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THE Current

September 23, 2014
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Former Postdoc Awarded a MacArthur Fellowship

Former UC Santa Barbara postdoctoral research associate and Sage Junior Research Fellow Danielle Bassett has been awarded a 2014 MacArthur Fellowship, sometimes referred to as a "genius grant." Now the Skirkanich Assistant Professor of Innovation in the Department of Bioengineering at the University of Pennsylvania, Bassett will receive a five-year, $625,000 grant, which can be used for research or creative pursuits without specific obligations or reporting requirements.

From 2009 to 2011, Bassett worked in the Department of Physics with Jean Carlson's Complex Systems Group exploring social, neuroscientific, genetic and granular materials systems. Studying granular systems aided Bassett's understanding of how networks are physically embedded. "Physical embedding turns out to play a very important role in how many real complex networks are organized and how they work – including the brain," Bassett explained.

From 2011 to 2013, Bassett was a Sage Center for the Study of the Mind Junior Research Fellow. During both postdoc and fellowship, Bassett collaborated with Scott Grafton's Action Lab West in the Department of Psychological and Brain Sciences. She said that the work she did with Grafton really helped to focus her research on how neural communication patterns change over time, both as the brain develops and through the act of learning.

“I realized what I really wanted to know was how brains were constantly reconfiguring while our behavior was changing,” Bassett said. “In fact, with Scott I made the discovery that people who have very flexible brain networks tend to learn better than people who have very rigid brain networks.”

Bassett says the scientific environment at UC Santa Barbara gave her the freedom to pursue interdisciplinary research easily. “I found that people were extremely collaborative and friendly,” she said. “It was never difficult to strike up a new collaboration or to interact on a topic that was slightly outside of my field. There were experts all around with whom I could quickly and easily connect and make some headway. I found that really refreshing.

“My time at UCSB was really important and influential in my research career because it propelled me into the study of dynamic networks in the brain, which is something I’m still focusing on now,” she concluded. “I’m currently doing research that involves porting over intuitions about physical network structure from the granular system to understanding the brain.”

Granular materials systems consist of many particles and those particles exert force on each other in very heterogeneous ways. “So although a sand pile looks very homogeneous, it’s actually not,” Basset explained. “One of the topics I’ve been studying in collaboration with Karen Daniels at NC State is the heterogeneity in force exertion profiles between particles in granular systems. This is important because models that have not taken into account this heterogeneity are unable to really predict the behavior of the material.”

The main thrust of Bassett’s current work focuses on how the brain is connected and how that connectivity pattern is changed in disease states or as new skills are learned. “We want to understand which parts of the brain we might be able to push to enhance flexibility, to push the brain into states that enable better learning,” she said.

About UC Santa Barbara

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