Kerui Wu

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Education

University of Massachusetts Amherst (UMass) **Sept. 2025 – Present**
***Ph.D** in Computer Science* *Masshachusetts, USA*

- Advised by Professor **Mingda Qiao**
- **Research Focus**: Learning Theory, Trustworthy ML

Rensselaer Polytechnic Institute (RPI) **Sept. 2021 – May 2025**
***Bachelor of Science** in Computer Science; GPA: 3.76/4.0* *New York, USA*

- **Undergraduate Honors**: Magna Cum Claude
- **Dean's Honor List** 2021 - 2025
- **Membership** in IT & Web Science Honor Society
- **Research Focus**: Trustworthy ML, AI for Science, Dynamic Network

Publication

On the Adversarial Robustness of Graph Neural Networks with Graph Reduction
***Kerui Wu**, Ka-Ho Chow, Wenqi Wei, Lei Yu*

- Accepted by **ESORICS 2025** (acceptance rate: 16%) — **Oral**

Large EEG-U-Transformer for Time-Step-level Detection without Pre-Training
***Kerui Wu**, Ziyue Zhao, Bülent Yener*

- Under review in **ICLR 2026**

On the Robustness of Graph Reduction Against GNN Backdoor
*Yuxuan Zhu, Michael Mandulak, **Kerui Wu**, George Slota, Yuseok Jeon, Ka-Ho Chow, Lei Yu*

- Accepted by **AISec'24 CCS 2024** (acceptance rate: 25%)

Computing equilibria in complex systems with billions of interactions
*Yanna Ding, **Kerui Wu**, Yadi Cao, Malik Magdon-Ismail, Jianxi Gao*

- Under review in **Physics Review E**

Research Experience

Representation Learning on Electroencephalography(EEG) Data **May 2024 - May 2025**
Advisor: Bulent Yener (Professor) ***Project Leader***

- Propose a representation learning strategy at the time-step level, which eliminates redundant overlapping inference, achieving a 10-fold runtime improvement in event-centric tasks like Seizure detection.
- Propose a novel neural network architecture for such a time-step level representation learning, which consistently outperformed the most recent baselines, including large foundation models, in various tasks by solely using the downstream datasets.
- Won the **1st place** in the *2025 Seizure Detection Challenge* organized in the International Conference on Artificial Intelligence in Epilepsy and Other Neurological Disorders.

Robustness of Graph Reduction Against GNN Poisoning **Jan. 2024 - May 2025**
Advisors: Lei Yu (Assistant Professor) ***Project Leader***

- Empirically studied the impact of graph reduction algorithms like coarsening and sparsification on the robustness of GNN against state-of-the-art poisoning, evasion, and backdoor attacks.
- Implemented six coarsening and six sparsification methods across six GNN architectures to assess their influence in various poisoning and backdoor attacks.
- Visualized clean accuracy and attack success rates under varying hyperparameters and comprehensively analyzed experimental results to interpret the interplay between graph reduction techniques and GNN security.

Efficient Steady-State Solver for Dynamical Complex Networks **Jan. 2024 - May 2025**
Advisor: Jianxi Gao (Associate Professor), Yanna Ding (PhD candidate) ***Collaborator***

- Combined Mean-Filed Approach with a perturbation-based method to efficiently compute steady states in large-scale dynamical systems with precision guaranteed.
- Implemented experiment in large dynamic networks with billions of nodes with four dynamic ODEs.
- Systematically evaluated solver's performance on different typologies like Erdős–Rényi and Scale-Free networks with different degree density and heterogeneity settings.

Work Experience

Full-Stack Developer, Submitty Open Source **Jan. 2023 – May 2023**
Advisors: Barb Cutler (Associate Professor) *New York, USA*

- Submitty is an open-source course management, assignment submission, exam, and grading system, which is widely used by multiple colleges like RPI.
- Led the design and development of comprehensive full-stack features, including integrating customizable pronoun settings. This involved front-end development using HTML and JavaScript, backend API creation with PHP, and database schema design using SQL.
- Engineered and executed unit tests to ensure feature reliability, leveraging Cypress for testing automation and implementing continuous integration via GitHub workflows.
- Proactively identified, documented, and resolved software bugs, significantly improving system stability and user experience.

Computer Science Mentor, Rensselaer Polytechnic Institute **Sept. 2022 – May 2025**
Advisors: Shianne Hulbert (Instructional Support Coordinator) *New York, USA*

- Conducted regular office hours, providing one-on-one and group mentoring to assist students in overcoming challenges in their assignments and lab work.
- Facilitated lab sessions, guiding students through problem-solving processes, verifying solutions, and ensuring they grasped key concepts necessary for academic success.

Technical Contribution

China Construction Bank Achievement System | *React.JS, Go, MySQL, Azure* **Jan. 2024**

- Developed a web application for China Construction Bank (CCB) employees to submit their daily achievements, utilizing UI frameworks like MUI. The app is currently in use across 11 bank branches.
- Created a combined web app for administrators to check each employee's daily score, where a table with comprehensive query functional backend APIs, like filter and sort by job positions and bank locations, was provided.
- Create secure signup and login Restful API functions with the use of SHA256 encryption and JWT.
- Deploy the website, including the backend framework and database management system to Microsoft Azure and use workflow scripts in Github to automate such process.

NASA Data Visualization | *React.JS, Express.JS, MongoDB* **May 2023**

- Developed a visualization app for NASA's research on the impact of wind energy on energy production as part of a Web Science System term project.
- Designed and implemented a user-friendly web application using the React framework, enabling intuitive data visualization for complex datasets related to wind energy.
- Engineered and deployed RESTful APIs using Express.js, allowing third-party developers to seamlessly integrate with the system and access the visualization data.

Award & Certificate

CICS Donor-Funded Scholarships **Sept. 2025**
Manning College of Information & Computer Sciences at UMass Amherst

1st Place in Seizure Detection Challenge **Mar. 2025**
2025 International Conference on AI in Epilepsy and Other Neurological Disorders

Neural Network and Deep Learning **Mar. 2024**
DeepLearning.AI

Certified in CyberSecurity (CC) **May 2023**
ISC^2 (International Information System Security Certification Consortium)

Professional Skills

- **Machine Learning & Numerical Computing**: Pytorch, Torch-Geometric, Numpy, Scipy, SKLearn
- **Programming**: Python, C/C++, Javascript, PHP, Go, React.JS, Express.JS, jQuery, R
- **Database**: MySQL, PostgreSQL, MicrosoftSQL, MongoDB
- **Tool**: Ubuntu, KaliLinux, Azure, Git(Hub), NeoVIM
- **Personal Interest**: Fishing, Running, Badminton, Music Production, Go(chess game)