Huining Li

Contact Information	340 Davis Hall	Phone: (716) 730-9454
	Department of Computer Science & Engineering	E-mail: huiningl@buffalo.edu
	University at Buffalo, SUNY	Page: https://www.buffalo.edu/~huiningl/
	Buffalo, NY, 14260-2500 USA	

Research Interests

My research interest is **Mobile Health** (a.k.a mHealth), and related research areas fall on the intersection of **Mobile Computing**, **Cybersecurity**, and **Internet of Things**. As a mHealth system researcher, I model, design, build, and evaluate end-to-end sensing and computing systems that aim to address clinical medical problems in non-clinical settings, such as *chronic wound care*, *Parkinson's disease management*, and *mental health*. Specifically, I explore technical innovations to satisfy real-world needs in mobile health systems, including *precision*, *high accessibility*, and *privacy preservation*. My research has primarily focused on:

1) Privacy-aware Sensing Mechanism: exploring novel sensing mechanisms to directly interrogate desired information and physically isolate privacy, e.g., mmWave-based vocal sensing for anti-spoofing voice biomarker extraction [SenSys'20, TMC'23], polarized-light-based blood perfusion sensing for unbiased wound healing assessment [SenSys'22].

2) Taming privacy protection and fairness in mobile data heterogeneity and dynamics: e.g., a privacy-preserving and lightweight computational framework based on semantic hashing to tame mobile data heterogeneity for companion diagnostics of early-stage Parkinson's disease [MobiCom'23], an adaptive fairness-aware privacy computing framework integrated with the quantifiable and controllable elements for mental health intervention monitoring [Ongoing].

In addition, my research innovation has been applied to other mobile health studies, including multi-label neural disease screening [UbiComp'22], medication adherence detection [UbiComp'19], and medicine effectiveness assessment for PD self-managing using mHealth technologies [MobiCom'20].

Education

University at Buffalo, the State University of New York (SUNY)   *Jan. 2020 - Present*
Ph.D., Computer Science & Engineering   Supervised by Prof. Wenyao Xu

University at Buffalo, the State University of New York (SUNY)   *Oct. 2018 - Oct. 2019*
Visiting Student, Computer Science & Engineering   Supervised by Prof. Wenyao Xu

Nanjing University of Posts and Telecommunications   *Sept. 2016 - Sept. 2018*
Graduate Student, Department of Automation & Artificial Intelligence

Nanjing University of Information Science and Technology   *Sept. 2012 - Jun. 2016*
B.Eng., Electronic Science and Technology

Honors and Awards

- **Rising Stars in EECS, 2023**
- **IEEE Engineering Projects in Community Service (EPICS) award (Elderly care wearables)**, 2023
- **Best Paper Candidate**, ACM Conference on Embedded Networked Sensor Systems (SenSys), 2022 (7 out of 209)

- **Best Poster Award Runner-up**, ACM Conference on Embedded Networked Sensor Systems (SenSys), 2022 (2 out of 35)
- **IEEE Technical Committee on the Internet (TCI) Travel Award**, IEEE/ACM CHASE conference, 2022
- **Best Student Paper Award**, IEEE International Conference on Healthcare Informatics (ICHI), 2022 (2 out of 109)
- **Women in Computing Scholarship**, Grace Hopper Celebration, 2022
- **Best Idea Award**, UB Blackstone LaunchPad ideas competition, 2021
- **Honorable Mention**, Russell Agrusa CSE Student Innovation Competition, University at Buffalo, 2021 (5 out of 17)
- **Honorable Mention**, ACM SIGDA University Demonstration at the 58th Design Automation Conference, 2021
- **NSF Student Travel Award**, IEEE/ACM CHASE conference, 2021
- **Best Paper Award**, EAI International Conference on Body Area Networks (BodyNet), 2021
- **Best Design Award Runner-up**, IEEE Healthcare Summit (IHS) COVID-19 Data Hackathon (Sensor Informatics Track), 2021
- **Best Paper Award**, ACM Conference on Embedded Networked Sensor Systems (SenSys), 2019 (1 out of 144)

SELECTED PUBLICATIONS

[**MobiCom'23**] **Huining Li**, Xiaoye Qian, Ruokai Ma, Chenhan Xu, Zhengxiong Li, Dongmei Li, Feng Lin, Ming-Chun Huang, Wenyao Xu, "*TherapyPal: Towards a Privacy-Preserving Companion Diagnostic Tool based on Digital Symptomatic Phenotyping*", ACM International Conference on Mobile Computing and Networking, Madrid, Spain, October 2023. (Acceptance Rate: 24.4%, 92 out of 377)

[**IMWUT/UbiComp'22**] **Huining Li**, Huan Chen, Chenhan Xu, Zhengxiong Li, Hanbin Zhang, Xiaoye Qian, Dongmei Li, Ming-Chun Huang, Wenyao Xu, "*NeuralGait: Assessing Brain Health using Your Smartphone*", ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Vol. 6, No. 4, December, 2022.

[**SenSys'20**] **Huining Li**, Chenhan Xu, Aditya Singh Rathore, Zhengxiong Li, Hanbin Zhang, Chen Song, Kun Wang, Lu Su, Feng Lin, Kui Ren, Wenyao Xu, "*VocalPrint: Exploring A Resilient and Secure Voice Authentication via mmWave Biometric Interrogation*", ACM Conference on Embedded Networked Sensor Systems, Yokohama, Japan, November 2020. (Acceptance Rate: 20.6%, 44 out of 213)

TEACHING EXPERIENCES

CSE590: Computer Architecture (Co-Lecturer) [Summer 2023]
CSE191: Introduction to Discrete Structures (Teaching Assistant) [Spring 2020]
CSE341: Computer Organization (Teaching Assistant) [Fall 2020, Spring 2021]

MENTORING EXPERIENCES

I mentored one K-12 student, 9 Undergraduate students, and two Graduate students.

Soumyadeep Bhattacharjee (High School Student, Williamsville East High School, co-authored BodyNet'22 [Best Paper Award)], SH'23)
Ruokai Ma (Master Student, CSE@ZJU, co-authored MobiCom'23)
Tianyu Chen (Master Student, CSE@UB, co-authored SH'23)
Aditya Pandya (Undergrad, CSE@UB, co-authored SenSys'22B [Best Poster Award Runner-up])
Enhao Zheng (Undergrad, CSE@UB, co-authored SH'22B, Current: Amazon Inc.)
Zijian Zhong (Undergrad, CSE@UB, co-authored SH'22B, Current: Master Student, CSE@USC)
Eric Kim (Undergrad, CSE@UB, project: Tinnitus App Development, Current: Giatech Inc.)

Weida Jiang (Undergrad, CSE@UB, project: Smoking Cessation App, Current: Google)
Matthew Rubino (Undergrad, CSE@UB, project: Mellowing App Development)
Anthony Feliciano (Undergrad, CSE@UB, project: Neural Diseases Assessment App Development)
Xingyu Chen (Undergrad, CSE@UB, co-authored SH'22, Current: Ph.D. student, CSE@UCSD)
Baicheng Chen (Undergrad, CSE@UB, co-authored MobiCom'20B, Current: Ph.D. student, CSE@UCSD)

GRANTS
EXPERIENCES

I assisted in the preparation of proposals for the following research grants:

[**Grant co-writing**] **National Institute of Health (NIH)**, NIBIB, Request Budget: $3,042,657, 2023/11/01-2027/10/31 (Study Session: CIDH; Impact Score: 30; Percentile: 11%), Project Title: *mHealth Technologies for Assessing Blood Perfusion in Chronic Wounds*

[**Grant assistant**] **Patient-Centered Outcomes Research Institute (PCORI)**, $2,456,515, 2020/10/01 - 2022/09/30, Project Title: *Comparing Two Ways to Mitigate the Impact of the COVID-19 Pandemic on Mental Health among Adults from Underserved and Racial Minority Communities*

PUBLICATIONS

I have published 28 research/poster papers (10 first-author papers) in high-impact venues for mobile computing (e.g., MobiCom, MobiSys, SenSys), human-computer interaction (IMWUT/UbiComp), smart health/bioinformatics (e.g., ICHI, Elsevier Smart Health, BodyNet), and security (NDSS). These papers have obtained more than 600 citations. My google Scholar: `https://scholar.google.com/citations?user=fAZqlmgAAAAJ&hl=en`

[**MobiCom'23**] **Huining Li**, Xiaoye Qian, Ruokai Ma, Chenhan Xu, Zhengxiong Li, Dongmei Li, Feng Lin, Ming-Chun Huang, Wenyao Xu, "*TherapyPal: Towards a Privacy-Preserving Companion Diagnostic Tool based on Digital Symptomatic Phenotyping*", ACM International Conference on Mobile Computing and Networking, Madrid, Spain, October 2023.

[**SH'23**] Tianyu Chen, Alexander Gherardi, Anarghya Das, **Huining Li**, Chenhan Xu, Wenyao Xu, "*VANet: An Intuitive Light-Weight Deep Learning Solution Towards Ventricular Arrhythmia Detection*", Elsevier Smart Health (SH), Volume 28, June 2023.

[**SH'23**] Soumyadeep Bhattacharjee, **Huining Li**, Jun Xia, Wenyao Xu, "*SimPPG: Self-Supervised Photoplethysmography based Heart-rate Estimation via Similarity-Enhanced Instance Discrimination*", Elsevier Smart Health (SH), Volume 28, June 2023.

[**TMC'23**] **Huining Li**, Chenhan Xu, Aditya Singh Rathore, Zhengxiong Li, Hanbin Zhang, Chen Song, Kun Wang, Lu Su, Feng Lin, Kui Ren, Wenyao Xu, "*VocalPrint: A mmWave-based Unmediated Vocal Sensing System for Secure Authentication*", IEEE Transactions on Mobile Computing, Volume 22, Number 1, Pages 589 - 606, January 2023.

[**IMWUT/UbiComp'22**] **Huining Li**, Huan Chen, Chenhan Xu, Zhengxiong Li, Hanbin Zhang, Xiaoye Qian, Dongmei Li, Ming-Chun Huang, Wenyao Xu, "*NeuralGait: Assessing Brain Health using Your Smartphone*", ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Vol. 6, No. 4, December 2022.

[**SH'22**] **Huining Li**, Xingyu Chen, Xiaoye Qian, Huan Chen, Zhengxiong Li, Soumyadeep Bhattacharjee, Hanbin Zhang, Ming-Chun Huang, Wenyao Xu, "*An Explainable COVID-19 Detection System based on Human Sounds*", Elsevier Smart Health, Volume 26, December 2022.

[**Sensors**] Wenhan Zheng, Huijuan Zhang, Chuqin Huang, Kaylin McQuillan, **Huining Li**, Wenyao Xu, Jun Xia, "*Deep-E Enhanced Photoacoustic Tomography using Three-dimensional Reconstruction for High-quality Vascular Imaging*", DMPI Sensors, October 2022.

[**SenSys'22**] Chenhan Xu, Tianyu Chen, **Huining Li**, Alexander Gherardi, Michelle Weng, Zhengxiong Li, Wenyao Xu, "*Hearing Heartbeat from Voice: Towards Next Generation Voice-User Interfaces with Cardiac Sensing Function*", ACM Conference on Embedded Networked Sensor Systems, Boston, MA, November 2022. (Acceptance Rate: 24.8%, 52 out of 209)(Best Paper Award Candidate, 7 out of 209)

[**SenSys'22**] **Huining Li**, Wenhan Zheng, Aditya Pandya, Chenhan Xu, Jun Xia, Wenyao Xu, "*Poster Abstract: Smartphone-based Blood Perfusion Assessment for Ulcer Care*", ACM Conference on Embedded Networked Sensor Systems, Boston, MA, Nov. 2022. (Best Poster Award Runner-up, 2 out of 35, 5.7%)

[**ICHI'22**] Chenhan Xu, **Huining Li**, Zhengxiong Li, Xingyu Chen, Aditya Singh Rathore, Hanbin Zhang, Kun Wang, Wenyao Xu, "*The Visual Accelerometer: A High-fidelity Optic-to-Inertial Transformation Framework for Wearable Health Computing*", IEEE International Conference on Health Informatics, Rochester, MN, June 2022. (Best Student Paper Award, 2 out of 109, 1.8%)

[**Methods'22**] Zetao Zhu, **Huining Li**, Jian Xiao, Wenyao Xu, Ming-Chun Huang, "*A Fitness Training Optimization System Based On Heart Rate Prediction Under Different Activities*", Elsevier Methods (Methods), Volume 205, Pages 89-96, June 2022.

[**NDSS'22**] Zhengxiong Li, Baicheng Chen, Xingyu Chen, **Huining Li**, Chenhan Xu, Chris Xiaoxuan Lu, Feng Lin, Kui Ren, Wenyao Xu, "*SpiralSpy: Exploring a Stealthy and Practical Covert Channel to Attack Air-gapped Computing Devices via mmWave Sensing*", The Network and Distributed System Security Symposium, San Diego, California, February 2022.

[**SH'22**] **Huining Li**, Enhao Zheng, Zijian Zhong, Chenhan Xu, Nicole Roma, Steven Lamkin, Tania T Von Visger, Yu-Ping Chang, Wenyao Xu, "*Stress prediction using micro-EMA and machine learning during COVID-19 social isolation*", Elsevier Smart Health, Volume 23, March 2022.

[**SH'22**] **Huining Li**, Huan Chen, Chenhan Xu, Anarghya Das, Xingyu Chen, Zhengxiong Li, Jian Xiao, Ming-Chun Huang, Wenyao Xu, "*Privacy computing using deep compression learning techniques for neural decoding*", Elsevier Smart Health, Volume 23, March 2022.

[**IMWUT/UbiComp'21**] Gabriel Guo, Hanbin Zhang, Liuyi Yao, Zhengxiong Li, **Huining Li**, Chenhan Xu, Wenyao Xu, "*MSLife Digital Behavioral Phenotyping of Multiple Sclerosis Symptoms in the Wild using Wearables and Graph-Based Statistical Analysis*", ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Volume 5, Number 4, December 2021.

[**IMWUT/UbiComp'21**] Chenhan Xu, **Huining Li**, Zhengxiong Li, Hanbin Zhang, Aditya Singh Rathore, Xingyu Chen, Kun Wang, Ming-Chun Huang, Wenyao Xu, "*CardiacWave: A mmWave-based Scheme of Non-Contact and High-Definition Heart Activity Computing*", ACM International Joint Conference on Pervasive and Ubiquitous Computing, Volume 5, Number 3, September 2021.

[**BodyNet'21**] Soumyadeep Bhattacharjee, **Huining Li**, Wenyao Xu, "*Anomalous Pattern Recognition in Vital Health Signals via Multimodal Fusion*", EAI International Conference on Body Area Networks, Virtual Conference. (Best Paper Award)

[**SenSys'20**] **Huining Li**, Chenhan Xu, Aditya Singh Rathore, Zhengxiong Li, Hanbin Zhang, Chen Song, Kun Wang, Lu Su, Feng Lin, Kui Ren, Wenyao Xu, "*VocalPrint: Exploring A Resilient and Secure Voice Authentication via mmWave Biometric Interrogation*", ACM Conference on Embedded Networked Sensor Systems, Yokohama, Japan, November 2020.

[**MobiCom'20**] Hanbin Zhang, Gabriel Guo, Chen Song, Chenhan Xu, Kevin Cheung, Jasleen Alexis, **Huining Li**, Dongmei Li, Kun Wang, Wenyao Xu, "*PDLens: Smartphone Knows Drug Effectiveness among Parkinson's via Daily-Life Activity Fusion*", ACM International Conference on Mobile Computing and Networking, London, UK, October 2020.

[MobiCom'20] Baicheng Chen, **Huining Li**, Zhengxiong Li, Chenhan Xu, Xingyu Chen, Wenyao Xu, *"ThermoWave: A New Paradigm of Wireless Passive Temperature Monitoring via mmWave Sensing"*, ACM International Conference on Mobile Computing and Networking, London, UK, October 2020.

[MobiSys'19] Chenhan Xu, Zhengxiong Li, Hanbin Zhang, Aditya Singh Rathore, **Huining Li**, Chen Song, Kun Wang, Wenyao Xu, *"WaveEar: Exploring a mmWave-based Noise-resistant Speech Sensing for Voice-User Interface"*, ACM International Conference on Mobile Systems, Applications, and Services, Seoul, South Korea, June 2019.

[IMWUT/UbiComp'19] Hanbin Zhang, Chenhan Xu, **Huining Li**, Aditya Singh Rathore, Chen Song, Zhisheng Yan, Dongmei Li, Feng Lin, Kun Wang, Wenyao Xu, *"PDMove: Towards Passive Medication Adherence Monitoring of Parkinson's Disease Using Smartphone-based Gait Assessment"*, ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT), Volume 3, Number 3, September 2019

[SenSys'19] Zhengxiong Li, Baicheng Chen, Zhuolin Yang, **Huining Li**, Chenhan Xu, Xingyu Chen, Kun Wang, and Wenyao Xu, *"FerroTag: A Paper-based mmWave-Scannable Tagging Infrastructure"*, ACM Conference on Embedded Networked Sensor Systems, New York City, NY, November 2019. (Acceptance Rate: 19%, 28 out of 144) (Best Paper Award, 1 out of 144)

[NMAG'19] **Huining Li**, Kun Wang, Toshiaki Miyazaki, Chenhan Xu, Song Guo, Yanfei Sun, *"Trust-Enhanced Content Delivery in Blockchain-Based Information-Centric Networking"*, IEEE Network, Volume 33, Number 5, September 2019, Pages 183 - 189.

[TGCN'18] Kun Wang, **Huining Li**, Sabita Maharjan, Yan Zhang, and Song Guo, *"Green energy scheduling for demand side management in the smart grid"*, IEEE Transactions on Green Communications and Networking, Volume 2, Number 2, Pages 596-611, June 2018.

[MMAG'17] **Huining Li**, Kun Wang, Xiulong Liu, Yanfei Sun, and Song Guo, *"A selective privacy preserving approach for multimedia data"*, IEEE Multimedia Magazine, Volume 24, Number 4, Pages 14-25, October-December 2017.

[TII'17] Kun Wang, **Huining Li**, Yixiong Feng, and Guangdong Tian, *"Big data analytics for system stability evaluation strategy in the Energy Internet"*, IEEE Transactions on Industrial Informatics, Volume 13, Number 4, Pages 1969-1978, Aug. 2017.

[TSC'17] Kun Wang, Xiaoxuan Hu, **Huining Li**, Peng Li, Deze Zeng, and Song Guo, *"A survey on Energy Internet communications for sustainability"*, IEEE Transactions on Sustainable Computing, Volume 2, Number 3, Pages 231-254, 1 July-Sept. 2017.

COMMUNITY SERVICES & OUTREACH ACTIVITIES

Committee Membership:
- 2nd International Workshop on Cyber-Physical-Human Systems Design and Implementation, Digital Support Co-Chair

Service in K-12 Education:
- Computer Science Club in Williamsville East High School, Research Project Mentor

Reviewer:
- IEEE-EMBS International Conference on Body Sensor Networks: Sensor and Systems for Digital Health (IEEE BSN) [2023]
- ACM Transactions on Computing for Healthcare (HEALTH) [2023]
- IEEE Internet of Things Journal (IOTJ) [2021, 2022]
- IEEE International Conference on Computer Communications (INFOCOM) [2021]
- IEEE/ACM international conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE) [2020]

Invited Talk, NSF-NIH Smart and Connected Health workshop   Oct. 2022
Lightning Talk: Towards a Privacy-Preserving Mobile Companion Diagnostic Tool for Treatment Effectiveness Monitoring

Invited Talk, NSF REU Site@UB   Jul. 2022
Research Paper Writing

Pitch Talk, Panasci Competition   Mar. 2022
Non-contact Assessment of Pressure Ulcer using Magic Smartphone

Elevator Pitch Talk, UB Blackstone LaunchPad   Nov. 2021
MidiGait: Melodic Gait Rehabilitation using Smart Insole