Broadly speaking, my research is on the control and estimation of networked dynamical systems. Such systems appear everywhere in both nature and engineering, for example in swarms of robotic vehicles, social networks, gene networks, animal flocking and spacecraft formation flight. My focus is on networked systems that have an intrinsic state-dependent graph structure, meaning that the dynamical process on the network changes the communication links between agents in the network. Such processes are highly nonlinear and are difficult to analyze with standard techniques. The goal of my research is to find methods of analysis that allow one to formulate controllers and estimators for such state-dependent networked systems.

In my previous life as an undergraduate student at the University of British Columbia, I worked at the Canadian Instutute for Theoretical Astrophysics under the supervision of James Owen, where we studied how X-ray heating contributes to the dispersal of protoplanetary discs. I also had the good fortune to work with Richard Marchand and Richard Sydora at the University of Alberta, where we worked on how to use electrodynamics space tethers for removing radiation belts around the Earth. In my final year, I did two Honours theses. I worked with Greg Martin on the Hilbert-Pólya and pair-correlation conjectures, and with Joanna Karczmarek's string theory group studying the geometry of membranes emerging from the Berenstein-Dzienkowski Hamiltonian.