Sneha Vireshwar Dixit
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EDUCATION: Washington College (August 2020 - May 2023) (Early graduation)
B.S. in Physics, Math | GPA: 4.00 |
Fellow, John S. Toll Science and Mathematics Program
Chapter President, Society of Physics Students
Pi Mu Epsilon | Cater Society of Junior Fellows
Merit Scholar + beneficiary of the G.E. Chairman's Scholarship, Hodson Trust Scholarship.

RESEARCH EXPERIENCE:
(Ongoing) Exploring Dark Matter Interactions w. SM Particles | Washington College   March 2022-Present
Working with Dr. Digesh Raut to explore properties of dark matter and its interactions with standard model particles using the Boltzmann Equation (student-initiated project).
- Using Mathematica to model dark matter interactions with standard model particles.
- Studying relevant literature and particle physics + cosmology research to understand parameters that explain the current abundance of dark matter in the universe.
- Successfully applied for + won competitive grants awarded by Cater Society of Junior Fellows and John S. Toll Fellows Program.
- The outcome of this project will form the basis of my senior year thesis.

(Ongoing) US-CMS Research Intern | Fermilab   May-August 2022
Working with Nick Smith and Oksana Shadura to convert outdated CMS OpenData MiniAOD data to 2016 NanoAOD data. The newer data type reduces file size + makes .root file easier to understand+process.
- Using ROOT, C++ and Python to efficiently convert data for efficient storage and faster+easier processing.
- Debugging and modifying conversion modules to output files that are more accessible to students/hobbyists working on CMS OpenData.
- Comparing behaviour of both files with Coffea-Casa+trying to identify sources of error.

Modelling Top-Quark Background for LHC Di-Higgs Search | Washington College   May-July 2021
Worked under CERN physicist Dr. Suyog Shrestha as a Washington College John S. Toll Fellow and student contributor to the ATLAS Project @ CERN.
- Assisted Dr. Shrestha with his research on simulating Di-Higgs background signals.
- Ran computer simulations using ROOT and C++ and Higgs Boson data from LHC at CERN, Geneva.
- Plotted and analysed given data using statistical methods using ROOT and C++ on Linux systems.
- Studied Higgs properties, particle interactions and additional mathematical+scientific theory for analysis.

OUTREACH:
(Ongoing) Science Education among Public School Students | Curiouscity Bengaluru   July 2022-Present
- Working with the nonprofit Curiouscity to improve science education+curiosity among public school students in Bengaluru.
- Designed simple, thought provoking, cost-effective experiments that can be repeated by students at home.
- Researched and designed science posters and articles to help students grasp concepts and become curious about science.

Curriculum Design | Washington College   May 2022-August 2022
- Ideated student-delivered physics+math course to help bridge gaps in teaching intro-level STEM courses.
- Helps students with weak high school math adjust better to intro-level college courses and helps instructors save time by eliminating the need to repeat high school math in a college classroom.
- Coordinating with Physics and Math faculty+students to understand pain points on both sides.
- Working to design a short course covering algebra, trigonometry and systems of linear equations concepts.
- Course designed to be delivered by student tutors @ Washington College's Quantitative skills centre.

TUTORING:
Physics + Math tutor | Washington College   **October 2021-Present**
- Peer tutor for math and physics @ Washington College's Quantitative Skills Centre.
- Led doubt and concept clarification for 20+ college students.
- Helped improve physics+math college test performance for tutored students by upto 3 letter grades.

SKILLS/COURSEWORK:
Physics : Thermodynamics and Stat. Mechanics (in progress), Quantum Mechanics, Classical Mechanics, Modern Physics, General Physics (calculus-based), Scientific Modelling and Data Analysis (computer-based modelling and computation of physical problems using Python).
Programming : Mathematica, Python+Machine learning with Python, C++, ROOT, Linux, Bash/Shell, SageMath, LaTex, HTML+CSS.
Mathematics : Real Analysis (in progress), Statistics, Linear Algebra, Discrete Mathematics, Differential Equations, Multivariable Calculus. Experience with modelling and analysing mathematical situations using Python.