

NEURO NEWS

Greg Clark lab in the media; SfN 2017, EurekAlert, Mashable.com, Washington Post

From the Lab:

Nice mashup video of our DARPA HAPTIX funded work with our previous subjects, by Mashable as part of their Machine Bodies series. Our goal is to connect an advanced dexterous and sensorized DEKA "Luke Skywalker" arm to the user's own neuromuscular system after hand amputation, so that they can move the hand just by thinking about it, and can feel a sense of touch and movement back from the hand--and ideally even feel whole again.

On Facebook: <https://www.facebook.com/mashablesocialgood/videos/10156878205998136/>

On the main Mashable site: http://mashable.com/2017/12/05/university-utah-neuroprosthetics-luke-arm-robotic-amputee/#Jb_oG2nqLkqj

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Additionally, below are a few new media links highlighting our neuroprostheses research that was recently presented at the Society for Neuroscience meeting.

<https://medcitynews.com/2017/11/neuroprosthetics/>

"...Perhaps the most impressive presentation was from Jacob Anthony George, a graduate student in the Clark lab at the University of Utah. The researchers are trying to equip prosthetics with a sense of touch to help amputees feel more connected to their prostheses and reduce phantom pain and anxiety.

In the study, an amputee tested a prosthetic hand he could control with his thoughts. In addition, electrode implants in his arm provided sensation from his missing hand. A short video showed him pushing open a virtual door with a virtual hand.

"Oh my God," he said. "I just felt that door."

It was an emotional moment, but these advanced prosthetics are still a long way off.

"A lot of the participants helping in the study will eventually be able to see it become a technology in their lifetime," said George at the news conference. "There are some big engineering challenges that

still need to be overcome but in a decade, maybe two, we'll have these types of devices available."

<https://futurism.com/new-mind-controlled-prosthetics-poised-transform-humanity/>

"...An amputee's prosthetic hand was also shown to improve the subject's motor skills and reduce phantom pain, contributing to a greater sense of ownership over the replacement body part."

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https://www.eurekalert.org/pub_releases/2017-11/sfn-etr111017.php
EurekAlert! AAAS
Engineering tomorrow's responsive, adaptable neuroprosthetics and robots
Findings illustrate rapid progress in prosthetic limbs and eyes as well as brain-machine interfaces

Today's new findings show that:...

Restoring sense of touch through an amputee's prosthetic hand improves motor skills, reduces phantom pain, and provides a sense of hand ownership (Jacob Anthony George, abstract 642.04).

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The Washington Post, William Wan. "New robotic hand named after Luke Skywalker helps amputee touch and feel again." Nov. 15, 2017.

Excellent lay-press write-up of our studies restoring the sense of touch in HAPTIX subject 2, via USEA stimulation of residual sensory nerve fibers after long-term amputation of the hand. Multiple pictures and videos as well.
https://www.washingtonpost.com/news/speaking-of-science/wp/2017/11/15/new-robotic-hand-named-after-luke-skywalker-helps-amputee-touch-and-feel-again/?utm_term=.609c4075075c

ASEE First Bell, Nov 16 2017. "University Of Utah Researchers Develop Prosthetic Hand With Sense Of Touch."
<http://mailview.bulletinmedia.com/mailview.aspx?m=2017111601asee&r=2881281-6b53>

*****From the Admissions Committee
Chair - Michael Deans*****

The Neuroscience Program admissions committee recently invited **Drs. Sophie Caron** (Biology), **Frans Vinberg** (Ophthalmology & Visual Sciences), and **Anna Docherty** (Psychiatry) to join our returning members: **Mike Deans** (Otolaryngology), **Sungjin Park** (Neurobiology & Anatomy), **Skyler Jennings** (Communication Sciences) and **Adrian Rothenfluh** (Psychiatry). Previous committee members **Drs. Bryan Jones, Ayako Yamaguchi, Jun Yang, Hilary Coon,** and **Tom Lane** have completed their commitments and we appreciate their service. Student committee chairs: **Heidi Febinger** and **Kyle Jenks**.

The committee has been active and we have received a total of *124 applications* from students across the US and world. This is an increase from the number of applications we received last year. **NP faculty and current students are invited to meet our top candidates at a dinner reception and poster session to be held at the JCC on February 9th- so save the date!**

*****NEW FACULTY*****

Since the last issue of NeuroNews we have added the following new faculty:

Behrad Noudoost, Ph.D., Associate Professor of Ophthalmology & Visual Sciences. Research: Neuronal basis and neuromodulatory pathways of visual attention.

Brennan Payne, Ph.D., Assistant Professor of Psychology. Research: Cognitive Neuroscience; Aging; Language; Memory; Event-Related Brain Potentials; EEG; Eye-Movement Control.

Jon-Kar Zubieta, M.D., Ph.D., Professor and Chair, Psychiatry. Research: Neurobiological mechanisms underlying motivational mechanisms and the regulation of stress responses.

Frans Vinberg, D.Sc., Assistant Professor of Ophthalmology & Visual Sciences. Research: Physiology and pathophysiology in the mammalian/primate retina. Calcium regulation and feedback mechanisms in photoreceptor and retinal pigment epithelium cells.

*****Other Important Dates*****

Feb. 9: Neuroscience Program Recruitment. Our annual reception devoted to recruiting student candidates for the upcoming academic year will be held at the Jewish Community Center, 2 North Medical Drive, Friday, February 9th from 6:00-9:00pm. There will be, of course, the usual amounts of food and drink **AND chocolate fountain!**

March 12-18: National Brain Awareness Week. Patrick Parker and Christine Wnukowski are the co-chairs of the committee this year.

May 10: Annual Neuroscience Student Symposium
Student organizer: Michelle Reed

October 19: Annual Snowbird Symposium
Student organizer: Andrew Moran

*****SEMINAR SERIES 2017-2018*****

Remaining seminars for this year:

January 16: Matthew Kennedy, Ph.D., U. Colorado, Denver
“New tools for visualizing and controlling synaptic function”

February 20: Katherine Nagel, Ph.D., NYU Neuroscience I.
“Neural circuits for navigation in *Drosophila*”

March 20: Mriganka Sur, Ph.D., FRS, MIT
“The functional logic of cortical circuits”

April 17: Joshua Sanes, Ph.D., Harvard U.
“Wiring up the retina: cells and synapses”

see more details at:
<http://neuroscience.med.utah.edu/meetings.php>

*****ACADEMIC DEFENSES*****

Since the last issue of NeuroNews, the Neuroscience Program congratulates the following student on successfully passing her qualifying exam: **Christine Wnukowski (Jorgensen lab);**

and dissertation proposals: **Heidi Febinger (Dorval lab), Michelle Reed (Baehr lab), Evan Ratzan (Deans lab), and Pablo Maldonado (Maricq lab);**

and dissertation defenses: **Rishi Alluri (Rose lab).**

*****STUDENT AWARDS*****

Patrick Parker (Brennan lab) has been awarded an NRSA Fellowship (NINDS).

RECENTLY PUBLISHED

Bahmani, Z., Daliri, M.R., Merrikhi, Y., Clark, K., and **Noudoost, B.** (2018) Working Memory Enhances Cortical Representations via Spatially-specific Coordination of Spike Times. *Neuron*, in press.

Basu, R., Duan, X., Taylor, M.R., Martin, A., Muralidhar, S., **Wang, Y., Gangi-Wellman, L.**, Das, S.C., Yamagata, M., **West, P.J.**, Sanes, J.R., and **Williams, M.E.** (2017) Heterophilic Type II cadherins are required for high magnitude synaptic potentiation in the hippocampus. *Neuron*, Sept 27. PMID 28957665.

Pastuzyn, E.D., Day, C.E., Kearns, R.B., Kyrke-Smith, M., **Taibi, A.V.**, McCormick, J., Yoder, N., Belnap, D., Erlendsson, S., Morado, D.R., Briggs, J.A., Feschotte, C., and **Shepherd, J.D.** (2018) The Neuronal Gene Arc Encodes a Repurposed Retrotransposon Gag Protein that Mediates Intercellular RNA Transfer. *Cell*, in press.

Zhu, W., Shi, D.S., Winter, J.M., Rich, B.E., Tong, Z., Sorensen, L.K., Zhao, H., Huang, Y., Tai, Z., Mleynek, T.M., Yoo, J.H., Dunn, C., Ling, J., Bergquist, J.A., Richards, J.R., Jiang, A., Lesniewski, L.A., **Hartnett, M.E.**, Ward, D.M., Mueller, A.L., Ostanin, K., Thomas, K.R., **Odelberg, S.J.**, and Li, D.Y. (2017) Small GTPase ARF6 controls VEGFR2 trafficking and signaling in diabetic retinopathy. *J Clin Invest.*, Oct 23. pii: 91770. doi: 10.1172/JCI91770. [Epub ahead of print]

ALUMNI NEWS

Darin Messina: was recently promoted to Vice President, Biology R&D for the Medical Device division of Allergan. The Medical Device division accounts for \$3B in annual revenue and includes their recent acquisition of LifeCell (regenerative tissue matrices). He and his family reside in Southern California.

Elliot Smith:

Sklar, S., Walmer, M., Sacre, P., Schevon, C.A., Srinivasan, S., Banks, G.P., Yates, M.J., McKhann, G.M., Sheth, S.A., Sarma, S.V., and **Smith, E.H.** (2017) Neuronal activity in human anterior cingulate cortex modulates with internal cognitive state during multi-source interference task. *Engineering in Medicine and Biology Society (EMBC), 39th Annual International Conference of the IEEE*, DOI: 10.1109/EMBC.2017.8036985.

Koji Takahashi: is now Associate Director of Medical Affairs at Sage Therapeutics.

Benedict Albensi, Ph.D., BCMAS, CRQM: CRQM is a certification achieved for Clinical Research Quality Manager and the BCMAS, is Board Certification Medical Affairs Specialist.

Snow, W.M., Cadonic, C., Cortes-Perez, C., Chowdhury, S.K.R., Djordjevic, J., Thomson, E., Bernstein, M.J., Suh, M., Fernyhough, P., and Albensi, B.C. (2018) Chronic dietary creatine enhances hippocampal-dependent spatial memory, bioenergetics, and levels of plasticity-related proteins associated with NF- κ B. *Learning and Memory*, in press.

Dr. Albensi's postdoc fellow, Dr. Aida Adlimoghaddam has won a 2018 Alzheimer's Drug Discovery Foundation (ADDF) Young Investigator Scholarship (USA Alzheimer's group), one of only 30 worldwide. Dr. Adlimoghaddam's application for this scholarship was based on her work with the drug nilotinib in Alzheimer's disease models (in collaboration w/ Dr. Turner at Georgetown Univ.)

Brain Awareness Week

Brain Awareness Week (BAW) is coming up again from March 12-18! During this week, students and faculty from the University of Utah will visit local elementary and high schools to teach them about the brain. During our visits, we have volunteers from various departments introduce different modules to the younger students. These modules include human brain anatomy of real cadaver brains, sensory and perception interactives, and the opportunity to hear the electricity within their own bodies by using an EMG. At the end of the week (March 19th), we will spend a day at the Leonardo where everyone is welcome to come experience the fun. Keep an eye out for more information on BAW and feel free to send any questions to neurobaw@gmail.com. See you soon!

Brain Awareness 2017 Co-Chairs: **Patrick Parker** and **Evan Ratzan**, Graduate Students, Neuroscience Program

New Learning Tool for Neuroscience Education

The ability to perform *in-vivo* and *in-vitro* neurophysiology studies usually require years of training and complex, expensive equipment. Christopher Butson, Ph.D. and Shana Black, a Bioengineering graduate student in his lab, have developed a low-cost (less than \$200), interactive learning tool for neurophysiology educators and students. The Virtual Neurophysiology Workbench (VNW) allows students to use inexpensive recording devices such as those made by Backyard Brains to capture activity from computational model neurons. Students can then conduct experiments to understand the relationships between intracellular and extracellular signals. This is a highly flexible setup that allows experimental manipulations that might be impossible to perform otherwise. For example, students can add or remove ion channels, or manipulate the biophysical properties of neurons such as capacitance, and subsequently see the effects of these manipulations in near real-time.

The VNW uses MATLAB and NEURON software along with neural recording equipment from Backyard Brains. Initial experiences indicate that students can learn the tools and start running experiments in about an hour with a trained instructor.

Initially funded by a University of Utah teaching grant, the VNW project develops hands-on experiments utilizing easily accessible equipment to assist undergraduate and graduate level engineering students in comprehending some of the relationships between intracellular neural signals and extracellular recordings.

More information can be found at www.brainSTEM.science.

Post-doctoral fellow position - Renshaw lab

A post-doctoral fellow position is available immediately in the laboratory of Dr. Perry Renshaw at the University of Utah Department of Psychiatry.

We are seeking a highly motivated scientist with a neuroscience background and expertise in rodent behavior and brain tissue analyses techniques. Our lab uses a rodent model for hypobaric hypoxia to study the brain and behavioral impacts of exposure to altitude. We are also interested in identifying novel nontraditional options for antidepressants using this model. The candidate is required to have a PhD in neuroscience or a related field, with training in cellular and molecular neuroscience, biochemistry and multidisciplinary approaches to neurological disorders. Experience in working with animal models is essential. Familiarity working with ELISA, protein chemistry and immunochemistry is desired. **Please send curriculum vitae, research interests, and contact information for three references to Shami.Kanekar@hsc.utah.edu.**

Post-doctoral fellow position - Angelucci and Noudoost labs

A joint postdoctoral position is available in the Angelucci and Noudoost labs in the Department of Ophthalmology and Visual Sciences, Moran Eye Institute, at the University of Utah. Our research, supported by NSF, NIH, and BRAIN initiative grants, aims to elucidate the contribution of feedback projections to sensory processing and perception. The research will involve a variety of techniques including array electrophysiological recording, pharmacological manipulation, electrical stimulation, functional connectivity testing, and optogenetics in anesthetized as well as awake behaving non-human primates. This position will have the possibility of collaborating scientifically with a team of 12 researchers at four other universities who comprise the EPSCoR Attention Consortium. Both labs are closely collaborating with the neural engineering groups at Utah that developed the Utah Arrays, and its variants. One of the NIH-BRAIN funded projects aims at developing novel technologies for simultaneous large scale optogenetics and electrical recordings in collaboration with this group.

The ideal candidate will have:

- a PhD in Neuroscience or related fields.
- Expertise with electrophysiology techniques. Experience with nonhuman primate research is advantageous but not necessary.
- Strong quantitative and programming skills (Matlab, Python, etc).
- Good interpersonal skills as the work is team oriented.

Please send your CV and application behrad.noudoost@utah.edu or alessandra.angelucci@hsc.utah.edu. In your application, briefly address the four above expectations, and provide the name and email address of two to three references.

The salary will be based on the University of Utah salary system; the start date and the duration are negotiable.

Salt Lake City offers unparalleled opportunities for outdoors recreation including world class skiing, rock climbing, mountain biking, river rafting and hiking. The city is consistently ranked among the most livable cities in America and is also a very affordable place to live.

Post-doctoral fellow position - Coon lab

The University of Utah School of Medicine is seeking applicants for postdoctoral position in psychiatric genomics with an emphasis on statistical/quantitative genetics and bioinformatics. The position will focus on a project examining genetic risk factors for suicide using analyses of genomic and phenotype data in suicide cases who are members of large, extended families at high risk for suicide. Additional follow-up and/or complementary analyses may also be undertaken in a large data set of >4000 Utah suicide cases with genomic data. The University of Utah is undertaking this research in collaboration with Janssen Research & Development. Applicants must have a Ph.D. Preferred applicants will have working knowledge of statistical genetics/bioinformatics methods relevant to complex trait genomics, and experience with large data sets. Applicants must also have excellent written and oral communication skills.

Salt Lake City is one of the most beautiful cities in the world, surrounded by mountains, with world-class skiing, rock climbing, hiking, backpacking, and mountain biking. The city also enjoys the Sundance Film Festival, an active music scene, excellent restaurants, professional basketball, baseball, and soccer teams, one of the largest LGBTQ communities in the country, the Utah Symphony/Utah Opera, a vibrant art community, and many other cultural attractions.

The University of Utah is an Equal Opportunity, Affirmative Action Employer of all protected classes including veterans and individuals with disabilities. Women and minorities are encouraged to apply.

Applicants should send a statement of research experience with career goals and a CV to hilary.coon@hsc.utah.edu, QL12@its.jnj.com

*Do you have something to submit in the next issue of NeuroNews?
Send your information to: Tracy Marble, Program in Neuroscience
401 MREB, FAX: 581-4233, or e-mail: tracy.marble@hsc.utah.edu*