PUYANG ZHAO

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EDUCATION

Ph.D. Candidate in Biostatistics and Data Science *Aug 2023 - Present*
The University of Texas Health Science Center at Houston
Expected to receive Ph.D. in Biostatistics and Data Science.

M.S. (Honours) in Mathematics and Statistics *July 2019 - July 2021*
The University of Melbourne
Specialization in Statistics and Stochastic Processes

B.S. (Honours) in Statistics *September 2015 - June 2019*
Beijing Normal University and Hong Kong Baptist University United International College (BNU-HKBU UIC)
Received B.S. (Honours) in Statistics from Hong Kong Baptist University

PUBLICATIONS

Peer-Reviewed Journal Articles

1. Huiyun Zhang, **Puyang Zhao***, Gaigai Tang, Zongjin Li, Zhu Yuan. "Reproducible and Generalizable Speech Emotion Recognition via an Intelligent Fusion Network." Biomedical Signal Processing and Control, May 2025
2. **Puyang Zhao**, James J. Yang, Yuh-Pey Anne Buu*. "Applied statistical methods for identifying features of heart rate that are associated with nicotine vaping." The American Journal of Drug and Alcohol Abuse (Methods in Addiction Research Section), Feb 2025
3. Huiyun Zhang*, Heming Huang, **Puyang Zhao**, Zhenbao Yu. "Sparse Temporal-Aware Capsule Network for Robust Speech Emotion Recognition." Engineering Applications of Artificial Intelligence, Volume 144, pp. 110060, 2025.
4. Huiyun Zhang*, Heming Huang, **Puyang Zhao**, Xiaojun Zhu, Zhenbao Yu. "CENN: Capsule-Enhanced Neural Network with Innovative Metrics for Robust Speech Emotion Recognition." Journal of Knowledge-Based Systems, September 2024.
5. **Puyang Zhao**, Xinhui Liu, Zhiyi Yue, Qianyu Zhao, Xinzhi Liu, Yuhui Deng, Jingjin Wu*. "DiGAN Breakthrough: Advancing Diabetic Data Analysis with Innovative GAN-Based Imbalance Correction Techniques." Journal of Computer Methods and Programs in Biomedicine Update, 2024.

Conference Proceedings

6. **Puyang Zhao**, Wei Tian, Lefu Xiao, Xinhui Liu, Jingjin Wu. "An Attention-based Long Short-Term Memory Framework for Detection of Bitcoin Scams." IEEE International Conference on High Performance Big Data and Intelligent Systems 2022. (*Best Paper Nomination Award*)
7. **Puyang Zhao** and Wei Tian. "Research on Prediction of Solar Power Considering the Methods of Statistical and Machine Learning–Based on the Data of Australian Solar Power Market." IOP Conference Series: Earth and Environmental Science, Vol. 1046, No. 1, 2022.

In-Process Journal Articles

1. **Puyang Zhao**, Yuh-Pey Anne Buu, James J. Yang*. "New Statistical Method for Predicting Personalized Momentary Probability of Vaping Behavior Using Heart Rate Data from Wearable Devices." Preparing to submit, 2025.
2. **Puyang Zhao**, Huiyun Zhang*, Zhiyi Yue, Zongjin Li. "A Novel Deep Learning Architecture for Speech Emotion Recognition with Enhanced Nonlinear Representation and Attention Mechanisms." Under review in Engineering Applications of Artificial Intelligence, April 2025.

3. **Puyang Zhao**, Huiyun Zhang*, Zilong Pang, Gaigai Tang, Junnan Liu, and Heming Huang. "Fractal-Inspired Features and Smoothed Loss in Attention-Augmented Residual Learning for Speech Emotion Analysis." Under review in Journal of Artificial Intelligence In Medicine, April 2025.

In-Process Conference Paper

1. Puyang Zhao, Zhiyi Yue, Md Saifur Rahman. "Comparative Analysis of Shallow and Deep Learning Methods for Diabetes Prediction Using the Pima Indians Dataset." Under review in IEEE-EMBS International Conference on Biomedical and Health Informatics 2025.

TALKS

Puyang Zhao, Zhiyi Yue, Md Saifur Rahman. Comparative Analysis of Shallow and Deep Learning Methods for Diabetes Prediction Using the Pima Indians Dataset. Poster at 2025 UT System AI Symposium in Healthcare, Houston, Texas Medical Center.

Puyang Zhao, Henry Han. Imbalanced Credit Risk Learning. Presented as the first author at the SDSC 2022 conference at Baylor University, Waco, TX.

Puyang Zhao, Wei Tian, Lefu Xiao, Xinhui Liu, Jingjin Wu. "An Attention-based Long Short-Term Memory Framework for Detection of Bitcoin Scams." Presented as the first author and nominated for the Best Paper Award at the IEEE International Conference on High Performance Big Data and Intelligent Systems 2022.

TEACHING EXPERIENCE

Graduate Teaching Assistant September 2024 - May 2025
The University of Texas Health Science Center at Houston (UTHealth)

- Led STATA tutorials and assisted in teaching PH 1700 Intermediate Biostatistics and PH 1976 Data Analytics and Predictions
- Collaborated with faculty to develop course projects, including curating appropriate datasets and designing practical assignments that enhance students' analytical skills
- Created comprehensive solution guides and rubrics for assignments, exams, and course projects to ensure consistent evaluation standards
- Conducted regular office hour sessions to provide one-on-one consultation, clarify statistical concepts, and assist students with programming challenges
- Supported course development by preparing instructional materials, reviewing assignment solutions, and providing feedback on student progress

Assistant Instructor I September 2021 - December 2021
BNU-HKBU United International College

- Delivered instruction for multiple courses including Calculus I, Logistics, Network and Transportation Models, and Data Analysis for Business
- Developed comprehensive course materials including lesson plans, assessments, and examination materials
- Mentored students through individualized tutoring sessions

RESEARCH EXPERIENCE

Graduate Research Assistant *August 2023 - August 2024*
The University of Texas Health Science Center at Houston

- Conducted research on the association between biobehavioral indicators and vaping behavior. Collected and analyzed biobehavioral data, such as heart rate, during e-cigarette use. Applied signal processing and time series analysis techniques to extract features and patterns from the data. Investigated the potential and accuracy of biobehavioral indicators in detecting and predicting vaping behavior.
- Processed and cleaned experimental data to ensure data quality and utilized statistical methods for data analysis and modeling. Wrote research reports and academic papers detailing research methods, findings, and conclusions.

Research Assistant *July 2021 - December 2021*
BNU-HKBU UIC

- Developed a new machine learning method 'A-LSTM', which achieved an F1 score of over 82% on the original data, surpassing existing methods.
- Proposed a novel data mining method 'DiGAN', combining Generative Adversarial Network (GAN) and Random Forest (RF), to classify a public dataset with 5,070 records. DiGAN achieved an F1-score up to 98%, representing at least 4% improvement over traditional techniques.

Research Assistant *December 2019 - February 2020*
North Carolina State University

- Implemented R code to draw samples from Forward Filtering-Backward sampling and compared the results with the marginal probability calculated by the Forward-Backward Algorithm method.
- Applied Forward Algorithm in Rcpp and compared the results with those from the Forward Algorithm implemented in R code. Completed the proof of Forward Filtering-Backward sampling.

Master's Thesis *Dec 2019 - May 2021*
University of Melbourne

- Proposed method for accurate PV array parameter estimation using LSTM and time series modeling on Ausgrid's solar data (2010-2013)
- Enhanced solar energy data through various irradiance models
- Demonstrated superior prediction performance compared to traditional time series approaches

Undergraduate Thesis *Jun 2018 - Dec 2018*
BNU-HKBU UIC

- Developed base-station sleeping strategy using ARIMA, Holt-Winters, and Prophet models to forecast mobile traffic
- Optimized network energy efficiency through Monte-Carlo simulation and switch control algorithms
- Implemented data discharge to overlapping stations when requirements were met, with Matlab simulations showing improved station and power utilization

LEADERSHIP ACTIVITIES & COMMUNITY SERVICE

Texas Medical Center AI Summit 2025 *February 20-21, 2025*

- Served on the Setup/Technical Team for TMC's annual AI Summit, managing audiovisual equipment setup and providing real-time technical support throughout the conference sessions
- Collaborated with event staff to coordinate venue preparation, assist attendees with technical needs, and ensure smooth operation of presentation equipment
- Facilitated post-event breakdown and systematically organized conference materials and technical equipment for efficient storage and future use

A Special Conference on Biostatistics in Data-Driven Sciences *November 15-16, 2024*

- Volunteered at the 55th Anniversary Conference of the Department of Biostatistics and Data Science, supporting participant registration and providing comprehensive photography coverage
- Collaborated with organizing committee on various preparation and logistical tasks to ensure successful delivery of the two-day professional academic conference

United Innovation Charity Club *September 2015 - June 2016*

- Engaged in the Mangrove Forest program for outdoor activities and voluntary teaching, with 35 volunteer hours.
- Liaised with external organizations for sponsorship and activity funding.

Nepal International Voluntary Teaching Project *January 2016*

- Participated in teaching and tutoring the Chinese language.

· Prepared lesson plans, follow-up exercises, homework assignments, and unit tests.

RESEARCH INTERESTS

Time Series Analysis, Machine Learning, Multivariate Analysis, Biostatistics, Disease Detection, Classification Methods, Clinical Trials, Health Equity, Environmental Health, Data Mining, Deep learning

SKILLS & LANGUAGES

Software: Python, R, ArcGIS, SAS, STATA, Julia, Matlab, LaTeX, C++, MySQL, Rcpp, Microsoft Office
Languages: Mandarin (Native), English (Fluent)

HONORS & AWARDS

James Emerson Award for Outstanding Teaching Assistant *Nominated, March 2025*
Nominated for excellence in teaching assistance.

AMSI Summer School in the Mathematical Sciences *January 2021 - February 2021*
Joined the course "The Mathematical Engineering of Deep Learning" with First Class Honours.

C++ Programming for Financial Engineering with Distinction *February 2022 - June 2022*
Offered by the Baruch College's Financial Engineering (MFE) program as part of the Pre-MFE Program.

National Mathematical Modeling Competition for College Students *September 2018*
Award: Third Prize