Maxwell Pollack → *mail@maxis.cool*

A digital copy of this resume with hyperlinks to each of my projects is available at maxis.cool/cv.pdf

BS - Physics, The College of New Jersey. *Aug 2011 - May 2015*

- POSTER - "Flux Variability from Turbulence and Bulk Velocity Variations in Relativistic Hydrodynamic Jets" Pollack, Pauls, Wiita 2014.

  - Presented at the 2014 American Physical Society - Division of Fluid Dynamics conference in San Francisco

- PAPER - "Variability in Active Galactic Nuclei from Propagating Relativistic Turbulent Jets" Pollack, Pauls, Wiita 2016.

  - Special-relativistic fluid simulations of galactic jets using the ATHENA hydrodynamic simulation code (written in **C**)
  - Time-series analysis of their synchrotron emission using **Mathematica** and **FORTRAN**
  - Published in the Astrophysical Journal, Volume 820, Number 1

MS - Astronomy, The U of Wisconsin–Madison, *Jun 2015 - Aug 2017*

- POSTER - "Modeling Blue Straggler Formation Through Case C Mass Transfer with MESA" Pollack, Leiner, Mathieu 2016.

  - Simulations of mass transfer in evolved binary star systems using the stellar-evolution code MESA (written in **FORTRAN**)
  - Presented at the 2016 Binary Stars in Cambridge conference in Cambridge, UK

- TEACHING - Astronomy 103 "The Evolving Universe"

  - 6 weekly discussion sections during the Fall 2016 semester
  - Prepared and delivered lectures, and held weekly office hours

- PAPER - "A Curiously Young Star in an Eclipsing Binary in an Old Open Cluster" Sandquist, Mathieu, Quinn, Pollack... 2018.

  - Conducted spectroscopic observations at the WIYN 3.5m telescope on Kitt Peak, Arizona
  - Refined the data reduction pipeline to measure stellar radial velocities through cross-correlation with solar spectra
  - Fit orbital parameters to binary star systems (using **Python**)
  - Published in the Astronomical Journal, Volume 155, Number 4

Research Intern, Numenta. *Dec 2018 - Apr 2019*

- CODE - "Localization in simulated 1D + 2D environments with simple RNNs"

  - Re-implemented Kanitscheider & Fiete 2017, in which a simple recurrent network was trained to output an agent's location in a simulated 1D environment as it moved about randomly, with its velocity and a short-range landmark sense as input (using **Python** and the **PyTorch** deep learning framework)
  - Designed and implemented a 2D analogue to the above model (also using **PyTorch**)
  - Produced visualizations of network activity and weights

Programmer, The Recurse Center. *Jul - Sep 2019*

- CODE - "Repitch: a real-time, polyphonic, MIDI-controlled audio pitch shifter"

  - An AU/VST/standalone audio plugin which uses an interpolated delay line to pitch-shift an audio signal (written in **C++** using the **JUCE** framework)
  - MIDI note input controls the pitch-shift interval, and multiple notes can be played at once

Programmer, Independent. *Sep 2019 - Present*

- CODE - "scalemap: a code library + string format for microtonal musical scales"

  - Defines a flexible string format for musical scales composed of arbitrary frequency intervals
  - Provides drop-in functions + classes for loading musical scales and mapping note numbers to frequencies in **C**, **C++**, and **JavaScript**

- CODE - "Frequency Explorer: a web-based microtonal synthesizer"

  - Using a math expression parser, allows precise control over the tuning and harmonic spectrum of a polyphonic synthesizer
  - Supports flexible keyboard mapping and pattern sequencing
  - Built with **JavaScript** and the **Web Audio API**