

## Columbia University Professor among 2017 Sloan Research Fellowship Recipients

Sebastian Will, an assistant professor in the Department of Physics at Columbia University, has been named a 2017 Sloan Research Fellow.

An assistant professor at Columbia since 2016, Will's research interests include ultracold molecules and dipolar quantum gases, quantum simulation and quantum magnetism, and ultracold Fermi gases and Bose-Einstein condensates. It sounds complicated, but Will explained that this area of research is important because it allows for a fundamental understanding about quantum many-body systems.

"Simply put," he said, "we're investigating how nature gives order to systems that consist of many interacting particles. In every-day life we see what nature does in basic ways -- stuff can be a solid, a liquid, or a gas - those are the three basic states of matter. However, in the world of quantum mechanics, many more states of matter are possible. One of them is the state of a superconductor -- electricity can flow without any resistance, which means no power is lost. With ultracold atoms and molecules we try to understand such quantum states of matter better. This may allow us to design new materials with powerful and technologically relevant properties. Personally, I am most excited that we can observe states of matter in the lab that no one has ever observed before. Who knows what they will be useful for in the future? That's the beauty of fundamental research."

The Alfred P. Sloan Foundation awards two-year, \$60,000 fellowships to 126 researchers from the United States and Canada annually. The fellowships, awarded since 1955, recognize the distinguished performance of early-career scholars and their unique potential to make substantial contributions to their field. Administered and funded by the foundation, the fellowships are awarded in eight scientific fields: chemistry, computer science, economics, mathematics, evolutionary and computational molecular biology, neuroscience, ocean sciences, and physics. To qualify, candidates must first be nominated by fellow scientists and subsequently selected by an independent panel of senior scholars.

"Getting early-career support can be a make-or-break moment for a young scholar," said Paul L. Joskow, president of the Alfred P. Sloan Foundation, in a press release. "In an increasingly competitive academic environment, it can be difficult to stand out, even when your work is first rate. The Sloan Research Fellowships have become an unmistakable marker of quality among researchers. Fellows represent the best-of-the-best among young scientists."

"It is a great honor to be selected," Will said. "The Sloan Research Fellowship has an enormous tradition. Among the awardees are some of the greatest physicists, such as Richard Feynman. It is quite amazing to stand on the shoulders of such giants." He added that the money will be used for experiments that deepen the exploration of ultracold molecules. "It will hopefully help to uncover more miracles of the quantum world," he said.

Since the beginning of the program, 43 Sloan Fellows have earned Nobel Prizes, 16 have won the Fields Medal in mathematics, 69 have received the National Medal of Science, and 16 have won the John Bates Clark Medal in economics.

Other 2017 Sloan Research Fellows include a chemist developing a heat-reflective window paint to help reduce air conditioning demands in hot climates; an evolutionary biologist who models how human gene distributions change with migration; an astronomer using state-of-the-art spectroscopy to study the galaxy's most massive stars; a computer scientist whose work upended a 25-year consensus on algorithmic efficiency; an ocean scientist studying how marine organisms adapt to climate change and the costs of those adaptations; an economist who examines the ways that racial bias among managers can suppress employee productivity; a mathematician developing optimal methods for the efficient analysis of large datasets; and a neuroscientist who studies the way bats learn through echolocation as a model for understanding language development.