Monday, May 10, 2021
PhD Defense for Alex John Quijano

Title: Mathematical Models of Natural Language Evolution
Time: 1pm
Zoom Link: https://ucmerced.zoom.us/j/89285860480
Passcode: 272613

Abstract: This dissertation investigates the ways that natural languages evolve and what it means in the overall cultural evolution of society. Computational and modeling advances have made possible to explore large-scale text data and test hypothesis of language evolution. Similar to biological systems, natural languages are evolving systems with words as its measurable units. Words have certain functions within a body of text to convey ideas and thought. The frequency distribution of these words can change based on how it is used at a particular point in time and context. This work incorporates two different sources of text data: 109 years' worth of digitized books and text taken from social media. Given large-scale diachronic corpora, this work focuses on the following topics:

- Modeling word rank evolution utilizing statistical and data-driven modeling approaches.
- Exploring the evolution of contextual semantics through the use of distributional semantics and word embedding models.
- Evaluating the accuracy of reading comprehension tasks by using contemporary machine learning models.

The evolution of language presents a profound problem in natural language processing and cognitive science. The social and cultural aspect of language adds to the problem of how word meanings develop and change. Examining how language evolves, while drawing from both molecular biology and socio-cultural aspects, allows us to explore the ways word meanings form that are influenced by political and social changes.

PhD Committee:
Suzanne S. Sindi (Chair) ssindi@ucmerced.edu, Rick Dale, Arnold Kim, & Roummel Marcia