ROBERT SNUGGS

PHYSICS | PARTICLE PHYSICS

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EDUCATION

University of Notre Dame 2023-Present
Doctor of Philosophy
Advisor: Marc Osherson
Thesis Title: TBD

University of Toledo 2018-2022
Bachelor of Science
Nominated Outstanding Graduating Student (UToledo Physics, College of NSM)

RESEARCH EXPERIENCE

University of Notre Dame, Indiana 2023 to Present
Graduate Researcher, Advisor: Dr. Marc Osherson

- *Search for new particles with four resolved photons in the final state*
  - Performing an analysis searching for generic X and φ with four resolved photons as a final state.
  - Analysis performed utilizing PyROOT and various other internal CMS tools.
  - Engaged in DQM (Data Quality Monitoring) shifts for CMS at FNAL.
  - Attended EDIT 2024 and CMSDAS2025.

University of Toledo, Toledo, Ohio 2022 to 2023
Undergraduate Researcher, Advisors: Dr. Richard Irving, Dr. Randall Ellingson

- *Ion Implantation in CdTe Solar Cells*
  - Performed implantation of protons in CdTe solar cells utilizing THIA.

University of Toledo, Toledo, Ohio Summer 2021
REU Student, Advisor: Dr. Richard Irving

- *Ultraviolet Transitions in Sulfur II including Diagnostic Techniques in Atomic Physics*
  - Engaged in development of PyBeaming, a software package built to simulate THIA's beam-foil interaction.

Argonne National Lab, Remote Summer 2020
SULI Intern, Advisor: Dr. Walter Hopkins

- *Validating the use of Lossy compression on ATLAS data*
  - Engaged in an analysis on whether lossy compression influences the physics of data collected by the ATLAS detector.

University of Toledo, Toledo, Ohio 2019 to 2023
Undergraduate Researcher, Advisor: Dr. Richard Irving

- *Ultraviolet Transitions in Neutral Chlorine and Sulfur II*
  - Performed spectroscopic measurements on neutral Chlorine and Sulfur II utilizing THIA (Toledo Heavy Ion Accelerator).

SKILLS

Computing Skills

- Programming: C/C++/C#, Python, limited experience in various other languages
- General PC building/maintenance
- Virtualization with VirtualBox, VMWare, Docker, apptainers/Singularity, Windows Subsystem(s)
- Data Analysis with ROOT, PyROOT, OriginLab, and homebrew analysis scripts (C++/Python)
- Simulation with SRIM, GRASP2018 (MCDHF)

Lab Skills

- Building, maintenance, and modification of a Danfysik 911A hollow cathode ion source
- Mounting of thin (2.2 – 2.4 $\mu g/cm^2$) excitation carbon foils
- Operation and maintenance of vacuum systems including diffusion, mechanical, and turbo pumps.
- Operation and Maintenance of a 300 KV LINAC
- Setup and utilized various PMTs, Surface Barrier detectors, channeltrons, and Ge (Li) particle detectors.
- Operating and maintaining a monochromator and its parts, including diffraction gratings and photomultiplier tubes.

RECENT TALKS

Ultraviolet Transitions in Neutral Chlorine, COF Scholar Showcase, Greater Columbus Convention Center, February 12, 2020.

Validating the use of Lossy compression on ATLAS data, *Learning off the Lawn*, Argonne National Lab, Virtual, July 30, 2020.

Ultraviolet Transitions in Sulfur II including Diagnostic Techniques in Atomic Physics National Physics REU Poster Symposium, APS, Virtual, October 16, 2021.

PROFESSIONAL DEVELOPMENT

EDIT 2024, Fermi National Accelerator Laboratory, November 11-22, 2024.

- Attended a two-week *Excellence in Detector and Instrumentation Technologies* School.
- This school involved seminars and labs covering the use of various detector technologies (PMTs, SiPMs, LarTPCs, Quantum Sensing, CCDs, etc.)

CMSDAS 2025, Fermi National Accelerator Laboratory, January 13-17 , 2025.

- Attended a weeklong CMS affiliated Data Science School.
- This school involved seminars going over various aspects of the CMS detector, short exercises involving different detector subsystems, and a long exercise aimed at recreating a previous analysis.
- Long Exercise performed: *Long Lived Particles in Muon Detector Showers*
- The long exercise group I participated in was awarded ‘Best Presentation.’

TEACHING EXPERIENCE

University of Notre Dame, Indiana August 2023 to Present
Teaching Assistant, Department of Physics & Astronomy
Engineering Physics II

- Hosted tutorials, wherein students engaged in group assignments.
- Support/grading for labs.
- Exam Grading

Physics for Life Sciences II

- Exam Grading
- Held help sessions
- Support/grading for labs.

Colloquium

- Speaker support for Physics Colloquia (ensuring slides and Zoom work).
- Discussion Coordinator for Graduate QA sessions with Colloquia speaker.

Science Literacy

- Homework Grading

Modern Physics

- Homework Grading

Physics of Civilization

- Exam Grading

University of Toledo, Toledo, Ohio January 2021 to May 2021
Learning Assistant, Department of Physics & Astronomy

- Helped teach Intermediate Lab (Electronics Lab)
- Built and tested lab circuits ahead of other students, helped troubleshoot circuits during class, and maintained the lab space.

University of Toledo, Toledo, Ohio August 2022 to December 2022
Teaching Assistant, Department of Physics & Astronomy

- Helped teach a Modern Physics course.
- Held recitations sections, graded homework, and managed a class Discord for homework/study help.

PROFESSIONAL AFFILIATIONS

University of Notre Dame GPAS, 2023-Present

- General Member, 2023-Present

University of Toledo Society of Physics Students, 2018-2022

- Secretary, 2018-2019
- Webmaster/Social Media Manager, 2019-2020
- President, 2020-2022
- SPS National Member, 2019-Present

OUTREACH/SERVICE

HEP Faculty Candidate Grad Committee
University of Notre Dame, Spring 2025

WISDOM, *Blackberry Solar Cells*
SPS Outreach, University of Toledo, May 9, 2019

COSMOS, *STEM in the Park*
SPS Outreach, Bowling Green State University, September 28, 2019

Downtown Fremont, Stargazing

SPS Outreach, Fremont, Ohio, October 1, 2021

REFERENCES

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