

UW-Madison: UW Biochemist Scott Coyle awarded 2020 Packard Fellowship

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MADISON – Scott M. Coyle, a University of Wisconsin-Madison assistant professor of biochemistry, has been named a 2020 Packard Foundation Fellow in Science and Engineering.

Coyle, whose research focuses on understanding and engineering microscale molecular and cellular machines, is one of 20 early career scientists from across the United States to be awarded this year's Packard Fellowship. The fellowship provides \$875,000 in flexible funding over five years.

Coyle's project will develop models for how the structure and behavior of single cells – which he likens to microscopic robots that move through, interact with, and respond to their environment – are encoded and programmed by their smaller components: the motors, filaments, signaling molecules, and so on that are used to build and control the physical machinery of the cell. His goal is to reveal strategies for building and organizing molecules into complex machines that scientists can one day use to engineer new cell behaviors.

What Coyle learns could have far-reaching applications, from expanding the scope and utility of cell-based therapies deployed inside the human body to fight human disease to developing smart micro-technologies that could scavenge damaged environmental sites to be used for bioremediation. The work could even lead to potential computing systems powered by biochemistry instead of electricity.

“To do this we explore a broad range of cellular systems,” says Coyle, “from human cells that crawl around your body to single celled protozoans that can jump, forage,

and hunt for prey like tiny animals. Despite how different these cells appear, they are all built from a similar toolbox of molecular components, but ones which are deployed in different ways – not so unlike how you can make a whole bunch of different electronic devices out of resistors, capacitors and transistors.”

Coyle was drawn to apply for the fellowship in part because of its support of collaborative and creative approaches to research. The Packard Fellowship’s flexible funding allows scientists the freedom to pursue research in innovative ways. In Coyle’s case, this flexibility provides the resources for his lab to obtain and work with materials and biological systems, such as protozoan cells, which may otherwise be difficult to secure with traditional funding streams.

“Dr. Coyle is an extraordinary young scientist with a rich array of academic and industry research experiences,” says Brian Fox, associate vice chancellor for research policy and integrity and biochemistry department chair. “He is uniquely poised to integrate his training and break new ground with an exciting research program that will redefine how we understand the systems biology of cell behavior.”

For Coyle, the fellowship is about a big-picture research vision. Collaboration and innovation will drive Coyle’s project, as he works with researchers across disciplines at UW-Madison, including computer science for technologies in machine vision and deep learning as applied to cell biology and limnology to study Madison’s lakes, a source of myriad understudied protozoan cells.

“We are entering an era in which the extraordinary biology of living systems will provide us a foundation upon which to build an exciting new class of molecular technologies,” says Coyle. “Getting to interact with physicists, ecologists and engineers will provide invaluable new perspectives and help me approach my own research questions from a fresh and inspired point of view.”

Coyle is UW-Madison’s 16th Packard Fellowship winner, chosen from among 100 nominees from 50 universities across the country by an advisory panel of distinguished scientists and engineers.