NEWS

Reactions from SfN 2014

BY **GREG BOUSTEAD**

14 NOVEMBER 2014

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*We checked in from Washington, D.C., where the **2014 Society for Neuroscience annual meeting** ran 15-19 November. Read below for daily reactions from the attendees. For overall takeaways from the meeting and a summary of our Twitter chat, **click here**.*

19 November 2014: Day Four

Robert Malenka

Pritzker Professor of Psychiatry and Behavioral Sciences, Stanford University

This year: “I’ve seen an explosion of research that uses optogenetic and related tools to manipulate specific inputs and outputs from the ventral striatum, primarily the nucleus accumbens. The array of results is bewildering. Many of these findings are related to social reward interactions — but also results on feeding and fear, as well as the more traditional studies on effects of drugs of abuse. This is perhaps not surprising given that the nucleus accumbens is a central node in the circuitry that helps mediate all forms of motivated behaviors.”

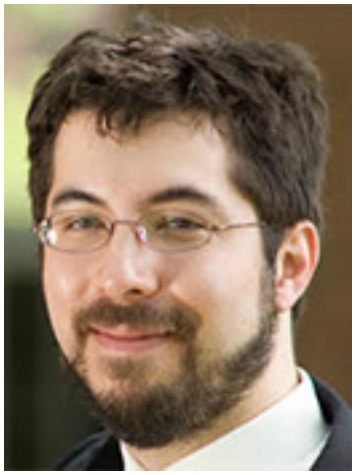
Complicated connections: “Making sense of all of these results is going to be challenging. It’s clear from this type of work, as well as the application of novel neuroanatomical techniques, that the brains of mice are amazingly complex and contain ‘connectivities’ — connections between different brain areas — that we never imagined existed. It will be important for researchers imaging human brains and human geneticists to pay close attention to these finding**s."**

Valerie Hu

Professor of Biochemistry and Molecular Medicine, George Washington University

System view: “I was pleased to see that autism researchers are increasingly embracing a systems approach, both at the level of integrative systems biology as well as at the level of systemic physiology. This integrates the interactions of brain-gut-immune (and maybe other?) systems as contributors to autism.”

Putting it together: “This new direction also suggests that there are multiple ways that the environment may increase risk for autism. The broader implication of these new studies is that we may glean useful information about biological deficits in autism even from peripheral tissues (for example, immune cells) that may help identify novel gene targets and pathways for treatment. This information may also translate into more readily accessible biomarkers (e.g., antibodies, inflammatory cytokines, gut microbiome, serum metabolites) for autism diagnosis.”



Ed Boyden

Associate Professor of Biological Engineering and Brain and Cognitive Sciences, Massachusetts Institute of Technology

Making big connections: “It was great to get feedback from many parts of the research community about our **new technology** for scalable, super-resolution imaging of large three-dimensional brain volumes. An emerging theme at this year’s meeting seems to be the desire to map large brain circuits — important for understanding how brain circuits work as an emergent whole — but without losing nanoscale precision, which is key for understanding the molecular signaling at hand. We are excited to collaborate with other scientists to map normal and abnormal brain states, in large circuits, with the precision needed to pinpoint key mechanisms of dysfunction.”

18 November 2014: Day Three

Samuel Wang

Associate Professor of Molecular Biology, Princeton University

Standouts: “An interesting presentation by Peter Tsai and Mustafa Sahin addressed the question of whether early-life contributions by cerebellar Purkinje cell function can affect later behavioral function. I like the way they are examining whether rescue at different points in life can affect later behavioral outcomes. Their work points toward the possibility outlined in **my recent review**, that brain regions can have effects that reach far beyond what they themselves are thought to do in the adult animal.”

Parsing the cerebellum: “Work presented by Amaicha Mara Depino uses a totally different method, that of neuroinflammatory insult. In their case, they explored anatomical specificity: They found that certain lobules of the cerebellum (specifically, VI and VII, near the midline) had effects on social interaction, but other lobules (IV and V) did not. This suggests that different parts of the cerebellum have different roles, just as **different layers of the neocortex have different functions**.”

Building bridges: “I think these results are deeply related. I know most research in mouse models of autism tends to focus on the molecular and cellular mechanisms. What I find interesting here is that these projects open the possibility of asking systems-level questions such as *when* in development and *where* in the brain a genetic or environmental insult can affect long-term function. That promises to bridge a large gap between genes-and-environmental-factors and circuits-and-systems.”

Beyond the cortex: “Broadly, I also like the nanosymposium I chaired [parts of which are **covered here**]. There, again, the theme was asking whether specific brain systems could make contributions to autism. I especially like the breadth of the presentations, which included rodent models and human behavior and brain imaging. It’s exciting to see brain-wide integrative function — especially in regions other than the neocortex! — start to get discussed as a necessary

component of the understanding of autism."

17 November 2014: Day Two

Alex Shcheglovitov

Assistant Professor of Neurobiology and Anatomy, University of Utah

Strength in numbers: "What impressed me the most today is the huge number of people —really overwhelming! — and the recent technological advances. It really seems like anything is possible today."

Be a hero: "I really liked the SHANK symposium, specifically the talks of Tom Insel and Young-hui Jeang. Dr. Insel very nicely outlined future directions in autism research. One of his ideas is to look for 'superheroes' — certain people who carry pathogenic mutations but are nevertheless healthy — and study what protects these individuals from developing neuropsychiatric abnormalities."

Michael Murias

Assistant Research Professor, Duke Institute for Brain Sciences

Promising EEG: “I was happy to see so much great basic electroencephalography work presented — from its development across the lifespan in typical populations, to simultaneous single-cell recordings, local field potential and scalp recordings in nonhuman primates. In autism, **Stewart Mostofsky**’s lab presented some terrific electroencephalography data in children during movement observation [which has been **a challenge for the field**]. I was also intrigued by work — from **Elizabeth Torres** and others — regarding peripheral mechanisms in sensorimotor processing, and I think we're bound to see more work in this area.”

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16 November 2014: Day One

Melissa Bauman

Assistant Professor of Psychiatry and Behavioral Sciences, University of California, Davis MIND Institute

Hot topic: “The **interest in neuroimmunology** was remarkable. For most of the three-and-a-half-hour session, yesterday’s **symposium** on immunity-brain connections was standing room only. I was impressed by efforts to evaluate the immune system’s contributions to complex behaviors, including social interactions. Members of **Jonathan Kipnis’** lab presented new data linking T-cell depletion with impairments in social behavior.”

Putting it together: “It’s becoming clear that combining expertise in immunology with comprehensive behavioral phenotyping will help us to uncover new ways in which interactions

between the immune and nervous systems influence behaviors that are altered in neurodevelopmental disorders."

Loren Frank

Professor of Physiology, University of California, San Francisco

Working lunch: "During a conversation over lunch today, I learned from **Jill** and **Stefan Leutgeb** that lesions of the dentate gyrus region disrupt sharp-wave ripple-related activity downstream in the CA3 region. This is interesting because we and others have linked sharp-wave ripples to learning and memory, and these findings give us a new perspective on how these events are generated in the hippocampus. Previous work had implicated the dentate gyrus region in creating memories, but as sharp-wave ripples also seem to be important for retrieving and consolidating memories, these findings suggest that communication between the dentate gyrus and CA3 regions is critical to multiple aspects of memory processing. This might also provide inspiration for an approach that enhances this communication to improve learning and memory."

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15 November 2014: Pre-conference

Matt Mosconi

Assistant Professor of Psychiatry and Pediatrics, University of Texas Southwestern

More lifting required: “There were multiple exciting talks at the satellite symposium on SHANK3 mutations, organized by the Phelan-McDermid Syndrome Foundation ahead of the conference. One of the important themes throughout was that a considerable amount of heavy lifting has been done in mouse studies of **SHANK3** and **PTEN**, but translating findings on possible targets to therapeutics in the clinic will take significant resources and a greater emphasis on identifying appropriate **biomarkers** and quantitative endpoints.”

Takeaways: “Catalina Betancur gave a very informative presentation that demonstrated just how valuable the **Phelan-McDermid syndrome registry** can be in determining genotype-phenotype relationships, especially as it continues to grow. **Alex Kolevzon** gave an exciting overview of preliminary results from his **IGF-1 trial of Phelan-McDermid syndrome**. **Craig Powell** also gave a very compelling talk detailing his lab's **electrophysiological and behavioral studies** of multiple SHANK3 mouse models and PTEN models.”

Drawing inspiration: “I have to say that the presentations from the families in the morning were particularly informative and inspirational. These are impressive mothers, fathers, siblings and children.”

Perspective: “**Tom Insel**’s informative overview of autism research was a nice blend of optimism and realism: optimism about the traction we are gaining studying a disorder like Phelan-McDermid syndrome with known genetic mechanisms, but also the reality that this does not mean a cure is around the corner, as advancing from mechanistic understanding to cure has been slower than expected in other diseases. He also pointed out that the smaller steps between where we are now and a cure will still be very important and of great impact to affected families.”

Rare momentum: “There is a lot of momentum now behind studying specific rare genetic variants associated with autism. While this does not **discount the role of common variants**, studies of SHANK, TSC and FMR1 — among others — really have built momentum in identifying pathways and generating new drug trials.”

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14 November 2014: Heading to D.C.

Tomorrow afternoon officially kicks off the 44th **annual meeting of the Society for Neuroscience** (SfN) in downtown Washington, D.C.

With more than 30,000 scientists making 15,000 presentations this year, **SfN's annual meeting** — the largest conference of its kind — can seem overwhelming.

Fear not. **Once again**, SFARI.org will have its crack team of reporters there to bring you breaking news from the conference. They will crystallize the noteworthy breakthroughs and highlight their relevance to autism-related disorders. We'll also offer daily 'scientist snapshots' from SfN attendees who, **as they did last year**, will provide their takeaways from the meeting. Those reactions will appear here as a rolling blog.

Stay informed by checking the regularly updated **SfN 2014 coverage on our site** throughout the meeting. Want all of this delivered to your inbox? Make sure you sign up for our **newsletter here**.

If you're attending the meeting, please join us at the **Autism Research Social** Monday night for drinks and food with the SFARI news and science teams, as well as leaders in the field. The evening will include short presentations by early-career scientists.

If you don't make it to SfN 2014 in person, there's still an opportunity to join in the excitement. On Tuesday, 18 November at 12 p.m. Eastern, we will host a Twitter Q&A chat live from SfN. Follow **@SFARIorg** on Twitter and use **#SFNchat** to join. You can find details about the **Twitter chat here**.

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*For more reports from the 2014 Society for Neuroscience annual meeting, please **click here**.*