Jifeng Song

412-430-2905 | JifengSong@pitt.edu | Homepage | LinkedIn | Google Scholar

Research Interests

Multimodal Large Language Models, AI for Science, Explainable AI, Efficient Large Language Models

Education

- **Swanson School of Engineering, University of Pittsburgh** *Sep. 2023 – Present*
  Ph.D. in Electrical and Computer Engineering Pittsburgh, PA, USA
  - Advisors: Prof. Yufei Huang, Prof. Zhi-Hong Mao
- **Swanson School of Engineering, University of Pittsburgh** *Sep. 2023 – August. 2025*
  M.S. Research in Electrical and Computer Engineering; GPA: 3.83/4 Pittsburgh, PA, USA
- **Huazhong University of Science and Technology** *Sep. 2019 – Jun. 2023*
  B.E. in Electrical Engineering and Automation; GPA: 3.77/4 Wuhan, China

Publications

Conference

1. **Jifeng Song**, Arun Das, Ge Cui, Yufei Huang. "FigEx: Aligned Extraction of Scientific Figures and Captions." *Findings of the Association for Computational Linguistics: EMNLP 2025*.
2. **Jifeng Song**, Xiaosheng Peng, Zimin Yang, Peijie Wei, Bo Wang, Zheng Wang. "A Novel Wind Power Prediction Approach for Extreme Wind Conditions Based on TCN-LSTM and Transfer Learning." *IEEE/IAS I&CPS Asia'22*.
3. Zimin Yang, Xiaosheng Peng, Peijie Wei, **Jifeng Song**. "Short-term Wind Power Prediction Based on CEEMDAN and Parallel CNN-LSTM." *IEEE/IAS I&CPS Asia'22*.

Journal

1. **Jifeng Song**, Xiaosheng Peng, Jiajiong Song, Zimin Yang, Bo Wang, Jianfeng Che. "MTTLA-DLW: Multi-task TCN-Bi-LSTM Transfer Learning Approach with Dynamic Loss Weights based on Feature Correlations of the Training Samples for Short-term Wind Power Prediction." *Wind Energy*, 2024.

Preprints

Conference

1. **Jifeng Song**, Kai Huang, Xiangyu Yin, Boyuan Yang, Wei Gao. "Achieving Sparse Activation in Small Language Models."

Research Experience

- **Research Assistant** *Oct. 2024 – Present*
  Dept. of Electrical and Computer Engineering, University of Pittsburgh
  Cancer Virology Program, UPMC Hillman Cancer Center Pittsburgh, PA, USA
  - **FigEx: Aligned Extraction of Scientific Figures and Captions.** Developed FigEx-7B, a vision-language model that separates compound figures and their captions into subfigures and subcaptions.
  - Curated the BioSci-Fig dataset of 7,174 compound biomedical figures with 43,183 annotated subfigure bounding boxes and aligned subcaptions.
  - Demonstrated that FigEx-7B outperforms YOLO-based detectors and LLaMA-based caption models in subfigure detection AP and caption separation ROUGE.
- **Research Assistant** *Sep. 2023 – Sep. 2024*
  Dept. of Electrical and Computer Engineering, University of Pittsburgh Pittsburgh, PA, USA
  - **Achieving Sparse Activation in Small Language Models with Explainable AI.** Proposed Corrected GxO, an attribution-based neuron importance metric for sparse activation in small language models.
  - Showed that gradient-based attribution outperforms magnitude-based pruning, achieving up to 80% sparsification with <5% accuracy loss.
  - Provided the mathematical theory that supports the corrected attribution metric.
- **Research Assistant** *Sep. 2021 – Jun. 2023*
  School of Electrical and Electronic Engineering, Huazhong University of Science and Technology Wuhan, China
  - **Transfer Learning for Short-Term Wind Power Prediction.** Designed a multi-task TCN–LSTM transfer learning model for newly built wind farms in a wind cluster.
  - Introduced dynamic loss weights based on feature correlations between source and target farms, reducing prediction error by about 25%.

Presentations

1. "Demand Paging towards Sparse Activation in Small Language Models." Elijah Group Meeting, Dept. of Computer Science, Carnegie Mellon University, March 2024.
2. "A Novel Wind Power Prediction Approach for Extreme Wind Conditions Based on TCN-LSTM and Transfer Learning." 2022 IEEE/IAS Industrial and Commercial Power System Asia (I&CPS Asia) Conference, Shanghai, China, July 2022.

Teaching Experience

- **Teaching Assistant, ECE0202 – Embedded Processors and Interfacing** *Spring 2025, Spring 2024*
  Dept. of Electrical and Computer Engineering, University of Pittsburgh
  ◦ Supported lab sessions and project guidance for a course on embedded processors and interfacing.
- **Teaching Assistant, ECE0101 – Linear Circuits & Systems** *Fall 2024*
  Dept. of Electrical and Computer Engineering, University of Pittsburgh
  ◦ Assisted with lectures, problem sessions, and grading for an introductory course on linear circuits and systems.
- **Teaching Assistant, ECE1140 – Systems and Project Engineering** *Fall 2023*
  Dept. of Electrical and Computer Engineering, University of Pittsburgh
  ◦ Helped students with team projects and systems engineering methodologies.
- **Teaching Assistant, ECE0401 – ECE Analytical Methods** *Fall 2023*
  Dept. of Electrical and Computer Engineering, University of Pittsburgh
  ◦ Assisted in grading and held office hours for a course on analytical methods in ECE.

Professional Activities

Conference Reviewer

- IEEE/IAS Industrial and Commercial Power System Asia (I&CPS Asia) 2023

Journal Reviewer

- IEEE Transactions on Power Systems

Honors and Awards

- **Outstanding Undergraduate Thesis (Top 3%)** *2023*
  Huazhong University of Science and Technology
  ◦ Recognized for outstanding undergraduate thesis in Electrical Engineering and Automation.
- **Scholarship for Academic** *2022*
  Huazhong University of Science and Technology
  ◦ Awarded for academic excellence during undergraduate studies.
- **Scholarship for Scientific and Technological Innovation** *2022*
  Huazhong University of Science and Technology
  ◦ Awarded for contributions to scientific and technological innovation projects.

Technical Skills

- **Programming:** Python, MATLAB/Simulink, C/C++, LaTeX
- **ML Frameworks:** PyTorch, TensorFlow, Keras