

# Nakul Garg

**Contact Information**      3245 Brendan Iribe Center      +1 202-725-1919  
8125 Campus Drive      nakul22@umd.edu  
College Park, MD 20742      <https://www.cs.umd.edu/~nakul/>

**Research Interests**      Ultra-low-power Sensing, Ambient Sensing, Embedded AI, Ubiquitous Perception

**Education**      **Ph.D.**, Computer Science      2019–present  
University of Maryland, College Park  
  
**Bachelor of Technology**, ECE      2014–2018  
Guru Gobind Singh Indraprastha University

**Awards & Honors**

- SPiDR is the SIGMOBILE research highlight      2023
- Ann G. Wylie Dissertation Fellowship      2023
- Future Faculty Fellowship      2023
- Outstanding Graduate Assistant Award      2023
- Best paper award MobiSys      2022
- Three minute Thesis (3MT) Award      2022
- Owlet featured on cover of ACM GetMobile, June'21      2021
- Best demo award MobiSys      2021
- University of Maryland CS Summer Research Fellowship      2021
- Travel grant HotMobile, ACM SIGMOBILE      2020
- University of Maryland Graduate School Dean's Fellowship      2019
- Outstanding Student Volunteer Award by IEEE Delhi Section.      2018
- Winner of World Food India Hackathon. Awarded by President of India.      2017
- Winner of Celestini Project India 2017, IIT Delhi & Marconi Society.      2017
- Travel grant Mobicom'17, NSF, ACM SIGMOBILE      2017
- Winner of eYantra - National Robotics Competition, IIT Bombay      2017

**Publications**

Structure Assisted Spectrum Sensing for Low-power Acoustic Event Detection  
**Nakul Garg**, Harshvardhan Takawale, Yang Bai, Irtaza Shahid, Nirupam Roy  
IASA CPS IoT Week 2023

ThermWare: Towards Side-channel Defense for Tiny IoT Devices  
**Nakul Garg**, Irtaza Shahid, Erin Avllazagaj, Jennie Hill, Jun Han, Nirupam Roy  
HotMobile 2023

Poster: Bringing AR/VR to Everyday Life- A Wireless Localization perspective  
**Nakul Garg**, Irtaza Shahid, Karthik Sankar, Malleshm Dasari, Ram Sheshadri, Karthikeyan Sundaresan, Nirupam Roy  
HotMobile 2023

Poster: Natural Voice Interface for the Next Generation of Smart Spaces  
Yang Bai, **Nakul Garg**, Harshvardhan Takawale, Anupam das, Nirupam Roy  
HotMobile 2023

SPiDR: Ultra-low-power Acoustic Spatial Sensing for Micro-robot Navigation  
Yang Bai, **Nakul Garg (co-primary)**, Nirupam Roy  
Mobisys 2022

Poster: Ultra-low-power Acoustic Imaging  
Yang Bai, **Nakul Garg (co-primary)**, Nirupam Roy  
Mobisys 2022

VoiceFind: Noise-Resilient Speech Recovery in Commodity Headphones  
Irtaza Shahid, Yang Bai, **Nakul Garg**, Nirupam Roy  
IASA Workshop Mobisys 2022

Owlet: Enabling Spatial Information in Ubiquitous Acoustic devices  
**Nakul Garg**, Yang Bai (co-primary), Nirupam Roy  
Mobisys 2021

Demo: Microstructure-guided Spatial Sensing for Low-power IoT  
**Nakul Garg**, Yang Bai (co-primary), Nirupam Roy  
Mobisys 2021

Enabling Self-defense in Small Drones  
**Nakul Garg**, Nirupam Roy  
HotMobile 2020

Poster: Acoustic Sensing for Detecting Projectile Attacks on Small Drones  
**Nakul Garg**, Nirupam Roy  
HotMobile 2020

Evaluating LED-Camera Communication for Drones  
Bhawana Chhaglani, Abhay Sheel Anand, **Nakul Garg**, Ashwin Ashok  
LioT Workshop Mobicom 2020

Poster: DRIZY- Collaborative Driver Assistance Over Wireless Networks  
**Nakul Garg**, Ishani Janveja, Divyansh Malhotra, Chetan Chawla, Pulkit Gupta,  
Harshil Bansal, Aakanksha Chowdhery, Prerana Mukherjee, Brejesh Lall  
MobiCom 2017

## Experience

**Research Intern** May. 2022—Aug. 2022  
NEC Laboratories  
*Advised by* : Prof. Karthik Sundaresan, Dr. Ramanujan K Sheshadri

**Research Intern** Sept. 2018—July 2019  
Computer Science Department, IIT Delhi  
*Advised by* : Dr. Rijurekha Sen

**Technical Advisor** May 2018—Sept. 2018  
Celestini Project India, Marconi Society, Google, IIT Delhi  
*Led by* : Dr. Aakanksha Chowdhery (Google AI) and Dr. Brejesh Lall (IIT Delhi)

**Research Intern** Jun. 2017—Sept. 2017  
Celestini Project India, Marconi Society, Google, IIT Delhi  
*Advised by* : Dr. Aakanksha Chowdhery (Google AI) and Dr. Brejesh Lall (IIT Delhi)

<b>Selected Talks</b>	<b>Talk:</b> Ultra-low-power Perception for Micro-robots Sept 9, 2022 Maryland Robotics Center
	<b>Invited Talk:</b> Toward Battery-free robots April 26, 2022 First-Year Innovation & Research Experience, UMD
	<b>3MT:</b> Inventing Battery-free Devices for a Sustainable Present April 6, 2022 University of Maryland College Park, USA
	<b>Invited Talk:</b> Powering up the Next Generation of Robots Nov 16, 2021 First-Year Innovation & Research Experience, UMD
	<b>Invited Talk:</b> Owlet: Enabling Spatial Information in Ubiquitous Acoustic devices July 19, 2021 Stony Brook University (Online)
	<b>Invited Talk:</b> Owlet: Enabling Spatial Information in Ubiquitous Acoustic devices July 15, 2021 University of Illinois Urbana-Champaign (Online)
	<b>Talk:</b> Owlet: Enabling Spatial Information in Ubiquitous Acoustic devices July 2, 2021 Mars, Solar System, Milky way (Online)
<b>Teaching</b>	Workshop: TinyML and TensorFlow Lite, 2022
	CMSC715 Wireless and Mobile Systems for the IoT, Fall'21, Fall'22 Instructor: Prof. Nirupam Roy
	Workshop: Introduction to Matlab, 2021
	CMSC420 Advanced Data Structures, Fall'19, Spring'21 Instructor: Prof. David Mount
	CMSC818W Wireless and Mobile Systems for the IoT, Fall'20 Instructor: Prof. Nirupam Roy
	CMSC417 Computer Networks, Spring'20 Instructor: Prof. Nirupam Roy
	Workshop Series: Embedded AI and Robotics, 2016-18
<b>Media Coverage</b>	<ul style="list-style-type: none"> <li>• Owlet: ACM GetMobile</li> <li>• DopplerDodge: The Economist, Robotics Industry News, ...</li> <li>• Aerogram: Times of India, Hindustan Times, ...</li> </ul>
<b>Activities &amp; Services</b>	<ul style="list-style-type: none"> <li>• Shadow TPC Sensys'22</li> </ul>

- Reviewer IEEE Transactions on Mobile Computing
- Mentor at Bitcamp Research Trail 2021. An initiative to engage BIPOC students in research.
- President of the IEEE student chapter at BVP in the academic year 2017-18.
- Chairperson of the Robotics and Automation Society. Conducted 20 workshops in the academic year 2016-17.