

# Preface

This symposium brings together connectionist and non-connectionist researchers to discuss and debate a topic of central concern in AI and cognitive science: the nature of compositionality. The open-ended productivity of the human capabilities aspired to by AI (e.g., perception, cognition, and language) is generally taken to be a consequence of compositionality (the ability to recursively combine constituents). Given that these capabilities are implemented by real neural networks in the brain, it is important to understand feasible connectionist implementations of compositionality. The aim of this symposium is to expose connectionist researchers to the broadest possible range of conceptions of composition while simultaneously alerting other researchers to the range of possibilities for connectionist implementation of composition.

The issue of compositionality has been recognized as important since the early days of the connectionist renaissance. Hinton's reduced representations, Smolensky's tensor binding, and Pollack's recursive auto-associative memory spring readily to mind. Yet, despite the apparent (to us) importance of compositionality, the proportion of connectionist research focusing on this issue has been disappointingly low. This may have been due, in part, to the radical connectionist desire to deny the necessity of anything that smacked of traditional, symbolic computation. It may also be because connectionist compositionality is a genuinely hard problem and research where the outcome is not guaranteed in advance is increasingly hard to fund. None the less, the level of interest in connectionist compositionality has increased of late and we hope that this symposium will help provide visibility to work that would otherwise be scattered thinly across venues. The response to the call for participation in this symposium has been enthusiastic and the speakers come from a wide range of disciplines and countries, so we are looking forward to equally wide ranging and stimulating discussion during the course of the event.

The authors were asked to focus entirely on the issue of compositionality that can or should be implemented by neural networks in the service of human agency at the perceptual, cognitive, and linguistic levels. The dual focus on human functionality and connectionist implementation distinguishes this symposium from other recent meetings dealing with the more philosophical or linguistic aspects of compositionality.

The symposium organizers received generous donations from a number of sources, to fund participation by plenary speakers, students, and several invitees. We gratefully acknowledge the support of the following individuals and institutions:

Robert J. Glushko provided much-needed funding for participation by independent scholars who work outside the normal institutional framework. Symposium participants may already be familiar with the Robert J. Glushko & Pamela Samuelson Foundation, which supports the David E. Rumelhart Prize for Contributions to the Theoretical Foundations of Human Cognition. It is a particularly happy coincidence that the most recent recipient of the Prize is also a founding figure in compositional connectionism—Paul Smolensky.

The Dean's Office at Washington and Lee University (W&L), in conjunction with the W&L University Lectures Fund generously funded participation by our two plenary speakers, allowing these speakers to interact with W&L undergraduates one-on-one at the symposium.

In addition to organizing and sponsoring the Fall Symposium Series, the American Association for Artificial Intelligence provided additional funds to support participation by students from W&L, Stanford University, and the University of Connecticut.