

# Jingjie Li

PH.D. CANDIDATE · UNIVERSITY OF WISCONSIN-MADISON

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## Education

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### University of Wisconsin-Madison

Madison

#### PH.D. COMPUTER ENGINEERING

2017-2023

- Department of Electrical and Computer Engineering
- Major Area: Computer Engineering, Minor Area: Computer Science
- Advisors: Prof. Younghyun Kim and Prof. Kassem Fawaz

### University of Wisconsin-Madison

Madison

#### M.SC. COMPUTER ENGINEERING

2017-2019

- Department of Electrical and Computer Engineering

### Australian National University

Canberra

#### B.ENG. (HONOURS)

2015-2017

- Research School of Engineering
- Major: Electronic and Communication Systems | First Class Honours

### Beijing Institute of Technology

Beijing

#### B.SC. (JOINT DEGREE WITH ANU)

2013-2015

- IT Advanced Class, School of Information and Electronics
- Major: Electronic Information Engineering

## Research Interests

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Usable Privacy and Security, Human-Centered Systems, Augmented/Virtual Reality, Internet of Things

## Professional Experience

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- 2017-Present **Research Assistant**, UW-Madison, USA
- 2022 **Research Intern**, Visa Research – Security, USA
- 2021 **Visiting Ph.D. Scholar**, Max Planck Institute for Security and Privacy, Germany (Virtual)
- 2016-2017 **Research Intern**, Commonwealth Scientific and Industrial Research Organisation, Australia
- 2015-2017 **Research Student**, ANU, Australia

## Awards & Honors

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- 2022 **CPS (Cyber-Physical Systems) Rising Star**, CPS-VO@National Science Foundation  
**Norton Labs Graduate Fellowship Finalist**, NortonLifeLock
- 2021 **IEEE Micro Top Picks from the Computer Architecture Conferences**, IEEE  
**Qualcomm Innovation Fellowship Finalist**, Qualcomm
- 2020 **Chancellor's Opportunity Fellowship**, UW-Madison  
**'Smart Cities - Smart Futures' Competition Finalist**, Foxconn
- 2019 **Chancellor's Opportunity Fellowship**, UW-Madison  
**'Smart Cities - Smart Futures' Competition Final Winner**, Foxconn  
**Qualcomm Innovation Fellowship Finalist**, Qualcomm  
**ACM CHI Best Paper Award**, ACM
- 2018 **ACM/IEEE ISLPED Low-Power Design Contest Award**, ACM/IEEE  
**A. Richard Newton Young Student Fellowship**, Design Automation Conference (DAC)

2016 Undergraduate International Partnership Scholarship, ANU

2015 Undergraduate International Partnership Scholarship, ANU

## Publications

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### SECURITY AND PRIVACY

**Jingjie Li**, Kaiwen Sun, Brittany Huff, Anna Bierley, Younghyun Kim, Florian Schaub, Kassem Fawaz. **“It’s up to the Consumer to be Smart”**: Understanding the Security and Privacy Attitudes of Smart Home Users on Reddit. IEEE S&P (Symposium on Security and Privacy), 2023.

Kaiwen Sun, **Jingjie Li**, Yixin Zou, Florian Schaub, Chris Brooks. **The Portrayal of Children in Smart Home Marketing**. Workshop on Kids’ Online Privacy and Safety (KOPS)@Symposium on Usable Privacy and Security, 2022.

**Jingjie Li**, Amrita Roy Chowdhury, Kassem Fawaz, Younghyun Kim. **Kaleido: Real-Time Privacy Control for Eye-Tracking Systems**. USENIX Security Symposium, 2021. (Acceptance Rate: 18.8%)

Yongwoo Lee, **Jingjie Li**, Younghyun Kim. **MicPrint: Acoustic Sensor Fingerprinting for Spoof-Resistant Mobile Device Authentication**. EAI MobiQuitous (International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services), 2019.

**Jingjie Li**, Kassem Fawaz, Younghyun Kim. **Velody: Nonlinear Vibration Challenge-Response for Resilient User Authentication**. ACM CCS (Conference on Computer and Communications Security), 2019. (Acceptance Rate: 16%)

### AFFECTIVE COMPUTING

Roneel V. Sharan, Shlomo Berkovsky, Ronnie Taib, Irena Koprinska, **Jingjie Li**. **Detecting Personality Traits Using Inter-Hemispheric Asynchrony of the Brainwaves**. IEEE EMBC (Conference of Engineering in Medicine and Biology Society), 2020.

Ronnie Taib, Shlomo Berkovsky, Irena Koprinska, Eileen Wang, Yucheng Zeng, **Jingjie Li**. **Personality Sensing: Detection of Personality Traits Using Physiological Responses to Image and Video Stimuli**. ACM TIIS (Transactions on Interactive Intelligent Systems), 2020.

Shlomo Berkovsky, Ronnie Taib, Irena Koprinska, Eileen Wang, Yucheng Zeng, **Jingjie Li**, Sabina Kleitman. **Detecting Personality Traits Using Eye-Tracking Data**. ACM CHI (Conference on Human Factors in Computing Systems), 2019. (Best Paper)

### POWER-EFFICIENT DESIGN

Di Wu, **Jingjie Li**, Zhewen Pan, Younghyun Kim, Joshua San Miguel. **A Unary Brain Computer Interface**. International Symposium on Computer Architecture (ISCA), 2022. (Acceptance Rate: 16%)

Di Wu, **Jingjie Li**, Hsuan Hsiao, Younghyun Kim, Joshua San Miguel. **uGEMM: Unary Computing for GEMM Applications**. IEEE Micro (Special Issue on IEEE Micro Top Picks), 2021.

Di Wu, **Jingjie Li**, Setareh Behroozi, Younghyun Kim, Joshua San Miguel. **UNO: Virtualizing and Unifying Nonlinear Operations for Emerging Neural Networks**. ACM/IEEE ISLPED (International Symposium on Low Power Electronics and Design), 2021.

Di Wu, **Jingjie Li**, Hsuan Hsiao, Younghyun Kim, Joshua San Miguel. **uGEMM: Unary Computing Architecture for GEMM Applications**. ACM/IEEE ISCA (International Symposium on Computer Architecture), 2020. (Acceptance Rate: 18%)

Hanwook Chung, **Jingjie Li**, Younghyun Kim, Jennifer M.C. Van Os, Sabrina H. Brounts, and Christopher Y. Choi. **Using Implantable Biosensors and Wearable Scanners to Monitor Dairy Cattle’s Core Body Temperature in Real-Time**. Computers and Electronics in Agriculture, 2020.

Younghyun Kim, Joshua San Miguel, Setareh Behroozi, Tianen Chen, Kyuin Lee, Yongwoo Lee, **Jingjie Li**, Di Wu. **Approximate Hardware Techniques for Energy-Quality Scaling Across the System**. ICEIC (International Conference on Electronics, Information, and Communication), 2020.

Jackson Melchert, Setareh Behroozi, **Jingjie Li**, Younghyun Kim. **SAADI-EC: A Quality-Configurable Approximate Divider for Energy Efficiency**. IEEE TVLSI (Transactions on Very Large Scale Integration Systems), 2019.

Setareh Behroozi, **Jingjie Li**, Jackson Melchert, Younghyun Kim. **SAADI: A Scalable Accuracy Approximate Divider for Dynamic Energy-Quality Scaling**. ASP-DAC (Asia South Pacific Design Automation Conference), 2019.

Hanwook Chung, **Jingjie Li**, Younghyun Kim, Christopher Y. Choi. **Continuous and Wireless Skin Contact and Ear Implant Temperature Measurements and Relations to the Core Body Temperature of Heat Stressed Dairy Cows.** ASABE ILES (International Livestock Environment Symposium), 2018.

## Invited Talks

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Nov 01, 2022. *Real-Time Privacy Control for Eye-Tracking Systems.* Invited by PrivacyCon @ **US Federal Trade Commission.**

Sept 07, 2022. *Usable Privacy Control for Real-Time Eye Tracking in AR/VR.* Invited by **Meta (formerly Facebook).**

Aug 19, 2022. *Usable Privacy for Biometrics-Based Smart Devices.* Invited by Long Feng Science Forum @ **the Chinese University of Hong Kong, Shenzhen.**

## Selected Research Projects

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**Understanding Smart Home Users' Security and Privacy Considerations via Online Media** *UW-Madison & UMich*

- Leveraged online discussion forum (Reddit) to study smart home users' considerations and attitudes on security and privacy through qualitative content analysis
- Analyzed the implications of smart home marketing materials regarding children's privacy and safety

**Usable Privacy Communication for Smart Device Users** *UW-Madison*

- Designing communication interfaces for smart device users to facilitate privacy decision by machine learning and mixed reality
- Building natural language model for privacy document comprehension and user communication
- Leading a team of pre-law students in building up an annotated dataset of smart home companies' privacy documents

**Human Factors in Hardware Reverse Engineering** *UW-Madison & MPI*

- Studying the psychological factors and cognitive processes that contribute to hardware reverse engineering
- Conducted eye-tracking studies to understand human behaviors in hardware reverse engineering under a gamified setting

**User Perception of Payment Authentication in Virtual Reality** *Visa Research*

- Designed payment authentication interfaces and conducted user studies to understand users' security and privacy perception in a virtual reality game context

**Privacy Enhancing Technologies for Augmented/Virtual Reality** *UW-Madison*

- Contributing to Meta's award project on "Trustworthy Products in AR, VR, and Smart Devices"
- Designed Kalēido, a privacy-utility control knob to protect real-time eye gaze data by local differential privacy
- Implemented Kalēido as a Unity plugin and evaluated the user experience with an eye-tracking game
- Understanding the privacy-utility tradeoffs for varying eye-tracking applications

**Balancing Privacy, Security, and Usability for Biometric Authentication** *UW-Madison*

- Exploring biometric modalities to balance privacy, security, and usability of user authentication in various interactive contexts
- Designed Velody, a system that uses nonlinear vibration biomtrics to generate unlinkable authentication challenge-responses

**Power-Efficient Design for Emerging Intelligent Systems** *UW-Madison*

- Designing power-efficient systems for emerging computing and interactive applications such as brain-computer interfaces

**Industrial Internet of Things in Precision Agriculture and Dairy Industry** *UW-Madison*

- Developed power-efficient wearable/implantable sensing and communication systems to monitor dairy cattle's health

**Automated Detection of Personality Traits Using Physiological Signals** *ANU & CSIRO*

- Researched on classifying users' personality traits using multiple physiological signals (eye gaze, EEG, skin conductance, etc.) during multi-media experience and driving simulation

**Indoor Localization by Software Defined Radio (SDR)** *ANU*

- Designed a received signal strength-based indoor localization scheme that reduces the calibration effort on SDR platforms

## Grant

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## Usable Privacy Control for Real-time Eye Tracking in AR/VR

AWARD: TOWARDS TRUSTWORTHY PRODUCTS IN AR, VR, AND SMART DEVICES (SPONSOR: META INC.)

- Principal investigators: Kassem Fawaz and Younghyun Kim
- Grant amount: 75,000.00 USD
- Responsibility: proposal writing and lead student contributor

## Teaching & Mentoring Experience

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- Fall 2022 **ECE 751 Embedded Computing Systems**, Guest Lecturer, UW-Madison  
**CS 642 Introduction to Information Security**, Guest Lecturer, UW-Madison
- 2021-2022 **NSF Research Experiences for Undergraduates Program**, Research Mentor, UW-Madison  
**Project: Human factors in hardware reverse engineering**, Mentee:
  - Lia Sudjana (Electrical Engineering)
- 2021-2022 **NSF Research Experiences for Undergraduates Program**, Research Mentor, UW-Madison  
**Project: Smart home privacy analysis**, Mentees:
  - Brittany Huff (Legal Studies & Psychology)
  - Anna Bierley (Political Science)
  - Lauren Damgaard (Legal Studies & Environmental Science)
  - Lauren Smith (Psychology & Economics)
  - Abigail Drucker (Psychology)
  - Kirubana Olivia Devadas (Risk Management and Insurance)
- 2021-2022 **ECE 399 Independent Study**, Research Mentor, UW-Madison  
**Project: Federated learning for electromyography**, Mentee:
  - Victoria Schrimpf (Electrical Engineering)
- 2020-2021 **Undergraduate Research Scholars Program**, Research Mentor, UW-Madison  
**Project: Smart home privacy analysis**, Mentee:
  - Kobe Frimpong (Computer Science)
- Spring 2019 **CS 354 Machine Organization and Programming**, Teaching Assistant, UW-Madison
- 2018 **Undergraduate Summer Research**, Research Mentor, UW-Madison  
**Project: IoT for dairy industry**, Mentee:
  - Anapat Chairithinugull (Computer Engineering)

## Professional Development

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- 2022 **CDIS Workshop (NSF Funding: Why, What and How)**, UW-Madison, USA
- 2022 **CPS Rising Stars Workshop (Academic Career Development)**, University of Virginia, USA

## Services

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### PROFESSIONAL SERVICE

- ACM Conference on Computer and Communications Security 2023**, Technical Program Committee Member
- IEEE/ACM Workshop on the Internet of Safe Things 2023**, Technical Program Committee Member
- IEEE Transactions on Mobile Computing**, Reviewer
- IEEE Pervasive Computing**, Reviewer
- IEEE Transactions on Computers**, Reviewer
- USENIX Security Symposium**, External Reviewer
- IEEE Symposium on Security & Privacy**, External Reviewer
- ACM Conference on Computer and Communications Security**, External Reviewer
- Design Automation Conference**, External Reviewer
- Asia and South Pacific Design Automation Conference**, External Reviewer
- International Symposium on Low Power Electronics and Design**, External Reviewer
- Symposium on Applied Computing**, External Reviewer

**International Conference on VLSI Design**, External Reviewer

#### COMMUNITY SERVICE

2022-Present **Madison Tech Clinic**, Volunteer

- Providing services to prevent technology abuse in intimate partner violence

2016-2017 **Robogals**, Volunteer

- Organized educational events for Australian children to prompt diversity in STEM majors

2014-2015 **Student Union at School of Information and Electronics, BIT**, Director of Publicity

- Designed publicity materials for student events

#### Media Coverage

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Mar 04, 2022. *Understanding implications of augmented reality in manufacturing, privacy.* Covered by **the Badger Herald**.

Jan 04, 2022. *Come the Metaverse, Can Privacy Exist?* Covered by **the Wall Street Journal**.

Sept 23, 2021. *Announcing the winners of the 2021 Towards Trustworthy Products in AR, VR, and Smart Devices request for proposals.* Covered by **Meta Research**.

Apr 25, 2019. *Foxconn Announces Final Round Winners of "Smart Cities-Smart Futures" Competition.* Covered by **Urban Milwaukee**.

Dec 21, 2018. *"Smart City" awards recognize 14 UW-Madison students in first stage.* Covered by **UW-Madison News**.