

# SIJIE HE

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## EDUCATION

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### Ph.D., Computer Science and Engineering

Aug. 2016 - Present

University of Minnesota, GPA: 4.00/4.00

Minneapolis, Minnesota

Advisor: Prof. Arindam Banerjee

Machine learning for prediction and structure learning on spatiotemporal data with applications in climate science.

### Master of Electrical Engineering (Excellent Graduate)

Aug. 2014 - Jun. 2016

Harbin Institute of Technology (Member of C9 League)

Harbin, China

GPA: 3.84/4.00, Rank: 1/130

Thesis: Flight modes recognition and tracking based on uninhabited aerial vehicle telemetry data.

### Bachelor of Electrical Engineering (Excellent Graduate)

Aug. 2010 - Jun. 2014

Harbin Institute of Technology, GPA: 3.91/4.00, Rank: 3/125

Harbin, China

Thesis: Fault diagnosis method based on condition monitoring data.

## WORK EXPERIENCE

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### Microsoft - Azure

Jun. 2020 - Aug. 2020

Data Scientist Intern

Redmond, Seattle

Built two interpretable models for Azure demand forecasting. The developed models achieved accurate forecasting and revealed the influential factors driving the demand, which ultimately yield actionable business insights.

### General Electric Global Research Center

Jun. 2019 - Aug. 2019

Research Intern - Machine Learning, Mentored by Dr. Hao Huang

San Ramon, California

Developed a novel deep learning model for anomaly detection and causal learning on multivariate time series. Beyond discovering the causal relationships among time series, the model is able to locate the root cause of anomalies.

## PUBLICATIONS

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Sijie He, Xinyan Li, Timothy DelSole, Pradeep Ravikumar, and Arindam Banerjee. Sub-sesaonal climate forecasting via machine learning, challenges, analysis, and advances. *AAAI Conference on Artificial Intelligence*, 2021 (Acceptance rate: 21%).

Sijie He and Hao Huang. Flight data anomaly detection and diagnosis with variable association change. *The 36th ACM/SIGAPP Symposium On Applied Computing*, 2021.

Sijie He, Xinyan Li, Vidyashankar Sivakumar, and Arindam Banerjee. Interpretable predictive modeling for climate variables with weighted lasso. *AAAI Conference on Artificial Intelligence*, 2019 (Acceptance rate: 16.2%)

Sijie He, Xinyan Li, Vidyashankar Sivakumar, and Arindam Banerjee. Land climate prediction using sea surface temperatures. In *7th International Workshop on Climate Informatics*. Springer, 2018 (Spotlight presentation)

Jamal Golmohammadi, Imme Ebert-Uphoff, Sijie He, Yi Deng, and Arindam Banerjee. High-dimensional dependency structure learning for physical processes. In *IEEE International Conference on Data Mining (ICDM)*, 2017

Sijie He, Datong Liu, and Yu Peng. Flight mode recognition method of the uninhabited aerial vehicle based on telemetric data. *Chinese Journal of Scientific Instrument*, 2016 (2016 Best paper award, acceptance rate: 10%).

Sijie He, Yu Peng, and Datong Liu. Fault diagnosis for discrete monitoring data based on fusion algorithm. In *12th IEEE International Conference on Electronic Measurement & Instruments (ICEMI)*, pages 125–130, 2015

## SELECTED RESEARCH PROJECTS

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### Sub-Seasonal climate forecasting with machine learning

Mar. 2019 - Aug. 2020

- Built novel sequence-to-sequence models (AAAI 2021) for sub-seasonal climate forecasting (forecasting 14-28 days ahead of time) that handles long-term temporal dependencies in spatiotemporal data.
- Built python library for benchmarking spatiotemporal prediction and real-time evaluation.
- Introduced the “Imagenet” dataset of sub-seasonal forecasting, integrating sources of climate data.

### Interpretable predictive modeling for climate variables

Sep.2017 - Aug. 2018

- Proposed Weighted Lasso (AAAI-2019, CI Workshop-2018) for solving linear regression problems with spatial-correlated covariates and derived its non-asymptotic estimation error bound with finite samples.
- Weighted Lasso outperforms gradient boosting tree (GBT) and deep learning models in terms of accuracy on high-dimensional regression problems with limited sample size.
- The method yields interpretable variable selection for land climate prediction using sea surface temperatures.

### High-dimensional dependency structure learning

Jan.2017 - Aug. 2017

- Proposed an efficient and scalable algorithm ACLIME-ADMM for adaptive structure learning of high-dimensional undirected graphical models (ICDM-2017).
- ACLIME-ADMM recovers the underlying dependency structure of synthetic advection-diffusion processes and real-world global atmospheric circulation.

## SKILLS

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**Technical Skills** Python, Pytorch, TensorFlow, R, C, C++, CUDA, and Verilog HDL

**Other Skills** Collaboration, Cooperation, Public Speaking, Presentation

## HONORS & AWARDS

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Student Travel award, AAAI. Jan. 2019

Student Travel award, CI Workshop. Sep. 2018

Student Travel Award, ICDM. Nov. 2017

Quality Metrics Fellowship for Graduate Study, University of Minnesota. 2016 - 2017

2016 Best Paper award, Chinese Journal of Scientific Instrument. Aug. 2017

Best Graduate Thesis Award in Harbin Institute of Technology 2016. Jul. 2016

National Scholarship for Graduate Students in China. Nov. 2015

## TEACHING EXPERIENCE

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### Teaching Assistant

CSCI 5302 Analysis of Numerical Algorithms . Jan. 2021 - May. 2021  
Prof. Daniel Boley. University of Minnesota, Twin Cities

CSCI 5304 Computational Aspects of Matrix Theory. Sept. 2018 - Dec. 2018  
Prof. Yousef Saad. University of Minnesota, Twin Cities

System Reliability Engineering and Technology. May. 2015 - Aug. 2015  
Prof. Haitao Liao. Harbin Institute of Technology

## RELEVANT COURSEWORK

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Machine Learning, Data Mining, Artificial Intelligence, Convex Optimization, Applied Parallel Programming (CUDA), Database Management Systems, Digital Signal Processing, Design and Analysis of Algorithms, Advanced Sensing Systems, Stochastic Process.