1106-VG-2294 **Raquel A Barata*** (raquel.a.barata@gmail.com), **David R Thompson** and **Lance Christensen**. *Application of Gaussian Process and Maximum Entropy Sampling in Methane Plume Prediction.* Preliminary report.

We implement a Gaussian Process model in the prediction and visualization of a methane field. Starting with an initial training data set, we fit the Gaussian Process to the data by adjusting the hyperparameters of the covariance function using maximum likelihood estimation. Further refinements include the consideration of wind direction in the covariance function and implementation of the log-Gaussian Process to more accurately model extreme fluctuations in methane measurements. We couple this modeling approach with a sampling technique known as Maximum-Entropy Sampling. This method selects measurements that provide the most information about the Gaussian Process. Ultimately, the research will be applied in autonomous exploration where the user cannot specify their measurement objectives but the exploratory robot can perform adaptive sampling that accounts for previous measurement distributions or prior expectations. (Received September 16, 2014)