

My work and studies have focused on ways to represent, visualize, and improve access to humanities information; Tufts has a unique combination of strengths that will enable me to teach while preserving our world's cultural heritage. Three of my most recent research projects include developing a tiled image browser, exposing data through a set of protocols, and representing geometric diagrams. First, in developing a tiled image browser using the Google Maps API, I applied scaling, image manipulation, and other concepts from computer graphics. During a meeting at Harvard's Center for Hellenic Studies (CHS) I used these concepts again to annotate subsections of tiled images using bounding boxes. CHS plans to use the browser on manuscript images for their Multitext of Homer Project; Perseus is beta testing the viewer on 500 of its coin images. Furthermore, the German Archaeological Institute (DAI) has also expressed interest in this service. Secondly, I help develop and implement protocols to increase the use and accessibility of texts, artifact metadata, images, and morphological information. Perseus data, accessed through these services, was featured this fall at the Classical Association of the Midwest conference. A coworker from the DAI uses these services to generate CIDOC-CRM metadata. My third research area explores the question: Can one develop data structures and/or a markup language to represent the semantics of geometric diagrams? In my senior year at Holy Cross, I studied the relationship between text and diagram in the Spherics of Theodosius. To fully represent geometric diagrams, the computer must recognize emergent shapes and the parent objects that produce them. For computational geometry this past fall, I implemented a sweep line algorithm that interpreted a diagram as an arrangement of line segments. The program detects points of intersection and enumerates all pieces of segment that emerge.

I want a Ph.D. because my research interests depend upon mastering advanced techniques for digitally representing images, diagrams, and 3D models of cultural heritage objects. Specifically, I want to investigate 3D modeling to generate and expose datasets of these objects. Further research goals include developing protocols for accessing and integrating 3D data with existing online applications. I expect a range of new research questions will result from the availability of these datasets. I also want to continue my recent work in computational geometry and study the design and limitations of markup languages for representing diagrams.

I already have a detailed research agenda, I simply need time and resources to pursue it. In addition, I already have working relationships with many of the professors within the department. Ideally, my research would produce high quality, freely accessible archives of humanities datasets and an XML vocabulary for geometric diagram semantics, the equivalent of TEI-XML for geometric diagrams. Ultimately, I want to teach computer science. My previous teaching experiences at the Butler Center and the CANE conference have shown me the difficulties and rewards of teaching. Teaching, researching, and preserving world cultures through computer science would prove extremely fulfilling. Graduate school will provide me with the resources I need to accomplish this vision.