

# Soundarya Ramesh

(Last Updated: September, 2024)

## RESEARCH SUMMARY

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My research interests are broadly in the realm of sensor data analysis for enabling novel applications. Currently, in my PhD, I am investigating the utility of audio sensor data for security, including proposing robust authentication methods, launching attacks, and designing defenses against eavesdropping. Looking ahead, I aim to explore complex sensing challenges in emerging technologies such as AR/VR and wearables, as well as in the healthcare domain.

## CONTACT

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Website : <https://soundaryaramesh.github.io>

## EDUCATION

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**National University of Singapore**

Ph.D. Candidate, Computer Science

Advisors : Jun Han and Chan Mun Choon

Expected Graduation : Dec 2024

*Aug 2018 – Present*

*Current GPA : 4.92/5*

**National Institute of Technology Karnataka, India**

Bachelor of Technology in Information Technology

*Jul 2014 – May 2018*

*GPA : 9.01/10*

## CONFERENCE PAPERS

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- *MagTracer*: Detecting GPU Cryptojacking Attacks via Magnetic Leakage Signals.  
Rui Xiao, Tianyu Li, [Soundarya Ramesh](#), Jun Han, Jinsong Han. **ACM MobiCom 2023**.
- *TickTock*: Detecting Mic Status in Laptops Leveraging Electromagnetic Leakage of Clock Signals.  
[Soundarya Ramesh](#), Ghazali Hadi, Sihun Yang, Chan Mun Choon, Jun Han. **ACM CCS 2022**.
- Acoustics to the Rescue: Physical Key Inference Attack Revisited.  
[Soundarya Ramesh](#), Rui Xiao, Anindya Maiti, Jong Taek Lee, Harini Ramprasad, Ananda Kumar, Murtuza Jadliwala, Jun Han. **USENIX Security 2021**.
- Neuro-Symbolic Execution: Augmenting Symbolic Execution with Neural Constraints.  
Shen Shiqi, Shweta Shinde, [Soundarya Ramesh](#), Abhik Roychoudhury, Prateek Saxena. **NDSS 2019**.

## WORKSHOP PUBLICATIONS

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- *Your Mic Leaks Too Much*: A Double-Edged Sword for Security  
[Soundarya Ramesh](#). **ACM MobiSys Rising Stars 2024**.  
**Best Presentation Award**
- *RampScope*: Ramp-level Localization of Shared Mobility Devices using Sidewalk Ramps.  
Jonghyuk Yun\*, Gyuyeon Kim\*, [Soundarya Ramesh](#), Jun Han. **ACM HotMobile 2023**.
- Listen to Your Key: Towards Acoustics-based Physical Key Inference.  
[Soundarya Ramesh](#), Harini Ramprasad, Jun Han. **ACM HotMobile 2020**.  
**Media Coverage: ACM News, Forbes, Scientific American, HackerNews, Mashable and over 25,000 views on YouTube**

- *SoundUAV: Towards Delivery Drone Authentication via Acoustic Noise Fingerprinting.*  
Soundarya Ramesh, Thomas Pathier, Jun Han. **ACM DroNet 2019.**

## INDUSTRY CONFERENCES

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- *RollBack - A New Time-Agnostic Replay Attack Against the Automotive Remote Keyless Entry Systems.*  
Levente Csikor, Hoon Wei Lim, Jun Wen Wong, Soundarya Ramesh, Rohini Poolat Parameswarath, Chan Mun Choon. **Black Hat USA 2022.**

## POSTERS

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- *RampScope: Ramp-level Localization of Shared Mobility Devices using Sidewalk Ramps.*  
Jonghyuk Yun\*, Gyuyeon Kim\*, Soundarya Ramesh, Jun Han. **ACM HotMobile 2023.**  
**Best Poster Award**
- *SoundUAV: Fingerprinting Acoustic Emanations for Delivery Drone Authentication.*  
Soundarya Ramesh, Thomas Pathier, Jun Han. **ACM MobiSys 2019.**  
**Best Poster Runner-up Award**

## RESEARCH EXPERIENCES

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|--|---------------------|
| <b>Research Intern at Google, Mountain View</b>  | <i>May-Aug 2022</i> |
| Speech Processing for AR Glasses as part of the Augmented Language Team<br>Hosts : Chiong Lai, Mathieu Parvaix (co-host) |                     |
| <b>Research Intern at System Security Lab, NUS</b>   | <i>May-Dec 2017</i> |
| Augmenting Symbolic Execution with Constraints Approximated as a Neural Network<br>Host : Prateek Saxena                 |                     |
| <b>Research Intern at Cryptography and Information Security Lab, IISc</b>  | <i>May-Jun 2016</i> |
| Development of Efficient Protocols for Graph Consensus Problem in Directed Graphs<br>Host : Arpita Patra                 |                     |

## HONORS AND AWARDS

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| • <i>Google PhD Fellowship (under Mobile Computing research area)</i>           | <i>2021-2024</i> |
| • <i>NUS School of Computing Dean's Graduate Research Achievement Award</i>     | <i>2022</i>      |
| • <i>Placed on the Honor List of Student Tutors for Excellence in Teaching</i>  | <i>2022</i>      |
| • <i>Graduate Research Fellowship, National University of Singapore</i>         | <i>2018-2022</i> |
| • <i>Research Forum Award at the Deep Learning &amp; Security Workshop, NUS</i> | <i>2017</i>      |
| • <i>Indian Academy of Sciences Fellowship</i>                                  | <i>2016</i>      |

## INVITED TALKS

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| • Microsoft Research, Bengaluru, India (hosted by Rohan Gandhi) | <i>Aug 2024</i> |
| • SiNRG Lab (led by Prof. Romit Roy Choudhury), UIUC            | <i>May 2024</i> |
| • Acoustical Society of America Meeting in Ottawa, Canada       | <i>May 2024</i> |
| • Safesforce Cloud Security Assurance Team, Seattle             | <i>Sep 2023</i> |
| • NESL Lab (led by Prof. Mani Srivastava), UCLA                 | <i>Feb 2023</i> |

## SKILLS

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**Programming Languages:** Python, Matlab, C/C++

**Technical Expertise:** Ambient Audio Analysis, Speech Enhancement, Signal Processing, Machine Learning, Electromagnetic Signal-based Sensing

**Sensors:** Microphones, Inertial Measurement Units (IMUs), Optical Sensors (Cameras, PPGs)

**Hardware:** 3D-Printing and Prototyping, Development using Respeaker Microphone Array, USRP B210 Software Defined Radio, Raspberry Pi and Arduino

## TEACHING EXPERIENCE

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- Teaching Assistant for CS4222 Wireless Networks *Spring 2022*
- Teaching Assistant for CS3103 Computer Networks Practice *Fall 2021*
- Teaching Assistant for CS3235 Computer Security *Spring 2020*
- Teaching Assistant for CS5476 IoT Security *Fall 2019, Fall 2020*

## PROFESSIONAL SERVICE

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### Student Reviewing Member

- Master of Computing Admission in the School of Computing, NUS (2022)

### Program Committee Member / Reviewer

- ACM MobiCom 2024 S3 Workshop
- ACM MobiSys 2024 Artifact Evaluation
- ACM IMWUT 2023
- ACM Transactions on Internet of Things 2022

### External Reviewer

- Conferences: S&P 2024, Security 2024, IPSN 2024, SenSys 2020-2023, IoTDI 2020-2022, ICDCS 2020-2022, COMSNETS 2020-2021, WiSec 2019, MobiSys 2019, 2024
- Workshops: HotMobile 2022, 2024