Chengxin Gong

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EDUCATION

- **Peking University** — Beijing, China
  B.S. (major: statistics), School of Mathematical Sciences — September 2019 - July 2023
- **Peking University** — Beijing, China
  PhD candidate (major: statistics), School of Mathematical Sciences — September 2023 - present

RESEARCH INTERESTS

- **Time Series (Especially Gaussian Processes and Data Assimilation)**: Apply machine learning methodologies to analyse the time series, recover the latent variables and predict the futural states from a Bayesian perspective and obtain some useful generalization bounds or theoretical guarantees.
- **Generative Models (Especially GANs and Diffusion Models)**: Investigate the inner properties and structures of a given dataset, generate new samples from an unknown distribution by SDEs or marginal ODEs and design new sampling algorithms to enhance the quality and accelerate the procedure.

RESEARCH EXPERIENCES

- **Automated Model Selection for the Two-Layer Mixture Model of Gaussian Process Functional Regressions (TMGPFR)**: I conducted a research supervised by Dr. Jinwen Ma, which mainly focuses on improving the TMGPFR model, designing the corresponding learning and model selection algorithms, and applying them to some realistic problems, such as clustering analysis and data prediction. Our model along with our algorithm can fit and cluster the unlabelled time series simultaneously, detect the patterns and predict the possible events for a brand new data set with massive missing sample points.
  Reference: Gong C, Ma J. Automated Model Selection of the Two-Layer Mixtures of Gaussian Process Functional Regressions for Curve Clustering and Prediction[J]. Mathematics, 2023, 11(12): 2592.
- **Adversarial Transform Particle Filtering**: I conducted a research supervised by Dr. Cheng Zhang and Dr. Wei Lin, which mainly focuses on proposing a generalized moment-matching method for data assimilation under the adversarial learning framework, deriving its generalization bound and convergence rate, recovering the latent states, predicting the futural events, and applying it to some realistic models and differential dynamical systems.
  Reference: Under peer review. https://arxiv.org/abs/2502.06165
- **Inversion Model of Atmospheric Physical Variables Driven by Data and Mechanism Dual Forces**: I'm now conducting a research with Shaobin Yu and Hongbin Lin, supervised by Dr. Wei Lin, which mainly focuses on using both deep learning methods (acting as inverse model) and real physical laws (acting as forward model) to invert satellite data into ground-level data. This research can help humans to better understand the atmospheric radiative transfer model and forecast the weather with satellite observations.
  Reference: Under construction.

TEACHING EXPERIENCES

- **Fall 2025**: Advanced Algebra (I), teaching assistant
- **Spring 2025**: Mathematical Analysis (II), teaching assistant
- **Fall 2024**: Advanced Algebra (I), teaching assistant
- **Spring 2024**: Mathematical Analysis (II), teaching assistant
- **Fall 2023**: Advanced Mathematics (I), teaching assistant
- **Spring 2023**: Transport and City Exploration of Beijing, teacher
- **Spring 2023**: Advanced Mathematics (II), teaching assistant
- **Fall 2022**: Transport and City Exploration of Beijing, teacher
- **Fall 2022**: Advanced Mathematics (I), teaching assistant

HONORS AND REWARDS

- **Merit Student**, 2024
- **The Third Prize of Peking University Scholarship**, 2024
- **Excellent Graduate of Peking University**, 2023
- **Award for Academic Excellents**, 2022
- **The Third Prize of Peking University Scholarship**, 2022
- **Merit Student**, 2021
- **Panasonic Scholarship**, 2021
- **The Third Prize of Peking University Challenge Cup**, 2021
- **Award for Academic Excellents**, 2020
- **The Third Prize of Peking University Scholarship**, 2020
- **The First Prize in the 12th Mathematics Competition of Chinese College Students**, 2020
- **The Second Prize in the 37th Physics Competition of Chinese College Students**, 2020

SKILLS

- **Programming Languages**: Python, Matlab, C/C++, R
- **Languages**: Chinese, English
- **Social Positions**:
  The 13th president of PKU Association of Railway Culture Enthusiasts (July 2021 - June 2022)
  The 14-16th routine director of PKU Association of Railway Culture Enthusiasts (July 2022 - June 2025)

HOBBIES

- **Cities Skylines** : A game of building a city.
- **All of Transport** : Railway, aircraft, metro, monorail, tram, etc.
- **Geography, Relic, Sociology, Education** : Witness of the past, the present and the future.
- **Feasting on Delicious Food** : Maybe I have an unusually keen taste.