Shyam Venkatasubramanian

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EDUCATION

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

University of California, Los Angeles (UCLA) **2018 – 2021**
B.S. in Electrical Engineering, Magna Cum Laude
Technical Breadth: Engineering Mathematics

RESEARCH EXPERIENCE

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

- Data-Driven Radar Target Localization
  - In collaboration with AFRL, ISL Inc, UDRI, Colorado State University
  - **Collaborators**: Dr. Sandeep Gogineni (ISL Inc), Dr. Bosung Kang (UDRI)
  - **Supervisors**: Dr. Muralidhar Rangaswamy (AFRL), Dr. Ali Pezeshki (CSU)
  - **Advisor**: Dr. Vahid Tarokh (Duke)

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

- Threshold and Early Waterfall Improvements of Structured LDPC Codes
  - In collaboration with Duke University
  - **Collaborators**: Dr. Siyi Yang (UCLA), Dr. Ahmed Hareedy (Duke)
  - **Supervisors**: Dr. Lara Dolecek (UCLA), Dr. Robert Calderbank (Duke)
  - Ran simulations on the UCLA Hoffman2 cluster to compare the bit error rate (BER) curves of spatially coupled LDPC codes and our proposed structured LDPC codes in the threshold and waterfall regions for improvements.
- Information Reconciliation in the Quantum Key Distribution (QKD)
  - In collaboration with UCLA CQSE
  - **Collaborators:** Dr. Siyi Yang (LORIS), Murat Sarihan (CQSE)
  - **Supervisors:** Dr. Lara Dolecek (LORIS), Dr. Chee Wei Wong (CQSE)
  - Designed and implemented a balanced modulation algorithm, matrix interleaving, and channel fitting for Joint LDPC codes tailored for the QKD channel. Worked on degree distribution optimizations for a novel Irregular Repeat-Accumulate (IRA) SC code framework.

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)
- Developed and analyzed mathematical models for an early-stage MIMO wireless charging system. Verified the mathematical basis of this self-proposed and self-designed MIMO transmitter and receiver system.

PROFESSIONAL EXPERIENCE

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

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

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

- **Supervisor:** Dr. Marcos Donolo
- Developed FFT event extraction software for SEL 7xx relays.

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

- **Supervisor:** Dr. Anjan Bose
- Developed tools to visualize power system oscillations across the Western Interconnection.

PUBLICATIONS AND PATENTS

- **Shyam Venkatasubramanian**, Sandeep Gogineni, Bosung Kang, Ali Pezeshki, Muralidhar Rangaswamy, Vahid Tarokh, *Subspace Perturbation Analysis for Data-Driven Radar Target Localization*. Accepted to IEEE Radar Conference, 2023 on 22 Jan. 2023

- **Shyam Venkatasubramanian**, Sandeep Gogineni, Bosung Kang, Ali Pezeshki, Muralidhar Rangaswamy, Vahid Tarokh, *Data-Driven Target Localization Using Adaptive Radar Processing and Convolutional Neural Networks*. Submitted to IEEE TAES

- **Shyam Venkatasubramanian**, Chayut Wongkhamthong, Mohammadreza Soltani, Bosung Kang, Sandeep Gogineni, Ali Pezeshki, Muralidhar Rangaswamy, Vahid Tarokh, *Toward Data-Driven STAP Radar*. Accepted to IEEE Radar Conference, 2022 on 27 Jan. 2022.

- Murat Can Sarihan, Siyi Yang, Kai-Chi Chang, **Shyam Venkatasubramanian**, Lara Dolecek, and Chee Wei Wong, *Photon-Efficient Energy-Time Entanglement QKD Using Spatially-Coupled Irregular-Repeat-Accumulate Error Correction Codes*. Accepted to Journal of the American Physical Society.

- Siyi Yang, Ahmed Hareedy, **Shyam Venkatasubramanian**, Robert Calderbank, and Lara Dolecek, *GRADE-AO: Towards Near-Optimal Spatially-Coupled Codes with High Memories*. Accepted to IEEE ISIT, 2021 on 30 April. 2021.

- Subhanshu Gupta, Erfan Ghaderi, Sudip Shekhar, **Shyam Venkatasubramanian**, and Ajith Sivadhasan Ramani. *Spatial interference cancellation for simultaneous wireless and information power transfer*. US Patent US10804988B2. United States Patent and Trademark Office. 13 October. 2020.

AWARDS AND ORGANIZATIONS

Student Member, IEEE **2019 – Present**

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

- Inducted into the Electrical Engineering honor society at UCLA.

Dean's Honor List, UCLA **2019 – 2021**

- For all quarters between Spring 2019 and Spring 2021 with 15+ Completed Units.

United States DOE National Science Bowl Finalist **Spring 2018**

- Competed at the 2018 United States Department of Energy National Science Bowl Finals as captain of the Pullman High School science team.