

Chonghao Qiu

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Pittsburgh, PA | Department of Computer Science | University of Pittsburgh

BIOGRAPHY

I am currently a second-year master's student in the Department of Computer Science at the University of Pittsburgh, advised by Prof. Xiaowei Jia. Prior to this, I earned my B.S. from the National Taipei University of Technology. My research interests are in data mining and machine learning, with a focus on applying knowledge-based methods to solve real-world problems that have significant social and ecological impacts

Currently applying for PhD programs for Fall 2025

EDUCATION

• University of Pittsburgh

Aug 2023 - May 2025

Master of Science in Computer Science

Pittsburgh, US

◦ GPA: 3.80/4.00

◦ Supervisor: [Prof. Xiaowei Jia](#) and [Dr. Runlong Yu](#)

◦ Relevant Courses: Data Mining, AI for Social Good(PhD level), Foundations of AI, NLP, Algorithm Design, Compiler Design, Wide Area Networks.

• National Taipei University of Technology

Sep 2019 - Jun 2023

Bachelor of Science in Electronic Engineering

Taipei, Taiwan

◦ GPA: 3.91/4.00

◦ Supervisor: [Prof. Lih-Jen Kau](#)

◦ Relevant Courses: Database System, Software Security & Reverse Engineering, OS, Image and Video Compression, Digital Image Processing, Computer Networks, Machine Learning, Signals and Systems, Electromagnetics, Electronics, Engineering Mathematics, Probability, Linear Algebra.

PUBLICATIONS

S=IN SUBMISSION, C=CONFERENCE

[S.1] Runlong Yu, **Chonghao Qiu**(first student author), Robert Ladwig, Paul Hanson, Yiqun Xie, Xiaowei Jia (2024). [Physics-Guided Foundation Model for Scientific Discovery: An Application to Aquatic Science](#)

[C.1] Runlong Yu, **Chonghao Qiu**(first student author), Robert Ladwig, Paul Hanson, Yiqun Xie, Yanhua Li, and Xiaowei Jia (2024). [Adaptive Process-Guided Learning: An Application in Predicting Lake DO Concentrations](#) ICDM 2024, Abu Dhabi, December 2024

[C.1] Tao Chen, Yongjie Yang, **Chonghao Qiu**, Xiaoran Fan, Xiuzhen Guo, Longfei Shangguan (2024). [Enabling Hands-Free Voice Assistant Activation on Earphones](#) MobiSys 2024, Tokyo, Japan, June 2024

PROFESSIONAL EXPERIENCE

• Research Assistant - University of Pittsburgh

Jun 2024 - Present

Advisor: Prof. Xiaowei Jia and Dr. Runlong Yu

Pittsburgh, US

◦ Developed algorithms to integrate physics-guided relationships into machine learning and deep learning models for simulating dynamical systems.

• Research Assistant - University of Pittsburgh

Jan 2024 - Jun 2024

Advisor: Prof. Longfei Shangguan

Pittsburgh, US

◦ Worked on the software and hardware development of wearable mobile devices for health applications.

• Research Assistant - National Taipei University of Technology

May 2022 - Feb 2023

Advisor: Prof. Lih-Jen Kau

Taipei, Taiwan

◦ Developed a smart mouse that can measure physiological parameters such as body temperature and heart rate.

• China United Network Communications Group



Jul 2021 - Aug 2021

Software Engineering Intern

Jiaxing, China

◦ Composed APIs and conducted corresponding online unit tests. Designed and maintained the user management system for the security center and the backend management platform.

SELECTED PROJECTS

- **Physics-Guided Foundation Model for Scientific Discovery: An Application to Aquatic Science** May 2024 - Aug 2024
Index Terms: foundation model, feature interaction, physics-guided learning, knowledge integration, ecosystem modeling.
 - Proposed a Physics-Guided Foundation Model combining pre-trained machine learning models and physics-based models, leveraging their complementary strengths to enhance the modeling of multiple coupled processes.
 - Constructed a simulated environmental system for the pre-training phase, incorporating a wide range of influential features and various simulated variables generated by physics-based models. The model is pre-trained in this system to adaptively select important feature interactions, guided by multi-task objectives.
 - Utilized an embedding layer to convert input phenological features into a series of multi-field feature embeddings, facilitating feature interactions. Through these embeddings, evolution-based feature selection is formally described as identifying the most informative feature interactions to improve the prediction of target objectives.
- **Adaptive Process-Guided Learning: An Application in Predicting Lake DO Concentrations** Jan 2024 - Jun 2024
Index Terms: physics-guided learning, knowledge integration, adaptive learning, ecosystem modeling. 
 - Proposed a Process-Guided Learning (Pril) framework that integrates physical models with recurrent neural networks (RNNs) to improve the prediction of dissolved oxygen (DO) concentrations in lakes, which is crucial for sustaining water quality and ecosystem health.
 - Developed a physics-based loss function that incorporates daily oxygen mass variance for both well-mixed and stratified lake conditions, integrating domain-specific constraints from aquatic ecosystem dynamics into the model.
 - Designed a generator-discriminator framework with adaptive timestep adjustments to address large day-to-day fluctuations in stratified conditions. The generator captures rapid variations, while the discriminator ensures predictions align with physical characteristics, enhancing stability and accuracy.
- **Enabling Hands-Free Voice Assistant Activation on Earphones** Aug 2023 - Apr 2024
Index Terms: ubiquitous and mobile devices, emerging technologies.
 - Designed and implemented EarVoice, a lightweight mobile service that enables hands-free voice assistant activation on commodity earphones.
 - Conducted extensive experiments with 23 participants in both controlled and uncontrolled environments.
 - Developed firmware for a 4-layer PCB using the low-power ESP32 MCU, achieving low power consumption and high-speed performance to meet design specifications.
- **Physiological Monitoring Intelligent Computer Mouse** May 2022 - Sep 2022
Index Terms: mobile devices, embedded system, health. 
 - Designed a smart mouse capable of measuring physiological parameters such as body temperature and heart rate, and developed its supporting Windows desktop software using Windows Presentation Foundation (WPF).
 - Developed a sensor board equipped with MAX30205, BME280, and MAXM81616 sensors to retrieve raw physiological data and communicate with the main board via the I2C protocol.
 - Applied filtering and standardization to the original photoplethysmography (PPG) signal using a Butterworth IIR filter and a moving average to calculate blood oxygen saturation and heart rate.

HONORS & AWARDS

- Undergraduate Dean's List Award for Fall 2019, Fall 2020, Spring 2021, and Spring 2022 (Top 1%)
- Outstanding Undergraduate Student Award 2023 (Top 1 in class)
- First Place in Graduation Project Exhibition 2023

SKILLS & OTHERS

- **Programming Languages:** Python, JavaSE, C, C#, SQL, MATLAB, JavaScript.
- **Tools:** PyTorch, TensorFlow, Linux, AWS, Keil5, SpringBoot, Windows Presentation Foundation, Vue.js, Git.
- **Volunteer Work:** I am a registered volunteer in Taipei City, where I teach basic subjects to primary and secondary school students, organize companionship activities for left-behind children, and provide services at elderly care centers through community welfare organizations.
- **Interests:** Music, Electric Guitar, Table Tennis, Fitness.