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Thursday, January 11, 2018
Room 135, 60 West Charlton
4:00 – 5:00 pm

Locally stationary spatio-temporal interpolation of Argo profiling float data

Argo floats measure sea water temperature and salinity in the upper 2,000 m of the global ocean. The statistical analysis of the resulting spatio-temporal data set is challenging due to its nonstationary structure and large size. I propose mapping these data using locally stationary Gaussian process regression where covariance parameter estimation and spatio-temporal prediction are carried out in a moving-window fashion. This yields computationally tractable nonstationary anomaly fields without the need to explicitly model the nonstationary covariance structure. I also investigate Student-t distributed microscale variation as a means to account for non-Gaussian heavy tails in Argo data. Cross-validation studies comparing the proposed approach with the existing state-of-the-art demonstrate clear improvements in point predictions and show that accounting for the nonstationarity and non-Gaussianity is crucial for obtaining well-calibrated uncertainties. The approach also provides data-driven local estimates of the spatial and temporal dependence scales for the global ocean which are of scientific interest in their own right.

Refreshments will be served 3:15 – 3:45 pm in the Faculty & Graduate
Student Lounge Room 4118 French Hall West