

Intent and Motivation

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I have long been fascinated by complex systems, originating with familiar systems like flocks of birds and dense crowds. Seeing how seemingly minute changes can incite disproportional impacts in these systems inspired me to work with faculty of the Industrial and Chemical Engineering departments at the Indian Institute of Technology Kanpur. There I calibrated popular crowd models against Indian data to test how robust they were to different customs and cultures.

Several years later, after getting a job as a site-reliability engineer at a large technology company, I attended a complexity group meeting at a local university and subsequently their ComplexityCon conference in San Francisco. I met several PhDs from various disciplines, along with industry professionals and together we formed an independent working group, eventually applying for a DARPA grant. We were interested in applying complexity science techniques to physiological data collected from publicly available wearable devices. Because no two of our six members were from the same field, our skills echoed complexity themes related to robust collective function. I will be a computational track facilitator and speaker at ComplexityCon 2020, where I will sync with researchers to further cultivate relationships that foster my broad research interests.

In my industrial engineering curriculum, I found courses like operations research, numerical methods, and machine learning the most intriguing. This interest led me to work with faculty at Texas A&M to investigate the relationship between popular movie ratings and the global structural properties of their character graphs. Beginning with initial conditions and working towards desired outcomes challenges my creativity and I enjoyed applying the probabilistic, optimization, and analytical techniques in my courses to real-world problems.

My research interests lie in applying modeling and analytical techniques to complex human systems – often categorized in the sociological, biological, and computational areas. I want my research sphere to consist chiefly of model-driven faculty like those found in the Big Data Analytics program, and to leverage this with an outer sphere of faculty in the social (e.g. Complex Human-Environment Systems group and esp. Dr. Li An), biological (e.g. Biological and Medical Informatics Research Center), and computational (e.g. Computational Science Research Center) fields. I strongly believe this to be my ideal research environment.

For me, complexity science is an opportunity to apply the modeling and analytical techniques that I enjoy to areas and topics I find interesting and impactful. It is an inherently interdisciplinary field requiring external domain knowledge, and by completing the MS Big Data Analytics program I will be well-equipped to tackle analytical and data-intensive complexity research at the doctoral level.