mention, the Alzheimer's Imaging Consortium Fellowship, and the Alzheimer's Association International Conference Travel Fellowship.

CONGRATULATIONS GRADUATES!

Michael Devinney graduated from Gordon Mitchell's lab and is finishing his last two years in Medical School at UW-Madison.

Valerie Joers graduated from Marina Emborg's lab and is now working as a Postdoctoral Fellow at Emory University.

Joshua LaRocque graduated from Bradley Postle's lab and is finishing his last two years in Medical School at UW-Madison.

Angela Navarrete-Opazo graduated from Gordon Mitchell's lab and is now a Medical Doctor, Clinical Researcher and Research Editor at Telethon in Santiago, Chile.

Olga Ponomareva graduated from Mary Halloran's lab and is finishing her last two years in Medical School at UW-Madison.

Annie Tanenhaus graduated from Jerry Yin's lab and is now working as a Postdoctoral Fellow at the Carnegie Institution for Science.

Samantha Wright graduated from Donata Oertel's lab.

Jiabin Zhang graduated from Jerry Yin's lab and is now working as a Postdoctoral Fellow at Harvard Medical School.

CONGRATS TO THE STUDENTS WHO HAVE RECENTLY PASSED THEIR PRELIMINARY EXAMINATIONS!

Erik Hoel

Christian La

Bob Nichol

David Ruhl

Ryan Selleck



Pictured: Tom Yin opening his gift at his surprise party on July 16, 2014.

BRAIN REACTS TO STRESS (CONT'D)

During this study, both patients and controls had their brains scanned while they reacted to certain cues and ambiguous ones that preceded either aversive or neutral photos. The study found that uncertainty triggered a greater insula response in the brain surgery patients, but that it did not increase their heart rate.

Control patients did have a heart rate increase, and such heart-rate variability is considered a healthy response to stress; lower variability is associated with delayed recovery from stress.

Together, the results of these two studies will likely trigger a reconsideration and revision of the predominant theory

regarding the brain mechanisms underlying emotion regulation. The findings indicate that the prefrontal cortex - the putative "control center" of the brain - does more than just clamp down on amygdala activity to regulate the expression of emotion.

"A better understanding of the brain circuitry involved in regulating emotion will hopefully lead to more effective, biologically-based strategies for the diagnosis and treatment of mental illnesses like anxiety and depression," Koenigs said.

MD/PhD Student is Lead Author

The lead author on the two studies was Julian Motzkin, a student in the Medical Scientist Training Program.

Motzkin recently won the Jerzy Rose prize for the research, given annually to the student in UW's Neuroscientist Training Program with the best doctoral thesis. He is currently a medical student at the UW School of Medicine and Public Health.

Other authors are Dr. Carissa Philippi, graduate student Richard Wolf, and UW neurosurgeon Dr. Mustafa Baskaya, associate professor of neurosurgery.

NEW NTP DIRECTORSHIP

In July 2014 we welcomed Dr. Mary Halloran, Departments of Zoology and Neuroscience, as the new director of NTP. Mary is also an alumna of the NTP and we look forward to the years ahead with Mary at the helm! She started off strong in her new role by leading our faculty team to win the Student vs. Faculty volleyball game at this year's NTP picnic as seen below coaching the team!



CONNECT WITH US!



NEUROSCIENCE TRAINING PROGRAM

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<http://ntp.neuroscience.wisc.edu/>



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CONTRIBUTIONS TO THE PROGRAM

Funds given to the program are used to support recruiting activities, guest speakers, the graduate travel award for professional conferences and the annual program picnic. For additional information, please contact the program office at (608) 262-4932. To contribute, please contact the UW Foundation at:

<https://www.myuwconnect.org/give?id=9E933A87-82C0-449E-B62E-6476CF0A0A93>

Thank you to all those who have contributed and continue to support the Neuroscience Training Program and its students.