

# Jiamin Xu

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## EDUCATION

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**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*

## PUBLICATIONS

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- **Xu J**, Demirer N, Pho V, Tian K, Zhang, H, Bhaidasna, K, Darbe R and 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 and Chen D, 2024. Data-Driven Modeling of Nonlinear Delay Differential Equations with Gap Effects Using SINDy. (Accepted).
- **Xu J**, Demirer N, Pho V, Tian K, Zhang, H, Bhaidasna, K, Darbe R and 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, Nazli D, Zhang H, Tian K, Bhaidasna K, Darbe R, Chen D. 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 SH, Tu Z. Progress and perspectives of integrated thermal management systems in PEM fuel cell vehicles: A review. *Renewable and Sustainable Energy Reviews*. 2022;155:111908. (**Highly Cited Paper** in 2022 and 2023, Web of Science. **149** citations so far)
- **Xu J**, Zhang C, Fan R, Bao H, Wang Y, Huang S, et al. Modelling and control of vehicle integrated thermal management system of PEM fuel cell vehicle. *Energy*. 2020;199:117495.. (**117** citations so far)
- Fan R, Chang G, Xu Y, **Xu J**. Multi-objective optimization of graded catalyst layer to improve performance and current density uniformity of a PEMFC. *Energy*. 2023 Jan 1;262:125580. (**Highly Cited Paper** in 2023, **40** citations so far)
- Ma R, **Xu J**, Li J, Yuan H, Zhang C. A multi-conditions speed predictor based on a DK clustering model. *Journal of Chongqing University*.

## HONORS AND AWARDS

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- 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 1<sup>st</sup> prize (2021, 2020, 2019)
- Champion of Hydrogen group in Shell Eco-marathon ASIA (2019)
- Undergraduate Academic Scholarship for 3<sup>rd</sup> prize (2019, 2018)
- Formula Student Electric China for 2<sup>nd</sup> prize (2018)

## PROJECTS AND RESEARCH EXPERIENCE

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**Development of an Optimization Solver Package** | Course Project Jan 2024 – May 2024

Instructor: *Raghu Bollapragada*, The University of Texas at Austin, Austin, TX, USA.

- Developed a software package for solving unconstrained optimization problems with methods such as

Gradient Descent, Newton-CG, and BFGS.

- Created user-friendly functionality with customizable and default parameters for flexibility.
- Ensured high code quality with comprehensive documentation and performance metrics.

**Event detection system and 3D borehole propagation** | Research Intern

May 2024 – Aug 2024

Manager: *Ketan Bhaidasna*, Halliburton, Houston, TX, USA.

- Proposed an optimization based method to solve 3D contact problem and proved the existence and uniqueness of solution.
- Developed a new hydraulic model that can considers changing depth during drilling.
- Developed a diagnosis system to detection if there is an event such as gas kick or fluid loss happening.
- Developed a high fidelity drift flux model (3 PDEs) to simulate the gas volume fraction in the wellbore.

**Multi-input multi-output control for directional drilling** | Research Intern

May 2023 – Aug 2023

Manager: *Robert Darbe*, Halliburton, Houston, TX, USA.

- Developed a high-fidelity, physics-based borehole propagation model optimized for computational efficiency.
- Implemented a real-time estimation algorithm to identify unknown parameters in the physics model.
- Designed a multi-input, multi-output controller to maintain alignment with well plans while maximizing the rate of penetration.

**Modelling of drilling dynamics** | Research Assistant

Aug 2022 - Present

Advisor: *Prof. Dongmei “Maggie” Chen*, Advanced Power Systems and Control Lab, The University of Texas at Austin, Austin, TX, USA.

- Reimplemented a linear Delay Differential Equation (DDE) model and a nonlinear DDE model for the borehole propagation; compared and verified them systematically.
- Generalized the linear and nonlinear DDE models to arbitrary stabilizers and nonuniform BHA; develop an initial condition estimation for the nonlinear DDE model to improve continuity.
- Validated and analyzed the linear and nonlinear DDE models by experiment data provided by Halliburton.

**Flow structure interaction** | Research Assistant

Sep 2021 – Mar 2022

Advisor: *Prof. Leonardo P. Chamorro*, Renewable Energy & Environmental Group, University of Illinois at Urbana-Champaign, Champaign, IL, USA.

- Performed an electromagnetic field simulation in COMSOL to verify the feasibility of a flow experiment.
- Analyzed the velocity data of canopy turbulence cases using statistical and signal processing methods, such as Empirical Mode Decomposition and Hilbert Transform to obtain detrended results of Reynold shear stress and Proper Orthogonal Decomposition to get the modes of flow.
- Conducted Particle Image Velocimetry experiment for the flow density change canopy turbulence in a refractive-index-matching, open channel, using Insight 4G.

**Modeling and control of vehicle integrated thermal management system of a Proton Exchange Membrane (PEM) fuel cell vehicle** | Research Assistant

Dec 2018 - Jan 2020

Advisor: *Prof. Caizhi Zhang*, Lab of Fuel Cell Vehicles, Chongqing University, Chongqing, China.

- Investigated the heat transfer of each key component in the fuel cell vehicle.
- Matched pumps and radiators for each cooling loop to ensure the cooling capacity of the system.
- Coupled the charge air loop with motor cooling loop innovatively, which could control the air temperature at

an exact value and keep the motor coolant temperature within a reasonable range under one radiator.

- Reduced heat exchangers and arranged them in series to make the system more compact and lightweight.
- Completed the system through energy management via a dynamic logic algorithm, so that it could obtain the thermal information of any component or loop by inputting the vehicle speed in KULI.

#### **Design of a pure fuel cell vehicle for Shell Eco Racer | Research Assistant**

Mar 2019 - May 2019

Advisor: *Ming Han*, Principal Research Scientist of Clean Energy Research Centre, Temasek Polytechnic, Singapore.

*Lei Wang*, Senior engineer, Clean Energy Research Centre, Temasek Polytechnic, Singapore.

- Designed various 3D printed parts used in the racers such as the fuel cell support and switch module in CATIA for shock absorption and lightweight.
- Topologically optimized the carbon fiber unitary construction body in HYPERMESH to make the racer lighter and modeled the racer surface in CATIA.
- Processed the parts and assembled them on the racer.

#### **Design and processing of a formula racer with excellent performance in acceleration, durability, steering, braking, and fuel economy | Team Leader**

Dec 2015-Dec 2018

Advisor: *Prof. Pan Wang*, School of Automotive Engineering, Chongqing University, Chongqing, China.

*Prof. Haifeng Lu*, School of Automotive Engineering, Chongqing University, Chongqing, China.

- Designed three inter combustion engine formula racers and three electric formula racers over three years as the team leader (one internal combustion engine formula racer and one electric racer per year).
- Adopted 95th percentile male mannequin in ergonomics to determine the most comfortable driving position and the widest field of vision; modeled the surface of a seat that fits the back of the confirmed mannequin.
- Designed the molds of seat, body, and aerodynamics packages in CATIA to customize them using minimal material; processed the molds and fabricated their carbon fiber parts via vacuum forming.
- Optimized the topology and analyzed the stress and modal of the frame in HYPERMESH to make the frame more lightweight and with guaranteed strength.
- Designed the positioning fixtures steel pipe groove of frame in CATIA to guarantee the processing accuracy. Finally, set up the welding platform and welded the frame.

## **TEACHING EXPERIENCE**

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

## **PROFESSIONAL SKILLS**

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**Language Skills:** English (Fluent), Mandarin (Native)

**Programming Skills:** Python/ MATLAB /C

**Engineering software Skills:** CATIA / KULI / COMSOL / ANSYS / HYPERMESH