Adam Lastowka

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Education

Florida Institute of Technology — Summa Cum Laude, April 2024
Physics, Bachelor of Science — GPA: 3.96

Experience

Florida Institute of Technology High Energy Physics Group — Fall 2021 - Present
Research Assistant — Melbourne, FL

- Created a machine learning model to reconstruct the momenta of top quark pairs in the Large Hadron Collider (LHC) and characterize their entanglement (density matrices).
- Developed software to automate and improve gas electron multiplier detector DAQ and QC tests, characterized detector responses using X-Ray and radioisotope sources, and assisted in the design of a novel cylindrical micro-pattern gaseous detectors.

Additional Research (Florida Tech) — Fall 2021 - Present
Research with various professors — Melbourne, FL

- Designed a DAQ pipeline and deconvolution algorithm to characterize azimuthal muon flux using a pair of scintillating detectors.
- Studied the nuclear decay network and developed a new way to visualize the nuclear chart (all atoms and their isotopes); paper coming soon.
- Served as a consultant on numerical methods for Florida Tech's galactic astrodynamics research group.
- Wrote and tested a fast(er) approximate fast Fourier transform algorithm for AVR microcontrollers in C.

Temple University — Summer 2022
Research Assistant

- Worked with a team collaborating with Brookhaven National Laboratories to simulate and design a central particle tracker for the future Electron Ion Collider. Investigated detector configurations with simulations in Python and C++.

University of Pennsylvania Complex Systems Group — 2014, 2017
Research Assistant

- Developed a mathematical metric for impact score in the human musculo-skeletal network as a part of a neuroscience research project (2014) (doi.org/10.1371/journal.pbio.2002811)
- Used MATLAB and Python to analyze the evolution of semantic networks across scientific papers (2017).

Open Connections — A.Y. 2018
Course Facilitator / Instructor

- Co-instructed a course in 3D modelling and fused deposition modelling (FDM) 3D printing to high school students. Additionally taught courses in drawing and animation.

Skills and Interests

Programming Languages: Python, Java, C++, MATLAB, JavaScript, Shell, Julia

Software/Systems: Git, Linux, Autodesk Inventor, AutoCAD, Blender, Microsoft Office, etc.

Hardware: Electronics (oscilloscope, signal gen., HV DC power, etc.), Soldering, Microcontrollers, Radiation & X-rays, Clean room etiquette, Laser cutters, 3D printers, Woodworking/metalworking

Soft Skills: Public speaking, Project management, Adaptability and enthusiasm, Technical communication, Presentation skills, Data visualization, Graphic design, Jazz piano & digital synthesizers

Areas of Interest: Image processing, Inverse problems, Chaotic systems, Control Systems, Tomography, Getting usable results from unruly data / equipment

Awards & Positions

- **Florida Tech,** *Outstanding Student Award in Physics* (A.Y. 2023-2024)
- **Florida Tech,** *Distinguished Student Scholar* (Spring 2023 & 2024)
- **Florida Tech,** *Dean's List* (all semesters)
- **Phi Kappa Phi** (Honor Society)
- **Sigma Pi Sigma** (Physics Honor Society)

Independent Work

JWST Photo Bot (@JWSTPhotoBot) Winter – Summer 2023

An open-source bot to automatically query, tone-map, and upload new JWST photos to Twitter

- I designed this bot to make 'raw' JWST photos more easily accessible to the public. It quickly gained thousands of followers. The bot is currently on indefinite hiatus due to high operating costs.
- Tools & Technologies used: AstroPy, PIL, Barbara A. Mikulski Archive for Space Telescopes (MAST)

Personal Website (www.adamlastowka.com) Winter 2021 - Present

Articles on technical topics & a repository for my creative work

- Designed a DAQ pipeline and deconvolution algorithm to characterize azimuthal muon flux using a pair of scintillating detectors.
- Tools & Technologies used: HTML/CSS, JavaScript, MetalSmith, GitHub Pages

Quadcopter A.Y. 2018

A quadcopter designed 'from scratch' (i.e. a custom-built chassis and stabilization system)

- Collaborating with a small team, I built a Wi-Fi-enabled quadcopter with software-based attitude controls.
- Tools & Technologies used: Raspberry Pi, Python, various electronics

Computer Graphics

Skilled computer graphics programmer with intimate knowledge of color spaces & shaders Ongoing

- Created a real-time volumetric visualization of the atomic orbitals (Hydrogen-like atom eigenfunctions) with custom Laguerre polynomial calculation code.
- Created a 3D graphics engine in C++/OpenGL featuring a deferred rendering pipeline, soft shadows, ambient occlusion, and more.