Jiamin Xu

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EDUCATION

The University of Texas at Austin, TX, USA   Aug 2022 – Dec 2025
Ph.D., Major in Mechanical Engineering, Cumulative GPA: 4.0/4.0

Chongqing University, Chongqing, China   Sep 2019 - June 2022
*Master of Engineering, Major in Vehicle Engineering, Cumulative GPA: 3.88/4.0, Ranking: **1/116***

Chongqing University, Chongqing, China   Sep 2015 - June 2019
Bachelor of Engineering, Major in Vehicle Engineering, Major GPA: 3.61/4.0

PROFESSIONAL SKILLS

Language Skills: English (Fluent), Mandarin (Native)
Programming Skills: Python (NumPy, Pandas, PyTorch, TensorFlow), MATLAB
Engineering software Skills: CATIA / KULI / COMSOL

PROJECTS AND RESEARCH EXPERIENCE

Deep-Learning Based Event Detection System for Drilling Operations │ UT Austin   Aug 2024 - Current
- Developed an LSTM to detect critical drilling events (e.g., gas kicks, fluid loss), achieving **98% accuracy**.
- Designed a **1D ConvNet GAN** to augment training data, enhancing model robustness and generalization.
- Processed datasets with over **5 million time steps** per sequence, using **PyTorch** for efficient model training.

Deep Learning Applications and Projects │ Deep Learning.AI   Sep 2024 - Dec 2024
- Built **CNNs, RNNs, and GANs** for image classification, object detection, and sequence modeling tasks.
- Implemented advanced models, including **ResNet** for classification, **U-Net** for medical image segmentation, **LSTMs** for jazz improvisation, **Transformers** for neural machine translation, and Progressive Growing GANs (**ProGAN**) for high-resolution image synthesis and controllable content generation.

Data-Driven Drilling Dynamics Modeling Using SINDy │ UT Austin   Jan 2024 – May 2024
- Developed a data-driven framework for modeling borehole propagation dynamics using **Sparse Identification of Nonlinear Dynamics (SINDy)**.
- Achieved **physics-free trajectory prediction** with equivalent accuracy under noisy conditions.
- Conducted **stability analysis** to validate reliability and scalability for real-world applications.

Observer-Based Event Detection System Using UKF │ UT Austin   Sep 2023 – Jan 2024
- Designed a **UKF-based detection system**, outperforming conventional adaptive nonlinear observers (ANO) in performance.
- Introduced **phase portraits** for visualizing dynamic event behaviors, validated on two real-world datasets.

Development of an Optimization Solver Package │ UT Austin   Jan 2024 – May 2024
- Designed a MATLAB-based solver integrating algorithms like **Gradient Descent, Newton-CG, and L-BFGS** for unconstrained optimization.
- Enhanced flexibility with customizable tolerances, **line search methods (e.g., Armijo, Wolfe),** and step size options.
- Analyzed performance on 12 benchmarks, identifying **L-BFGS with Wolfe search** as most efficient for large-scale tasks.

- Delivered a modular package applicable to ML problems like loss function minimization.

Other Ph.D. Engineering and Research Projects⎪ Various Institutions   Aug 2022 – Current
- **Delay Differential Equation Modeling and Control**: Refined **nonlinear DDE models** for borehole propagation, achieving an **80x improvement in computational efficiency**. Designed a **multi-input, multi-output controller** to enhance drilling trajectory alignment and stability.
- **Computational Fluid Dynamics (CFD)**: Developed and validated **two-phase** flow models for drilling operations, improving simulation accuracy using second-order schemes.

HONORS AND AWARDS

- Web of Science Highly Cited Paper 4 times.
- Best Student Paper Finalist. Modelling, Estimation, and Control Conference (MECC) 2023.
- China National Scholarship (Top 0.2% in China, 2021)
- Graduate Academic Scholarship for 1st prize (2021, 2020, 2019)
- Champion of Hydrogen group in Shell Eco-marathon ASIA (2019)
- Undergraduate Academic Scholarship for 3rd prize (2019, 2018)
- Formula Student Electric China for 2nd prize (2018)

TEACHING EXPERIENCE

Teaching Assistant: Mechatronics (ME 140L), 2022 Fall and 2023 Spring, UT Austin.

PUBLICATIONS

- **Xu, J.**, Demirer, N., Pho, V., Tian, K., Zhang, H., Bhaidasna, K., Darbe, R. & Chen, D., 2024. Data-Driven Modeling of Nonlinear Delay Differential Equations with Gap Effects using SINDy. In *2024 IEEE International Conference on Advanced Intelligent Mechatronics (AIM)* (pp. 198-203). IEEE.
- **Xu, J.**, Aguirre, J., Song, S., Sun, Z., Bhaidasna, K., & Chen, D. (2024). A UKF Enabled Model Based Event Detection System for Drilling Operation. *Geoenergy Science and Engineering*, 213617.
- **Xu, J.**, Demirer, N., Pho, V., Tian, K., Zhang, H., Bhaidasna, K., Darbe, R. & Chen, D., 2024. Nonlinear Model Predictive Control for Directional Drilling Applications. (Accepted).
- **Xu, J.**, Demirer, N., Pho, V., Tian, K., Zhang, H., Bhaidasna, K., Darbe, R. & Chen, D., 2024. Advancing real-time drilling trajectory prediction with an efficient nonlinear DDE model and online parameter estimation. *Geoenergy Science and Engineering*, *238*, p.212829.
- **Xu, J.**, Keller, A.M., Demirer, N., Zhang, H., Tian, K., Bhaidasna, K., Darbe, R. and Chen, D., 2023. Experimentally Validated Nonlinear Delayed Differential Approach to Model Borehole Propagation for Directional Drilling. *ASME Letters in Dynamic Systems and Control*. ALDSC-23-1030 (**Best Student Paper Finalist,** MECC 2023)**.**
- **Xu, J.**, Zhang, C., Wan, Z., Chen, X., Chan, S. H., & Tu, Z. (2022). Progress and perspectives of integrated thermal management systems in PEM fuel cell vehicles: A review. *Renewable and Sustainable Energy Reviews*, *155*, 111908 (**Highly Cited Paper** in 2022, 2023, 2024, Web of Science)
- **Xu, J.**, Zhang, C., Fan, R., Bao, H., Wang, Y., Huang, S., ... & Li, C. (2020). Modelling and control of vehicle integrated thermal management system of PEM fuel cell vehicle. *Energy*, *199*, 117495.
- Fan, R., Chang, G., Xu, Y., & **Xu, J**. (2023). Multi-objective optimization of graded catalyst layer to improve performance and current density uniformity of a PEMFC. *Energy*, *262*, 125580. (**Highly Cited Paper** in 2023, Web of Science)
- Ma, R., **Xu, J.**, Li, J., Yuan, H., Zhang C. (2023). A multi-conditions speed predictor based on a DK clustering model. *Journal of Chongqing University*.