Other - Candidate Lecture

Exoplanet Demographics & Other Science with Wide-Field Photometric Time-Domain Surveys

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Abstract:
Exoplanet demographics (e.g., the distribution of planets' masses, orbits, and their occurrence rates) imprint a wealth of information about how planetary systems form and evolve, and also provide clues as to where to search for life. However, the most successful planet search techniques can only find planets with relatively small orbits (<~1 AU) around relatively nearby stars (< 3000 ly). I will describe two surveys: a census of planets down to Mars-masses in wider orbits using the NASA flagship mission, WFIRST, and a search for hot Jupiters in the distant Galactic bulge, MISHAPS. Both rely on rapid, repetitive imaging using hundreds of megapixel, wide-field cameras. I will discuss some of the challenges these data sets present to achieving the principal goals of the respective surveys, as well as how data science and machine learning techniques might be used on these data sets in real time to discover and trigger rapid follow-up of several types of transient objects that erupt and fade on timescales of minutes to months.

Speaker's Bio:
PhD 2011 University of Manchester
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