Data Analysis Techniques for Next-Generation Radial Velocity Surveys

This year marks the 20th anniversary of 51 Pegasi b, the first exoplanet discovered using radial velocity (RV) observations. RV surveys continue to push both their temporal baseline and to higher measurement precision, enabling planet hunters to detect and characterize planets in Jupiter-like orbits and terrestrial-mass planets respectively. However, new statistical and astrophysical problems have emerged with these new advancements (e.g. high-dimensional parameter spaces, stellar activity masquerading as planetary signals). I will present some ongoing community efforts to resolve these issues. I will describe some parameter estimation algorithms that efficiently deal with the high-dimensional parameter spaces required to model multi-planet systems. I will also describe several approaches to disentangle stellar noise from real planetary signals, from observational to Bayesian model comparison treatments.