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An Exhaustive Neuroscience 2009 Preview

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As described on Monday and hinted at all week, this weekend marks the start of Neuroscience 2009, the annual mega-conference of more than 30,000 neuroscientists. After years of staging the meeting in areas with distractingly nice climates such as New Orleans, Orlando and San Diego, this year should be all business with the rainy chill of Chicago keeping people indoors. But there's still a lot of fun to be had, with big-time speakers, immersive poster sessions, the never-ending hunt for the best vendor knick-knack giveaway and the night-time socials. Because of Neuroscience's massive size, there are a million different ways to navigate a path through the science, but here's a ~~quick~~ extremely long guide to what I'm looking forward to experiencing. Remember to tune in to ScienceLife all weekend (and through Wednesday) for coverage.

Saturday: Magicians Were the First Neuroscientists

Each year one of the most interesting lectures falls under the sober heading of "Dialogues Between Neuroscience and Society," which basically means "we invited someone from outside of neuroscience to talk about neuroscience." At previous meetings I've attended, that meant hearing public figures such as the Dalai Lama and Frank Gehry offering their own perspective on the brain, the mind and thinking - necessary reminders that the microscopic neurons those 30,000 scientists are concentrated on actually add up to some pretty amazing things in practice.

This year's Dialogues speakers are neuroscientists of a different sort: magicians Apollo Robbins and Eric Mead. Even though I saw a local version of this talk earlier this year with Robbins and neuroscientist Susana Martinez-Conde (which I wrote about it for the Tribune), I'm excited to see it again, because it really is a neat demonstration of how magicians have used the brain's limitations to produce convincing illusions. Robbins, whose act is centered on his considerable abilities as a pickpocket, is a master of using diversion to direct a person's attention one direction while he slips off their watch from another angle. As Robbins and Martinez-Conde explained back in January, this deceptively simple trick actually says a lot about how the brain shifts attention from stimulus to stimulus, and how a normal brain is "tricked" may help us learn about the neurobiological process that underlie an attentional disorder like ADHD. You can watch a video of a similar symposium organized by Martinez-Conde back in 2007 called "The Magic of Consciousness" - which includes Teller of Penn & Teller in a rare speaking role.

Also Saturday: We're only two weeks away from the University of Chicago's big Darwin conference, but I still will probably take in at least part of the symposium on Evolution of Brain and Behavior. Harvard's Elizabeth Spelke caps off the day with a lecture on how the brain processes math - thankfully, it's scheduled early in the conference, before my own brain will surely grow too tired to handle such a heavy topic.

Sunday: Autism Suspects Under Interrogation

There is so much bad science floating around the topic of autism that I try to take every opportunity to learn about what actual peer-reviewed scientists are doing to seek out a cause of a disease that appears to be rapidly on the rise. Sunday afternoon's headliner is Thomas Südhof from Stanford, an expert in the biology of how neurons form connections so that they can communicate with one another. It may sound pedestrian next to the usual autism boogeymen of vaccines and gut microflora, but hey, there's actual science behind it - many of the genes identified so far to be associated with autism are involved in properly constructing the brain and its billions of connections. Südhof published a paper earlier this week identifying one such gene; his talk should be an informative update on where the field is on understanding this mysterious disease.

Also Sunday: If I can wake up early enough, Richard Huganir of Johns Hopkins will be starting off the day's session with a lecture on the cellular basis of memory. But I may sleep in to conserve my energy for the University of Chicago Committee on Neurobiology bash at the Shedd Aquarium.

Monday: A Visit from the Big Boss

The clear centerpiece of Monday's session, and maybe the conference itself, is a lecture by Francis Collins, former director of the Human Genome Project and now director of the National Institutes of Health. As the man at the top of the NIH, Collins holds the ultimate pursestrings for the majority of neuroscientists in attendance, and one would expect many of the conference's attendees to be listening hard for information about where the federal money will be going under the Collins administration. The somewhat generic title of Collins' talk, "The Future of the NIH: Advancing Biomedical Research to Benefit Humankind," suggests that it may be mostly boilerplate, but I'm interested to hear where neuroscience fits in to the NIH agenda as more and more of the basic science shows promise for translation into the clinic and other parts of our everyday lives.

Also Monday: I won't be able to make it down to McCormick Place until Collins' lecture, so I'm bummed to miss the big Neuroethics talk by Steven Laureys on how brain-computer interfaces may help people in a vegetative state after brain injury. But at least I'll be fresh for the night-cap talk by Nora Volkow, director of the National Institute on Drug Abuse, a great speaker and scientist and, incidentally, Leo Tolstoy's great-grand-daughter. It will be the perfect appetizer for the night's main event: the annual Dopamine Dinner at Schuba's.

Tuesday: The Guy Who Wrote the Book on Neuroscience

That title is literal - Tuesday evening's featured speaker is Nobel laureate Eric Kandel, who's 1400-page tome Principles of Neural Science was the textbook of my graduate school career in neurobiology. Kandel's research connected learning and memory with changes at the synaptic level, the synaptic plasticity I touched on briefly on the blog this week. Kandel's work made a celebrity out of the not-very-photogenic sea slug Aplysia, the animal model he used to prove that the brain changes along the principles of Hebbian learning - put simply, if you keep stimulating a connection between two neurons, that connection becomes stronger. Sound simple, but subsequent studies have found that this mechanism, called long-term plasticity, may be central to the way our brain develops and learns new information into adulthood - including whatever facts are still rattling around in my head from Kandel's textbook.

Also Tuesday: The action seems to be in symposia (one thing you learn going to a lot of scientific conferences is the plural form of symposium). In the morning, I'm going to check out "From Bench to Bedside: Long-Term Consequences of Early-Life Stress," and in the afternoon, I feel I'm obligated to my research background to sit in on "Nicotine-Induced Upregulation of Nicotine Receptors."

Wednesday: Limping Down the Homestretch

If you read my very long (even longer than this post) recap of Neuroscience 2006 that I posted Monday, you'll know that the fifth and final day of the conference is like the last five miles of a marathon. Fortunately, organizers have stocked it with a trio of intriguing lectures, on hot topics ranging from the genetics of obesity (Sadaf Farooqi) to reversing fear conditiong (Elizabeth Phelps in a very timely lecture for Halloween) to mechanisms of drug addiction (Eric Nestler).

Also Wednesday: Taking a good long nap after an overdose of neuroscience.

Those are the highlights, as I see them. Hope you'll come on by over the next six days to experience them with me!

Posted by - Rob Mitchum

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