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

Washington State University (WSU) **2016 – 2018**
Non-Degree Seeking, Dual Enrolled High School Student
Relevant Coursework:

- Graph Theory, Linear Optimization, Probability and Statistics, Intermediate Differential Equations, Applied Math I, Signals and Systems

RESEARCH EXPERIENCE

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

- Data-Driven Space-Time Adaptive Processing (STAP) Radar
  - 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)
  - Working on data-driven STAP radar target detection and localization.

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

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

- **Supervisor:** Dr. Marcos Donolo
- Developed FFT event extraction software for SEL 7xx relays (C#).
- *Spectrum Analyzer* - GUI application supporting asynchronous FFT event extraction from SEL relays. Detects induction motor faults through sideband spike identification and analysis.
- *Communiqué* - Background application supporting periodic FFT event extraction from SEL relays.

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

- **Supervisor:** Dr. Anjan Bose
- Created MATLAB animations to map grid-based voltage oscillations across the (NERC) Western Interconnection.

PUBLICATIONS AND PATENTS

- **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, **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**

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

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

Inductee, IEEE Eta Kappa Nu (HKN) **Fall 2019**

- Tutored EE, CS, and CE students in Fall 2019 while inducting into the Electrical Engineering honor society at UCLA.

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. Led team to a first-place finish at the 2018 Inland Northwest Regional Science Bowl Championships.