Huang Huang

Postdoc Fellow II
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---------- Working Experience

2018-now 

Postdoc Fellow II, Advanced Study Program, National Center for Atmospheric Research, U.S.

- Research implementation and optimization of distributed parallel multi-resolution approximation of Gaussian process for large datasets

2017-2018 


Postdoc Fellow, Department of Statistical Science, Duke University & Statistical and Applied Mathematical Sciences Institute, U.S.

- Research statistical methods for climate problems and Bayesian hierarchical modeling of large ensembles

---------- Education

2014-2017 

Ph.D. in Statistics
King Abdullah University of Science and Technology, Saudi Arabia
Advisor: Prof. Ying Sun
Thesis title: computational methods for large spatio-temporal datasets and functional data ranking

2011-2014 

Master in Computational Mathematics
Fudan University, China
Advisor: Prof. Weiguo Gao

2007-2011 

Bachelor in Mathematics
Fudan University, China

---------- Publications

Huang, H., Hammerling, D., Li, B., and Smith R. (2019), "Combine multiple interdependent climate models: a Bayesian approach", in preparation.

Huang, H., Blake, L., and Hammerling, D. (2019), "Pushing the limit: a hybrid parallel implementation of the multi-resolution approximation for massive data", submitted.

Huang, H. and Sun, Y. (2019), "A Decomposition of Total Variation Depth for Understanding Functional Outliers", *Technometrics*, in press.

Huang, H. and Sun, Y. (2018), "Hierarchical low rank approximation of likelihoods for large spatial datasets", *Journal of Computational and Graphical Statistics*, 27:1, 110-118.

Huang H. and Sun Y. (2017), "Visualization and assessment of spatio-temporal covariance properties", *Spatial Statistics*, in press.

Toye, H., Zhan, P., Gapalakrishnan, G., Kartadikaria, R. A., **Huang, H.**, Knio, O., and Hoteit, I. (2017), "Ensemble data assimilation in the Red Sea: sensitivity to ensemble selection and atmospheric forcing", *Ocean Dynamics*, 67:915-933.

---------- Honors and Awards

Travel awards

- Forecasting from Complexity workshop, IMA, U.S. 2018
- Summer school on optimization, SAMSI, U.S. 2016
- Rossbypalooza workshop on climate science and statistics, University of Chicago, U.S. 2016
- Geospatial week by International Society for Photogrammetry and Remote Sensing, France. 2015

Scholarship

- National scholarship, Fudan University. 2012
- First-class graduate scholarship, Fudan University. 2012
- Renmin undergraduate scholarship, Fudan University. 2011/2010/2009

Poster awards

- Jury's choice second best poster award in Biennial Conference of the Research Group for Environmental Statistics, Italy, by the International Environmetrics Society (TIES). 2015

Others

- Outstanding graduate of Fudan University, China. 2014
- First award of National Olympiad in Informatics in Provinces, China. 2006

---------- Presentations and Posters

Visualization and assessment for properties of spatio-temporal covariance properties

- Forecasting from Complexity, Minneapolis, U.S. (poster) 2018

Inference on the future state of the climate through combining multiple interdependent climate model outputs with observations using Bayesian hierarchical models

- Symposium on Data Science and Statistics, Reston, U.S. (talk) 2018
- Joint Statistical Meetings, Vancouver, Canada (talk) 2018

Total variation depth for functional data

- Joint Statistical Meetings, Chicago, U.S. (talk). 2016
- International Conference of the ERCIM WG on Computational and Methodological Statistics, Pisa, Italy. (invited talk). 2018

Hierarchical low rank approximation of likelihoods for large spatial datasets

- Joint Statistical Meetings, Seattle, U.S. (talk) 2015
- International Workshop on Climate Informatics, Boulder, U.S. (poster) 2015
- Spatial Statistics, Avignon, France (poster) 2015
- Biennial Conference of the Research Group for Environmental Statistics, Bari, Italy (poster) 2015

---------- Research Experiences

High-performance computing

- Implementation and optimization of distributed parallel multi-resolution approximation of Gaussian process for extremely large spatial datasets comprising up to tens of millions of observations using C++. 2019

Bayesian modeling

- Proposal of a Bayesian hierarchical model to infer the future climate states from the interdependent climate models and reanalysis data. 2018
- Fast computations in Bayesian nonparametric regression models, where we apply suitable likelihood approximation techniques. 2017

Computational methods for large datasets

- Fast kriging for large spatial datasets. The proposed hierarchical low rank approximation method is used to do fast spatial interpolation. 2016
- Hierarchical low rank approximation of likelihoods for large spatial datasets. An approximation scheme is proposed to compute the Gaussian likelihood when the covariance matrix is large, dense, and unstructured. 2015

Data assimilation

- Ensemble data assimilation in the Red Sea. An ensemble data assimilation and forecasting system for the Red Sea capable of studying the sensitivity of the system to various filtering parameters and atmospheric forcing is built. 2016

Functional data analysis

- Total variation depth for functional data. A notion of functional data depth is developed for functional data ranking and outlier detection. 2017

Industry projects

- Click-through rate prediction. Prediction methods have been developed using massive datasets of user historical behaviors on the distributed file system, Apache Hadoop. 2013
- Data mining in recommendation systems. The Latent Dirichlet Allocation model is used to classify advertisement passages by the hidden topics, and advertisements are recommended to users accordingly. 2012

Machine learning

- Imputations for biochemical measurements in Argo data. We apply neural network methods to Argo profiles to predict oxygen at locations where the observations are missing. 2018

Spatio-temporal statistics

- Visualization and assessment for properties of spatio-temporal covariances, including separability and symmetry, using functional data analysis. 2016

---------- Teaching Experience

Undergraduate Modeling Workshop, North Carolina State University, U.S. 2018

- Short course: R tutorial
- Leading an undergraduate group working on the project, estimation of above ground biomass in the Bonanza Creek experimental forest.

Statistics in the Criminal Justice System Workshop, North Carolina Central University, U.S. 2018

- Short course: Hands-on data experience with R

Undergraduate Climate Extremes workshop, SAMSI, U.S. 2017

- Short course: R tutorial

Graduate teaching assistant, KAUST, Saudi Arabia 2016

- Course: Applied statistics and data analysis

Undergraduate teaching assistant, Fudan University, China 2012

- Course: Advanced mathematics

---------- Academia Service

Session Chair Joint Statistical Meetings, Chicago/Seattle, U.S. 2016/2015

Peer-review service

Biometrics, Journal of Climate, Journal of Computational and Graphical Statistics, Stat, Statistics and Computing, Stochastic Environmental Research and Risk Assessment, 4th International Conference on Big Data and Information Analytics

---------- Computational skills

Proficient:	C/C++, R, MATLAB.
Intermediate:	Python, Linux, MPI, OpenMP
Basic:	SQL