PRAGYA SHARMA

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Summary: Ph.D. Candidate in Computer Engineering with 4+ years of research experience in 5G/6G systems, network security, and applied AI/ML for wireless networks, and 2+ years of full-time software engineering experience in industry. Seeking Research Scientist/Engineer roles to design next-generation wireless systems.

EDUCATION

Virginia Tech | Arlington, Virginia, USA — Jan 2021 – May 2026 (anticipated)
Ph.D. in Computer Engineering — *GPA: 4.0/4.0*

Indian Institute of Technology Bombay | Mumbai, India — Jul 2013 – Jun 2018
B.Tech. & M.Tech. in Electrical Engineering — *GPA: 8.36/10.0*

WORK EXPERIENCE

Futurewei Technologies | Addison, Texas, USA — May 2025 – Aug 2025
Wireless Research Intern – 5G Advanced/6G System Architecture

- Designed and proposed novel enhancements to the 6G core network architecture, enabling QoS-aware sharing of beyond-connectivity services (e.g., sensing) between local subnetworks.
- Formulated a QoS-aware optimization problem for service function selection in sensing-as-a-service use case; simulations demonstrated superior performance of the optimal solution over priority-only selection baseline.

Kryptowire Labs | McLean, Virginia, USA — May 2022 – Aug 2022
Research & Development Intern

- Deployed WAVE, a decentralized authorization framework, on a Kubernetes cluster and conducted stress-testing experiments to assess the scalability of the distributed system under constrained resources.
- Evaluated the performance of WAVE to propose and further integrate the framework as an authorization mechanism in the 5G core network.

Cadence Design Systems | Pune, India — Jul 2018 – Dec 2020
Design Engineer II

- Developed standardized libraries for Tensilica FixedPoint and FloatingPoint MathX Digital Signal Processors (DSPs) and optimized the code to achieve best possible performance of the DSPs.
- Improved DSP core performance by optimizing the Instruction Set Architecture (ISA) of Tensilica ConnX DSPs, benchmarking performance improvements across GCC and LLVM C-compilers.
- Contributed to the development of the neural network (NN) library of the Tensilica HiFi4 DSP to enhance Automatic Speech Recognition (ASR) capabilities of voice-controlled digital assistants.

PUBLICATIONS

1. **Towards xApp Conflict Evaluation with Explainable Machine Learning and Causal Inference in O-RAN**
   P. Sharma, S. Sun, S. Deshpande, A. Stavrou, H. Wang
   Accepted at IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN) 2025

2. **Enabling QoS-Aware Beyond-Connectivity Service Sharing in 6G Local Networks**
   P. Sharma, A. Xiang, A. Kiani, J. Kaippallimalil, T. Saboorian, H. Wang
   [Under Review]

3. **5G-WAVE: A Core Network Framework with Decentralized Authorization for Network Slices**
   P. Sharma, T. Atalay, H. Gibbs, D. Stojadinovic, A. Stavrou, H. Wang
   IEEE INFOCOM 2024 - IEEE International Conference on Computer Communications

4. **FedMADE: Robust Federated Learning for Intrusion Detection in IoT Networks Using a Dynamic Aggregation Method**
   S. Sun, P. Sharma, K. Nwodo, A. Stavrou, H. Wang
   ISC 2024 - Information Security Conference

5. **Adaptive Flow-Level Scheduling for the IoT MAC**
   P. Sharma, J. Nair, R. Singh
   COMSNETS 2020 - International Conference on COMmunication Systems & NETworkS

Technical Skills

Programming Languages: C, C++, Python, Bash (Linux)
AI/ML Frameworks: scikit-learn, PyTorch, Gymnasium, DoWhy
Network Simulation and Analysis: OpenAirInterface (OAI), MATLAB, Wireshark
Other Platforms and Tools: Kubernetes, Docker, Gurobi

Research Projects

Conflict Evaluation of xApps in 5G O-RAN near-real-time RIC
- Proposed a framework for conflict evaluation among xApps by combining explainable ML (SHAP) and causal inference to evaluate the causal relationships between xApp control actions (RCPs) and network KPIs.
- Measured the network impact of potential conflicts using metrics such as Average Treatment Effect (ATE) and Conditional Average Treatment Effect (CATE) of xApp RCPs on network KPIs.

5G-WAVE: Decentralized Authorization of Network Functions (NFs) in 5G core
- Designed a decentralized authorization framework for service access among NFs in the 5G core service-based architecture to eliminate security vulnerabilities caused by OAuth-based central authorization.
- Implemented the 5G-WAVE design by modifying OpenAirInterface (OAI) 5G core NFs deployed on a Kubernetes cluster and evaluated the framework's scalability by measuring latency in multi-slice deployments.

Federated Learning-based Intrusion Detection in IoT Networks
- Co-designed a dynamic aggregation method within the federated learning framework to address data heterogeneity from varying device vulnerabilities, significantly improving attack classification accuracy on real-world IoT traffic datasets.

Awards and Achievements

Pratt Fellowship, ECE, Virginia Tech (2024)
Student Travel Grant, IEEE INFOCOM (2024)
Institute Organizational Color, IIT Bombay (2016)
All India Rank (AIR) 192, out of 1.4 million candidates in the IIT-JEE Advanced Exam (2013)

Leadership Roles

Campus Representative, Arlington (2022)
Virginia Tech Graduate Student Assembly (VT-GSA)
- Advocated for VT Arlington graduate students by conveying their concerns to the Graduate School and driving campus engagement initiatives.

President, Washington DC Chapter (2022–24)
IIT Bombay Heritage Foundation (IITB-HF)
- Led a 5-member executive board to strengthen alumni engagement through networking and community events.

Academic Services

Reviewer
- Journal of Computer Security 2024, 2025
- ESORICS 2024
- IEEE ICDCS 2024

Teaching Assistant
- Computer and Network Security Fundamentals, ECE, Virginia Tech (Spring 2021 & Fall 2021)