

Ayon Chakraborty

Assistant Professor, IIT Madras

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Research Interests

I am broadly interested in system-level design of future intelligent wireless systems and sensing technologies, spanning both algorithm design as well as system prototyping. I direct the Sensing and Networked Systems Engineering (SeNSE) group at IIT Madras.

Education

- 2011 – 2017 ■ **Ph.D. in Computer Science**, *SUNY Stony Brook*, New York, USA.
Thesis: *Data-driven Performance Optimization in Wireless Networks*
Advisor: Samir R. Das
- 2007 – 2011 ■ **B.E. in Computer Science & Engineering**, *Jadavpur University*, Kolkata, India.
Winner of Department Gold Medal, Best Project Award (sponsored by TCS)
- 1992 – 2007 ■ **Secondary and Higher Secondary**, *South Point (High) School*, Kolkata, India.

Professional Appointments

- 2020 - ■ **Assistant Professor, IIT Madras**, Chennai, India.
Department of Computer Science and Engineering
- 2017 - 2020 ■ **Research Scientist, NEC Laboratories America**, Princeton, New Jersey.
Mobile Communication and Networking Department
- 2011 – 2017 ■ **Research Assistant, SUNY Stony Brook**, Stony Brook, New York.
WINGS Laboratory, Department of Computer Science
- Summer 2015 **Hewlett-Packard Laboratories**, Palo Alto, California, (extended for one year).
- Summer 2014 **Huawei (Futurewei) Technologies**, Bridgewater, New Jersey.
- Summer 2013 **Bell Laboratories**, Murray Hills, New Jersey.
- Summer 2010 **Leibniz Universität Hannover**, Hannover, Germany, (DAAD WISE Fellowship 2010).
- Summer 2009 **IIT Kharagpur**, Kharagpur, West Bengal, India.

Selected Publications [Citations: 745+, h-index: 16]

- [PerCom] Manoj Lenka and **Ayon Chakraborty**. *EcoVis: Towards Energy and Connectivity Optimized Visual Surveillance*, accepted in IEEE PerCom 2025.
- [MobiHoc] Subrata Das and **Ayon Chakraborty**. *SkyScale: A Radio Tomographic Approach Towards Scaling UAV Network Deployments*, in ACM MobiHoc 2024.
- [AloT] Amartya Basu and **Ayon Chakraborty**. *SpecNeRF: Neural Radiance Field Driven Wireless Coverage Mapping for 5G Networks*, in AloT, ACM MobiHoc Workshops 2024.
- [AloT] SnehadEEP Gayen, Yamini Shankar and **Ayon Chakraborty**. *Improving Network Resource Utilization for Distributed Wireless Sensing Applications*, in AloT, ACM MobiHoc Workshops 2024.

- [IEEE TMC] Amartya Basu, **Ayon Chakraborty**, and Kush Jajal. *Ubiquitous Indoor Mapping using Mobile Radio Tomography*, accepted in IEEE Transactions on Mobile Computing, Vol.23, No.12 (2024).
- [WiSense] Manoj Lenka and **Ayon Chakraborty**. *On-Device Deep Learning for IoT-based Wireless Sensing*, in WiSense, IEEE Percom Workshops 2024.
- [ICC] Junye Li, Deepak Mishra, Dilip Krishnaswamy, **Ayon Chakraborty**, Joseph Davis, Aruna Seneviratne. *WiFi Interference-Based Adversarial Attacks on NTC Using CSI Sensing*, in IEEE ICC 2022.
- [NSDI] Ashutosh Dhekne, **Ayon Chakraborty**, Karthik Sundaresan, Sampath Rangarajan. *TrackIO: Tracking First Responders Inside-Out*, in USENIX NSDI 2019.
- [IEEE TCCN] Arani Bhattacharya, **Ayon Chakraborty**, Samir Das, Himanshu Gupta, and Petar M. Djuric. *Spectrum Patrolling with Crowdsourced Spectrum Sensors*, in IEEE Transactions on Cognitive Communications and Networking 6.1 (2019): 271-281.
- [WCNC] Md Shaifur Rahman, Himanshu Gupta, **Ayon Chakraborty**, Samir Das *Creating Spatio-Temporal Spectrum Maps from Sparse Crowdsensed Data*, IEEE Wireless Communications and Networking Conference 2019.
- [CoNEXT] **Ayon Chakraborty**, Eugene Chai, Karthik Sundaresan, Amir Khojastepour, Sampath Rangarajan. *SkyRAN: A Self-Organizing LTE RAN in the Sky*, in ACM SIGCOMM CoNEXT 2018.
- [INFOCOM] **Ayon Chakraborty**, Arani Bhattacharya, Snigdha Kamal, Samir Das, Himanshu Gupta and Petar Djuric. *Spectrum Patrolling with Crowdsourced Spectrum Sensors*, in IEEE INFOCOM 2018.
- [INFOCOM] **Ayon Chakraborty**, Shaifur Rahman, Himanshu Gupta and Samir Das. *SpecSense: Crowdsensing for Efficient Querying of Spectrum Occupancy*, in IEEE INFOCOM 2017.
- [CONEXT] **Ayon Chakraborty**, Shruti Sanadhya, Samir Das, Dongho Kim and Kyu-Han Kim. *ExBox: Experience Management Middlebox for Wireless Networks*, in ACM SIGCOMM CoNEXT 2016.
- [ATC] Vasudevan Nagendra, Himanshu Sharma, **Ayon Chakraborty** and Samir Das. *LTE-Xtend: Scalable Support of M2M Devices in Cellular Packet Core*, in ACM All Things Cellular 2016.
- [HOT WIRELESS] **Ayon Chakraborty**, Udit Gupta and Samir Das. *Benchmarking Resource Usage for Spectrum Sensing on Commodity Mobile Devices*, in ACM HotWireless 2016.
- [DCOSS] **Ayon Chakraborty** and Samir Das. *Designing a Cloud-Based Infrastructure for Spectrum Sensing: A Case Study for Indoor Spaces*, in IEEE DCOSS 2016.
- [INFOCOM] **Ayon Chakraborty**, Luis Ortiz and Samir Das. *Network-side Positioning of Cellular-band Devices with Minimal Effort*, in IEEE INFOCOM 2015.
- [CONEXT] **Ayon Chakraborty** and Samir Das. *Measurement-Augmented Spectrum Databases for White Space Spectrum*, in ACM SIGCOMM CoNEXT 2014.
- [IMC] Fatima Zarinni, **Ayon Chakraborty**, Vyas Sekar, Samir Das and Phillipa Gill. *A First Look at Performance in Mobile Virtual Network Operators*, in ACM SIGCOMM IMC 2014. **Best Paper Award Nominee.**
- [MOBICOM] **Ayon Chakraborty**, Samir Das and Milind Buddhikot. *Radio Environment Mapping with Mobile Devices in the TV White Space*, ACM MOBICOM 2013 (Extended Abstract). **Finalist in ACM Student Research Competition.**

[SENSORS] Ayon Chakraborty, Rashmi R. Rout, Aveek Chakrabarti and Soumya K. Ghosh. *On Network Lifetime Expectancy with Realistic Sensing and Traffic Generation Model in Wireless Sensor Networks*, IEEE Sensors Journal, 2013(7).

[CELLNET] Ayon Chakraborty and Samir Das. *Adapp: An Adaptive Network Selection Framework for Smartphone Applications*, in CellNet, ACM MobiSys Workshops, 2013.

Patents & Invention Disclosures [Granted: 8, Applied: 4]

■ At IIT Madras, Chennai, India

1. **System and Method for Visual Analytics Pipelines (VAPS) for Real-time Surveillance**, Ayon Chakraborty and Manoj Lanka. [Filed, Indian Patent 202541017351](#)
2. **Method and System for Performing Sensing on a Wireless Device**, Ayon Chakraborty and Manoj Lanka. [Filed, Indian Patent 202441017442](#)
3. **A System and Method for Mapping Indoor Spaces in Real-Time**, Ayon Chakraborty and Amartya Basu. [Filed, Indian Patent 202441040240](#)
4. **A Method and System for Determining an Optimal Operating Position of an Unmanned Aerial Vehicle in Wireless Networks**, Ayon Chakraborty and Subrata Das. [Filed, Indian Patent 202441076383](#)

■ With NEC Laboratories America, Princeton, New Jersey

5. **Infrastructure-free Tracking and Response**, Ayon Chakraborty, Karthikeyan Sundaresan, Sampath Rangarajan, Md Shaifur Rahman. [Granted, US Patent 11,595,934](#)
6. **Infrastructure-free RF Tracking in Dynamic Indoor Environments**, Ayon Chakraborty, Karthikeyan Sundaresan, Sampath Rangarajan, Md Shaifur Rahman. [Granted, US Patent 11,388,564](#)
7. **Tracking Indoor Objects from an Unmanned Aerial Vehicle (UAV)**, Karthikeyan Sundaresan, Ayon Chakraborty, Sampath Rangarajan, Ashutosh Dhekne. [Granted, US Patent 11,089,432](#)
8. **Tracking Indoor Objects with Inertial Sensor Measurements**, Ayon Chakraborty, Karthikeyan Sundaresan, Sampath Rangarajan, Ashutosh Dhekne. [Granted, US Patent 11,169,518](#)
9. **Self-configuring LTE Radio Access Network on Unmanned Autonomous Vehicles**, Karthikeyan Sundaresan, Eugene Chai, Sampath Rangarajan, Ayon Chakraborty. [Granted, US Patent 11,054,843](#)
10. **Implementing Wireless Communication Networks using Unmanned Aerial Vehicles**, Karthikeyan Sundaresan Eugene Chai, Ayon Chakraborty, Sampath Rangarajan. [Granted, US Patent 10,470,243](#)

■ With Hewlett-Packard Laboratories, Palo Alto, California

11. **Managing Network Traffic Using Experiential Capacity**, Ayon Chakraborty, Shruti Sanadhya, Kyu-Han Kim. [Granted, US Patent 11,134,409](#)
12. **Determining Whether a Flow is to be Added to a Network**, Ayon Chakraborty, Shruti Sanadhya, Kyu-Han Kim. [Granted, US Patent 10,271,240](#)

Funded Research Grants

Total share as PI: ≈93 Lakhs INR

- **(2023 – 2025)** *Infrastructure-free Localization in Dynamic Indoor Environments*
SERB - Startup Research Grant (SRG), Govt. of India
- **(2022 – 2023)** *Synthesizing Adversarial Timeseries for Robust Networked Control Systems*
India – United States of America (University of Texas, Austin), Collaborative Research Grant - NSF

- (2021 – 2023) *Next Generation Telecommunications Networks: Privacy and Security Challenges, Regulatory Interventions and Policy Framework*
Australia-India Cyber and Critical Technology Partnership - AICCTP, jointly with U.Sydney and UNSW
- (2021 – 2025) IIT Madras New Faculty Startup Grant
- (2020 – 2024) IIT Madras New Faculty Initiation Grant

Teaching and Student Guidance

■ Courses taught at IIT Madras [January – May: Holi Semester, July – Nov: Diwali Semester]

CS3205: Introduction to Computer Networks (UG 110 students)	Holi Semester, 2025
CS1100: Introduction to Computer Programming (UG 40 students)	Diwali Semester, 2024
CS3205: Introduction to Computer Networks (UG 106 students)	Holi Semester, 2024
CS2300: Foundations of Computer System Design (UG 107 students)	Diwali Semester, 2023
CS2310: Foundations of Computer System Design Lab (UG 96 students)	Diwali Semester, 2023
CS6650: Smart Sensing for Internet of Things (PG 49 students)	Holi Semester, 2023
CS2300: Foundations of Computer System Design (UG 97 students)	Diwali Semester, 2022
CS2310: Foundations of Computer System Design Lab (UG 88 students)	Diwali Semester, 2022
CS3205: Introduction to Computer Networks (UG 105 students)	Holi Semester, 2022
CS6650: Smart Sensing for Internet of Things (PG 65 students)	Diwali Semester, 2021
CS6650: Smart Sensing for Internet of Things (PG 41 students)	Holi Semester, 2021

■ Online workshop/courses/MOOCs

Smart Sensing for IoT (Industry Web M.Tech course)	Aug'24 - Nov'24
Computer System Design (BS-Data Science NPTEL)	Sep'23 - Jan'24
Smart Sensing for IoT (Industry Web M.Tech course)	Jan'23 - May'23
IIT Workshop on Location Tracking for IoT (1 week workshop)	Mar'22

■ Student Guidance at IIT Madras

- **Research Scholars** (1 PhD + 3 MS (Research))
 - Yamini Shankar ▷ PhD candidate, 2022 -->
 - Subrata Das (Thesis submitted) ▷ MS(Research), 2021 – 2024
 - Amartya Basu (Thesis submitted) ▷ MS(Research), 2021 – 2024
 - Institute Research Award (MS), Research Excellence Award, Funding for pre-incubation
 - **Next:** Doctoral candidate at SUNY Stony Brook, New York, USA
 - Manoj Kumar Lenka ▷ MS(Research), 2022 – 2024
 - **Next:** Doctoral candidate at NTU, Singapore
- **M.Tech Students (MTP)**
 - Hritik Kumar (2024), Sai Reddy (2024), Parthasarathy Reddy (2024), Raghav Gupta (2024), Harsh Gupta (2024), Dushyant Singh (2024), Jasmine Karki (2023), Krishna Shah Teli (2023), Kush Biren Jajal (2022), Shibobrota Das (2021)
- **B.Tech/Dual degree Students (BTP/UGRC)**
 - Aadyot Bhardwaj (2024) Prasann Sanjaybhai (2024) Suhail Sivaraman (2024) Aditya CR (2024) Anmol Panda (2024) Prithvi Rao (2023) Karthick Krishna (2023) Ritvik Rishi (2022), Rishika Verma (2021), Sri Sindhu Gunturi (2021), Nithin Uppalapathi Chowdhury (2021)
- **Internship at SeNSE group**
 - **ACM India Avneshan Setu Internship Program (PhD)**
 - Ruthwik Muppala (IIIT Hyderabad, 2023), Shareefa Fairoose (NIT Calicut, 2024)

- **IITM Summer Fellowship Program (UG)**
 - Abhiraj Sen and Aaryan Saha (Jadavpur University, 2023)
- **Others**
 - Yesindan Radhakrishnan (Semester exchange student from University of Jaffna, Sri Lanka)
 - Arko Dutta (NIT Durgapur)

Selected Conference and Invited Talks

- **Radios as Sensors - the Good, the Bad and the Ugly.**
 - Special guest speaker at the *IoT, Robotics, and AI/ML Workshop*, IIIT Sri City, Dec'24.
 - Keynote talk at SoCleTY Workshop, ICDCN 2024, IIT Madras, Jan'24.
 - Invited talk at *CSE Bytes*, Department of CSE, IIT Madras, Feb'23.
 - Invited talk at Jadavpur University, IEEE Computer Society Chapter, Kolkata section, Dec'22.
- **SkyScale: A Radio Tomographic Approach Towards Scaling UAV Network Deployments**, ACM MobiHoc 2024, Athens, Greece.
- **Research Overview in Computer Systems and Networking** - Invited talk at the ACM India Research Opportunities in Computer Science (ROCS), IIT Madras, Dec'23.
- **Exploring Wi-Fi-based Sensing – Experiments and Privacy Implications**, Invited talk at Australia-India Cyber and Critical Technology Partnership (AICCTP) workshop, Bangalore, India, Nov'22.
- **Drones as On-Demand Infrastructure for Next-Generation Wireless Networks**
 - Keynote talk at the *Third International Conference on Advances in Distributed Computing and Machine Learning* (ICADCML), NIT Warangal (Jan'22).
 - Conducted online seminars at 10+ Faculty Development Program (FDP) initiatives at various institutes across India (NIT Silchar (Aug'21), IIIT Kurnool (Sep'21), KIIT Bhubaneswar (Oct'21) etc.).
 - Indian Institute of Technology (IIT) - Madras, Delhi, Kanpur, Kharagpur (Feb'20)
- **TrackIO: Tracking First Responders Inside-Out**, USENIX NSDI 2019, Boston, Massachusetts.
- **SkyRAN: A Self-Organizing LTE RAN in the Sky**, ACM CoNEXT 2018, Heraklion, Greece.
- **SkyLiTE: End-to-End Design of Low-altitude UAV Networks for Providing LTE Connectivity**, Invited Talk (Industry) at 39th IEEE Sarnoff Symposium 2018, Newark, New Jersey.
- **Data-Driven Techniques Towards Performance Optimization in Wireless Networks** (Feb/Mar'17)
 - NEC Laboratories, Princeton, NJ.
 - Samsung Research America, Mountain View, California.
 - Xerox Research Center India, Bangalore.
 - Indian Institute of Technology (IIT) – Delhi, Madras, Bombay.
- **ExBox: Experience Management Middlebox for Wireless Networks**, ACM CoNEXT 2016, Irvine, California.
- **Benchmarking Resource Usage for Spectrum Sensing on Commodity Mobile Devices**, ACM MobiCom 2016 (HotWireless Workshop), New York City.
- **Designing a Cloud-Based Infrastructure for Spectrum Sensing: A Case Study for Indoor Spaces**, IEEE DCOSS 2016, Washington DC.

- **Network-side Positioning of Cellular-band Devices with Minimal Effort**, IEEE INFOCOM 2015, Hong Kong.
- **Measurement-Augmented Spectrum Databases for White Space Spectrum**, ACM CoNEXT 2014, Sydney, Australia.
- **Radio Environment Mapping with Mobile Devices in the TV White Space**, ACM MobiCom 2013, Miami, Florida. (Finalist in ACM Student Research Competition.)

Professional Services

■ Journal Editorial Board Member:

- Ad-Hoc Networks (Elsevier)

■ Journal Reviewer:

- IEEE Transactions on Mobile Computing (2024, 2022, 2021, 2020, 2019, 2018, 2017)
- IEEE Transactions on Wireless Communications (2021, 2020, 2019, 2018, 2017)
- IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (2023)
- IEEE Communications Magazine (2020, 2019)
- IEEE Transactions on Networking (2020, 2019)
- Elsevier Computer Communications (2018)

■ Technical Program Committee Member:

- ACM CoNEXT (2025, 2024)
- IEEE INFOCOM (2025, 2024)
- ICDCN (2025, 2024, 2023, 2022)
- COMSNETS (2025, 2024, 2023, 2022, 2021)
- IEEE ICCCN (2022)
- ACM COMPASS (2022, 2021)
- IEEE ICDCS (2021, 2019, 2018)

■ Conference Chairing Activities:

- Area chair (Networks): ACM India ARCS '24, '25 (Academic Research and Careers for Students)
- Session chair: COMSNETS'21, ACM CoNEXT'18
- Tutorial chair: ICDCN'23
- Organizing chair: ICDCN'24

Awards, Achievements and Honors

- ACM India Eminent Speaker (2025 – 2027)
- Our UBIQMAP project on real-time indoor mapping is covered by major print media outlets including Times of India, The Hindu, Hindustan Times, India Today etc.
- Startup founded on TRACKIO localization technology, 2020. <https://www.navigateio.com>

- Semi-finalist (TRACKIO) at *UnderFire Response Innovation Showcase 2019* @TexasA&M.
- Best Paper Award Nominee in ACM Sigcomm IMC 2014.
- NSF Travel Awards for ACM MobiCom ('13), ACM CoNext ('13, '14, '16), ACM IMC ('14).
- Finalist in ACM Student Research Competition at ACM Mobicom 2013.
- Received University Fellowship (2011–2012), Stony Brook University.
- Awarded Department Gold Medal, Jadavpur University. (sponsor: Tata Consultancy Services Ltd.)
- Recipient of University Grants Commission (Govt. of India) grant, for best undergraduate project.
- Awarded the DAAD WISE fellowship 2010 for internship at Leibniz Universität Hannover, Germany.
- State government award, secondary school board finals (ranked 29th out of ≈ 0.5 million students).