

Short CV of Liang He

CONTACT INFORMATION	<i>E-mail:</i> lhe20@unl.edu <i>Linkedin:</i> https://www.linkedin.com/in/liang-he-ab430333/
EDUCATION	Nankai University , Tianjin, P.R. China Ph.D. in Computer Science and Engineering, 12/2011
ACADEMIC APPOINTMENTS	Associate Professor , 08/2024 to present School of Computing University of Nebraska Lincoln, NE, USA Assistant Professor , 09/2017 to 08/2024 Department of Computer Science and Engineering University of Colorado Denver, CO, USA Research Fellow , 2015 to 2017 Department of Electrical Engineering and Computer Science (with Prof. Kang G. Shin) University of Michigan at Ann Arbor, MI, USA Research Scientist , 2012 to 2014 Pillar of Information System Technology and Design (with Dr. Yu Gu) Singapore University of Technology and Design, Singapore Research Assistant , 2009 to 2011 Department of Computer Science and Engineering (with Prof. Jianping Pan) University of Victoria, BC, Canada
RESEARCH INTERESTS	Cyber-physical systems and internet-of-things with applications to batteries, vehicles, and manufacturing systems.
ENTREPRENEUR- SHIP	Co-founder of Batteries Beyond Batteries
HONORS AND AWARDS	<ul style="list-style-type: none">• Citation: 2,785; H-index: 25; i-10 index: 42 (Google Scholar, 02/2024)• Early Career Award for Excellence in Research, CEDC@CU-Denver, 2024.• Best paper candidate of ACM e-Energy'23, 2023.• University nominee for the Blavatnik National Awards for Young Scientists, 2021• Winner of Lab Venture Challenge, Colorado State, 2021• Lewis Family Innovation Award, CU-Denver, 2021• Inclusive Pedagogy Academy, CU-Denver, 2021• 1 paper highlighted in ACM GetMobile as top picks in the SIGMOBILE area, 2021• Young Upwardly Mobile Professor Award, CU-Denver, 2020• ACUE Certificate on Effective Teaching, 2020• CRC Fellowship, CU-Denver, 2020• CMTC Fellowship, CU-Denver, 2018

- Best Poster Award, ACM MobiSys'17, 2017

SELECTED PUBLICATIONS

- P-1.** Hojun Choi and **Liang He**, RheelPower: Advancing Automotive IoT via Non-Invasive Power Generation from Rotating Vehicle Wheels, in *The 26th International Workshop on Mobile Computing Systems and Applications (HotMobile'25)*, 2025.
- P-2.** Zeyu Yang*, **Liang He**, Yucheng Ruan, Peng Cheng, and Jiming Chen, Unveiling Physical Semantics of PLC Variables Using Control Invariants, *IEEE Transactions on Dependable and Secure Computing (IEEE TDSC)*, 2024.
- P-3.** Zeyu Yang*, Hongyi Pu*, **Liang He**, Chengtao Yao, Jianying Zhou, Peng Cheng, and Jiming Chen, Deception-Resistant Stochastic Manufacturing for Automated Production Lines, in *The 27th International Symposium on Research in Attacks, Intrusions and Defenses (RAID'24)*, 2024.
- P-4.** Zeyu Yang*, **Liang He**, Peng Cheng, and Jiming Chen, Mismatched Control and Monitoring Frequencies: Vulnerability, Attack, and Mitigation, *IEEE Transactions on Dependable and Secure Computing (IEEE TDSC)*, 2024.
- P-5.** **Liang He** and Kang G. Shin, Rethink Physical Security: Protecting Vehicles via Battery-enabled Sensing and Control, *Proceedings of the IEEE (P-IEEE)*, 2023.
- P-6.** Zeyu Yang*, **Liang He**, Yu Hua, Chengcheng Zhao, Peng Cheng, and Jiming Chen, Reverse Engineering Physical Semantics of PLC Program Variables Using Control Invariants, in *The 20th ACM Conference on Embedded Networked Sensor Systems (ACM SenSys'22)*, 2022.
- P-7.** **Liang He** and Kang Shin, Battery-Enabled Anti-Theft Vehicle Immobilizer, in *The 20th ACM International Conference on Mobile Systems, Applications, and Services (ACM MobiSys'22)*, 2022.
- P-8.** John Pace, Jubilee Rao, Jesse Williams, and **Liang He**, Unsupervised Anomaly Detection using Batteries in eVTOL Vehicle Propulsion Test Bed, in *The 14th Annual Conference of the Prognostics and Health Management Society (PHM'22)*, 2022.
- P-9.** **Liang He**, Yuanchao Shu, Youngmoon Lee, Dongyao Chen, and Kang Shin, Authenticating Drivers Using Automotive Batteries, in *ACM International Joint Conference on Pervasive and Ubiquitous Computing (ACM UbiComp'21)*, 2021.
- P-10.** Yiqin Wang, Linghe Kong, Siyu Lin, and **Liang He**, Detecting Engine Anomalies Using Batteries, *IEEE Transactions on Mobile Computing (IEEE TMC)*, 2021.
- P-11.** Hongyi Pu*, **Liang He**, Chengcheng Zhao, David Yau, Peng Cheng, and Jiming Chen, Fingerprinting Movements of Industrial Robots for Replay Attack Detection, *IEEE Transactions on Mobile Computing (IEEE TMC)*, 2021.
- P-12.** Hongyi Pu*, **Liang He**, Chengcheng Zhao, David Yau, Peng Cheng, and Jiming Chen, Detecting Replay Attacks against Industrial Robots via Power Fingerprinting, in *The 18th ACM Conference on Embedded Networked Sensor Systems (ACM SenSys'20)*, 2020.
- P-13.** **Liang He**, Youngmoon Lee, and Kang Shin, Mobile Device Batteries as Thermometers, in *ACM International Joint Conference on Pervasive and Ubiquitous Computing (ACM UbiComp'20)*, 2020.
- P-14.** Youngmoon Lee, **Liang He**, and Kang Shin, Causes and Fixes of Unexpected Phone Shutoffs, in *The 18th ACM International Conference on Mobile Systems, Applications, and Services (ACM MobiSys'20)*, 2020.
- P-15.** Zeyu Yang*, **Liang He**, Peng Cheng, Jiming Chen, David Yau, and Linkang Du, PLC-Sleuth: Detecting and Localizing PLC Intrusions Using Control Invariants, in *The 23rd International Symposium on Research in Attacks, Intrusions and Defenses (RAID'20)*, 2020.

- P-16.** **Liang He**, Linghe Kong, Ziyang Liu, Yuanchao Shu, and Cong Liu, Diagnosing Vehicles with Automotive Batteries, In *The 25th ACM Annual International Conference on Mobile Computing and Networking (ACM MobiCom'19)*, 2019.
- P-17.** **Liang He**, Linghe Kong, Yu Gu, Cong Liu, Tian He, and Kang Shin, Extending Battery System Operation via Adaptive Reconfiguration, *ACM Transactions on Sensor Networks (ACM TOSN)*, Vol. 15, No. 11, 2019.
- P-18.** **Liang He**, Zhe Yang, Yu Gu, Cong Liu, Tian He, and Kang Shin, SoH-Aware Reconfiguration in Battery Packs, *IEEE Transactions on Smart Grids (IEEE TSG)*, Vol. 9, No. 4, pp. 3727-3735, 2018.
- P-19.** Junghyun Jun, **Liang He**, Yu Gu, et al., Low-Overhead WiFi Fingerprinting, *IEEE Transactions on Mobile Computing (IEEE TMC)*, Vol. 17, No. 3, pp. 590-603, 2018.
- P-20.** **Liang He**, Yu-Chih Tung, and Kang Shin, iCharge: User-Interactive Charging of Mobile Devices, In *The 15th ACM International Conference on Mobile Systems, Applications, and Services (ACM MobiSys'17)*, 2017.
- P-21.** **Liang He**, Guozhu Meng, Yu Gu, Jun Sun, Cong Liu, Yang Liu, and Kang Shin, Battery-Aware Mobile Data Service, *IEEE Transactions on Mobile Computing (IEEE TMC)*, Vol. 6, No. 16, pp. 1544-1558, 2017.

PATENTS

- P-1.** “Detecting anomalous behavior in aerial vehicle components”
 - Co-inventors: Liang He, John Pace, Jubilee Rao, and Jesse Williams
 - US Provisional Patent Application No. 63/403,578, filed, 09/2022
- P-2.** “System And Methods To Diagnose Vehicles Based On The Voltage Of Automotive Batteries”
 - Inventor: Liang He
 - US Patent Application No. 16/723,398, granted, 11/2022
- P-3.** “Anti-theft Vehicle Immobilizer Using Batteries”
 - Co-inventors: Liang He and Kang G. Shin
 - US Patent Application No. 63/165,790, granted, 07/2023
- P-4.** “Controlling Battery Output Power To Prevent Vehicle Theft”
 - Co-inventors: Liang He and Kang G. Shin
 - US Patent Application No. 16/823,647, granted, 06/2022
- P-5.** “User Aware Charging Algorithm That Reduces Battery Fading”
 - Co-inventors: Liang He and Kang G. Shin
 - US Patent Application No. 15/984843, granted, 02/2022
- P-6.** “Method To Estimate Battery Health For Mobile Devices Based On Relaxing Voltages”
 - Co-inventors: Liang He and Kang G. Shin
 - US Patent Application No. 16/605893, granted, 08/2021
 - China Patent Application No. 2018800314255, granted, 11/2019
 - Japanese Patent Application No. 2020-506131, granted, 09/2022
 - Korea Patent Application No. 10-2019-7033092, granted, 04/2023
- P-7.** “Method to Charge Lithium-Ion Batteries with User, Cell, and Temperature Awareness”
 - Co-inventors: Liang He and Kang G. Shin
 - US patent Application No. 15/335556, granted, 05/2022

- British Patent Application No. 18145482, granted, 09/2018
- Korea Patent Application No. 10-2018-7028062, granted, 09/2018
- German Patent Application No. 1120170011671, filed, 09/2018

INVITED TALKS

- “Battery-Enabled Vehicle Immobilizer”
 - Boulder New Tech, USA, 2024
 - Destination Startup Showcase, USA, 2024
- “Batteries beyond Batteries”
 - University of Nebraska Lincoln, USA, 2024
 - Cambridge University, UK, 2023
 - University of Michigan, USA, 2023
 - North Carolina State University, USA, 2023
- “Diagnosing Vehicles Using Automotive Batteries”
 - Shanghai Jiaotong University, China, 2019
 - Fudan University, China, 2019
 - Zhejiang University, China, 2019
- “Batteries as Power Supplies and Sensors”
 - Nankai University, China, 2019
 - Southeast University, China, 2019
- “Cognitive Battery Management with Cyber-Physical Approaches”
 - University of Colorado Boulder, USA, 2017
- “Reconfiguration-Assisted Battery Management”
 - University of Waterloo, Canada, 2016

EXTRAMURAL GRANTS

My research has received over \$3.6M funding support from NSF, NASA, and Colorado State, among which I have a share of \$1.6M as PI (or PI of subcontract to my institute).

- G-1. Sole PI**, NSF I-Corps, NSF-2336145, I-Corps: Battery-enabled Vehicle Immobilizer, \$50,000, 10/2023 – 02/2025.
- G-2. Sole PI**, NSF SaTC, NSF-2245224, Collaborative Research: SaTC: CORE: Medium: Securing Interactions between Driver and Vehicle Using Batteries, \$573,596, 06/2023 – 05/2026 (Part of a \$1.2M collaborative project with The University of Michigan, UM grant: NSF-2245223).
- G-3. PI**, NSF DCSD, NSF-2231759, Diagnosing Vehicles Using Automotive Batteries as Physical Root-of-Trust, \$620,780, 04/2023 – 03/2026.
- G-4. Sole PI of Subcontract**, NSF SBIR (Phase 1), NSF-2151374, Airborne Contagion Mapping through Visual Exhale Monitoring, Industry PI: Shane Transuex, \$256,000 (share: \$16,421), 09/2022 – 08/2023.
- G-5. Sole PI**, Colorado OEDIT, OEDIT-2022-2453, BAuth: Battery-based Anti-Theft Vehicle Immobilizer, \$96,096, 05/2022 – 05/2024.
- G-6. Sole PI of Subcontract**, NASA SBIR (Phase 2), NASA-80NSSC22CA144, ARADISS Adaptive Real-time Anomaly Detection & Identification for Space Systems, Industry PI: Jesse Williams, \$799,987 (share: \$185,000), 05/2022 – 04/2024.

- G-7. Sole PI of Subcontract**, NASA SBIR (Phase 1), NASA-80NSSC21C0356, ARADISS Adaptive Real-time Anomaly Detection & Identification for Space Systems, Industry PI: Jesse Williams, \$131,355 (share: \$25,000), 05/2021 – 10/2021.
- G-8. Co-PI**, NSF CPS, CNS-1739577, CPS: Small: Imposing Recovery Period for Battery Health Monitoring, Prognosis, and Optimization, PI: Kang G. Shin, \$450,000 (share: \$117,619), 08/2017 – 07/2022.

SELECTED
STUDENT SUCCESS

- S-1.** Adarsh Thoke, Graduate Education Distinguished Master’s Capstone Award, 2024
- S-2.** Ngoc Que Anh Tran, Outstanding Graduate of Engineering College (Undergraduate Category), 2024
- S-3.** Ngoc Que Anh Tran, Outstanding Graduate of CSE Department (BA Category), 2024
- S-4.** Daniel Rodriguez, Outstanding Graduate of CSE Department (BS Category), 2024
- S-5.** Nathan Maas, Outstanding Graduate of CSE Department (BS Category), 2023
- S-6.** Hojun Choi, Chancellor Scholarship, 2023
- S-7.** John Marinelli, Outstanding Graduate of CSE Department (Graduate Category), 2023
- S-8.** John Pace, Outstanding Graduate of Engineering College (Graduate Category), 2022
- S-9.** John Pace, Outstanding Graduate of CSE Department (Graduate Category), 2022
- S-10.** Dennis Mills, Outstanding Graduate of CSE Department (Undergraduate Category), 2022
- S-11.** Rhys Butler, Chancellor Scholarship, 2020

SELECTED
PROFESSIONAL
SERVICES

Editorship: Associate Editor, IEEE Transactions on Vehicular Technology, since 2022

Chair Positions: co-chair of ACM EnergySP’24; publication co-chair of ACM e-Energy’24

TPC Membership: SenSys’25, e-Energy’24, ’23; IoTDI’22; RTCSA’21, ’20; MASS’20, ’19; IC-CPS’18

Advisory Reviewer Board/Pannel: NSF, DoE, Samsung, NSC Poland, RGC Hong Kong