Andrew Pensoneault

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Work Experience:

Graduate Research Assistant

IIHR - Hydrosciences & Engineering, University of Iowa, Iowa City, IA
08/2018 - Present
-Developed and implemented Data Assimilation algorithms for flood forecasting models.
-Obtained and performed data analysis on measurements from stage sensors.
-Designed experimental setups for verification of the algorithm results.
-Visualized relevant results and data.
-Prepared reports to present technical results to a non-mathematician audience.
-Collaborated with peers to write academic papers.

Givens Associate Intern

Argonne National Lab, Lemont, IL
05/2019 - 08/2019
-Developed neural network based methods for learning probability distributions.
-Collaborated with several research scientists on the project.
-Designed tools based on the TensorFlow framework in Python.
-Visualized results for meaningful technical interpretation.

International HPC Summer Intern

RIKEN Center for Computational Science, Kobe, Japan
06/2018 - 08/2018
-Investigated cost-reduction techniques for Data Assimilation in numerical weather models.
-Researched Data Assimilation in a High-Performance Computing environment.
-Co-authored a publication based on the research.

Graduate Teaching Assistant

Department of Mathematics, University of Iowa, Iowa City, IA
08/2016 - 06/2018
-Led discussion sections of college-level calculus and algebra.
-Graded assignments over a wide breadth of undergraduate-level mathematical courses.
-Individually tutored students in the Math Tutorial Lab.
-Collaborated with colleagues to create materials and discuss best teaching practices.

Education:

Ph.D. Candidate in Applied Mathematical and Computational Sciences

University of Iowa, Iowa City, IA United States
05/2023 (**Projected**)
GPA: 3.62 of a maximum 4.0
Research Interests:

-Efficient Posterior Sampling with Ensemble Kalman methods
-Efficient Bayesian Physics Informed Neural Networks and DeepONets
-Physics and Constraint Informed Gaussian Process Regression
Relevant Coursework:
-Probabilistic Mechanics and Reliability Theory
-Bayesian Statistics
-Deep Learning
-Foundations of Deep Learning
-High Performance and Parallel Computing
-Interpretable Machine Learning and Explainable Artificial Intelligence

Bachelor's Degree in Applied Mathematics
State University of New York at Geneseo, Geneseo, NY United States
06/2016
GPA: 3.71 of a maximum 4.0
Minor: Physics
Honors: Magna Cum Laude

Skills:

Scientific Computing: Julia, Python, MATLAB, Fortran
Machine Learning: TensorFlow, PyTorch, Jax, NumPy, pandas, scikit-learn
Data Visualization: Matplotlib, Plotly, LaTeX, HTML, CSS
High Performance Computing: Linux, Bash, C, OpenMPI, CUDA, OpenMP
Machine Learning: Neural Networks, Kernel Methods, Random Forest, Linear Regression, kNN
Other Skills : SQL, Git, Excel, Deep Learning,

Professional Publications:

-Pensoneault, A., Yang, X., & Zhu, X. (2020). *Nonnegativity-enforced Gaussian process regression*. Theoretical and Applied Mechanics Letters, 10(3), 182-187.

-Kotsuki, S., Pensoneault, A., Okazaki, A., & Miyoshi, T. (2020). *Weight structure of the Local Ensemble Transform Kalman Filter: A case with an intermediate atmospheric general circulation model*. Quarterly Journal of the Royal Meteorological Society, 146(732), 3399-3415.

-Pensoneault, A., Krajewski, W., Valasquez, N., Zhu, X., & Ricardo, M. (2023). *Ensemble Kalman Inversion with Limited Observations for Parameter Estimation and Streamflow Prediction at Upstream Basins: A Simulation Study* (submitted to Journal of Water Resources)

-Pensoneault, A. & Zhu, X. (2023). *Efficient Bayesian Physics Informed Neural Networks for Inverse Problems via Ensemble Kalman Inversion*. (submitted to Journal of Computational Physics)