



NATIONAL SCIENCE FOUNDATION RESEARCH TRAINEESHIP

INTERDISCIPLINARY TRAINING IN COMPLEX NETWORKS AND SYSTEMS



Melanie Mitchell
Portland State University
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3:00 PM
Luddy Hall 1106

Artificial Intelligence and the “Barrier of Meaning”

Abstract: In 1986, the mathematician and philosopher Gian-Carlo Rota wrote, “I wonder *whether or when* artificial intelligence *will ever* crash the barrier of meaning.” Here, the phrase “barrier of meaning” refers to a belief about humans versus machines: humans are able to “actually understand” the situations they encounter, whereas AI systems (at least current ones) do not possess such understanding. The internal representations learned by (or programmed into) AI systems do not capture the rich “meanings” that humans bring to bear in perception, language, and reasoning.

In this talk I will assess the state of the art of artificial intelligence in several domains, and describe some of their current limitations and vulnerabilities, which can be accounted for by a lack of true understanding of the domains they work in. I will explore the following questions: (1) To be reliable in human domains, what do AI systems actually need to “understand”? (2) Which domains require human-like understanding? And (3) What does such understanding entail?

Biography: Melanie Mitchell is Professor of Computer Science at Portland State University, and External Professor and Member of the Science Board at the Santa Fe Institute. She attended Brown University, where she majored in mathematics and did research in astronomy, and the University of Michigan, where she received a Ph.D. in computer science. Her dissertation, in collaboration with her advisor Douglas Hofstadter, was the development of Copycat, a computer program that makes analogies.

Melanie has held faculty or professional positions at the University of Michigan, the Santa Fe Institute, Los Alamos National Laboratory, the OGI School of Science and Engineering, and Portland State University. She is the author or editor of six books and numerous scholarly papers in the fields of artificial intelligence, cognitive science, and complex systems. Melanie’s book *Complexity: A Guided Tour* (Oxford University Press) won the 2010 Phi Beta Kappa Science Book Award and was named by Amazon.com as one of the ten best science books of 2009. Melanie’s latest book, *Artificial Intelligence: A Guide for Thinking Humans*, will be published by Farrar, Straus, and Giroux in 2019.

Melanie originated the Santa Fe Institute’s *Complexity Explorer* platform, which offers online courses and other educational resources related to the field of complex systems. Her online course “Introduction to Complexity” has been taken by over 25,000 students, and is one of Course Central’s “top fifty online courses of all time”.

