Sneha Vireshwar Dixit

sdixit2@washcoll.edu | snehavireshwardixit.github.io

EDUCATION: Washington College (2023) | B.S., Physics + Mathematics | GPA : 4.00

RESEARCH EXPERIENCE:

US ATLAS Student Researcher **October 2022-Present**

Advisor : Dr. Suyog Shrestha

- Studying truth-level kinematics in search for Di-Higgs events in the 0-lepton channel. Studying kinematics of top-quark background in Di-Higgs search in 0-lepton channel.
- Benchmarked key network specs, tested net speed while setting up new particle physics lab suited for computer-based particle physics analysis at Washington College.

Exploring Dark Matter Interactions w. SM Particles **March 2022-Present**

Advisor : Dr. Digesh Raut

- Studying properties of WIMP dark matter and its interactions with standard model particles.
- Building a freeze-out model of WIMP dark matter and solving the Boltzmann Equation to calculate dark matter relic abundance using Wolfram Mathematica and the FeynCalc package.
- Won competitive grants from Cater Society of Junior Fellows and John S. Toll Science Fellows Program.
- Links to : Presentation Slides, Poster

US CMS Student Researcher | Fermilab **May-August 2022**

Advisors : Dr. Nick Smith, Dr. Oksana Shadura

- Contributed to CMS Software ver. 10.6.X as a USCMS PURSUE intern at Fermilab.
- Developed computer program to convert CMS OpenData from before 2016 to the new NanoAOD datatype.
- Developed + debugged config files with ROOT, C++ and Python with the Coffea Casa environment.
- Generated output files that make CMS OpenData accessible to researchers without technical difficulties.
- Links to : GitHub Repository, Pull Request on CMSSW 10.6.X, Presentation Slides

Modelling Top-Quark Background for Di-Higgs search @ LHC **May-July 2021**

Advisor : Dr. Suyog Shrestha

- Studied kinematics of top-quark background in the search for W-boson produced Di-Higgs at the LHC, Geneva.
- Studied top-quark kinematics as simulated by various monte-carlo programs (POWHEG, MC@NLO, HERWIG, PYTHIA) and compared monte-carlo programs. The goal was to estimate differences due to schemes and obtain a measure of the uncertainty on top-quark backgrounds due to different simulations.

SKILLS:

Programming: Python, ROOT, C++, HTML, CSS, Wolfram Mathematica, Linux, Bash/Shell, Virtual Machines with Docker, Git and Github, design and analysis of algorithms.

Research: Literature review, scientific modelling, grant writing, scientific report writing, advanced lab skills.

TEACHING EXPERIENCE:

Curriculum Design | Washington College **May-August 2022**

- Ideated math bridge course to help students with weak math backgrounds adjust to intro-level STEM courses.
- Prepared teaching materials from scratch + delivered course to 20+ students in the first week of classes.

Physics+Math tutor | Washington College **October 2021-Present**

- Led tutor training as senior tutor at Washington College's Quantitative Skills Centre.

OUTREACH:

Particle physics outreach in Bengaluru, India **August 2022-January 2023**

- Extnded research at Fermilab to create particle physics outreach program for high school students in Bengaluru, India. Used python instead of ROOT and Linux to avoid technical barriers for low-income students.
- Delivered program in person in January 2023 to high school students in Bengaluru.
- Students analyzed Z boson decay to muon-antimuon pairs and plotted resonance using CMS OpenData and python.
- Links to : Lecture Slides (1), Lecture Slides (2), Project code+plots generated by students

STEM Sisters @ Washington College **February 2022-Present**

- Founded interest group for women+gender minorities in STEM at Washington College.
- Conducted weekly python, HTML, and tech literacy classes for women+gender minority students.