SHIVANG AGGARWAL

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https://shivang94.github.io

SUMMARY: Currently working as a Research Scientist in the Networking and Distributed Systems Lab at Hewlett Packard Labs with research interests in mobile computing and wireless networks such as WiFi 6/WiFi 7 (WLANs) and private/public 5G/6G (cellular)

EDUCATION

Northeastern University, Massachusetts, USA December 2022
Ph.D., Computer Engineering

University at Buffalo, State University of New York, New York, USA December 2017
Master of Science, Computer Science and Engineering

Manipal Institute of Technology, Karnataka, India July 2016
Bachelor of Technology, Computer Science and Engineering

EXPERIENCE

Research Scientist – Hewlett Packard Labs Sept 2022 – Present

- Working in the Networking and Distributed Systems Lab (NDSL) at Hewlett Packard Enterprise

Research Assistant – WiNS Lab (Northeastern University, University at Buffalo) Oct 2017 – Aug 2022

- Looked at aspects of using high speed millimeter-wave networks (802.11ad/5G) on smartphones and the effect on the power consumption and performance of high-quality video/VR/AR applications
- Worked on the Linux kernel to modify Multipath TCP using 60 GHz and 5 GHz networks to optimize performance under various possible scenarios
- Performed experimental evaluation and analysis of commercial off-the-shelf 60 GHz devices such as APs, laptops, and smartphones to understand the performance of such devices as compared to the understanding of the challenges faced by millimeter-wave networks

Research Intern – NEC Laboratories America, Inc. May 2021 – Dec 2021

- Worked on enabling real-time user localization and tracking in indoor environments leveraging existing WiFi infrastructure using 802.11mc WiFi FTM ranging

Teaching Assistant – Department of Computer Science and Engineering (University at Buffalo) Jan 2018 – May 2019, Jan 2020 – May 2020

- Worked as a Teaching Assistant (TA) for the Modern Networking Concepts course and the Operating Systems course
- Held recitations and office hours to help students and guide them through the demanding course projects

Research Assistant – ODIn Lab (University at Buffalo) Jun 2017 – Dec 2017

- Worked on Mimir database, a probabilistic database which attempts to guess missing and incorrect values to assist with efficiently dealing with messy data.
- Worked on prioritizing data errors to be fixed by building a linear solver based on confidence gain. Also, built a model to fill in missing values by detecting functional dependencies between attributes.

Research and Development Intern – Defence Research and Development Organisation (DRDO) Feb 2016 – Jun 2016

- Used data mining techniques to find ways to improve the cyber security of government networks by increasing the rate of intrusion detections.

PUBLICATIONS

- **RFBridge: Ultra Wideband Reconfigurable Metamaterial Surface Enabling Frequency Conversion**
  Yawen Liu, Shivang Aggarwal, Mohamed Ibrahim, Puneet Sharma, Swarun Kumar
  ACM HotMobile 2025
- **Wixor: Dynamic TDD Policy Adaptation for 5G/xG Networks**
  Ahmad Hassan, **Shivang Aggarwal**, Mohamed Ibrahim Ahmed, Puneet Sharma, Feng Qian
  ACM CoNEXT 2024

- **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, Claudio Fiandrino, Charalambos Orfanidis, **Shivang Aggarwal**, Ana Aguiar, Ozgu Alay, Carla Fabiana Chiasserini, Falko Dressler, Y. Charlie Hu, Steven Ko, Dimitrios Koutsonikolas, Joerg Widmer
  IFIP/IEEE NETWORKING 2024
- **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, Jiayi Meng, Yuanjie Li, Y. Charlie Hu, Dimitrios Koutsonikolas
  IEEE MASCOTS 2023
- **Understanding the Impact of Wi-Fi Configuration on Volumetric Video Streaming Applications**
  Umakant Kulkarni, Khaled Diab, **Shivang Aggarwal**, Lianjie Cao, Faraz Ahmed, Puneet Sharma, Sonia Fahmy
  ACM EMS 2023
- **Is WiFi 802.11mc Fine Time Measurement Ready for Prime-Time Localization? (Best Paper Award)**
  Shivang Aggarwal, Ramanujan K Sheshadri, Karthikeyan Sundaresan, Dimitrios Koutsonikolas
  ACM WiNTECH 2022
- **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
  ACM SIGCOMM 5G-MEMU 2022
- **A Detailed Look at MIMO Performance in 60 GHz WLANs**
  Shivang Aggarwal, Srisai Karthik Neelamraju, Ajit Bhat, Dimitrios Koutsonikolas
  ACM SIGMETRICS / IFIP Performance 2022
- **MuSher: An Agile Multipath-TCP Scheduler for Dual-Band 802.11ad/ac Wireless LANs**
  Shivang Aggarwal, Swetank Kumar Saha, Imran Khan, Rohan Pathak, Dimitrios Koutsonikolas, Joerg Widmer
  IEEE/ACM ToN 2022
- **Multipath TCP in Smartphones Equipped with Millimeter Wave Radios**
  Imran Khan, Moinak Ghoshal, **Shivang Aggarwal**, Dimitrios Koutsonikolas, and Joerg Widmer
  ACM WiNTECH 2021
- **Throughput Prediction on 60 GHz Mobile Devices for High-Bandwidth, Latency-Sensitive Applications**
  Shivang Aggarwal, Zhaoning Kong, Moinak Ghoshal, Y. Charlie Hu, Dimitrios Koutsonikolas
  PAM 2021
- **An Experimental Study of the Performance of IEEE 802.11ad in Smartphones**
  Shivang Aggarwal, Moinak Ghoshal, Piyali Banerjee, Dimitrios Koutsonikolas
  Elsevier COMCOM 2021
- **802.11ad in Smartphones: Energy Efficiency, Spatial Reuse, and Impact on Applications**
  Shivang Aggarwal, Moinak Ghoshal, Piyali Banerjee, Dimitrios Koutsonikolas, Joerg Widmer
  IEEE INFOCOM 2021
- **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, Dimitrios Koutsonikolas
  ACM CoNEXT 2020
- **An Experimental Study of Rate and Beam Adaptation in 60 GHz WLANs**
  Shivang Aggarwal, Urjit Satish Sardesai, Viral Sinha, Dimitrios Koutsonikolas
  ACM MSWiM 2020
- **An Analysis of Delay in Live 360° Video Streaming Systems**
  Jun Yi, Md Reazul Islam, **Shivang Aggarwal**, Dimitrios Koutsonikolas, Y. Charlie Hu, Zhisheng Yan
  ACM MM 2020
- **How to Evaluate Mobile 360° Video Streaming Systems?**
  Shivang Aggarwal, Sibendu Paul, Pranab Dash, Nuka Saranya Illa, Y. Charlie Hu, Dimitrios Koutsonikolas, Zhisheng Yan
  ACM HotMobile 2020

- **Poster: Link Adaptation in 60 GHz WLANs using PHY Layer Information**
  Shivang Aggarwal, Urjit Satish Sardesai, Viral Sinha, Dimitrios Koutsonikolas
  ACM HotMobile 2020
- **Performance and Pitfalls of 60 GHz WLANs Based on Consumer-Grade Hardware**
  Swetank Kumar Saha, **Shivang Aggarwal,** Hany Assasa, Adrian Loch, Naveen Muralidhar Prakash, Roshan Shyamsunder Anantharamakrishna, Daniel Steinmetzer, Dimitrios Koutsonikolas, Joerg Widmer, Matthias Hollick
  IEEE TMC 2020
- **A First Look at 802.11ad Performance on a Smartphone (Best Paper Award)**
  Shivang Aggarwal, Arvind Thirumurugan, Dimitrios Koutsonikolas
  ACM mmNets 2019
- **Poster: Can Mobile Hardware Keep Up with Today's Gigabit Wireless Technologies?**
  Shivang Aggarwal, Swetank Kumar Saha, Pranab Dash, Jiayi Meng, Arvind Thirumurugan, Dimitrios Koutsonikolas, Y. Charlie Hu
  ACM MobiCom 2019
- **MuSher: An Agile Multipath-TCP Scheduler for Dual-Band 802.11ad/ac Wireless LANs**
  Swetank Kumar Saha, **Shivang Aggarwal,** Dimitrios Koutsonikolas, Joerg Widmer
  ACM MobiCom 2019
- **Fast and Infuriating: Performance and Pitfalls of 60 GHz WLANs Based on Consumer-Grade Hardware**
  Swetank Kumar Saha, Hany Assasa, Adrian Loch, Naveen Muralidhar Prakash, Roshan Shyamsunder Anantharamakrishna, **Shivang Aggarwal,** Daniel Steinmetzer, Dimitrios Koutsonikolas, Joerg Widmer, Matthias Hollick
  IEEE SECON 2018
- **Poster: AMuSe: An Agile Multipath TCP Scheduler for Dual-Band 802.11ad/ac Wireless LANs**
  Swetank Kumar, **Shivang Aggarwal**, Dimitrios Koutsonikolas, Joerg Widmer
  ACM MobiCom 2018

PATENTS

- **Realizing Enterprise-Grade Localization using WiFi 802.11mc Fine Time Measurement**
  Pending US Patent Application 18/182,713
- **Timestamping Of Direct Wireless Path Signal**
  Pending US Patent Application 18/734,867
- **Classification of an AP Pair as a Line-Of-Sight Pair or Non-Line-Of-Sight Pair**
  Pending US Patent Application 18/734,839
- **QOE-aware Dynamic Resource Allocation**
  Pending US Patent Application

AWARDS

- **Best Paper Award** – ACM WiNTECH 2022, ACM mmNets 2019
- **Outstanding PhD Research Award** – Northeastern University College of Engineering 2022
- **Best Dataset Award –** Passive and Active Measurement (PAM) Conference 2021
- **Best PhD Research Award** – UB CSE 2020
- **Best PhD Teaching Award** – UB CSE 2020
- **Best Poster Award** – UB CSE PhD Poster Competition 2019
- **Travel/Conference Grants** – IEEE INFOCOM (2018, 2019, 2021), ACM HotMobile (2020), ACM CoNEXT (2020), ACM SIGMETRICS (2022), ACM MobiCom (2022)

SERVICE

- **TPC Co-Chair –** ACM S^3 Wireless of the Students, by the Students, and for the Students Workshop (ACM MobiCom 2022)
- **TPC Member –** ACM WiNTECH (2022 - 2024), IEEE WoWMoM (2023, 2024), IEEE LANMAN (2023), IEEE INFOCOM (2024), IEEE ICCCN (2025)
- **Shadow TPC Member** – ACM IMC 2022

- **Reviewer** – IEEE/ACM Transactions on Networking (TON), IEEE Transactions on Mobile Computing (TMC), IEEE Transactions on Wireless Communications (TWC), IEEE Transactions on Multimedia (TMM), IEEE Journal on Selected Areas in Communications (JSAC), Elsevier Computer Communications (COMCOM), IEEE Network Magazine, ACM Transactions on Modeling and Performance Evaluation of Computing Systems (TOMPECS)
- **Artifact Evaluation Committee Member** – ACM CoNEXT (2023), ACM MobiCom (2023, 2024), ACM SIGCOMM (2023)
- **Web Chair –** ACM S^3 Wireless of the Students, by the Students, and for the Students Workshop (ACM MobiCom 2018)
- **Secretary** – UB Computational Sciences Club 2018-19

SOURCE CODE/DATA RELEASE

- **MuSher –** Released source code for our MPTCP scheduler, a set of MPTCP instrumentation tools, and the dataset characterizing MPTCP performance ACM MobiCom 2019, IEEE/ACM ToN 2022
- **LiBRA, 60 GHz Link Adaptation –** Released dataset used in studying link adaptation under various link impairment scenarios and developing LiBRA, a learning based 60 GHz link adaptation protocol ACM CoNEXT 2020, ACM MSWiM 2020
- **60 GHz Throughput Prediction –** Released dataset used to study throughput predictability of 60 GHz mobile devices for high-bandwidth, latency-sensitive applications PAM 2021
- **802.11ad Smartphone –** Released dataset used to study 802.11ad power consumption, spatial reuse, and application performance on smartphones IEEE INFOCOM 2021
- **MPTCP for mmWave Smartphones –** Released source code for our MPTCP kernel for a dual-band smartphone (ASUS RoG Phone II) equipped with 802.11ad and 802.11ac radios ACM WiNTECH 2021
- **MIMO Performance in 60 GHz –** Released dataset used to study SU- and MU-MIMO performance in 60 GHz WLANs in various environments ACM SIGMETRICS/IFIP Performance 2022