

Lecture in Remembrance of John McCarthy

Through the Lens of Drosophila: John McCarthy's Quest for Human-Level Artificial Intelligence

Leora Morgenstern

John McCarthy, famous for his role in the development of time-sharing, for inventing the computer language LISP, for his foundational work in theory of computation, and for his founding of the fields of artificial intelligence and knowledge representation, was concerned for much of his career with what he termed drosophilae: small challenge problems that highlighted characteristic aspects of intelligent problem solving, and that could be constructed, researched, and hopefully solved rapidly, thus facilitating progress towards human-level intelligence. Although we tend to think of such drosophilae as toy problems, McCarthy's challenge problems were often quite complex, nuanced, and far reaching.

This talk analyzes McCarthy's myriad contributions to artificial intelligence and knowledge representation through the set of drosophilae that he proposed, ranging from the airport example in "Programs with Common Sense," where he first argued

for the need for an explicit representation of knowledge in order to endow computers with the ability to perform common-sense reasoning, to his many later puzzles involving knowledge and self-awareness. I show how these challenge problems reflect McCarthy's strengths as both theoretician and engineer, and explore how these drosophilae shaped his research.

Leora Morgenstern, senior scientist and technical fellow at Science Applications International Corporation, received her Ph.D. in computer science from the Courant Institute of Mathematical Sciences, and has served on the faculty of Brown University and as a research staff member at the IBM T. J. Watson Research Center. Her innovations in inheritance with exceptions and in semantic networks have been used for software and solutions that have significantly increased company revenue, expanded customer bases, and streamlined operations. Since 2010, she has served as principal investigator of the Evaluation and Knowledge Infrastructure Team for DARPA's Machine Reading Program.