

Moinak Ghoshal

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PROFILE

Completed P.h.D. at Northeastern University under the guidance of Prof. Dimitrios Koutsonikolas. My research interests are broadly in experimental wireless networking and mobile computing with a current focus on enabling the next generation of bandwidth- and latency-critical mobile applications – augmented reality (AR), virtual reality (VR), cloud gaming, and connected autonomous vehicles over 5G and Beyond 5G networks.

EDUCATION

Northeastern Univeristy (transferred from SUNY Buffalo, USA, in Jan, 2021) <i>PhD Candidate</i> GPA: 3.96	Boston, USA 01/2020 - 08/2026
Northeastern Univeristy <i>Master of Science, Electrical and Computer Engineering</i> - GPA: 3.96 - May 2022: Successfully defended Master's thesis Topic: Can 5G mmWave support Multi-User AR?	Boston, USA 01/2020 - 08/2022
Maulana Abul Kalam Azad Univesity of Technology <i>Bachelor of Technology (B. Tech in Information Technology)</i> GPA: 8.48	Kolkata, India 08/2013 - 07/2017

EXPERIENCE

Research Assistant <i>WiNS Lab (Northeastern University, University at Buffalo)</i> - Worked on understanding the capabilities and constraints of operational 5G/xG networks and their impact on the performance of latency critical applications (LCAs) such as mobile augmented reality, connected autonomous vehicles, etc. I also demystify different operator policies of cellular networks wrt. handovers, beam management, and resource allocation. My current work also involves system prototyping for 5G/xG networks. - Worked on experimental evaluation of commercial WiFi 6/6e devices in terms of their performance and interference characteristics. - Worked on 60 GHz networks and did experimental evaluation of performance and energy consumption of commercially available 802.11ad enabled smartphones. - Was involved in porting Multi-Path TCP on commercially available mobile phones to simultaneously use 60 GHz and 5 GHz networks and understand their performance, energy consumption, and challenges associated with it.	01/2020 - 08/2026
Research Associate Intern <i>Hewlett Packard Labs</i> Worked with the Networking and Distributed Systems Lab (NDSL) to deploy, evaluate and compare Wi-Fi and P5G in terms of their range, coverage, network performance (throughput, latency, etc.), and interaction with latency-critical-applications.	05/2025 - 04/2026 Milpitas, CA
Research Intern <i>Futurewei Technologies</i> Worked with the wireless standards and research team on the intersection of AI/ML, sensing, and energy-efficiency for next-generation of cellular networks.	05/2024 - 09/2024 Addison, TX
R&I Intern <i>InterDigital</i> Worked on 5G PHY layer optimization to reduce end-to-end delay for emerging latency critical applications like XR, CAV, etc. Implemented the solution in a 3GPP compliant OAI testbed for performance evaluation.	05/2023 - 09/2023 Los Altos, CA
R&D Engineer, Software <i>Keysight Technologies</i>	08/2017 – 01/2020 Kolkata, India

(* indicates co-primary authors and underlining denotes presented at conference/workshop)

Journal Publications

1. **Roads, Radios, and Reality: What 5G Looks Like From the Driver's Seat.**
Moinak Ghoshal, Imran Khan, Z. Jonny Kong, Omar Basit, Sizhe Wang, Yufei Feng, Phuc Dinh, Jiayi Meng, Y. Charlie Hu, and Dimitrios Koutsonikolas.
Invited article. In ACM Mobile Computing and Communications (GetMobile), Vol. 9(4), December 2025.
2. **How Mature is 5G Deployment? A Cross-Sectional, Year-Long Study of 5G Uplink Performance?**
Imran Khan, **Moinak Ghoshal**, Joana Angjo, Sigrid Dimce, Mushahid Hussain, Paniz Parastar, Yenchia Yu, Xueting Deng, Sumit Hawal, Shirui Huang, Ameya Rane, Yin Wang*, Claudio Fiandrino, Charalampos Orfanidis, Shivang Aggarwal, Ana C Aguiar, Ozgu Alay, Carla Fabiana Chiasserini, Falko Dressler, Y. Charlie Hu, Steven Y. Ko, Dimitrios Koutsonikolas, and Joerg Widmer.
Accepted in Elsevier Computer Communications (COMCOM), March 2025.
3. **Demystifying Resource Allocation Policies in Operational 5G mmWave Networks**
Phuc Dinh*, **Moinak Ghoshal***, Dimitrios Koutsonikolas, Joerg Widmer.
In IEEE/ACM Transactions on Networking (ToN), Vol. 33(2), pp. 745-760, April 2025.
4. **An Experimental Study of the Performance of IEEE 802.11ad in Smartphones.**
Shivang Aggarwal, **Moinak Ghoshal**, Piyali Banerjee, and Dimitrios Koutsonikolas.
Accepted in Elsevier Journal of Computer Communications (COMCOM), Vol. 169, pp. 220-231, March 2021.
5. **An Evolutionary Algorithm Based Parameter Estimation Using Pima Indians Diabetes Dataset.**
Chandan Banerjee, Sayak Paul, **Moinak Ghoshal**
Accepted in International Journal on Recent and Innovation Trends in Computing and Communication, 2017.

Refereed Conference Publications

1. **Disentangling the Throughput Contributions of MIMO and Carrier Aggregation in 5G Networks.**
Yufei Feng, Phuc Dinh, **Moinak Ghoshal**, Omar Basit, Sizhe Wang, Y. Charlie Hu, Dimitrios Koutsonikolas.
In Proceedings of the Passive and Active Measurement Conference (PAM 2026), Virtual Conference, March 23-25, 2026. (acceptance rate 31.5%).
2. **Exploring the 5G Digital Divide in the Non-Contiguous US: LEO Satellites to the Rescue?**
Sizhe Wang, **Moinak Ghoshal**, Yufei Feng, Imran Khan, Phuc Dinh, Omar Basit, Zhekun Yu, Y. Charlie Hu, Dimitrios Koutsonikolas.
In Proceedings of the ACM International Conference on Measurements and Modeling of Computer Systems (SIGMETRICS 2026), Ann Arbor, Michigan, USA, June 8-12, 2026. (Winter deadline, acceptance rate 20.7%)
3. **A First Large-scale Study of Operational 5G Standalone Networks. (Best Community Paper Runner-Up)**
Moinak Ghoshal, Omar Basit, Sizhe Wang, Phuc Dinh, Imran Khan, Yufei Feng, Zhekun Yu, Y. Charlie Hu, Dimitrios Koutsonikolas.
In Proceedings of the 21st ACM International Conference on emerging Networking EXperiments and Technologies (CoNEXT 2025), Hong Kong, December 1-4, 2025.
4. **Replication: Performance of Cellular Networks on the Wheels**
Moinak Ghoshal, Omar Basit, Imran Khan, Z. Jonny Kong, Sizhe Wang, Yufei Feng, Phuc Dinh, Y. Charlie Hu, Dimitrios Koutsonikolas.
In Proceedings of the 25th ACM Internet Measurement Conference (IMC 2025), Madison, WI, USA, October 28-31, 2025. (Acceptance rate 23.6%).
5. **5G Metamorphosis: A Longitudinal Study of 5G Performance from the Beginning.**
Imran Khan, Omar Basit, **Moinak Ghoshal**, Y. Charlie Hu, Dimitrios Koutsonikolas.
In Proceedings of the 25th ACM Internet Measurement Conference (IMC 2025), Madison, WI, USA, October 28-31, 2025. (Acceptance rate 23.6%).
6. **Vivisecting Beam Management in Operational 5G mmWave Networks.**
Yufei Feng, Phuc Dinh, **Moinak Ghoshal**, Eduardo Baena, Dimitrios Koutsonikolas.
In Proceedings of the 21st ACM International Conference on emerging Networking EXperiments and Technologies (CoNEXT 2025), Hong Kong, December 1-4, 2025. (Winter round acceptance rate 6.6%).

7. **AI/ML-Based Sensing-Assisted Energy-Efficient Communications in Next-Gen Cellular Networks.**
Moinak Ghoshal, Abbas Kiani, Amanda Xiang, John Kaippallimalil, Tony Saboorian, Rostand A.K. Fezeu, Nirwan Ansari.
In Proceedings of the 102nd IEEE Vehicular Technology Conference (VTC Fall 2025), Chengdu, China, Oct 19-22, 2025.
8. **mm-NOLOC: mmWave-based Localization for Mobile Networks without 3GPP Location Service.**
Phuc Dinh, Yufei Feng, Eduardo Baena, Yunmeng Han, Weiming Qi, Zihan Xu, Moinak Ghoshal, Pau Closas, Dimitrios Koutsonikolas and Joerg Widmer.
In Proceedings of the 26th ACM International Symposium on Theory, Algorithmic Foundations, and Protocol Design for Mobile Networks and Mobile Computing (MobiHoc 2025), Houston, TX, October 27-30, 2025. (Acceptance rate 23%).
9. **Root Cause Analysis of Cellular Network Throughput Degradations under Vehicular Mobility.**
Eduardo Baena, Zihan Xu, Moinak Ghoshal, Imran Khan, Phuc Dinh, Z. Jonny Kong, Y. Charlie Hu, and Dimitrios Koutsonikolas.
In Proceedings of the 22nd IEEE International Conference on Mobile Ad Hoc and Smart Systems (MASS 2025), Chicago, IL, October 6-8, 2025. (Acceptance rate 29.6%).
10. **A Large-Scale Study of the Potential of Multi-Carrier Access in the 5G Era.**
Fukun Chen*, Moinak Ghoshal*, Enfu Nan, Imran Khan, Phuc Dinh, Z. Jonny Kong, Y. Charlie Hu, Dimitrios Koutsonikolas.
In Proceedings of the Passive and Active Measurement Conference (PAM 2025), Virtual Conference, March 10-12, 2025. (acceptance rate 29.8%).
11. **Enabling low-latency applications through UE-assisted proactive PHY frame reconfiguration in next-generation cellular networks.**
Moinak Ghoshal, Subhramoy Mohanti, Dimitrios Koutsonikolas.
In Proceedings of the 35th Annual International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC 2024), Valencia, Spain, September 2-5, 2024.
12. **A First Look at 160 MHz WiFi 6/6E in Action: Performance and Interference Characterization.**
Moinak Ghoshal*, Shravan Bhoopasamudram Krishna*, Francesco Gringoli, Joerg Widmer, Dimitrios Koutsonikolas.
In Proceedings of the 23rd IFIP/IEEE Networking Conference (NETWORKING 2024), Recent Results, Thessaloniki, Greece, June 3-6, 2024.
13. **How Mature is 5G Deployment? A Cross-Sectional, Year-Long Study of 5G Uplink Performance?**
Imran Khan, Moinak Ghoshal, Joana Angio, Sigrid Dimce, Mushahid Hussain, Paniz Parastar, Yenchia Yu, Claudio Fiandrino, Charalampos Orfanidis, Shivang Aggarwal, Ana C Aguiar, Ozgu Alay, Carla Fabiana Chiasserini, Falko Dressler, Y. Charlie Hu, Steven Y. Ko, Dimitrios Koutsonikolas, Joerg Widmer.
In Proceedings of the 23rd IFIP/IEEE Networking Conference (NETWORKING 2024), Thessaloniki, Greece, June 3-6, 2024.
14. **Performance of Cellular Networks on the Wheels.**
Moinak Ghoshal*, Imran Khan*, Jonny Kong*, Phuc Dinh, Jiayi Meng, Y. Charlie Hu, Dimitrios Koutsonikolas.
In Proceedings of the 23rd ACM Internet Measurement Conference (IMC 2023), Montreal, Canada, October 24-26, 2023. (acceptance rate 25%).
15. **Can 5G mmWave Enable Edge-Assisted Real-Time Object Detection for Augmented Reality?**
Moinak Ghoshal*, Z. Jonny Kong*, Qiang Xu*, Zixiao Lu, Shivang Aggarwal, Imran Khan, Yuanjie Li, Y. Charlie Hu, Dimitrios Koutsonikolas.
In Proceedings of the 31st International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (MASCOTS 2023), Stony Brook, NY, USA, October 14-18, 2023. (acceptance rate 30%).
16. **Co-located Immersive Gaming: A Comparison between Augmented and Virtual Reality**
Moinak Ghoshal, Juan Ong, Hearan Won, Dimitrios Koutsonikolas, Caglar Yildirim.
In Proceedings of the IEEE Conference on Games (CoG 2022), Beijing, China (Virtual), August 21-24.
17. **Demystifying Resource Allocation Policies in Operational 5G mmWave Networks**
Phuc Dinh*, Moinak Ghoshal*, Dimitrios Koutsonikolas, Joerg Widmer.
In Proceedings of the 23rd IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM 2022), Belfast, UK, June 14-17. (acceptance rate 31%)

18. **Can 5G mmWave Support Multi-user AR?**
Moinak Ghoshal, Pranab Dash, Zhaoning Kong, Qiang Xu, Y. Charlie Hu, Dimitrios Koutsonikolas, Yuanji Li.
In Proceedings of the Passive and Active Measurement Conference (PAM 2022), Virtual Conference, March 2021.
 (acceptance rate 48%).
19. **Throughput Prediction on 60 GHz Mobile Devices for High-Bandwidth, Latency-Sensitive Applications.**
 Shivang, Agarwal, Zhaoning Kong, **Moinak Ghoshal**, Y. Charlie Hu, and Dimitrios Koutsonikolas.
In Proceedings of the Passive and Active Measurement Conference (PAM 2021), Virtual Conference, March 2021.
 (acceptance rate 44%)
20. **802.11ad in Smartphones: Energy Efficiency, Spatial Reuse, and Impact on Applications.**
 Shivang Aggarwal, **Moinak Ghoshal**, Piyali Banerjee, Dimitrios Koutsonikolas, and Joerg Widmer.
In Proceedings of the IEEE Conference on Computer Communications (INFOCOM 2021), Virtual Conference, May 10-13, 2021. (acceptance rate 19.9%)
21. **LiBRA: Learning-Based Link Adaptation Leveraging PHY Layer Information in 60 GHz WLANs.**
 Shivang Aggarwal, Urjit Satish Sardesai, Viral Sinha, Deen Dayal Mohan, **Moinak Ghoshal**, and Dimitrios Koutsonikolas.
In Proceedings of the 16th International Conference on emerging Networking EXperiments and Technologies (CoNEXT 2020), Barcelona, Spain, December 1-4, 2020. (acceptance rate 24%)
22. **A CFS-DNN-Based Intrusion Detection System.**
 Sayak Paul, Chandan Banerjee, **Moinak Ghoshal**
International Conference in Communication, Devices and Networking (ICCDN 2017), Sikkim, India, 3-4 June, 2017.
23. **A comparative study of different ensemble learning techniques using Wisconsin breast cancer dataset.**
 Chandan Banerjee, Sayak Paul, **Moinak Ghoshal**
In Proceedings of 2017 International Conference on Computer, Electrical & Communication Engineering (ICCECE), Kolkata, India, December 22-23 2017.

Refereed Workshop Publications

1. **Private 5G vs. Wi-Fi in the Enterprise: A Measurement Study of Tunability and QoE.**
Moinak Ghoshal, Shivang Aggarwal, Mohamed Ibrahim, Puneet Sharma, K. K. Ramakrishnan, Dimitrios Koutsonikolas.
In Proceedings of the 20th ACM International Workshop on Wireless Network Testbeds, Experimental evaluation & CHaracterization (WiNTECH 2026), Virtual, October 30, 2026.
2. **Dissecting 5G in the Wild: Performance, Coverage, and Support for Next-Gen Applications.**
Moinak Ghoshal.
In Proc. of the 23rd Annual International Conference on Mobile Systems, Applications and Services (MobiSys 2025) Rising Stars Forum, Anaheim, LA, USA, June 23, 2025.
3. **Beam Management in Operational 5G mmWave Networks.**
 Yufei Feng, Jin Wei, Phuc Dinh, **Moinak Ghoshal**, Dimitrios Koutsonikolas..
In Proceedings of the 7th ACM Workshop on Millimeter-Wave and Terahertz Networks and Sensing Systems (mmNets 2023), Madrid, Spain, October 6, 2023.
4. **The Power of Asynchronous SLAM in Multi-User AR over Cellular Networks: A Measurement Study.**
 Yuting Guo, Sizhe Wang, **Moinak Ghoshal**, Y. Charlie Hu, Dimitrios Koutsonikolas.
In Proceedings of the ACM SIGCOMM Workshop on Emerging Multimedia Systems (EMS 2023), New York City, NY, September 10, 2023.
5. **An In-Depth Study of Uplink Performance of 5G mmWave Networks**
Moinak Ghoshal^{*}, Z. Jonny Kong^{*}, Qiang Xu^{*}, Zixiao Lu, Shivang Aggarwal, Imran Khan, Yuanjie Li, Y. Charlie Hu, Dimitrios Koutsonikolas.
In Proceedings of the 2nd ACM SIGCOMM Workshop on 5G and Beyond Network Measurements, Modeling, and Use Cases (5G-MeMU 2022), Amsterdam, Netherlands, August 22.
6. **Multipath TCP in Smartphones Equipped with Millimeter Wave Radios.**
 Imran Khan, **Moinak Ghoshal**, Shivang Aggarwal, Dimitrios Koutsonikolas, and Joerg Widmer.
In Proceedings of the 15th ACM International Workshop on Wireless Network Testbeds, Experimental evaluation & CHaracterization (WiNTECH 2021), Virtual, October 29, 2021.

Posters and Demos

1. **Demo: NextG-UP: A Longitudinal and Cross-Sectional Study of Uplink Performance of 5G Networks.**
Moinak Ghoshal^{*}, Imran Khan^{*}, Qiang Xu, Z. Jonny Kong, Y. Charlie Hu, and Dimitrios Koutsonikolas.
ACM MobiCom, 2022.
2. **Demo: NextG-UP: A Tool for Measuring Uplink Performance of 5G Networks.**
Moinak Ghoshal^{*}, Imran Khan^{*}, Qiang Xu, Z. Jonny Kong, Y. Charlie Hu, Dimitrios Koutsonikolas.
ACM MobiSys, 2022

Patents

1. **Wtru assisted proactive phy frame reconfiguration associated with low latency applications.**
Subhramoy Mohanty, and Moinak Ghoshal.
Patent No. WO2025111448A1, Application No. PCT/US2024/056872, published May 30, 2025.

AWARDS

- **Distinguished PhD Teaching Award** - Northeastern University Electrical and Computer Engineering, 2026
- **Best Community Paper Runner-up** - ACM CoNEXT, 2025
- **Outstanding PhD Research Award** - Northeastern University College of Engineering, 2024
- **Travel/Conference Grants** - ACM SIGCOMM (2022), IEEE/IFIP NETWORKING (2024)
- Shortlisted as one of the finalists from Northeastern University to apply for the **Google PhD Fellowship 2024.**
- **Best Dataset Award** - Passive and Active Measurement (PAM) Conference, 2021
- **Spot Award** - Keysight Technologies, (2017 (Q4), 2018 (Q1))

SERVICE

- **TPC Co-Chair:** ACM S3 Wireless of the Students, by the Students, and for the Students Workshop (ACM MobiCom 2025)
- **TPC Member:** ACM S3 Wireless of the Students, by the Students, and for the Students Workshop (ACM MobiCom 2022), IEEE WCNC (2025), ACM CoNext (Winter) 2025 Shadow TPC
- **Publicity Chair:** ACM WiNTECH 2026, ACM MobiCom 2027
- **Web Chair:** ACM WiNTECH 2026
- **Artifact Evaluation Committee Member:** ACM MobiCom 2024
- **Reviewer:** IEEE/ACM Transactions on Networking (TON), IEEE Transactions on Mobile Computing (TMC), Elsevier Computer Communications (COMCOM), IEEE Networking Letters, IEEE COMMAG, International Journal of Communication Systems (IJCS), IEEE MILCOM (2026), IEEE LCN (2024), IEEE ICC (2024), IEEE PIMRC (2024), ACM IMC 2026 Posters

DATA/SOURCE CODE/APP RELEASE

- **Dataset** of our PAM 2026 paper - *Disentangling the Throughput Contributions of MIMO and Carrier Aggregation in 5G Networks.*
- **Dataset** of our ACM SIGMETRICS 2026 paper - *Exploring the 5G Digital Divide in the Non-Contiguous US: LEO Satellites to the Rescue?*
- **Dataset** of our ACM CoNext 2025 paper - *A First Large-Scale Study of Operational 5G Standalone Networks.*
- **Dataset** of our ACM IMC 2025 paper - *Replication: Performance of Cellular Network on the Wheels.*
- **Dataset** of our ACM CoNext 2025 paper - *Dissecting Beamforming in Operational 5G mmWave Cellular Networks.*
- **Dataset** of our PAM 2025 paper - *A Large-Scale Study of the Potential of Multi-Carrier Access in the 5G Era.*
- Year-long cellular performance **dataset** from 8 cities from our Networking 2024 paper
- **Dataset** of cellular network performance measurements while driving from LA to Boston from our ACM IMC 2023 paper.
- **Dataset** of multi-user AR measurements using Cloud Anchor and Just-a-line application over 5G mmWave, LTE, and WiFi networks from our ACM SIGCOMM EMS 2023 paper.
- **Dataset** of 5G mmWave uplink performance using commercially available mobile devices from our ACM SIGCOMM 5G-MeMU 2022 paper.
- **NextG-UP:** Android application to collect crowd-sourced cellular network data for our MobiSys 2022 demo.
- **Dataset** of multi-user AR measurements over 5G mmWave and LTE networks from our PAM 2022 paper.
- **Dataset** of throughput prediction of 60 GHz mobile devices using high-bandwidth, latency-sensitive applications from our PAM 2021 paper.
- **Dataset** of 802.11ad power consumption, spatial reuse, and application performance on smartphones from our IEEE INFOCOM 2021 paper
- **MPTCP source code** for a ROG Phone 2, from our WiNTECH 2021 paper.

TEACHING ACTIVITIES

- **EECE 7374 (NU)**: Fundamentals of Computer Networks (TA → Fall 2025, Fall 2024, Fall 2023, Spring 2022, Fall 2022)
- **EECE 7364 (NU)**: Mobile and Wireless Networks (TA → Spring 2025)
- **CSE 489/589 (UB)**: Modern Networking Concepts (TA → Fall 2020)

TECHNICAL SKILLS

- **Languages**: Python, Java, C, C++, C#, Tcl/Tk
- **Frameworks**: Android, Unity, OMNeT++, OAI
- **Linux**: Wireless Device Drivers (ath10k, wil6210), TCP/MPTCP Networking Subsystem/Stack

LINKS

- [Personal Webpage](#)
- [LinkedIn](#)
- [Google Scholar](#)

REFERENCES

- **Prof. Dimitrios Koutsonikolas**, Associate Professor, Electrical and Computer Engineering, Northeastern University (d.koutsonikolas@northeastern.edu)
- **Prof. Y. Charlie Hu**, Michael and Katherine Birck Professor, Electrical and Computer Engineering and Computer Science, Purdue University (ychu@purdue.edu)
- **Prof. Joerg Widmer**, Research Professor and Research Director, IMDEA Networks Institute (joerg.widmer@imdea.org)
- **Prof. Tommaso Melodia**, William Lincoln Smith Professor, Electrical and Computer Engineering, Northeastern University (t.melodia@northeastern.edu)