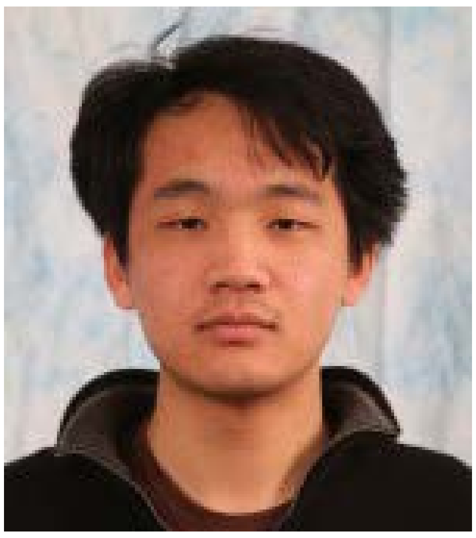
# The Field Robotics Center

## Seminar Series

**Tuesday, Feb 3**

**GHC 2109 9:30am – 10:30am**

Food will be served

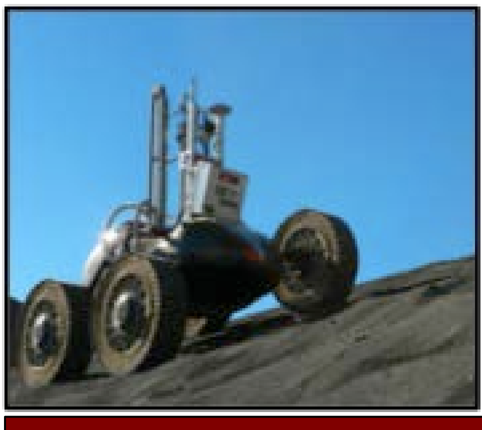


**Humphrey Hu**
PhD Student
Robotics Institute

### Positive-Definite Matrix Regression for Covariance Estimation

**Abstract:** The ubiquitous additive Gaussian noise model is favored in statistical modeling applications for its flexibility and ease of use. Most commonly used models assume a constant covariance, while in reality error characteristics may change predictably over time. By instead modeling errors as being drawn from varying distributions, we can capture a wide variety of noise characteristics while preserving the efficiency of the constant covariance model. The primary challenge here is then the representation and estimation of such a varying covariance model. This talk presents a parametric covariance regression scheme that combines common scalar regression techniques with the modified Cholesky decomposition to form an efficient positive-definite matrix estimator. We also present a method to fit a varying covariance model without ground truth, and demonstrate the advantages of estimating covariances with our approach against traditional baselines on simulated range-bearing datasets as well as physical fiducial pose estimation data.

**Speaker Bio:** Humphrey Hu is a Ph.D. student in the Robotics Institute advised by George Kantor. He received his B.S. in Mechanical Engineering, and Electrical Engineering and Computer Science from the University of California at Berkeley in 2012. His current research focuses on state estimation systems and techniques for multi-robot teams.



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