

## Short CV of Liang He

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CONTACT INFORMATION	<p><i>Address:</i> 1380 Lawrence Street, Room 816, Denver, CO, 80204 <i>E-mail:</i> liang.he@ucdenver.edu <i>Website:</i> <a href="http://cse.ucdenver.edu/~helias/">http://cse.ucdenver.edu/~helias/</a></p>
EDUCATION	<p><b>Nankai University</b>, Tianjin, P.R. China Ph.D. in Computer Science and Engineering, 12/2011</p>
ACADEMIC APPOINTMENTS	<p><b>Assistant Professor</b>, 2017 to present Department of Computer Science and Engineering University of Colorado Denver, CO, USA</p> <p><b>Research Fellow</b>, 2015 to 2017 Department of Electrical Engineering and Computer Science (with Prof. Kang G. Shin) University of Michigan at Ann Arbor, MI, USA</p> <p><b>Research Scientist</b>, 2012 to 2014 Pillar of Information System Technology and Design (with Dr. Yu Gu) Singapore University of Technology and Design, Singapore</p> <p><b>Research Assistant</b>, 2009 to 2011 Department of Computer Science and Engineering (with Prof. Jianping Pan) University of Victoria, BC, Canada</p>
RESEARCH INTERESTS	<p>Cyber-physical systems and internet-of-things with applications to batteries, vehicles, and manufacturing systems.</p>
ENTREPRENEURSHIP	<p>Co-founder of Batteries Beyond Batteries, a spin-off startup focusing on commercializing our research innovations.</p>
HONORS AND AWARDS	<ul style="list-style-type: none"><li>• Citation: 2,785; H-index: 25; i-10 index: 42 (Google Scholar, 02/2024)</li><li>• Early Career Award for Excellence in Research, CEDC@CU-Denver, 2024.</li><li>• Best paper candidate of ACM e-Energy'23, 2023.</li><li>• University nominee for the Blavatnik National Awards for Young Scientists, 2021</li><li>• Winner of Lab Venture Challenge, Colorado State, 2021</li><li>• Lewis Family Innovation Award, CU-Denver, 2021</li><li>• Inclusive Pedagogy Academy, CU-Denver, 2021</li><li>• 1 paper highlighted in ACM GetMobile as top picks in the SIGMOBILE area, 2021</li><li>• Young Upwardly Mobile Professor Award, CU-Denver, 2020</li><li>• ACUE Certificate on Effective Teaching, 2020</li><li>• CRC Fellowship, CU-Denver, 2020</li><li>• CMTC Fellowship, CU-Denver, 2018</li><li>• Best Poster Award, ACM MobiSys'17, 2017</li></ul>

SELECTED  
PUBLICATIONS

- P-1.** 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-2.** **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-3.** 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-4.** **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-5.** **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-6.** Yiqin Wang, Linghe Kong, Siyu Lin, and **Liang He**, Detecting Engine Anomalies Using Batteries, *IEEE Transactions on Mobile Computing (IEEE TMC)*, 2021.
- P-7.** 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-8.** 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-9.** **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-10.** 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-11.** 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-12.** **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-13.** **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-14.** **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 CU-Denver.

- G-1. PI, NSF I-Corps**, NSF-2336145, I-Corps: Battery-enabled Vehicle Immobilizer, \$50,000, 10/2023 – 02/2024.
- G-2. 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, \$570,950, 04/2023 – 03/2026.
- G-4. PI of CU-Denver, 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. PI, Colorado OEDIT**, OEDIT-2022-2453, BAuth: Battery-based Anti-Theft Vehicle Immobilizer, \$96,096, 05/2022 – 05/2024.
- G-6. PI of CU-Denver, 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. PI of CU-Denver, 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.** Ngoc Que Anh Tran, Outstanding Graduate of CSE Department (BA Category), 2024
- S-2.** Daniel Rodriguez, Outstanding Graduate of CSE Department (BS Category), 2024
- S-3.** Nathan Maas, Outstanding Graduate of CSE Department (BS Category), 2023
- S-4.** Hojun Choi, Chancellor Scholarship, 2023
- S-5.** John Marinelli, Outstanding Graduate of CSE Department (Graduate Category), 2023
- S-6.** John Pace, Outstanding Graduate of Engineering College (Graduate Category), 2022
- S-7.** John Pace, Outstanding Graduate of CSE Department (Graduate Category), 2022
- S-8.** Dennis Mills, Outstanding Graduate of CSE Department (Undergraduate Category), 2022
- S-9.** 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:** e-Energy'24, '23; IoTDI'22; RTCSA'21, '20; MASS'20, '19; ICCPS'18  
**Advisory Reviewer Board/Pannel:** NSF, DoE, Samsung, NSC Poland, RGC Hong Kong