

My primary research interests revolve around analogy, cognitive modeling, and psycholinguistics. I am fascinated by analogical reminding and transfer, similarity, concept learning, metaphor, polysemy, lexical semantics, and design patterns. My goal is to become a research and teaching professor.

For the past year I have been working with Professor Matt Jones through independent study and as an RA. We are researching the role of analogy in concept learning. Specifically, the role of relational schema refinement and consolidation in constructing hierarchical, compositional mental representations. The core theses of the model are that all concepts are both atomic objects and systems of relations, and that useful common structure discovered by analogical mapping can, over time, become chunked and available for automatic recognition, parallel memory retrieval, and participation in higher order concepts.

I presented a poster on our computational model and theoretical contributions at the Psychonomics conference in November 2011. We have also run behavioral experiments on higher order concept learning. We are testing the effects of labels, priming, role assignment, feature similarity, and transfer on classification of relational concepts.

In my first two years in CU's Computer Science Ph.D. program, I worked on two projects in educational technologies with Professors Tamara Sumner and James Martin as my advisors. First, I led an expert annotation study to collect machine learning training data for automatically identifying core educational concepts. I presented this work at the ICS poster session, and am preparing the data for publication. In my second project, I worked with Psychology Professor Kirsten Butcher at the University of Utah. We developed, coded, and analyzed structured interviews with teachers to assess their technological, pedagogical, and content knowledge. This work is currently in revision for publication.

To change my focus to cognitive rather than computational issues and to continue research with Professor Jones, I hope to enter the Cognitive Psychology Ph.D. program at CU. I intend to continue our study of analogy through computational modeling and human experiments. Furthermore, I plan to expand our work into the effects of linguistic labels on relational concept consolidation. Professors Randy O'Reilly and Tim Curran offer opportunities to explore neural and memory implementations of our consolidation model.

Another psycholinguistic research question I plan to pursue is the role of metaphor in polysemous sense extension. What are the conditions under which alternate meanings of a word are recruited to understand (or coin) a novel usage? For example, the names of data structures (*tree*, *array*), hardware (*gate*, *hub*), and other abstract labels such as *semaphore*, *signature*, and *key* can all be understood in terms of concrete objects and experiences. To develop these questions, I did my undergraduate research thesis with Hana Filip, Professor of Linguistics at the University of Florida. To answer these questions, I hope to collaborate with Professors Eliana Colunga and Al Kim at CU.

James Foster
Statement of Purpose
CU Psychology – Cognitive Ph.D.

I also want to teach. As a computer science undergraduate, I TA'd for a programming class for engineers. My teaching experience was rewarding and supplemented my understanding of the material. Teaching is how I learn best.

Through my interdisciplinary classes and research experience as a graduate student in computer and cognitive science, I have found my research goals are fundamentally psychological rather than computational. Consequently I am applying to the Psychology department to transition between degree programs. My technical background remains an asset for modeling the psychological phenomena for which I am passionately curious.