Vansh Nagpal

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Education

University of South Carolina - Columbia, Honors College **Spring 2025**
*Bachelor of Science in **Computer Science**, Bachelor of Science in **Mathematics**, Minor in **Data Science*** ***GPA: 4.000***

Research Experience

SyReX Lab(5G Systems Research on X at USC) **Fall 2022 - Present**
Undergraduate Research Assistant *Columbia, SC*

- Explore the applications of 5G/millimeter-wave (mmWave) technology on robust pedestrian and vehicle detection using transmitted signals alongside data transmission/networking.
- Work with an array of IoT devices like mmWave cascade radars, stereo cameras, and lidars to record the environment
- Develop MATLAB/Python scripts to visualize data and extract features from mmWave signals and camera images.
- Implement a TensorFlow deep-learning-based approach for the purpose of predicting the real silhouettes and bounding boxes with range information of vehicles/pedestrians from transmitted mmWave data.

Thomas Jefferson National Accelerator Facility **Summer 2022 - Fall 2022**
Software Development Research Assistant *Columbia, SC*

- Developed software in C++ in to improve UI for nuclear physics simulated event generator for the purpose of simulating nuclear events pertaining to the J/Psi Meson.
- Programmed in an exclusively UNIX/LINUX server environment and wrote shell scripts for the purpose of file manipulation, data processing, and automating routine tasks.
- Worked closely with a team of researchers to determine the most effective solutions for implementing features.
- Presented my research progress weekly to a team of nuclear physicists at Jefferson Lab and the University of South Carolina Physics Department.

University of South Carolina Applied Mathematics Department **Summer 2020 - Fall 2020**
SPRI Research Assistant *Remote*

- Conducted research under Dr. Paula Vasquez on the effectiveness of the SEIR and Erlang distribution models for modeling the spread of diseases accurately
- Composed MATLAB script with the goal of analyzing the spread of infectious disease patterns by tracking different variables and their effect on a sample population
- Composed and presented research paper, presentation, and poster at the South Carolina Junior Academy of Science (SCJAS) and 2021 SCGSSM Annual Colloquium

Honors & Awards

- 2023: **1st Place in Fall 2023 ACM Code-A-Thon** (Data Structures and Algorithms Division)
- 2023: **Magellan Scholar Research Grant** - $3000 to pursue research with SyReX lab
- 2023: **Boeing Scholarship (2x)** - $1500 awarded for academic studies
- 2023: **Tau Beta Pi Scholarship** - $2000 for penultimate year of study
- 2023: **Jack Price Scholarship** - $1000 award for exemplary academics
- 2023: **USC President's Honor's List (4x)** - Awarded to students displaying academic excellence
- 2023: **Marva Smalls Scholarship** - Awarded to engineering students displaying academic excellence
- 2021: **Academic Scholar - Excellence Award** - $23,000/year for 4 years to student in top 6% of their class
- 2021: **Dr. William C. Alexander Excellence in Research Award** - Given to student excelling in research
- 2021: **SCGSSM Excellence in Mathematics Award** - Given to student displaying excellence in Mathematics
- 2020: **2nd Place in SC Junior Academy of Science** - Mentored Research in Phys., Eng., and Mathematics Division

Publications/Conferences

- **INFOCOM 2023**: Regmi, H., Nagpal V., and Sur, S. *Towards Robust Pedestrian Detection with Roadside Millimeter-Wave Infrastructure.*
- **SEAPS 2022**: Nagpal, Vansh. *A realistic event generator for studies of Coherent J/psi Photoproduction off Light Nuclei at the EIC.* Bulletin of the American Physical Society (2022).
- **SCJAS 2021**: Nagpal, Vansh, Brown, Lucia. *Synthesizing SEIR Diffusion AND Erlang Distribution to develop a more realistic, applicable epidemiological model*

Projects Experience

Water Quality Chatbot - Artificial Intelligence Project | *Python, JSON, Flask, VS Code*

- Created a data-driven water potability chatbot to assess water potability (70% acc) with machine learning approach.
- Evaluated different machine learning/deep learning models to predict potability based on water quality metrics
- Utilized BERT/NLTK/Rasa libraries for natural language processing and Flask for web interface to improve UI/UX.

Learning Management System - Software Engineering Project | *Java, Python, JavaScript, JSON, Scrum*

- Developed a learning management system to provide educators/students a platform to learn JavaScript and Python.
- Collaborated with a dev. team using Git and managed sprint using SCRUM methodology and tested using JUnit.
- Programmed in Java to manage JSON databases to strategically load and save necessary data after running an instance of Learning Management System (LMS).

Wordle Replica (Nerdle) | *JavaScript, HTML/CSS, Java, Server-based Web Development*

- Designed a working replica of New York Times game Wordle using HTML/CSS/JavaScript.
- Works in real-time by making a REST API call to WordNik API

Skills

Languages: Java, Python, C/C++, MySQL, MATLAB, R, HTML/CSS/JavaScript, Prolog/Haskell
Tech./Frameworks: AWS Cloud, Microsoft Excel, UNIX/Linux, Git, TensorFlow, .NET, React.js/Node.js, Rest API

Extracurricular Involvement

- Minorities in Computing (**President**)
- Tau Beta Pi - Engineering Honors Society (**Vice President**)
- Pi Mu Epsilon - Mathematics Honors Society