

Ron (Rongyu) Lin, Ph.D., MBA

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RESEARCH SUMMARY

I focus on developing intelligent systems for scientific discovery and engineering optimization, particularly in semiconductor design, by addressing challenges at three interconnected levels: Multi-modal and Multi-agent Interactive Learning (Framework Level), Multi-fidelity Knowledge Integration (Method Level), and Human-Machine Interactive Systems (Application Level).

1. Multi-modal and Multi-agent Interactive Learning: Developing frameworks that enable effective integration of diverse data modalities and learning agents for scientific discovery.

- ❑ Multi-modal Alignment & Fusion
- ❑ Mixture-of-Experts Systems
- ❑ Cross-modal Knowledge Integration
- ❑ Active Learning

2. Multi-fidelity Knowledge Integration: Creating methods to bridge different scales of physical modeling and integrate diverse data for efficient exploration of complex design spaces.

- ❑ Physics-informed Neural Networks
- ❑ Multi-scale Optimization
- ❑ Surrogate Modeling
- ❑ First-principles Calculations
- ❑ Technology Computer-Aided Design

3. Human-Machine Interactive Systems: Building systems that seamlessly integrate domain expertise with AI for accelerated scientific discovery and engineering optimization.

- ❑ Expert-guided Learning
- ❑ Preference Optimization
- ❑ Uncertainty Quantification
- ❑ Interactive Knowledge-driven Design
- ❑ Interpretable AI Decision Pathways

EDUCATION

Doctor of Philosophy in Electrical and Computer Engineering

King Abdullah University of Science and Technology, Thuwal, Saudi Arabia | 08/2018 - 12/2022

Dissertation: Wide Bandgap Semiconductor Device Design via Machine Learning

Supervisor: Prof. Xiaohang Li; Co-Supervisor: Prof. Xiangliang Zhang

Master of Business Administration (Data Science and Business Analytics Concentration)

Santa Clara University, Santa Clara, United States | 08/2020 - 03/2023

Bachelor of Science in Physics

Southern University of Science and Technology, Shenzhen, China | 09/2013 - 07/2017

Doctor of Education Student (Part-time)

Johns Hopkins University, Baltimore, United States | 08/2023 - present

Research Topic: Application of AI-Generated Content (AIGC) in Education

PROFESSIONAL EXPERIENCES

Assistant Professor

School of Computing & Engineering, Quinnipiac University, Connecticut, USA | August 2024 – Present

Visiting Assistant Professor

Department of Computer Science, Clark University, Massachusetts, USA | August 2024 – August 2025

Principal Data Scientist

Capital One Financial Corporation, Texas, USA | January 2023 - August 2024

Ph.D. Data Scientist Intern

Capital One Financial Corporation, Texas, USA | June 2022 - August 2022

Research Intern

Physical Science and Engineering Division, King Abdullah University of Science and Technology, Saudi Arabia | February 2017 - May 2017

JOURNAL PUBLICATIONS

*** Corresponding Author**

1. Toral Banerjee, **Rongyu Lin***, Mengyuan Shi " Don't train medical AI on patients' data without their knowledge" ***Nature 644.8075 (2025): 42.***
2. Yuan Yan, Yimu Yang, Yinchang Ma, Kadin Reed, Shengzhi Li, Zhenwen Liang, Yi Wan, Xiangliang Zhang and **Rongyu Lin*** " Machine Learning for 2D Material-Based Devices." ***Materials Science and Engineering: R: Reports, accepted.***
3. **Rongyu Lin**, Shengzhi Li, and Xiangliang Zhang." ALIGN4DR: Augmented LLM Integration in Graph Neural Networks for Drug Recommendation." ***in preparation.***
4. **Rongyu Lin**, Zhiyuan Liu, Xinyi Yan, Xiangliang Zhang and Xiaohang Li. " A systematic study on asymmetric AlGaIn graded tunnel junction by the machine learning framework " ***in preparation.***
5. Shengzhi Li, **Rongyu Lin**, Xiangliang Zhang and Shichao Pei. "Multi-modal preference alignment remedies degradation of visual instruction tuning on language models." *Proceedings of the 62nd Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers).* 2024.
6. Zhiyuan Liu, Yi Lu, Haicheng Cao, Raul Aguilera Vazquez, Rongyu Lin, Na Xiao, Xiao Tang, Mingtao Nong, Shutu Li, Tingang Liu, and Xiaohang Li" Multi-wavelength and broadband AlGaIn-based LED for versatile and artificial UV light source." ***Micro and***

Nanostructures (2024): 207755.

7. Yinchang Ma, Yuan Yan, Linqi Luo, Sebastian Pazos, Chenhui Zhang, Xiang Lv, Maolin Chen, Chen Liu, Yizhou Wang, Aitian Chen, Yan Li, Dongxing Zheng, **Rongyu Lin**, Hanin Algaidi, Minglei Sun, Jefferson Zhe Liu, Shaobo Tu, Husam N Alshareef, Cheng Gong, Mario Lanza, Fei Xue, Xixiang Zhang. "High-performance van der Waals antiferroelectric CuCrP2S6-based memristors." **Nature Communications** 14, no. 1 (2023): 7891.
8. Chuanju Wang, Feras AlQatari, Vishal Khandelwal, **Rongyu Lin**, and Xiaohang Li. "Origin of interfacial charges of Al2O3/Si and Al2O3/GaN heterogeneous heterostructures." **Applied Surface Science** 608 (2023): 155099.
9. Xiao Tang, Yi Lu, **Rongyu Lin**, Che-Hao Liao, Yue Zhao, Kuang-Hui Li, Na Xiao, Haicheng Cao, Wedyan Babatain, and Xiaohang Li. "Flexible self-powered DUV photodetectors with high responsivity utilizing Ga2O3/NiO heterostructure on buffered Hastelloy substrates." **Applied Physics Letters** 122, no. 12 (2023).
10. **Rongyu Lin**, Zhiyuan Liu, Peng Han, Ronghui Lin, Yi Lu, Haicheng Cao, Xiao Tang et al. "A machine learning study on superlattice electron blocking layer design for AlGaIn deep ultraviolet light-emitting diodes using the stacked XGBoost/LightGBM algorithm." **Journal of Materials Chemistry C** 10, no. 46 (2022): 17602-17610.
11. **Rongyu Lin**, Peng Han, Yue Wang, Ronghui Lin, Yi Lu, Zhiyuan Liu, Xiangliang Zhang, and Xiaohang Li. "Low Resistance Asymmetric III-Nitride Tunnel Junctions Designed by Machine Learning." **Nanomaterials** 11, no. 10 (2021): 2466.
12. Wen Gu, Yi Lu, **Rongyu Lin**, Wenzhe Guo, Zihui Zhang, Jae-Hyun Ryou, Jianchang Yan, Junxi Wang, Jinmin Li, and Xiaohang Li. "BAlN for III-nitride UV light-emitting diodes: undoped electron blocking layer." **Journal of Physics D: Applied Physics** 54, no. 17 (2021): 175104.
13. Zhiyuan Liu, Yi Lu, Yue Wang, **Rongyu Lin**, Chenxin Xiong, and Xiaohang Li. "Polarization modulation at last quantum barrier for high efficiency AlGaIn-based UV LED." **IEEE Photonics Journal** 14, no. 1 (2021): 1-8.
14. Maocheng Shan, Yi Zhang, Ming Tian, **Rongyu Lin**, Jie'an Jiang, Zhihua Zheng, Yongming Zhao et al. "Transverse Electric Lasing at a Record Short Wavelength 244.63 nm from GaN Quantum Wells with Weak Exciton Localization." **ACS Photonics** 8, no. 5 (2021): 1264- 1270.
15. Xiao Tang, Kuang-Hui Li, Che-Hao Liao, Dongxing Zheng, Chen Liu, **Rongyu Lin**, Na Xiao, Shibin Krishna, Jose Tauboda, and Xiaohang Li. "Epitaxial growth of β -Ga₂O₃ (– 201) thin film on four-fold symmetry CeO₂ (001) substrate for heterogeneous integrations." **Journal of Materials Chemistry C** 9, no. 44 (2021): 15868-15876.
16. Xiao Tang, Kuang-Hui Li, Yue Zhao, Yanxin Sui, Huili Liang, Zeng Liu, Che-Hao Liao

Wedyan Babatain, **Rongyu Lin**, Chuanju Wang, Yi Lu, Feras S. Alqatari, Zengxia Mei, Weihua Tang, Xiaohang Li. "Quasi-Epitaxial Growth of β -Ga₂O₃-Coated Wide Band Gap Semiconductor Tape for Flexible UV Photodetectors." **ACS Applied Materials & Interfaces** 14, no. 1 (2021):1304-1314.

17. **Rongyu Lin**, Xinwei Liu, Kaikai Liu, Yi Lu, Xinke Liu, and Xiaohang Li. "BAIN alloy for enhanced two-dimensional electron gas characteristics of GaN/AlGaIn heterostructures." **Journal of Physics D: Applied Physics** 53, no. 48 (2020): 48LT01.

CONFERENCE PRESENTATIONS

1. **Rongyu Lin**, Zhiyuan, Peng Han, Ronghui Lin, Yi Lu, Che-Hao Liao, Haicheng Cao, Xiangliang Zhang and Xiaohang Li "A machine learning study on superlattice electron blocking layer design for AlGaIn deep ultraviolet light-emitting diodes using the stacked XGBoost/LightGBM algorithm," IWUND 2023, Metz, France, June. 2023
2. **Rongyu Lin**, Zhiyuan, Peng Han, Ronghui Lin, Yi Lu, Che-Hao Liao, Haicheng Cao, Xiangliang Zhang and Xiaohang Li "Machine learning design for UVC light-emitting diodes by stacked XGBoost/LightGBM," IWN 2022, Berlin, Germany, Oct. 2022
3. **Rongyu Lin**, Peng Han, Yue Wang, Chenxin Xiong, Yi Lu, Xiangliang Zhang and Xiaohang Li "Low resistance III-nitride tunnel junction design based on machine learning," SPIE Photonics West, San Francisco, United States, Feb. 2020
4. **Rongyu Lin**, Xinwei Liu, Kaikai Liu, Yi Lu, Xinke Liu and Xiaohang Li "AlGaIn/GaN Heterostructure Field-Effect Transistor with BAIN interlayer," SPIE Photonics West, San Francisco, United States, Feb. 2020
5. Wen Gu, Yi Lu, **Rongyu Lin**, Wenzhe Guo, Jianchang Yan, Junxi Wang, Jinmin Li and Xiaohang Li, "High-performance UV LED with an undoped BAIN EBL," SPIE Photonics West, San Francisco, United States, Feb. 2020
6. Chenxin Xiong, Yi Lu, Dongjun Qu, Xiangliang Zhang, **Rongyu Lin** and Xiaohang Li, "Quantum well prediction for III-nitride based deep-UV optoelectronics using machine learning," SPIE Photonics West, San Francisco, United States, Feb. 2020

TEACHING EXPERIENCES

Courses

08/2024 - present

Courses Instructor, *Department of Computer Science, Clark University, Worcester, Massachusetts, USA.*

- CSCI 120: Introduction to Computing (Fall 2024 & Spring 2025)
- CSCI 160: Algorithms (Fall 2024 & Spring 2025)

01/2019 - 05/2019

Graduate Teaching Assistant, *Department of Electrical and Computer Engineering, King Abdullah University of Science and Technology, Thuwal, Makkah, Saudi Arabia.*

- ECE390B: Special Topics in Photonics

Mentorships

Graduate Students

Carol Chu – Graduate Research Assistant, Clark University

- *Focus:* Exploring how large language models (LLMs) simulate human social, psychological, and behavioral patterns, including commercial interactions.

Undergraduate Students

Kadin Reed – Undergraduate Research Assistant, Clark University

- *Focus:* Research in AI4Engineering, applying advanced machine learning techniques to engineering challenges.

Kendall Lisa Codjoe – Undergraduate Research Assistant, Clark University

- *Focus:* Research in AI4Engineering, with emphasis on interdisciplinary collaboration.

Branson Witt, Alexander Vu, Sai Chanda, and Aryadeep Ray – Members of the Data Science Collaboration Club (DSCO), Clark University

- *Focus:* Mentoring in Kaggle competitions, with emphasis on practical applications of data science and machine learning.

Research Interns

Haiyang Liu – Remote Research Intern

- *Focus:* Co-mentoring on multimodal LLM applications in collaboration with Prof. Shichao Pei from UMass Boston.

PROFESSIONAL SERVICES

Reviewers for International Journals:

Transactions on Computational Science – Springer

Applied Intelligence – Springer

Journal of Ambient Intelligence and Humanized Computing – Springer

Journal of Materials Science – Springer

Journal of Automation and Intelligence – Elsevier
Computers and Education: Artificial Intelligence – Elsevier
Sustainable Computing: Informatics and Systems – Elsevier
Engineering Applications of Artificial Intelligence – Elsevier
Micro and Nano Structures – Elsevier
Optics and Laser Technology – Elsevier
Optik – Elsevier
Transactions on Sensor Networks – ACM
IEEE/ACM Transactions on Computational Biology and Bioinformatics – IEEE/ACM
IEEE Transactions on Fuzzy Systems – IEEE
IEEE Transactions on Consumer Electronics – IEEE
Advances in Civil Engineering – Hindawi (Wiley)
International Journal of Image and Graphics – World Scientific
Photonics – MDPI
Sensors – MDPI
Electronics – MDPI
Micromachines – MDPI
Applied Sciences – MDPI
Semiconductor Science and Technology – IOP
Smart Materials and Structures – IOP
Journal of Physics D: Applied Physics – IOP
Journal of Physics: Communications – IOP
Physica Scripta - IOP

Committee Service:

Technical Committee Member – ICMRE 2024 (The 10th International Conference on Mechatronics and Robotics Engineering) - Milan, Italy | IEEE Conference List

HONORS AND AWARDS

Merit-based Scholarship, Johns Hopkins University (2023)
Merit-based Scholarship, Santa Clara University (2020)
Full scholarship for MS/PhD study, KAUST (2018-2022)
Summa Cum Laude Graduate, SUSTech - 1 out of 42 in Physics Department (2017)
SUSTech Outstanding Student Scholarship (2016)
Start-up and Innovative Full Scholarship from SUSTech (2013-2016)
Physics experiment design competition, Guangdong Province, First Prize (2014)

SOCIAL CONTRIBUTION AND LEADERSHIP

Alumni representative of SUSTech (2018 till present)
President of Student Union of SUSTech (2014 – 2015)

LANGUAGE

English – Master level in oral and in written

Chinese (Mandarin/Hokkien) – Native