The Rumelhart Prize at 10

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At the August 2000 meeting of the Cognitive Science Society, Dr. James L. McClelland and Dr. Robert J. Glushko presented the initial plan to honor the intellectual contributions of David E. Rumelhart to cognitive science by awarding an annual prize of $100,000 funded by the Robert J. Glushko and Pamela Samuelson Foundation. McClelland was a close collaborator of Rumelhart, and together they had written numerous articles and books on parallel distributed processing. Glushko, who had been Rumelhart's PhD student in the late 1970s and a Silicon Valley entrepreneur in the 1990s, is currently an adjunct professor at the University of Califonria, Berkeley. Rumelhart had just retired from Stanford University in 1998, suffering from Pick's disease, a degenerative neurological illness. The David E. Rumelhart prize was conceived to honor outstanding research in formal approaches to human cognition. Rumelhart's own seminal contributions to cognitive science included both connectionist and symbolic models, employing both computational and mathematical tools. These contributions progressed from his early work on analogies and story grammars to the development of back-propagation and the use of parallel, distributed processing to model various cognitive abilities. Critically, Rumelhart believed that future progress in cognitive science would depend upon researchers being able to develop rigorous, formal theories of mental structures and processes.

Initial selection criteria and processes were developed with the help of an advisory committee that consisted of James McClelland (chair), William Estes, Barbara Partee, and

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*The authors consist of the current members of the Rumelhart Prize Selection Committee. Previous members of the committee included John Anderson, Allan Collins, Stanislas Dehaene, Mark Liberman, Tony Marley, James McClelland, and Linda Smith.

Herbert Simon (recipient of the Nobel prize, which we choose to think of as the Rumelhart Prize for Economics), and McClelland chaired the selection committee from 2001 to 2007. The first recipient was Geoffrey Hinton in 2001. In chronological order, the subsequent recipients were: Richard Shiffrin (2002), Aravind Joshi (2003), John Anderson (2004), Paul Smolensky (2005), Roger Shepard (2006), Jeff Elman (2007), Shimon Ullman (2008), Susan Carey (2009), and James McClelland (2010). Fitting with Rumelhart's own interdisciplinary and multipronged attack on the problems of cognitive science, these cognitive scientists have come from a number of fields (computer science, linguistics, and psychology), tackled a number of core issues (learning, development, vision, language, induction, generalization, and memory to name a few), and used a wide variety of theory-building tools (process models, optimality analyses, statistical modeling, neural networks, and knowledge representation). Although the prize was conceived to honor theoretical approaches to cognition, most of the prize recipients have also engaged in empirical work, and closely connect their theories to data collected from human behavior and other natural phenomena. Like Rumelhart, the prize winners have been centrally concerned with developing validated and testable theories.

The Cognitive Science Society has been associated with the prize since its inception. The prize winner has been announced at the annual Cognitive Science Society meeting, and there has always been a plenary Rumelhart Prize talk by the recipient at the meeting. However, over the years, the reach of the prize has increased in important ways. First, starting in 2002, a Rumelhart Prize symposium was instituted at the Cognitive Science Conference on a topic related to the Rumelhart Prize recipient's research. Second, starting with the second Rumelhart Prize recipient, there have been special issues of Cognitive Science on topics related to the prize winner's research. Thus far, special issues have been published or are planned honoring Shiffrin, Joshi, Anderson, Smolensky, Shepard, Elman, Carey, and McClelland. Third, at the 2010 Annual Meeting of the Cognitive Science Society, there was a symposium consisting of previous winners of the Rumelhart Prize. These panelists were charged with laying out the most important unanswered and unasked questions in cognitive science. In so doing, the previous prize winners formulated remaining challenges that await the future prize winners.

The prize has changed in other ways as well. Most significantly, in 2005, the selection criterion of ''formal approaches to human cognition'' was modified to ''contemporary contribution to the theoretical foundations of human cognition.'' Although relaxing the constraint on mathematical, computational, or linguistic formalizations, the prize committee continues to place a premium on foundational theoretical developments, and for efforts toward developing the kinds of systematic and rigorous accounts that Rumelhart himself esteemed.

The Rumelhart Prize honors Rumelhart, the prize recipients, and the broader community of cognitive scientists striving to develop a scientific understanding of minds, in all of the forms that they may take. Among the unanswered questions of science are fundamental inquiries concerning the nature of matter, life, and minds. The last of these inquires falls squarely in the provenance of cognitive science and is arguably the pursuit best poised for profound progress in the next decade. As the Rumelhart Prize enters its second decade, our

quest will persist for foundational theories for how minds are possible and how they work. We also expect novelty in these theories. This fusion of continuity and change is well captured by the symbol called ''Alinea,'' the appearance of which (¶) has been made mundane by its insertion at the end of each paragraph in some word processors. Belying this pedestrian usage, the symbol not only stands for the end of a paragraph, but the beginning of a new idea. That is something that Rumelhart always admired.