Shyam Venkatasubramanian

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EDUCATION

Duke University **2021 – Present**
Ph.D. Candidate in Electrical and Computer Engineering
Advisor: Dr. Vahid Tarokh

UCLA **2018 – 2021**
B.S. in Electrical Engineering
Magna Cum Laude, Technical Breadth in Engineering Mathematics

Washington State University **2016 – 2018**
Dual Enrollment (Pullman High School)
Relevant Coursework:

- Graph Theory, Linear Optimization, Nonlinear Dynamics and Chaos, Partial Differential Equations, Signals and Systems

RESEARCH EXPERIENCE

Duke Signal Processing and Applied Statistics Group (SPAS) **2021 – Present**

- Broadly interested in the design and optimization of neural network architectures for signal processing, computer vision, and natural language processing applications

UCLA Laboratory for Robust Information Systems (LORIS) **2020 – 2021**

- Threshold and Early Waterfall Improvements of Structured LDPC Codes
  - **Collaborators**: Dr. Siyi Yang (UCLA), Dr. Ahmed Hareedy (Duke)
  - **Supervisors**: Dr. Lara Dolecek (UCLA), Dr. Robert Calderbank (Duke)
- Information Reconciliation in the Quantum Key Distribution
  - **Collaborators:** Dr. Siyi Yang (LORIS), Murat Sarihan (CQSE)
  - **Supervisors:** Dr. Lara Dolecek (LORIS), Dr. Chee Wei Wong (CQSE)

WSU Systems-on-Chip Laboratory **2016 – 2018**

- Sampled Time Delay Based Multi-Input-Multi-Output Baseband Receiver
  - **Collaborators:** Dr. Erfan Ghaderi (WSU), Ajith S. Ramani (UBC)
  - **Supervisors:** Dr. Subhanshu Gupta (WSU), Dr. Sudip Shekhar (UBC)

PROFESSIONAL EXPERIENCE

Machine Learning Intern, Tesla **Spring 2024**

- **Supervisor:** Dr. Dariush Dabiri
- Autopilot AI and navigation team

Research Intern, U.S. Air Force Research Laboratory (AFRL) **Summer 2022, 2023**

- **Supervisor:** Dr. Muralidhar Rangaswamy
- Joint project between SPAS (Duke) and AFRL

Engineering Intern, Schweitzer Engineering Laboratories (SEL) **Summer 2019**

- **Supervisor:** Dr. Marcos Donolo
- Developed fault-detection software for SEL-700 relays

Technical Assistant, Washington State University EECS Department **Summer 2018**

- **Supervisor:** Dr. Anjan Bose
- Developed tools to visualize power system oscillations

PUBLICATIONS, PREPRINTS, AND PATENTS

- Shyam Venkatasubramanian, Sean Moushegian, Ahmed Aloui, Vahid Tarokh. *An Information-Theoretic Lower Bound on the Generalization Error of Autoencoders*. Submitted to UAI 2025.
- Shyam Venkatasubramanian, Vahid Tarokh. *Learn2Mix: Training Neural Networks Using Adaptive Data Integration*. Submitted to UAI 2025. doi: 10.48550/arXiv.2412.16482
- Shyam Venkatasubramanian, Kellen Cheng, Ahmed Aloui, Vahid Tarokh. *SPATULA: Sparse Adaptive Transformations Using Lightweight Attention*. Submitted to ICML 2025.
- Shyam Venkatasubramanian, Bosung Kang, Ali Pezeshki, Muralidhar Rangaswamy, Vahid Tarokh. *RASPNet: A Benchmark Dataset for Radar Adaptive Signal Processing Applications*. Submitted to ICML 2025. doi: 10.48550/arXiv.2406.09638.
- Shyam Venkatasubramanian, Ali Pezeshki, Vahid Tarokh. *Steinmetz Neural Networks for Complex-Valued Data*. AISTATS 2025. doi: 10.48550/arXiv.2409.10075.
- Shyam Venkatasubramanian, Ahmed Aloui, Vahid Tarokh. *Random Linear Projections Loss for Hyperplane-Based Optimization in Neural Networks*. UAI 2024. doi: 10.48550/arXiv.2311.12356.
- Shyam Venkatasubramanian, Sandeep Gogineni, Bosung Kang, Ali Pezeshki, Muralidhar Rangaswamy, Vahid Tarokh. *Data-Driven Target Localization Using Adaptive Radar Processing and Convolutional Neural Networks*. IET Radar, Sonar, & Navigation. doi: 10.1049/rsn2.12600.
- Shyam Venkatasubramanian, Sandeep Gogineni, Bosung Kang, Muralidhar Rangaswamy. *Data-Driven Target Localization: Benchmarking Gradient Descent Using the Cramér-Rao Bound*. ArXiv preprint. doi: 10.48550/arXiv.2406.09638.
- Shyam Venkatasubramanian, Sandeep Gogineni, Bosung Kang, Ali Pezeshki, Muralidhar Rangaswamy, Vahid Tarokh. *Subspace Perturbation Analysis for Data-Driven Radar Target Localization*. 2023 IEEE Radar Conference. doi: 10.1109/RadarConf2351548.2023.10149781.

- Shyam Venkatasubramanian, Chayut Wongkhamthong, Mohammadreza Soltani, Bosung Kang, Sandeep Gogineni, Ali Pezeshki, Muralidhar Rangaswamy, Vahid Tarokh. *Toward Data-Driven STAP Radar*. 2022 IEEE Radar Conference. doi: 10.1109/RadarConf2248738.2022.9764354.
- Siyi Yang, Ahmed Hareedy, Shyam Venkatasubramanian, Robert Calderbank, Lara Dolecek. *GRADE-AO: Towards Near-Optimal Spatially-Coupled Codes with High Memories*. 2021 IEEE International Symposium on Information Theory. doi: 10.1109/ISIT45174.2021.9517931.
- Subhanshu Gupta, Erfan Ghaderi, Sudip Shekhar, Shyam Venkatasubramanian, Ajith Sivadhasan Ramani. *Spatial interference cancellation for simultaneous wireless and information power transfer*. United States Patent and Trademark Office. US Patent US10804988B2.

AWARDS AND ORGANIZATIONS

Student Member, IEEE **2019 – Present**

IEEE Eta Kappa Nu (HKN) **2019 – Present**

DOE National Science Bowl Finalist **2014, 2018**

- Captained the Pullman High School Science Team at the United States DOE National Science Bowl Finals in Washington, D.C in 2014 and 2018