

Zhirui Luo

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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., “DeepTPA-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