Our adaptive immune system protects us against a large variety of different pathogens — many of which were not around when we were born. How can our immune system be prepared for the many unknown pathogens that we will encounter throughout our life? To make the job harder, the pathogens keep changing and evolving, forcing the immune system to change too. In this talk I will explore how nature uses statistics to generate diversity and withstand this life-long struggle.

Tuesday, 15 October 2019
Lunch will be served at 12:30 pm, PCTS
2:00 pm ~~ Jadwin Hall, Room 407, PCTS Seminar Room
Seminar: “Learning the interaction structure in bird flocks from data”
The coordinated flight of bird flocks is a striking example of collective behavior in biology. Using 3D positions and velocities of large natural flocks of starlings I will describe our efforts in attempting to find the effective dynamics driving this motion. Learning these models allows us to infer the local rules of alignment, and to reveal that flocks are poised close to a critical point, where susceptibility to external perturbations is maximal. Extending the approach to alignment dynamics shows that flocks are in a state of local quasi-equilibrium.

Monday, 21 October 2019
12:15 pm ~~ Jadwin Hall, Joseph Henry Room, First Floor
Lunch will be served at 12:00 Noon
Biophysics Seminar: “Response in immune repertoires”
The immune repertoire responds to a wide variety of pathogenic threats. Immune repertoire sequencing experiments give us insight into the composition of these repertoires. Since the functioning of the repertoire relies on statistical properties, statistical analysis is needed to identify responding clones. Using such methods I will describe the repertoire level response to the yellow fever vaccine and immunotherapy among other perturbations. Repertoires are dynamic ensembles and I will also show how we can distinguish a viral specific response from generic selection using data from patients from HIV. Lastly, I will try to link the phenotypic with genotypic level description and present an experiment that measures antibody-antigen binding in a high-throughput way.