Xiangbei Liu

15 Thayer Dr, Hanover, NH 03755 xiangbei.liu.th@dartmouth.edu 949-307-7176 LinkedIn

OBJECTIVE

Machine learning researcher with a strong engineering background and broad expertise in machine learning, including generative models, natural language processing, and data-driven optimization, seeking a Machine Learning Engineer opportunity. Passionate about bridging cutting-edge research with real-world applications, delivering robust and scalable solutions for complex challenges.

EDUCATION

Dartmouth College, Ph.D. Candidate in Engineering — Aug 2022 – Expected Jun 2026
Awarded Dean's Fellowship (Thayer School of Engineering, Sept 2022) — Hanover, NH

University of California, San Diego (UCSD), M.S. in Mechanical Engineering — Sept 2020 - Aug 2022
GPA 3.88/4.0 — San Diego, CA

Dalian University of Technology (DUT), B.S. in Mechanical Engineering — Sept 2016 - Jun 2020
GPA 3.64/4.0, Graduated in the top 5% of the class — Dalian, China

SKILLS

Languages: Python, C++, C, SQL, JavaScript, MATLAB, APDL, R
Tools: PyTorch, Tensorflow, Git, Docker, CUDA, AWS, ANSYS, Abaqus, LabView, SolidWorks, AutoCAD, SLA, SEM, EDS

EXPERIENCE

Research Assistant, Thayer School of Engineering, Dartmouth College — Aug 2022 – Present

- Devising an NLP-inspired transformer model to predict material properties of high-entropy alloy (*Funded by Sandia*)
- Designed transfer learning strategies to accelerate metamaterial property calculations, achieving the same accuracy while using only **5% of the data**, and built a JavaScript-based web page to visualize the design
- Invented a few-shot learning-based variational autoencoder, effectively utilizing an extremely unbalanced dataset, leading to a **130-fold** increase in generative efficiency (*Funded by NSF*)
- Developed a genetic algorithm to optimize titanium processing parameters, improving mechanical properties **by 50%**
- Designed, prototyped, and 3D printed piezoelectric and thermoelectric materials and devices, achieving a **10× increase** in sensitivity and **66% higher** energy harvesting efficiency (*Funded by NASA*)

Research Assistant, Jacobs School of Engineering, UCSD — Sept 2020 – Aug 2022

- Devised a reconstruction-error-minimizing generative adversarial network for airfoil shape parameterization, achieving **over 20%** improvement in capturing the design space of real airfoils (*Funded by NASA*)
- Implemented a modified Sobolev-trained neural network to predict aerodynamic coefficients for airfoil designs, improving predictive accuracy **by 16%** compared to the benchmark model
- Collaborated on developing an open-source framework for non-matching isogeometric shell coupling, utilizing FEniCS on Linux and ensuring deployment compatibility with Docker
- Developed the API and implementation code for a Python-C++ integrated package of a parametrically-driven geometry modeler for generating unstructured meshes and streamlining the eVTOL design process (*Funded by NASA*)

Undergraduate Researcher, University of California, Irvine — Sept 2019 - June 2020
3+1 Study Abroad Program, GPA: 3.78/4.0

- Implemented real-time trajectory control and navigation algorithms for UAVs
- Conducted microfabrication and mechanical characterization of micro-resonators for semiconductor and MEMS applications

Undergraduate Researcher, School of Mechanical Engineering, DUT — Sept 2017 - Mar 2019

- Implemented a MATLAB backpropagation neural network to predict long-term population distribution geographical spread of speakers for ten languages; awarded *Honorable Mention in Interdisciplinary Contest in Modeling (USA)*
- Engineered a lightweight gantry for obstacle avoidance and target capture and programmed using an STM32 microcontroller; awarded *Second-class Prize in National College Mechanical Innovation Design Competition (China)*

SELECTED PUBLICATIONS *(Cited 56 times)*

Liu, X., Zhao, H., et al. (2024). Few-shot learning-based generative design of metamaterials with zero Poisson's ratio. Materials & Design, 113224.

Ruh, M. L., **Liu, X.**, et al. (2023). Airfoil shape parameterization using reconstruction-error-minimizing generative adversarial networks. In AIAA AVIATION 2023 Forum (p. 3722).

Zhao, H., **Liu, X.**, et al. (2022). An open-source framework for coupling non-matching isogeometric shells with application to aerospace structures. Computers & Mathematics with Applications, 111, 109-123.

COMMUNITY INVOLVEMENT

Vice President of Client Network & Outreach, *Dartmouth Graduate Consulting Group* — Sept 2023 – Present

- Developed a sustainable business model for an AI-clone video creation platform and expanded the client network

Manager and Coordinator, *Thayer Gear* — Sept 2022 – Present

- Managing B2B sales of branded merchandise to the Thayer School community and increased sales 10-fold