Researchers in AI have long studied planning, where an agent internally simulates possible actions to determine which action leads to the best future situation. The knowledge to predict results is called action. In general, action models are represented using rule-like data structures (think STRIPS) that describe the conditions under which the action can be executed, and the changes the action makes. Our hypothesis is that there are many forms of knowledge for action modeling, not just rule-like structures, and that these can be embedded within a unified task-independent framework where they are used opportunistically based on the knowledge and the task demands. In this talk, I describe such a framework based on the Soar cognitive architecture, where different processes and sources of knowledge are available for prediction, including rules, episodic memory, semantic memory, mental imagery, and general problem solving. I present results from two simple domains.

BIO: John E. Laird is the John L. Tischman Professor of Engineering at the University of Michigan. He received his Ph.D. in Computer Science from Carnegie Mellon University in 1983 working with Allen Newell. From 1984 to 1986, he was a member of research staff at Xerox Palo Alto Research Center. His research interests spring from a desire to understand the nature of the architecture underlying artificial and natural intelligence. He is one of the original developers of the Soar architecture and leads its continued evolution, including the recent development and integration of reinforcement learning, episodic memory, semantic memory, visual and spatial mental imagery, and appraisal-based emotion. He was a founder of Soar Technology, Inc. and he is a Fellow of AAAI, ACM, and the Cognitive Science Society.