

# Nikil Shyamsunder

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John Handley High School - 425 Handley Blvd. Winchester, VA

## EDUCATION

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### John Handley High School, Class of 2023

**GPA: 4.0/4.0** (unweighted) **4.4/4.0** (weighted); (high school average to date)

**SAT: 1580/1600** (**Math: 800/800** + **Language: 780/800**)

Plan to attend university in Fall 2023 as a freshman majoring in Computer Science with a focus on sustainability

## RELEVANT COURSES

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**Laurel Ridge (formerly Lord Fairfax) Community College:** Data Structures in C++ (Grade A), Linear Algebra (Spring '23)

**Coursera Online:** Machine Learning (Stanford), Python for Everybody (UMich), Python Data Structures (UMich), Object-Oriented Data Structures (UIUC), Unordered Data Structures (UIUC), Ordered Data Structures (UIUC)

**MIT Beaver Works Online:** Remote Sensing for Disaster Response (Machine Learning), Python, Git & Github

**Other Relevant Coursework:** AP Computer Science (AP Score 5/5); AP Calculus AB (AP Score 5/5); AP Chemistry (AP Score 5/5); AP Calculus BC (AP Score 5/5); AP Physics C: Mechanics (AP Score 5/5); AP Physics C: Electricity & Magnetism (AP Score 5/5)

**In Progress:** Advanced Computer Programming, AP Statistics, AP Environmental Science

## TECHNICAL / PROGRAMMING SKILLS

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**Operating Systems:** Windows, Mac OS X, Unix, Linux (Redhat, Ubuntu), iOS, Android

**Programming Languages:** Python, C/C++, Java, HTML, JavaScript, Octave, SQL, MatLab, R, Swift

**Software & Tools:** Shell, SQLite, AWS EC2, AWS S3, AWS SageMaker, Github, Geoweaver, Audacity, Camtasia

**ML Libraries:** Sci-Kit Learn, TensorFlow, Keras, PyTorch, KerasTuner

## WORK/RESEARCH EXPERIENCE

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### Stony Brook University Simons Research Program, Research Intern/Fellow

May 2022-Present

- Working with Dr. William Holt at Stony Brook to develop a novel system for detecting offsets in GPS time-series.
- Developed a novel sliding window algorithm to generate a dataset of GPS time series labeled with offsets.
- Tested a number of different classifiers to develop a model with F1 score of .98 on both classes.
- Presented poster at Simons Summer Research Symposium in June 2022.
- Classifying man-made vs. seismic-related offsets and writing paper for conferences/competitions.

### George Mason University Aspiring Scientists Summer Internship Program, Research Intern

May 2022-Present

- Working with Dr. Ziheng Sun in Geoinformation Science Department to make Snow-Water-Equivalence (SWE) predictions publicly available using ML models.
- Developed/tested univariate Neural Networks using SNOTEL data and 50 multivariate Neural Networks using a 24-field dataset to forecast future SWE given a location achieving MSE of 6.989.
- Integrated models into SnowSource mobile app (iOS & Android) to provide SWE data to public.
- Abstract to be published in GMU Journal of Student-Scientists' Research and to be presented at American Geophysical Union in December 2022.

### Berryville Institute of Machine Learning ([berryvilleiml.com](http://berryvilleiml.com)), Intern

Mar 2021 - Present

- Working under world-renowned security expert Dr. Gary McGraw in Machine Learning Security (MLSec).
- Leading effort to curate an online annotated bibliography with >150 entries of cutting-edge MLSec research.

### The Princess Codes ([theprincesscodes.com](http://theprincesscodes.com)), Co-Founder

Jun 2018 - Present

- Co-founded The Princess Codes organization to teach youth about coding's interdisciplinary nature.
- Designed and delivered python coding courses to 50+ students in 3 summer camps and 1-on-1 tutoring.

## PROGRAMMING EXPERIENCE/PROJECTS

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### Late-Graduation Risk Assessment Project, Team Lead

May 2022 - Present

- Developed Random Forest Decision Tree and Logistic Regression models to predict whether a student will graduate high school on-time based on student's middle school grades/attendance/demographic data.
- Gathered and preprocessed historical data of students in the Winchester Public Schools system securely.
- Ran analytics to determine the efficacy of models using an iterative process to continually tune them.
- Achieved a model that can be used by schools to better target students that need additional assistance.

### Save Our Seas (SOS), Inventor

Nov 2021 - April 2022

- Developed an edge-capable machine learning model for marine garbage detection in Python on Linux.
- Successfully trained a single-shot object detection model for detecting multiple types of garbage and fish within a single frame using PyTorch.
- Built model in the AWS cloud, which was then converted to ONNX and deployed onto a Jetson Nano.
- Optimized classifier by evaluating metrics on models using different dataset sizes and number of epochs.
- Designed/Built solar-powered buoy with Jetson Nano capable of running ML model and with Arduino microcontroller using custom code to regulate energy usage.

### Drone Enabled Env. Patrol & Surveillance Edge AI System (DEEPSEAS), Lead Software Engineer

Sep 2021 - April 2022

- Developed a prototype to reduce illegal, unreported, and unregulated fishing
- Led hardware and software technical direction for the cross-functional product and marketing teams.
- Designed the end-to-end technical architecture and its integration with hardware components.
- Developed the machine learning model and inference engine using transfer learning deployed to NVIDIA Jetson Nano 2GB on Ubuntu with a serial camera to detect illegal fishing vessels.

### Grub Exchange, Inventor

Sep 2019 - March 2020

- Developed a method to reduce food waste in school cafeterias using a novel food-sharing web app.
- Designed end-to-end product structure and programmed app published at grubexchange.net complete with security/privacy protections in place.
- Tested the app in school cafeteria and collected data on its efficacy in reducing waste.

## HONORS, AWARDS, & SCHOLARSHIPS

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- Awarded the *Conrad Innovator* status in Conrad Innovation Challenge 2022 for DEEPSEAS
- Awarded the *Honorable Mention (top 10%)* status in Toshiba ExploraVision Challenge 2022 for DEEPSEAS
- 2x 3rd place in James Madison University Science Fair in Engineering section for SOS & Grubexchange
- IEEE Central Virginia Technology Innovation Award for SOS
- 2022 High School Science Fair 1st place winner, advancing to regionals
- Berryville Institute of Machine Learning High School Scholar 2021 and 2022
- National Merit Scholar Semifinalist/AP Scholar with Distinction/National Honor Society/Spanish Honor Society
- Top 16 in the International Public Policy Forum debate out of >150 of teams
- 7th in Virginia High School League State Debate Competition (Lincoln-Douglas style)
- Shenandoah Valley Forensics League 1st place winner in Lincoln-Douglas Debate
- Accepted into Wharton Leadership in the Business World and Management & Technology Summer Institute
- Four-time school Spelling Bee champion, two-time region champion, went to Nationals twice

## LEADERSHIP EXPERIENCE

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- **Varsity International Public Policy Forum Debate Captain:** Led a team at International Public Policy Forum by organizing/writing the papers, delegating tasks, and brainstorming ideas.
- **Varsity Lincoln Douglas Debate Captain:** Coached John Handley High School students for Lincoln Douglas debate by developing cases and teaching debate concepts and philosophy.
- **Mathcounts Coach:** Coached 20+ Powhatan middle school students to compete in the 2022 competition, which led to securing first place in two scrimmages and 4 students progressing to the state level.
- **Director of Social Activities and President of the Interact Club:** As DSA, led social events in order to create solidarity within the club and bring in new members to participate in community service. As President, lead weekly meetings, keep track of event attendance, work with non-profits in the community to organize events.