

# NEURO NEWS

## News from the Admissions Chair: Sabine Fuhrmann

I would like to welcome 7 new students into the Neuroscience Graduate Program this fall: **Kevin Breen** (University of Idaho, MD/ PhD Program), **Younghwan Kim** (Sungkyunkwan University), **Jared Nielsen** (BYU), **Daniel Ryskamp** (University of Idaho), **Jeremy Wilkerson** (University of Utah), **Melissa Wright** (BYU), and **Lingyan Xing** (Shandong University). The Admissions Committee reviewed more than 80 completed applications (38 domestic, 45 international) and interviewed 18 candidates in person or by phone this past spring.

Special thanks to the current graduate students **Andrea Schwager** (Hoffman lab) and **Elliott Smith** (Greger Lab) who organized hosting the candidates and helped organizing the recruitment days. The success of our admissions and recruitment activities is highly dependent on the help and enthusiasm of the current graduate students who host the candidates. We greatly appreciate the help from additional Neuroscience Faculty who participated in interviewing the candidates. I also want to thank specifically all those who presented posters at the recruitment reception last February. And we are very grateful to our Program Coordinator **Tracy Marble** who is invaluable for organizing our admission and recruitment activities.

For their time and excellent work in our recruiting efforts, I would like to thank the Admissions Committee members **Jeanne Frederick**, **Shannon Odelberg** and **Ray Kesner** who leave after several years of devoted and enthusiastic service. Furthermore, **Alessandra Angelucci** is taking a sabbatical leave. The Admissions Committee will continue in 2010 with **Kuby Balagurunathan** (Medicinal Chemistry), **Josh Bonkowsky** (Pediatrics), **Sabine Fuhrmann** (Chair – Ophthalmology and Visual Sciences), **Gary Rose** (Biology), **Yukio Saijoh** (Neurobiology and Anatomy), **Sharif Taha** (Physiology) and **Ning Tian** (Ophthalmology and Visual Sciences).

Furthermore, if anybody is interested, we still need a replacement for a recruitment chair to enhance our recruitment efforts for future candidate students (e.g. for identifying opportunities to contact US and minority undergraduates in colleges and universities, for attending career day events for undergrads etc.). Finally, please, mark your calendar; our tentative date for the recruitment reception with dinner and poster presentations will be **February 12th, 2010** (Friday of President's weekend).

We are pleased to announce that the first year graduate students **Melissa Wright** and **Jared Nielsen** and the second year students **Adam McPherson**, **Elissa Pastuzyn**, **Christina Rossi** and **Scott**

**Lauritzen** have been awarded the NIH Neuroscience Training Grant. Congratulations!

### \*\*\*\*Other Important Dates\*\*\*\*

The Graduate Council administers both internal and external reviews of the Neuroscience Program every 7 years. The purposes are to provide information for long range planning, to promote opportunities for improvement, and to document accountability. We assembled a self-study describing the Program's history, responses to the previous review, and future plans. Reviewers will use the self-study and on-site interviews to prepare a written report containing commendations (things we do well) and recommendations for future improvements. An abbreviated self-study is on the Program website; a full version is in Tracy's office. Please email any suggestions for the Program to Tracy. The Directorate will discuss and prioritize suggestions before the review days. Thank you for your time in helping to improve the Program through this review process.

**Sept. 17: Internal Program Review:** Details to follow.

**Sept. 17: New Graduate Student Reception.** Our annual reception devoted to welcoming the incoming Neuroscience graduate students will be held at the Jewish Community Center, 2 North Medical Drive, Thursday from 5:00-8:00 pm. There will be the usual amounts of food and drink.

**Sept. 21-22: External Program Review:** Details to follow.

**Sept. 22: Bioscience Symposium.** University Marriott Park Hotel, 1:00-7:00pm. Dinner at 7:00pm. Pre-registration required.

**Nov. 6-7: Annual Neuroscience Program Symposium @ Snowbird** <http://neuroscience.med.utah.edu/Snowbird>. This year's invited speakers: **Susumu Tonegawa, Ph.D. 1987 Nobel Laureate, MIT, Howard Eichenbaum, Ph.D., Boston U., Charan Ranganath, Ph.D., UC, Davis, Scott C. Steffensen, Ph.D., BYU, Ray Kesner, Ph.D., U. Utah**

**Oct. 17-21: The Society for Neuroscience Annual Meeting** held this year in Chicago, IL.

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## \*\*\*\*ALUMNI NEWS\*\*\*\*

**Robert Renden:** started July 22, 2009 as 'Senior Principal Scientist' in the New Targets Biology Group at UCB, a pharma company located near Brussels, Belgium.

**Prachee Avasthi Crofts:** has joined the Wallace Marshall's lab at UCSF as a postdoctoral fellow.

**Arie Sitthichai Mobley:** has been awarded a postdoc NRSA. The award is for two years. It will begin Sept 1, 2009. Grant title: "Mechanisms of embryonic olfactory sensory neuron axon targeting."

**Koji Takahashi:** and wife had a baby boy: Ethan Eiji, weighing in 7 lbs, 9 oz., 20" long on July 29th. Everyone is doing great!

**Darin Messina:** was recently promoted to Principal Research Scientist at the Stem Cell Organization, Johnson & Johnson, in Philadelphia, PA. He currently directs the organization's preclinical pharmacology, mechanism of action, and potency assay development teams.

**Suzanna Gribble:** was appointed department chair of Biology at Grove City College on June 1st.

## \*\*\*FACULTY NEWS\*\*\*

**Bradley Greger (Bioengineering)** gets press time in US News (June 30, 2009) and the NSF (June 29, 2009). Experimental devices that read brain signals have helped paralyzed people use computers and may let amputees control bionic limbs. But existing devices use tiny electrodes that poke into the brain. Now, a University of Utah study shows that brain signals controlling arm movements can be detected accurately using new microelectrodes that sit on the brain but don't penetrate it. "The unique thing about this technology is that it provides lots of information out of the brain without having to put the electrodes into the brain," says **Bradley Greger**, an assistant professor of bioengineering and coauthor of the study. "That lets neurosurgeons put this device under the skull but over brain areas where it would be risky to place penetrating electrodes: areas that control speech, memory and other cognitive functions."

**Monica L. Vetter (Neurobiology & Anatomy)**, has been selected as one of 53 ELAM Fellows for 2009-2010. The yearlong fellowship, part of the *Hedwig van Ameringen* Executive Leadership in Academic Medicine (ELAM) Program for Women at Drexel University College of Medicine, prepares senior faculty at medical, dental, and public health schools to assume leadership roles at academic medical centers. This year's class of ELAM fellows was selected from 49 institutions.

**Robert E. Marc (Ophthalmology & Visual Sciences)** is the winner of the Graduate Student and Postdoctoral Scholar Distinguished Mentor Award 2009. The award recognizes faculty who effectively guide graduate students and postdoctoral scholars throughout their professional training in a continuing, multifaceted partnership sustained by mutual respect and concern. The effective mentor serves as advisor, teacher, advocate, sponsor, and role model.

Recipients of the Graduate Student and Postdoctoral Scholar Distinguished Mentor Award will receive an award of \$2,500.

## \*\*\*\*NEWS WORTHY\*\*\*\*

Felix Vazquez, postdoc in Levine & Marc lab, is the SFN IM Chapter Postdoc Representative. He has received a Knight's Templar postdoctoral fellowship, and published "Rlbp1 promoter drives robust Muller glial GFP expression in transgenic mice" in IOVS and "Differential response of C57BL/6J mouse and DBA/2J mouse to optic nerve crush" in BMC neuroscience.

### Meet the Scientists!



<u>Left top to bottom:</u> Jason Druzgal MD PhD <i>Neuroradiology</i> Tracy Abildskov <i>Computer Science</i> Moo Chung PhD <i>Biostatistics &amp; Medical Informatics</i> Molly DuBray MA <i>Neuroscience</i> Alyson Froehlich PhD <i>Cognitive Neuroscience</i> Jee Eun Lee PhD <i>Medical Physics</i>	<u>Middle top to bottom:</u> Jared Nielsen <i>Neuroscience</i> Erin Bigler PhD <i>Neuropsychology</i> Tom Fletcher PhD <i>Computer Science</i> Katie Maasberg <i>Biology</i>	<u>Right top to bottom:</u> Jason Cooperrider BS <i>Neuroscience</i> Andy Alexander PhD <i>Medical Physics</i> Nicholas Lange ScD <i>Neurostatistics</i> Mikle South PhD <i>Clinical Psychology</i> Janet Lainhart MD <i>Psychiatry</i>
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*Research participants and their parents met members of the imaging research group at the "Meet the Scientists" reception on February 3rd. This group is a great example of how the Department of Psychiatry is collaborating with scientists in different disciplines to really go after the basis of neuropsychiatric and developmental disorders.*

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## \*\*\*ACADEMIC DEFENSES\*\*\*

Since the last issue of NeuroNews, the Neuroscience Program congratulates the following students on successfully defending their dissertations: **D. Koji Takahashi (Wilcox lab)** and **Meghan Jobson (Jorgensen lab)**.

Also, since the last issue of NeuroNews, the Neuroscience Program congratulates the following students on successfully passing their qualifying exams: **Rob Duncan (Piotrowski lab)**, **Rebecca Parker (Greger lab)**, **Elliot Smith (Greger lab)**, **Samantha Hammond (Capecchi lab)**, **Scott Lauritzen (Marc lab)**

and dissertation proposals: **Fred Federer (Angelucci lab)**, **Arik Hone (McIntosh lab)**, **Eric Bend (Jorgensen lab)**, **Shushruth (Angelucci lab)**, **James Anderson (Marc lab)**, **Andrew Zayachivsky (Dudek lab)**

## \*\*Graduate Student / Postdoctoral Opportunity\*\*

We are currently looking for a post-prelim graduate student or postdoctoral investigator interested in a neuroscience project. The research will study the effects of drugs and neuropeptide analogs on neuronal morphology and expression of specific receptors and ion transporters. The studies would be conducted on cultured hippocampal neurons with most of the analysis performed in the U of Utah Fluorescence Microscopy Core Facility. If interested in learning more about this project please contact:

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briank@neuroadjvants.com

## \*\*\*\*RECENTLY PUBLISHED\*\*\*\*

**Burns, C.J.**, Zhang, J., Brown, E.C., Van Bibber, A.M., Van Es, J., Clev-ers, H., Ishikawa, T., Taketo, M.M., **Vetter, M.L.**, and **Fuhrmann, S.** (2008) Investigation of Frizzled-5 during embryonic neural development in mouse. *Dev Dyn*, 237:1614-1626.

**Fuhrmann, S.**, Riesenber, A., Mathiesen, A.M., Brown, E.C., **Vetter, M.L.**, and Brown, N.L. (2009) Characterization of a transient TCF/LEF-responsive progenitor population in the embryonic mouse retina. *Invest Ophthalmol Vis Sci*, 50:432-440.

Kellis, S.S.\* , House, P.A.\* , Thomson, K.E., Brown, R., **Greger, B.** (2009) Human neocortical electrical activity recorded on nonpenetrating microwire arrays: applicability for neuroprostheses, *Neurosurg Focus*, Jul;27(1):E9. \* contributed equally to this study.

Pirri, J.K., **McPherson, A.D.**, Donnelly, J.L., Francis, M.M., and Alkema, M.J. (2009). A tyramine-gated chloride channel coordinates distinct motor programs of a *Caenorhabditis elegans* escape response. *Neuron*, 62:526-538.

**Shushruth, S.**, Ichida, J.M., Levitt, J.B., and **Angelucci, A.** (2009) Comparison of spatial summation properties of neurons in macaque V1 and V2. *J Neurophysiol*, (in press).

**Westenskow, P.**, Piccolo, S., and **Fuhrmann, S.** (2009)  $\beta$ -catenin controls differentiation of the retinal pigment epithelium in the mouse optic cup by regulating *Mitf* and *Otx2* expression. *Development*, 136:2505-2510.

Zhang, J., **Fuhrmann, S.**, and **Vetter, M.L.** (2008) A nonautonomous role for retinal Frizzled-5 in regulating hyaloid vitreous vasculature development. *Invest Ophthalmol Vis Sci*, 49:5561-5567.

## \*\*\*\*STUDENT AWARDS\*\*\*\*

**Eli Iacob (Wilcox lab)** is the recipient of a summer fellowship from the Epilepsy Foundation of America.

**Eric Bend (Jorgensen lab)** has been awarded an NRSA from NINDS.

**Adam McPherson (Dorsky lab)** has obtained a spot at the Zebrafish Development and Genetics course in Woods Hole, MA. They have also awarded him \$1,100 to help with travel costs. The course runs from August 8-22, 2009.

**Jason Cooperrider (Lainhart lab)** was received \$5,000 from the Brain Institute Pilot Program in Imaging Research Award. His award money will cover the cost of 10 hours of scan time at the Brain Institute's 3T MRI instruments, which includes a radiologist's read.

**Jay Vargas (Wilcox lab)** has been awarded an NRSA from NINDS.

**Yelena Filchakova (McIntosh lab)** has been awarded the Atherton Scholarship for Graduate Students.

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**\*\*\*Scientists Shed Light on Cause of Inherited Movement Disorder\*\*\***

**Disturbed calcium signaling may play a critical role in brain cell degeneration**

University of Utah Health Care press release; Jul 21, 2009 9:00 AM

University of Utah School of Medicine researchers and their colleagues at University of Texas (UT) Southwestern Medical Center have found strong evidence that abnormal calcium signaling in neurons may play an important role in the development of spinocerebellar ataxia type 2 (SCA2), a disorder causing progressive loss of coordination, speech difficulty, and abnormal eye movements. Their findings are published in the *Journal of Neuroscience*.

SCA2 is an inherited neurodegenerative disease that predominantly affects neurons called Purkinje cells in the cerebellum, the region of the brain that controls voluntary muscle movements, balance, and posture. It is one of a group of genetic disorders characterized by ataxia, or loss of muscle coordination.

"We have known for some time that, at a molecular level, SCA2 is caused by glutamine repeat mutations in the ataxin-2 gene, but the exact mechanism of Purkinje cell degeneration is not well understood," says Stefan-M. Pulst, MD, University of Utah professor and chair of neurology, member of the Brain Institute at the University of Utah, and contributor author on this study. Pulst's group also discovered the ataxin-2 gene in 1996.

The glutamine repeat mutations found in SCA2 are also found in other neurodegenerative diseases, including Huntington disease (HD) and spinocerebellar ataxia type 3 (SCA3). It is commonly assumed that these disorders share a common pathogenic mechanism. Ilya Bezprozvanny, PhD, associate professor of physiology at UT Southwestern Medical Center, and his group had previously uncovered evidence that deranged calcium signaling played an important role in the pathology of HD and SCA3, so they thought that abnormal calcium signaling might also be involved in SCA2.

Calcium signaling refers to the movement or release of calcium ions as a form of cellular communication. Bezprozvanny and his colleagues demonstrated that the mutant ataxin-2 gene strongly associated with an intracellular calcium release channel, increasing the sensitivity of the channel to activation. They also found that enhanced calcium signaling contributed to the death of Purkinje cells in cell culture, but this effect could be attenuated by dantrolene, a stabilizer of intracellular calcium signaling. Bezprozvanny and his colleagues then approached Pulst, who had developed a mouse model of SCA2, in order to test whether these results could be replicated in genetically modified mice.

The authors discovered that dantrolene was effective in alleviating motor coordination deficits in mice with a mutant ataxin-2 gene. After being fed dantrolene for a period of nine months, these mice were found to have motor coordination that was similar to normal mice and they did not suffer any significant adverse effects from long-term treatment with the calcium signaling stabilizer. The scientists also discovered that, beyond the positive effects on coordination, feeding dantrolene to mice with a mutant ataxin-2 gene reduced the death of Purkinje cells in the cerebellum.

"We were all elated to find that dantrolene had a pronounced effect in our mice," says Pulst. "It prevented deterioration in motor function and Purkinje cell death."

Dantrolene is approved for use in humans for the treatment of muscle spasticity. "Although it showed effects in mice with ataxia, it could have major side effects in human patients with ataxia because it may cause sedation and muscle weakness. Therefore, this drug should be evaluated in controlled clinical trials before wide-spread use in SCA2 patients," cautions Pulst.

Taken together with their previous studies on HD and SCA3, the research group now has evidence that deranged calcium signaling contributes to the pathogenesis of at least three inherited ataxias. This strongly suggests that abnormal neuronal calcium signaling may also be involved in other neurodegenerative diseases caused by glutamine repeat mutations.

It is estimated that SCA2 affects as many as one or two in every 100,000 people. "Neurodegenerative diseases like HD and SCA2 are progressive and have no known cures at this moment," according to Pulst. "Calcium signaling stabilizers such as dantrolene or similar compounds may provide a new avenue for investigation in the laboratory and in clinical trials to limit disability and disease progression."

*Do you have something to submit in the next issue of NeuroNews?  
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