

# Zhirui Luo

National Cancer Institute  
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## EDUCATION

- Ph.D. CSE, New Mexico Institute of Mining and Technology, Socorro, USA, 2020-2024
- M.S. CSE, New Mexico Institute of Mining and Technology, Socorro, USA, 2018-2020
- B.S. CSE, New Mexico Institute of Mining and Technology, Socorro, USA, 2015-2017
- B.E. Software Engineering, Yangtze University, Jingzhou, China, 2012-2015

## APPOINTMENTS

- 2024– National Institutes of Health  
Postdoctoral Fellow, National Cancer Institute

## RESEARCH AREAS

Cancer Data Science and Computational Pathology: spatial modeling of WSI, AI for cancer research

Smart meter: building occupancy detection, socio-demographic info identification, energy theft detection, and load monitoring

Social computation: multi-modal language model method for rumor detection on social media

Computer Vision: plant leaf diseases detection and neural adversarial attack & detection

Biomedical data analytics: sEMG-based hand gesture recognition and user authentication, EEG-based driving fatigue detection

## PUBLICATIONS

### Journal Articles

- 2025 **Luo, Z.**, Li, Q., Qi, R., Zheng, J., “Designing Channel Attention Fully Convolutional Networks with Neural Architecture Search for Customer Socio-Demographic Information Identification Using Smart Meter Data.” In: *AI* 6.1 (2025). ISSN: 2673-2688. DOI: 10.3390/ai6010009
- 2024 Li, Q., **Luo, Z.**, Qi, R., Zheng, J., “Automatic Searching of Lightweight and High-Performing CNN Architectures for EEG-based Driving Fatigue Detection.” In: *IEEE Transactions on Instrumentation and Measurement* (2024)
- 2024 Nichols, T., Zemlanicky, J., **Luo, Z.**, Li, Q., Zheng, J., “Image-based PDF Malware Detection Using Pre-trained Deep Neural Networks.” In: *2024 12th International Symposium on Digital Forensics and Security (ISDFS)*. IEEE. 2024, pp. 1–5

- 2024 **Luo, Z.** “Deep Learning Methods for Smart Meter Data Analytics and Applications.” PhD thesis. New Mexico Institute of Mining and Technology, 2024
- 2023 Qi, R., Li, Q., **Luo, Z.**, Zheng, J., Shao, S., “Deep semi-supervised electricity theft detection in AMI for sustainable and secure smart grids.” In: *Sustainable Energy, Grids and Networks* 36 (2023), p. 101219. ISSN: 2352-4677. DOI: <https://doi.org/10.1016/j.segan.2023.101219>
- 2023 Li, Q., **Luo, Z.**, Qi, R., Zheng, J., “Deep TPA-Net: A Deep Triple Attention Network for sEMG-Based Hand Gesture Recognition.” In: *IEEE Access* 11 (2023), pp. 96797–96807. DOI: 10.1109/ACCESS.2023.3312219
- 2022 Li, Q., **Luo, Z.**, Zheng, J., “A New Deep Anomaly Detection-Based Method for User Authentication Using Multichannel Surface EMG Signals of Hand Gestures.” In: *IEEE Transactions on Instrumentation and Measurement* 71 (2022), pp. 1–11
- 2022 Qi, R., Zheng, J., **Luo, Z.**, Li, Q., “A Novel Unsupervised Data-Driven Method for Electricity Theft Detection in AMI Using Observer Meters.” In: *IEEE Transactions on Instrumentation and Measurement* 71 (2022), pp. 1–10
- 2021 **Luo, Z.**, Li, Q., Zheng, J., “Deep Feature Fusion for Rumor Detection on Twitter.” In: *IEEE Access* 9 (2021), pp. 126065–126074
- 2021 **Luo, Z.**, Li, Q., Zheng, J., “A Study of Adversarial Attacks and Detection on Deep Learning-Based Plant Disease Identification.” In: *Applied Sciences* 11.4 (2021), p. 1878
- 2018 Zamani, N., **Luo, Z.**, Pourkand, A., Salas, C., Mercer, D., Grow, D. I., “Patterns in bone drilling performance before and after the 2017 motors skills course of the southwest orthopaedic trauma association.” In: *UNM Orthopaedic Research Journal* 7.1 (2018), p. 23
- 2015 Li, W., Song, W., Zou, J., **Luo, Z.**, Peng, W., “Research and Implementation of 3D Horizontal Well Track Visualization Based on C#.” In: *Journal of Hubei University of Technology* 30 (1 2015), pp. 23–24

### Conference Proceedings

- 2022 **Luo, Z.**, Qi, R., Li, Q., Zheng, J., Shao, S., “ABODE-Net: An Attention-based Deep Learning Model for Non-intrusive Building Occupancy Detection Using Smart Meter Data.” In: *The 7th International Conference on Smart Computing and Communication (SmartCom 2022)*. New York, USA, 2022
- 2021 Li, Q., **Luo, Z.**, Zheng, J., “Deep Learning-based User Authentication with Surface EMG Images of Hand Gestures.” In: *2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*. IEEE. 2021, pp. 2038–2041

### CONFERENCE ACTIVITY

- 2022 The 7th International Conference on Smart Computing and Communication (SmartCom 2022), New York, USA
- 2022 NSF EPSCoR Workshop on Artificial Intelligence & No-Boundary Thinking, Little Rock, Arkansas

## **AWARDS**

### **Awards and Honors**

- 2022 Best Student Paper Award, SmartCom2022
- 2022 First Place Graduate Poster Award, New Mexico Research Symposium (NMRS)
- 2022 First Place Poster Winner, NM SMART Grid Center All Hands Meeting
- 2022 Second Place Graduate Poster Award, NMT Student Research Symposium

## **TEACHING**

- 2022 Summer Introductory-level Python course, Upward Bound Math and Science
- 2020-2022 Compiler Writing Lab
- 2018-2022 Teaching Assistant: Computer Network, Operating System,

## **SERVICE**

### **Academic Journal and Conference Peer Review**

- IEEE Wireless Communications and Networking Conference (WCNC)
- Scientific Reports
- Knowledge-Based Systems
- PeerJ Computer Science
- Journal of King Saud University - Computer and Information Sciences
- The 36th ACM/SIGAPP Symposium On Applied Computing

## **RESEARCH LABS AND ASSISTANTSHIP**

- 2020-Now Research assistant at Human-Centered Computing and Security Lab, NMT
- 2019-2021 Graduate Assistant for REU in Cybersecurity, NMT
- 2018-2020 Research assistant at Sensor Security, Neural Network Lab, NMT
- 2017 Summer Research assistant on optimization of twice-differentiable non-convex function
- 2016-2017 Robotics Lab Research, NMT

## **CERTIFICATES**

- 2022 Intel AI Analytics Toolkit Workshop
- 2014 IBM Academic Initiative Senior Software Development Engineer

## **PROFESSIONAL EMPLOYMENT**

- 2018 C++ Development, Zhejiang Guozi Robotics, Hangzhou, China

## **SKILLS**

Programming	Python, C/C++, C#, Java, LaTeX, Matlab, R
Web	Flask, Bootstrap
Deep Learning	PyTorch, TensorFlow
Visualization	Matplotlib, ggplot, Gephi, OpenCV