Preface

One major motivation behind the *Coevolutionary and Coadaptive Systems* symposium is to begin the process of bringing together researchers who have historically focused on different, yet fundamentally related AI search techniques. In that sense, we hope to construct a technique-oriented workshop to discuss overlapping concepts and shared challenges in systems that involve multiple interacting elements that are learned concurrently in relationship to one another. We came to the idea of creating an explicitly cross-technique topic by observation: Previous domain-oriented workshops, such as last year’s AAAI Fall Symposium on *Artificial Multiagent Learning* brought together researchers from what appear to be fairly disparate disciplines in AI to focus on a shared class of problems. In contrast, this symposium seeks to bring people together over the commonalities in the techniques themselves.

Consider recent work in two types of coadaptive learning systems: coevolutionary computation and reinforcement learning for multiple agents. Naturally, both research groups have attempted to understand their respective systems using concepts of game theory. Both groups are interested in questions surrounding problem decomposition and role assignment. Both have recognized the difficulty of measuring and reporting progress when there are relativistic tendencies to coadapting elements of a problem. Both have recognized that the problems we consider often involve many underlying objectives, and that complicated dynamics can ensue when information about those objectives is lost, or inappropriately attended to during search. Recently, theoretical research in both areas has intensified, and in both cases analysis underscores the need to understand the relationship between the underlying problems one wishes to solve and the nature of the applied algorithms. This analysis has lead to more realistic expectations of the potential of these systems, as well as clarifications of their goals. We have begun to see the design and implementation of more useful coevolutionary and reinforcement learning algorithms as a result.

We believe that there are general principles and challenges at play in many coadaptive systems. There may be much to learn from one another on issues such as methodological, architectural, and representational choices—or how to develop metrics and to visualize information in these systems. A lively, technique-oriented discussion will help us see where the various disciplines that study coevolutionary and coadaptive systems overlap, and where we can leverage from one another’s efforts. Perhaps more importantly, we can begin the process of discovering a common language to talk about these issues.

There are at least four ways individuals will participate in the *Coevolutionary and Coadaptive Systems* symposium. First, there will be talks related to the six technical reports that appear in this volume. These are quality publications, well worth the read, that represent complete and vetted works of research. Second, there will be several talks relating to working notes that represent promising works in progress. The working notes do not appear in this volume. Instead, they will be available in hard copy at the symposium, and in soft copy on our symposium website[1] afterwards. Third, there will be several invited talks on a variety of topics, ranging from pedagogy and philosophy to workshop-style discussions of current research directions. Finally and most importantly, attendees serve a vital role by initiating and participating in constructive discussion.

We take this opportunity to thank all our participants for their wonderful contributions, especially the invited speakers, who responded with enthusiasm and acumen to our request. We particularly appreciate the students who contributed. As with many scientific endeavors, this symposium was greatly strengthened by their involvement. We also thank the American Association for Artificial Intelligence, who helped make student participation possible by providing travel grants. Finally, this event could not have been possible without the work of the organizing committee: Anthony Bucci, Edwin de Jong, Kenneth De Jong, Liviu Panait, Mitchell Potter, and Paul Wiegand.