

# A Multi-Agent Systems “Turing Challenge”

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## ABSTRACT

I recently argued that Turing, were he alive now, would conjecture differently than he did in 1950, and I suggested a new “Turing challenge” question, “Is it imaginable that a computer (agent) team member could behave, over the long term and in uncertain, dynamic environments, in such a way that people on the team *will not notice* it is not human.” [4]. In the last several decades, the field of multi-agent systems has developed a vast array of techniques for cooperation and collaboration as well as for agents to handle adversarial or strategic situations. Even so, current generation agents are unlikely to meet this new challenge except in very simple situations. The need for agents to work better with people has become greater and more widespread, as evidenced by the Human-Agent Interaction Design and Models Workshop at this conference and an upcoming conference on Human Computation and Crowdsourcing. Research in these arenas approaches human-computer collaborations from different perspectives, but shares many challenges. Meeting these challenges requires new algorithms and novel plan representations.

This talk will explore the implications of this new “Turing question” and examine several challenges that arise in the design both of agents supporting people and of systems in which people assist computers in their work. These challenges include determining a division of labor that respects the complementary strengths of people and computer agents, development of methods for information sharing, defining incentive mechanisms for such settings, and designing empirical methodologies for evaluating agents in open mixed networks [3]. I will describe recent work by my group on interruption management, plan recognition, and test-beds for empirical studies of human-computer collaborations aimed at addressing these challenges, and will discuss our current work on developing intelligent agents able to work as a team supporting health care providers and patients to improve care coordination and in the communication of medical information.

## Categories and Subject Descriptors

I.2.11 [Distributed Artificial Intelligence]: Intelligent Agents, MAS. H.1.2 [User/Machine Systems]. H.5.2 [User interfaces]

## Keywords

Human-computer collaboration; Teamwork models; Interruption management; Multi-Agent Plans; Crowdsourcing; Healthcare

## Short Biography

Barbara J. Grosz is Higgins Professor of Natural Sciences in the School of Engineering and Applied Sciences at Harvard

University. From 2001-2011, she served as dean of science and then dean of the Radcliffe Institute for Advanced Study at Harvard. Grosz is known for her seminal contributions to the fields of natural-language processing and multi-agent systems. She developed some of the earliest computer dialogue systems and established the research field of computational modeling of discourse. Her work on models of collaboration helped establish that field and provides the framework for several collaborative multi-agent and human-computer interface systems. Grosz is a member of the National Academy of Engineering, the American Philosophical Society, and the American Academy of Arts and Sciences and a fellow of the Association for the Advancement of Artificial Intelligence (AAAI), the Association for Computing Machinery, and the American Association for the Advancement of Science. In 2009, she received the ACM/AAAI Allen Newell Award for “fundamental contributions to research in natural language processing and in multi-agent systems, for her leadership in the field of artificial intelligence, and for her role in the establishment and leadership of interdisciplinary institutions.” She served as president of the AAAI from 1993-1995 and on the Boards of IJCAI (Chair 1989-91) and IFAAMAS.

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