Li Lu (卢立)

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RESEARCH INTERESTS

IoT Security, Voice Security, Mobile Sensing, Ubiquitous Computing, Human-Machine Interactions.

EDUCATIONAL BACKGROUND

- Ph.D. in Computer Science and Technology, Shanghai Jiao Tong University, Shanghai, China, 2020.

- B.E. in Computer Science and Technology & B.Admin in Business Administration, Xi'an Jiaotong University, Xi'an, Shaanxi, China, 2015.

RESEARCH EXPERIENCE

- Research Professor, Zhejiang University
  - Location: Hangzhou, Zhejiang, China.
  - Duration: Jul. 2020 -present.
  - Duties: I am a tenure-track research professor of school of cyber science and technology at Zhejiang University, also being a doctoral and master advisor. Currently, I am working on the area of IoT security, mobile sensing and ubiquitous computing.

- Research Assistant, Shanghai Jiao Tong University
  - Location: Shanghai, China.
  - Duration: Sep. 2015-Jun. 2020.
  - Supervisor: Prof. Jiadi Yu and Prof. Minglu Li (IEEE Fellow).
  - Duties: My previous research interest includes cloud computing and network economic, now I mainly work on mobile and ubiquitous computing, cyber security and privacy, human-computer interactions. The main work is to adopt signal processing and machine learning techniques in mobile network and applications.

- Visiting Research Student, Rutgers University
  - Location: New Brunswick, NJ, USA.
  - Duration: Oct. 2018-Sep. 2019.
  - Supervisor: Prof. Yingying Chen (IEEE Fellow, NAI Fellow, ACM Distinguished Scientist).
  - Duties: Mainly worked on acoustic-based communication system and mmWave radar-based sensing applications. The joint Ph.D. training program is supported by China Scholarship Council.

- Summer Internship, Zhejiang University
  - Location: Hangzhou, Zhejiang, China.
  - Duration: Jul. 2014-Aug. 2014.
  - Supervisor: Prof. Gang Pan.
  - Duties: Mainly worked on Biocomputing (implement a PCA algorithm for ECG signals).

- Summer Internship, Xi'an Jiaotong University
  - Location: Xi'an, Shaanxi, China.
  - Duration: Jul. 2013-Aug. 2013.
  - Supervisor: Prof: Yinliang Zhao.
  - Duties: Mainly worked on the code reverse engineering of ARM-based program.

PUBLICATIONS

Conference Papers

[C1].   Meng Chen, **Li Lu***, Zhongjie Ba, Kui Ren, "PhoneyTalker: An Out-of-the-Box Toolkit for Adversarial Example Attack on Speaker Recognition," in *Proceedings of IEEE International Conference on Computer Communications* (*IEEE INFOCOM 2022*), pp. 1419-1428, London, United Kingdom, May 2022, doi: 10.1109/INFOCOM48880.2022.9796934.

[C2].   **Li Lu**, Jiadi Yu, Yingying Chen, Yan Wang, "VocalLock: Sensing Vocal Tract for Passphrase-Independent User Authentication Leveraging Acoustic Signals on Smartphones," in *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* (*IMWUT*)/*ACM UbiComp 2020*, vol. 4, no. 2, pp. 51:1-51:24, Cancun, Mexico, Jun. 2020, doi: 10.1145/3397320. [CSRankings-Human-computer interaction]

[C3].   **Li Lu**, Jiadi Yu, Yingying Chen, Yanmin Zhu, Minglu Li, Xiangyu Xu, "I³: Sensing Scrolling Human-Computer Interactions for Intelligent Interest Inference on Smartphones, " in *Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies* (*IMWUT*)/*ACM Ubicomp 2019*, vol. 3, no. 3, pp. 97:1-97:22, London, England, Sep. 2019, doi: 10.1145/3351255. [CSRankings-Human-computer interaction]

[C4].   **Li Lu**, Jiadi Yu, Yingying Chen, Yanmin Zhu, Xiangyu Xu, Guangtao Xue, Minglu Li, "KeyListener: Inferring Keystrokes on QWERTY Keyboard of Touch Screen through Acoustic Signals," in *Proceedings of IEEE International Conference on Computer Communications* (*IEEE INFOCOM 2019*), pp. 775-783, Paris, France, Apr. 2019, doi: 10.1109/INFOCOM.2019.8737591.

[C5].   **Li Lu**, Jiadi Yu, Yingying Chen, Hongbo Liu, Yanmin Zhu, Yunfei Liu, Minglu Li, "LipPass: Lip Reading-based User Authentication on Smartphones Leveraging Acoustic Signals," in *Proceedings of IEEE International Conference on Computer Communications* (*IEEE INFOCOM 2018*), pp. 1466-1474, Honolulu, HI, USA, Apr. 2018, doi: 10.1109/INFOCOM.2018.8486283.

[C6].   Qianniu Chen, Meng Chen, **Li Lu***, Jiadi Yu, Yingying Chen, Zhibo Wang, Zhongjie Ba, Feng Lin, Kui Ren, "Push the Limit of Adversarial Example Attack on Speaker Recognition in Physical Domain," in *Proceedings of ACM Conference on Embedded Networked Sensor Systems* (*ACM SenSys 2022*), Boston, MA, USA, Nov. 2022, doi: to appear. [CSRankings-Mobile computing]

[C7].   **Li Lu**, Zhongjie Ba, Feng Lin, Jinsong Han, Kui Ren, "ActListener: Imperceptible Activity Surveillance by Pervasive Wireless Infrastructures," in *Proceedings of IEEE International Conference on Distributed Computing Systems* (*IEEE ICDCS 2022*), Bologna, Italy, Jul. 2022, doi: 10.1109/ICDCS54860.2022.00080.

[C8].   Hao Kong and **Li Lu**[1], Jiadi Yu, Yingying Chen, Yanmin Zhu, Linghe Kong, Minglu Li, "FingerPass: Finger Gesture-based Continuous User Authentication for Smart Homes Using Commodity WiFi," in *Proceedings of ACM International Symposium on Mobile Ad Hoc Networking and Computing* (*ACM MobiHoc 2019*), pp. 201-210, Catania, Italy, Jul. 2019, doi: 10.1145/3323679.3326518.

[C9].   **Li Lu**, Jian Liu, Jiadi Yu, Yingying Chen, Yanmin Zhu, Xiangyu Xu, Minglu Li. "VPad: Virtual Writing Tablet for Laptops Leveraging Acoustic Signals," in *Proceedings of IEEE International Conference on Parallel and Distributed Systems* (*IEEE ICPADS 2018*), pp. 244-251, Sentosa, Singapore, Dec. 2018, doi: 10.1109/PADSW.2018.8644615.

[C10].   **Li Lu**, Jiadi Yu, Yanmin Zhu, Shiyou Qian, Guangtao Xue, Minglu Li, "Cost-Efficient VM Configuration Algorithm in the Cloud using Mix Scaling Strategy," in *Proceedings of IEEE International Conference of Communications* (*IEEE ICC 2017*), pp. 1-6, Paris, France, May 2017, doi: 10.1109/ICC.2017.7997241.

[C11].   Hao Kong, **Li Lu**, Jiadi Yu, Yanmin Zhu, Feilong Tang, Yi-Chao Chen, Linghe Kong, Feng Lyu, "Push the Limit of WiFi-based User Authentication towards Undefined Gestures," in *Proceedings of IEEE*

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[1] Hao Kong and **Li Lu** are the co-first authors of this paper.

International Conference on Computer Communications (*IEEE INFOCOM 2022*), pp. 410-419, London, United Kingdom, May 2022, doi: 10.1109/INFOCOM48880.2022.9796740.

[C12]. Yike Chen, Ming Gao, Yimin Li, Lingfeng Zhang, **Li Lu**, Feng Lin, Jinsong Han, Kui Ren, "Big Brother is Listening: An Evaluation Framework on Ultrasonic Microphone Jammers," in *Proceedings of IEEE International Conference on Computer Communications* (*IEEE INFOCOM 2022*), pp. 1119-1128, London, United Kingdom, May 2022, doi: 10.1109/INFOCOM48880.2022.9796834.

[C13]. Chao Wang, Feng Lin, Tiantian Liu, Ziwei Liu, Yijie Shen, Zhongjie Ba, **Li Lu**, Wenyao Xu, Kui Ren, "mmPhone: Acoustic Eavesdropping on Loudspeakers via mmWave-characterized Piezoelectric Effect," in *Proceedings of IEEE International Conference on Computer Communications* (*IEEE INFOCOM 2022*), pp. 820-829, London, United Kingdom, May 2022, doi: 10.1109/INFOCOM 48880.2022.9796806.

[C14]. Hao Kong, **Li Lu**, Jiadi Yu, Yingying Chen, Xiangyu Xu, Feilong Tang, Yi-chao Chen, "MultiAuth: Enable Multi-User Authentication with Single Commodity WiFi Device," in *Proceedings of ACM International Symposium on Mobile Ad Hoc Networking and Computing* (*ACM MobiHoc 2021*), pp.31-40, Shanghai, China, Jul. 2021, doi: 10.1145/3466772.3467032.

[C15]. Yang Bai, Jian Liu, **Li Lu**, Yilin Yang, Yingying Chen, Jiadi Yu, "BatComm: Enabling Inaudible Acoustic Communication with High-throughput for Mobile Devices," in *Proceedings of ACM Conference on Embedded Networked Sensor Systems* (*ACM SenSys 2020*), Yokohama, Japan, Nov. 2020. doi: 10.1145/3384419.3430773. [CSRankings-Mobile computing]

[C16]. Hua Xue, Jiadi Yu, Yanmin Zhu, **Li Lu**, Shiyou Qian, Minglu Li, "WiZoom: Accurate Multipath Profiling using Commodity WiFi Devices with Limited Bandwidth," in *Proceedings of Annual IEEE International Conference on Sensing, Communication, and Networking* (*IEEE SECON 2019*), pp. 1-9, Boston, MA, USA, Jun. 2019, doi: 10.1109/SAHCN.2019.8824859.

[C17]. Liu Liu, Hanlin Yu, Zhongjie Ba, **Li Lu**, Feng Lin, Kui Ren, "PassFace: Enabling Practical Anti-Spoofing Facial Recognition with Camera Fingerprinting," in *Proceedings of IEEE International Conference on Communications* (*IEEE ICC 2021*), pp. 1-6, Montreal, Canada, Jun. 2021, doi: 10.1109/ ICC42927.2021.9501053.

[C18]. Yanhua Cao, **Li Lu**, Jiadi Yu, Shiyou Qian, Yanmin Zhu, Minglu Li, "Online Cost-Aware Service Requests Scheduling in Hybrid Clouds for Cloud Bursting," in *Proceedings of the 18th International Conference on Web Information Systems Engineering* (*WISE 2017*), pp. 259-274, Moscow, Russia, Oct. 2017, doi: 10.1007/978-3-319-68783-4_18.

[C19]. Qiang Wu, Jiadi Yu, **Li Lu**, Shiyou Qian, Guangtao Xue, "Dynamically Adjusting Scale of a Kubernetes Cluster Under QoS Guarantee," in *Proceedings of IEEE International Conference on Parallel and Distributed Systems* (*IEEE ICPADS 2019*), pp. 193-200, Tianjin, China, Dec. 2019, doi: 10.1109/ICPADS47876.2019.00037.

[C20]. Ahmad Ali, **Li Lu**, Yanmin Zhu, Jiadi Yu, "An Energy Efficient Algorithm for Virtual Machine Allocation in Cloud Datacenters," in *Proceedings of Conference on Advanced Computer Architecture* (*CCF ACA 2016*), pp. 61-72, Weihai, Shandong, China, Aug. 2016, doi: 10.1007/978-981-10-2209-8_6.

Journal Papers

[J1]. **Li Lu**, Jiadi Yu, Yingying Chen, Hongbo Liu, Yanmin Zhu, Minglu Li, "Lip Reading-Based User Authentication Through Acoustic Sensing on Smartphones," *IEEE/ACM Transactions on Networking*, vol. 27, no. 1, pp. 447-460, Feb. 2019, doi: 10.1109/TNET.2019.2891733. (Reported by multiple media including IEEE Spectrum, Sohu Tech, etc.)

[J2].   **Li Lu**, Jiadi Yu, Yanmin Zhu, Minglu Li, "A Double Auction Mechanism to Bridge Users' Task Requirements and Providers' Resources in Two-Sided Cloud Markets," *IEEE Transactions on Parallel and Distributed Systems*, vol. 29, no. 4, pp. 720-733, Dec. 2018, doi: 10.1109/TPDS.2017.2781236.

[J3].   **Li Lu**, Jiadi Yu, Minglu Li, "Towards a Real-Time Anti-Theft Method for Mobile Devices Leveraging Acoustic Sensing," *Chinese Journal of Computers*, vol. 43, no. 10, pp. 2002-2018, Oct. 2020, doi: 10.11897/SP.J.1016.2020.02002.

[J4].   **Li Lu**, Jian Liu, Jiadi Yu, Yingying Chen, Yanmin Zhu, Linghe Kong, Minglu Li, "Enable Traditional Laptops with Virtual Writing Capability Leveraging Acoustic Signals," *The Computer Journal*, vol. 64, no. 12, pp. 1814-1831, Dec. 2021, doi: 10.1093/comjnl/bxz153.

[J5].   Jiadi Yu, **Li Lu**, Yingying Chen, Yanmin Zhu, Linghe Kong, "An Indirect Eavesdropping Attack of Keystrokes on Touch Screen through Acoustic Sensing," *IEEE Transactions on Mobile Computing*, vol. 20, no. 2, pp. 337-351, Feb. 2020, doi: 10.1109/TMC.2019.2947468.

[J6].   Hao Kong, **Li Lu**, Jiadi Yu, Yingying Chen, Feilong Tang, "Continuous Authentication through Finger Gesture Interaction for Smart Homes Using WiFi," *IEEE Transactions on Mobile Computing*, vol. 20, no. 11, pp. 3148-3162. May 2020, doi: 10.1109/TMC.2020.2994955.

[J7].   Yang Bai, **Li Lu**, Jerry Cheng, Jian Liu, Yingying Chen, Jiadi Yu, "Acoustic-based Sensing and Applications: A Survey," *Computer Networks*, vol. 181, pp. 107447:1-107447:19, Nov. 2020, doi: 10.1016/j.comnet.2020. 107447.

[J8].   Cong Shi, **Li Lu**, Jian Liu, Yan Wang, Yingying Chen, Jiadi Yu, "mPose: Environment- and Subject-Agnostic 3D Skeleton Posture Reconstruction Leveraging a Single mmWave Device", *Smart Health/IEEE/ACM CHASE*, vol. 23, pp. 100228:1-100228:14, Nov. 2021, doi: 10.1016/j.smhl. 2021.100228. (Invited Paper of IEEE/ACM CHASE 2021)

[J9].   Yanhua Cao, **Li Lu**, Jiadi Yu, Shiyou Qian, Yanmin Zhu, Minglu Li, "Online Cost-rejection Rate Scheduling for Resource Requests in Hybrid Clouds," *Parallel Computing*, vol. 81, pp. 85-103, Jan. 2019, doi: 10.1016/j.parco.2018.12.003.

Posters

[CP1].   Meng Chen, **Li Lu***, Jiadi Yu, Yingying Chen, Zhongjie Ba, Feng Lin, Kui Ren, "A Non-intrusive and Adaptive Speaker De-Identification Scheme Using Adversarial Examples," in Proceedings of *the 28th Annual International Conference on Mobile Computing and Networking* (*ACM MobiCom 2022*), pp. 853-855, Sydney, Australia, Oct. 2022. doi: 10.1145/3495243.3558260. [CSRankings-Mobile computing]

[CP2]. Yang Bai, Jian Liu, Yingying Chen, **Li Lu**, Jiadi Yu, "Poster: Inaudible High-throughput Communication Through Acoustic Signals," in *Proceedings of the 25th Annual International Conference on Mobile Computing and Networking* (*ACM MobiCom 2019*), pp. 79:1-79:3, Los Cabos, Mexico, Oct. 2019, doi: 10.1145/3300061.3343405. (First Runner-up Poster Award) [CSRankings-Mobile computing]

FUNDING

TEACHING

- Computer Systems II, Undergraduate teaching reform course for information security and Turing class, 21121840, Fall-Winter 2021-2022.

- Computer Systems I, Undergraduate teaching reform course for information security and Turing class, 21121830, Spring-Summer 2021-2022.
- Foundations of Wireless and IoT Security, Undergraduate, 21191930, Spring-Summer 2021-2022.
- Frontier Techniques and Research Methodology in Cyber Science, Graduate, 2102001001, Spring-Summer 2021-2022.
- Wireless and IoT Security, Graduate, 2124096001, Fall-Winter 2020-2022.
- Software Engineering, Undergraduate, Spring-Summer 2018, Fall-Winter 2017, Fall-Winter 2015, Teaching Assistant @Shanghai Jiao Tong University with Prof. Jiadi Yu.

AWARDS

- Best Poster Runner-up Poster Award, ACM MobiCom, 2022.
- Shanghai Computer Society Doctoral Dissertation Award Nominations, Shanghai Computer Society, 2020.
- ACM China SIGAPP Chapter Doctoral Dissertation Award, ACM China SIGAPP, 2020.
- Outstanding Graduate of Shanghai, Shanghai Education Committee, 2020.
- First Runner-up Poster Award, ACM MobiCom, 2019.
- Travel Grant of Global Young Scientist Summit of Singapore, National Research Foundation, 2019.
- Joint Ph.D. Training Grant, China Scholarship Council, 2018.
- National Scholarship for Doctoral Students, Ministry of Education of the People's Republic of China, 2018, 2019.
- Outstanding Graduate, Xi'an Jiaotong University, 2015.
- Excellent Undergraduate Student, Xi'an Jiaotong University, 2012-2014.
- National Encouragement Scholarship, Xi'an Jiaotong University, 2012, 2014.
- Lu Shidi 2nd Scholarship, Xi'an Jiaotong University, 2013.

PROFESSIONAL SERVICES

- Academic Organization Service: Executive Committee Member in China Computer Federation Technical Committee on Pervasive Computing (CCF TCPC)

  Deputy Secretary-general of Technical Committee in Zhejiang Cyber Space Security Association
- Technical Program Committee: IEEE INFOCOM 2022-2023

  IEEE ICDCS 2022-2023

  IEEE/ACM IWQoS 2021

  IEEE ICPADS 2019, 2022
- Reviewer: IEEE Transactions on Dependable and Secure Computing

  IEEE Transactions on Mobile Computing

  IEEE/ACM Transactions on Networking

  Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies

  IEEE Transactions on Vehicular Technology

  ACM Transactions on Sensor Networks

  IEEE Transactions on Services Computing

  IEEE Transactions on Multimedia

  IEEE Internet of Things Journal

  Computer Networks

  Knowledge-based Systems

  Smart Health

  Journal of Cloud Computing

Sensors
Journal of Cybersecurity and Privacy
IEEE ICC 2017
ACM AIIPCC 2019
- Co-Reviewer: IEEE Transactions on Parallel and Distributed Systems
    IEEE Transactions on Industrial Informatics
    ACM Transactions on Privacy and Security
    IEEE Transactions on Network and Service Management
    Journal of Computer Security
    ACM CCS
    ACM MobiSys
    IEEE PerCom
    IEEE DySPAN
- Member: China Computer Federation (CCF)
    Association of Computing Machinery (ACM)
    Institute of Electrical and Electronics Engineers (IEEE)