

The Science of Sight



Ruth Rosenholtz

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CURRENT RESEARCH

Applying computational tools and theories to vision

Seeing is such a big part of everyday life that about half the brain is involved in the process. Shockingly, however, the part of vision with the highest fidelity occupies only 1% of our visual field. The remaining 99% falls on our peripheral vision. Our brain must use sophisticated "algorithms" to piece together vision despite not having all the information needed. Dr. Ruth Rosenholtz, of Massachusetts Institute of Technology, is fundamentally rethinking vision from the ground up, with the goal of gaining a better understanding of both underlying mechanisms and the strengths and limitations of our visual processing. For most of us, vision is a big determinant of how well we do a wide range of daily tasks; it affects our quality of life and ability to be independent. Dr. Rosenholtz's research may eventually help better understand disorders such as dyslexia, age-related macular degeneration, and cognitive impairments as we age. In addition, her basic research aids in increasing our knowledge of how normal vision works, and therefore may also lead to the better design of tools for those with normal vision and cognition, such as maps, web pages, cell phones, and GPS systems.

While in the last decades neuroscientists and psychologists have learned more about vision than about many other neural processes, the field has still been stuck due to a lack of computational tools and theories. Dr. Rosenholtz's commitment to computational thinking helps to answer many of the questions that remain unanswered. She and her team use state-of-the-art computational techniques from artificial intelligence, computer vision, machine learning, and image processing to understand human vision. This movement towards computational tools...

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AFFILIATION



Massachusetts Institute of Technology

EDUCATION

- B.S., in Engineering, 1988 , Swarthmore College
- M.S., in Electrical Engineering and Computer Science, 1990 , University of California, Berkeley
- Ph.D., in Electrical Engineering and Computer Science, 1994 , University of California, Berkeley

AWARDS

- University of California at Berkeley Eliahu Jury Award for excellence in control, systems, and signal processing research, 1995

RESEARCH AREAS

Humanities, Neurological / Cognitive, Neurological / Cognitive

FUNDING REQUEST

Your contributions will support the continued research of Dr. Ruth Rosenholtz, of MIT, as she rethinks vision from the ground up. Donations will support the necessary \$400-500K per year required for personnel. In choosing to support her research, you will play a role in understanding how normal vision works in addition to disorders including dyslexia, age-related macular degeneration, and cognitive impairments as we age.