The Society for Neuroscience 2023 Annual Meeting Report: Advancing the Understanding of the Brain and Nervous System

From November 11th to the 15th, 2023, Washington D.C., USA, hosted the Society for Neuroscience (SfN) conference, one of the largest international neuroscience meetings with over 20,000 participants in attendance, including researchers, clinicians, vendors, and many others. There was plenty to see among the various symposia, special lectures, and, of course, the expansive plethora of posters that invited visitors to soak up as much information as possible. Vendors and exhibitors showed off some of the newest tools for research, from virtual reality and electroencephalogram recordings, to 2-photon microendoscopes and fancy sequencers. The annual meeting garners lots of attention from visitors of every career stage, from early-career investigator to tenured faculty, from industry scientists to science officers at the U.S. National Institutes of Health. There were also plenty of opportunities to engage in workshops for learning different technologies, professional development and networking, and grant writing, in addition to the social events after the main conference sessions on each day. With all this in mind, it is very easy to be overwhelmed with so many choices of what to attend, see and do: one becomes curious as to how one makes the decision to see a prominent scientist's work, to meet a trainee at a poster for the latest research update, or to play with and explore new tools and techniques. Everyone can find something to enjoy at the conference.

New open-source multi-device commutator for rodent calcium imaging, electrophysiology, and more from Open Ephys vendor on the exhibit floor at SfN 2023.

D-SPAN Meeting

SfN attracts so many researchers around the world that it has become an organizing site for satellite meetings before the meeting hosted by different organizations all meeting at the same location. One such meeting was the annual D-SPAN (Diversity Specialized Predoctoral to Postdoctoral Advancement in Neuroscience Award) meeting which is hosted by the BRAIN Initiative and NIH Blueprint for Neuroscience Research, for all current and previous DSPAN awardees. This session was organized by an amazing set of NIH officials, Michelle Jones-London, PhD, and Lauren Ullrich, PhD. The meeting offered a setting for the awardees who have a diverse background in race and ethnicity, disability, and/or scientific background to network during events like "Brain Trust Networking Activity," "Alumni Panel: New Faculty Reflect", "Postdoc Perspective Roundtables", and "Scientific Networking/Speed Dating". Each of these events was a spectacular way to meet other peers and mentors while fostering a community working towards common goals. However, an additional function was to provide trainees easy access to tools for applying directly to the SfN main meeting. It is truly a privilege to attend this meeting and I cannot wait for next year's session.

Dr. Karl Deisseroth "Inner workings of channelrhodopsins and nervous systems":

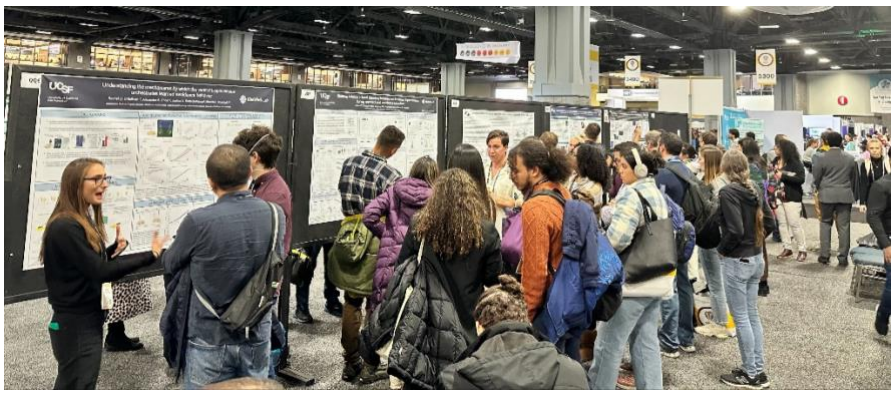
One session was lectured by Dr. Karl Deisseroth, a prominent neuroscientist at Stanford University known for being among those who pioneered optogenetics, who spoke on the topic of channelrhodopsins for systems neuroscience. He began the session by describing the beginnings of opsins, citing Francis Crick's idea that for molecular biology to have an impact on neuroscience – the ideal signal would be light, underscoring how the idea for light-guided modulation of neural activity was brought up years ahead of its implementation. Optogenetics is a tool base in which genetically modified opsin proteins, mostly ion channels, could be activated with certain wavelengths of light. The most widely used is channelrhodopsin, which is a cationic channel that opens in the presence of blue light, which has been used for neuronal excitation experiments pioneered by the Deisseroth Lab. The speaker then described how the search for an anion channel with collaborators had allowed them to explore other branches of opsin proteins that could be leveraged for neuroscience applications. For example, the main search for red-shifted channels involving mutagenesis screens of different variants, led to the discovery of ChRmine. The search for ChRmine was motivated by the need to multiplex neural calcium recordings commonly used with blue-shifted sensors like the GcAMP series and, therefore, is incompatible with channelrhodopsin. Interestingly, they published a paper in *Nature Biotech* (Chen et al. 2020) on how to utilize ChRmine for non-invasive fiber optics. Non-invasive fiber optics is advantageous since their use eliminates brain damage produced from insertion of commonly used optic fibers and thus increases its potential application. He ended the talk with newer work from the lab on new K^+-selective ion channels for neuronal inhibition and their potential usage.

Dr. Huda Akil "The Emotional Brain: Embracing the Complexity":

Dr. Akil is a researcher at University of Michigan who studies emotional reactivity in rodents as a window into psychiatric disease. Her talk focused on how the field should be harnessing individual variability to tell us more about how the brain may work. The Akil lab's major goal was to understand neural activity well enough to predict future emotional reactivity to prevent maladaptive responses. The paradigm they use is from selectively breeding two kinds of rats, one defined as a low responder and the other a high responder to locomotion in an open field. Selectively breeding based on behavioral phenotypes allows researchers to harness individual behavior differences across generations. What they were able to show is that you can find maladaptive behaviors in the low responding rats such as diminished social interaction, greater spontaneous anxiety, and more stress symptomology than their high responding counterparts. They went further to show that overexpression of the main stress steroid receptor, the glucocorticoid receptor, mimics phenotypes seen in the low responding rats. Further studies into several brains had led them to suspect the ventral medial hypothalamus as a possible key region that could predict emotional reactivity in these rats.

Poster Session

The poster session at SfN is legendary for its rows that range from A to WW and beyond, illustrating the copious amounts of science that is being presented. Talking to scientists at posters with their work is truly an amazing thing. For one, it is free education offered by an expert who is actively doing work in their field. It provides many opportunities to gain experience about other areas of work without doing all the research yourself, just by listening and asking questions. Similarly, it also provides a platform for individuals to showcase their research and promote it.



Poster session on the floor of the convention center.

Matt Gergues is a doctoral candidate at the University of California, San Francisco who is providing this meeting report as a recipient of the Society for Neuroscience Trainee Professional Development Award and the Tianqiao and Chrissy Chen Institute Science Writers Fellowship