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Physics Department

College of Science & Mathematics

Geometry, Inference, and the Large Astronomical Survey Landscape

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11:10 am - 12:00 Noon
Building 53, Room 215

Abstract: I will present the claim that geometric perspectives on inference have the potential to meet the challenges posed by the large and heterogeneous datasets that will be produced by next generation astronomical surveys. To support this claim, I will begin with an overview of these extremely large photometric, spectroscopic, and line intensity mapping surveys focusing on differences in science goals, survey strategy, and the types of data each will produce. I will then provide a case study in geometry informed inference by sharing a new information theory approach that enables us to optimally combine datasets to improve redshift inference from multi-band photometry from the Vera C. Rubin Observatory Legacy Survey of Space & Time, Nancy Grace Roman Space Telescope, Euclid Observatory, and Cosmological Advanced Survey Telescope for Optical-UV Research (CASTOR). If time allows, I will then discuss recent results using geometric inference and manifold learning to improve inference with the Subaru Observatory Prime Focus Spectrograph Galaxy Evolution Survey and from future Line Intensity Mapping Experiments. Throughout this talk, I will discuss the opportunities and challenges involved with interdisciplinary work in modern astrophysics and highlight how the Cal Poly "Learn by Doing" philosophy continues to impact my approach to problem solving.

Bio: Dr. Bryan Scott is the LSST Discovery Alliance Data Science Fellowship Program (DSFP) Postdoc at the Center for Interdisciplinary Exploration and Research in Astrophysics, Northwestern University. In addition to data driven research in astronomy, he is the assistant director of the DSFP, an international fellowship program for graduate students in data intensive science for next generation surveys. He also co-leads the Chicago Area LSST Expansion Partnership between Northwestern, the Illinois Institute of Technology, and the Chicago City Colleges to expand access to research with large astronomical surveys. He earned his PhD in Physics & Astronomy from the University of California, Riverside and completed his undergraduate studies at California Polytechnic State University, San Luis Obispo. In his free time, he helps students with college applications, advocates for transportation and housing equity, and practices architectural photography.