ChengAo Shen

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Research Interests

My research interests include **Time Series Analysis** and **Agentic Systems**. I aim to improve how temporal data is modeled for forecasting, classification, and anomaly detection, with a focus on multi-modal approaches and on efficient, deployable models. I study how to strengthen the capabilities of agentic systems, such as causal reasoning, and how to keep them running stably and reliably over long horizons.

Education

Ph.D. in Computer Science at University of Houston — Jan 2025 – Expected Jun 2029
- Advisor: Jingchao Ni

B.Sc. in Information and Computing Science at Sichuan Agricultural University — Sep 2020 – Jun 2024
- Advisors: Zhaoli Shen and Houhui Huang

Work Experience

Research Intern at NEC Laboratories America (DS3) — May 2026 – Aug 2026
- Explored methods for detecting anomalies in complex LLM agent systems, targeting reliable identification and interpretable diagnosis of failures arising in multi-agent execution

Teaching Assistant at University of Houston — Jan 2025 – Present
- Facilitated student learning and assessed assignments on programming, data visualization, and data mining techniques, ensuring code quality and conceptual understanding

Publications

Preprints

[1] **ChengAo Shen**, Yanjun Zhao, Haoxin Liu, Bonnie Chen, Miles Ma, Dongjin Song, Hanghang Tong, Qingsong Wen, Jingrui He and Jingchao Ni, TSFLab: A Self-Improving Agent-Agnostic Workbench for Time Series Forecasting Research, *arXiv preprint* arXiv:2610.40901, 2026

[2] **ChengAo Shen**, Ziming Zhao, Hanghang Tong, Dongjin Song, Dongsheng Luo, Qingsong Wen and Jingchao Ni, SVTime: Small Time Series Forecasting Models Informed by "Physics" of Large Vision Model Forecasters, *arXiv preprint* arXiv:2510.09780, 2025

Published

[3] **ChengAo Shen**, Wenchao Yu, Fangyu Wu, Dongjin Song, Hanghang Tong, Dongsheng Luo, Wei Cheng, Haifeng Chen and Jingchao Ni, MetaCaster: Meta-Harness-Optimized Agent for End-to-End Few-Shot Learning of Lightweight Time Series Forecasters, *Proceedings of the Conference on Empirical Methods in Natural Language Processing (**EMNLP**), Main Conference*, 2026

[4] **ChengAo Shen**, Hanghang Tong, Dongjin Song, Zhigang Deng, Qingsong Wen and Jingchao Ni, From Images to Signals: Are Image-Pretrained Vision Models Useful for Time Series Analysis?, *Transactions on Machine Learning Research (**TMLR**)*, 2026, **Featured Certification** (top ∼2% of accepted papers)

[5] **ChengAo Shen**, Wenchao Yu, Ziming Zhao, Dongjin Song, Wei Cheng, Haifeng Chen and Jingchao Ni, Multi-Modal View Enhanced Large Vision Models for Long-Term Time Series Forecasting, *Proceedings of the Annual Conference on Neural Information Processing Systems (**NeurIPS**)*, 2025

[6] **ChengAo Shen**, Zhengzhang Chen, Dongsheng Luo, Dongkuan Xu, Haifeng Chen and Jingchao Ni, Exploring Multi-Modal Data with Tool-Augmented LLM Agents for Precise Causal Discovery, *Findings of the Association for Computational Linguistics (**ACL**)*, 2025

[7] Jingchao Ni, Ziming Zhao, **ChengAo Shen**, Hanghang Tong, Dongjin Song, Wei Cheng, Dongsheng Luo and Haifeng Chen, Harnessing Vision Models for Time Series Analysis: A Survey, *Proceedings of the International Joint Conference on Artificial Intelligence (**IJCAI**)*, 2025

Research Experience

Agentic Few-Shot Learning of Lightweight Time Series Forecasters Dec 2025 – May 2026
Proposed MetaCaster, a meta-harness-optimized multi-agent framework where agents act as intermediary engineers, generating data and training specialized lightweight forecasters from only a few examples. Demonstrated data and computational efficiency across 18 datasets, 23 forecasters and 14 baselines.

Small Time Series Forecasting Models Informed by LVMs Jul 2025 – Oct 2025
Proposed SVTime, a lightweight framework encoding the "physics" of Large Vision Models into compact architectures via linear layers and annealing constraint functions. Achieved state-of-the-art performance on 8 benchmarks, rivaling foundation models with $10^3\times$ fewer parameters.

Multi-Modal View Enhanced Large Vision Models Jan 2025 – May 2025
Proposed DMMV, a multi-modal framework integrating numerical and visual views for long-term forecasting. Identified the inductive bias of Large Vision Models towards periodicity and developed a backcast-residual adaptive decomposition to mitigate it, outperforming 14 SOTA baselines across 8 benchmarks.

Multi-Modal Causal Discovery with Tool-Augmented LLM Agents Aug 2024 – Dec 2024
Proposed MATMCD, a tool-augmented LLM agent framework that incorporates semantic cues from multi-modal data into causal graph learning. Reduced causal inference error (NHD) by 66.7% and improved root cause analysis (MAP@10) by 83.3% over state-of-the-art baselines.

Open-Source Projects

Textus – Lead Maintainer, CatVinci Studio Jul 2026 – Present
The next-generation Markdown editor, with an AI writing assistant. Free, open source and cross-platform; more than 500 stars on GitHub.

Invited Talks

Georgia Tech Data Seminar May 2026
Multi-Modal View Enhanced Large Vision Models for Long-Term Time Series Forecasting

Honors & Awards

People's Choice Award, PhD Research Showcase (Fall 2026) — UH Computer Science, 2026
Claude for Startups Program (CatVinci Studio, Lead Maintainer) — Anthropic, 2026
Gold Reviewer Award — ICML, 2026
NSM Travel Award — University of Houston, 2026
NeurIPS Scholar Award — NeurIPS, 2025
Graduate Tuition Fellowship — University of Houston, 2025, 2026

Professional Service

- **Conference Organization:** EMNLP 2026 – Session Chair (virtual)
- **Workshop Organization:** AI4TS @ AAAI – Webmaster 2027; Program Committee 2026–2027
- **Reviewer:** NeurIPS 2026; ICML 2026; ICLR 2026–2027; AAAI 2027; IEEE TPAMI 2026

Skills

Programming	Python, C++, CUDA, TypeScript, Rust
ML Tools	PyTorch, DeepSpeed, Triton, vLLM, SGLang, LangGraph, multi-GPU training
Dev Tools	Linux, Git, Docker, Slurm, Weights & Biases
Languages	Chinese (native), English (fluent), Japanese (intermediate)