# Vincent Niedermayer

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## Education

**UNIVERSITY OF PITTSBURGH** Pittsburgh, PA

*B.S. Major in Applied Math, Minors in Computer Science and Physics* *Expected Graduation: April 2027*

- Coursework: Data Structures & Algorithms, Probability & Statistics, Linear Algebra, Machine Learning

## Research Experience

**Computational Physics Undergraduate Research** October 2024 – Present

***Project 8, YALE UNIVERSITY*** *| Python, TensorFlow, Keras, Matplotlib, Numpy, Conda, HPC*

- Developed **U-Net** for electron frequency spectrogram segmentation to determine the neutrino's mass
- Designed **Time Series GAN** with **attention mechanism** to generate tritium decay electron frequencies
- Employed **convolutional layers** and skip connections to segment and reconstruct spectrogram data
- Accessed Yale's 'Grace' **High Performance Computing** cluster via secure SSH for model training
- Utilized **Matplotlib** for model performance evaluation, **data visualizations**, and reconstruction plotting

**Astrophysics Undergraduate Research** June 2023 – Present

***Allegheny Observatory, UNIVERSITY OF PITTSBURGH*** *| Python, Sklearn, Pandas, Astropy, ImageJ*

- Devised automated **data processing pipeline** and telescope operating **documentation** for all users
- Independently detected **10+ Exoplanet Transits** remotely accessing 24" Keeler Telescope via VPN
- Utilized AstroImageJ and **Astropy** to employ **differential photometry** to visualize transit light curves
- Founded the Allegheny Observatory's High School Research Program, mentoring student research

## Awards

**Kuzneski Innovation Cup ($2,000), CSC Combinator ($250)** November 2024 – Feb 2025

***Clef App*** *| Typescript, React, Docker, PostgreSQL, CI/CD, Tauri, Rust, Bootstrap, HTML, TailwindCSS*

- Scaled social media presence to **23.1 million** profile views, resulting in a **63.6% increase** in followers
- Utilized **TailwindCSS**, **Bootstrap** for rapid UI prototyping with **React**, **Tauri** for cross-platform builds
- Built landing page and integrated **ConvertKit API**, growing our email list to **1,000+ subscribers**
- Deployed discrete containers via **Docker** and leveraged Gitlab **CI/CD** pipelines for automated testing and seamless deployment. Employed **Git** in **Bash** terminal for team collaboration and version control
- Migrated data to **PostgreSQL** to enhance query execution time by 40% and support dynamic scalability

## Projects

**NASA Exoplanet Archive Neural Network** | *Python, Tensorflow, Keras, Seaborn, Pandas* August 2024

- Exported **CSV data** from NASA's Exoplanet Archive applying **Pandas** for data cleaning and **feature engineering** (e.g., planet-to-star-radius ratio, distance from host star) to extract key predictors
- Performed **data exploration** using **correlation matrices**, scatter plots, and histograms in **Seaborn**
- Trained **dense neural network** implementing techniques including **dropout** and **batch normalization** to prevent overfitting. Achieved a test accuracy of 86.8% after **hyperparameter fine-tuning**

**Harvard CS50 edX Final Project** | *C#, Unity* December 2023

- Developed a Flappy Bird–style 2D game using **Unity**, incorporating **physics-based collision detection**, gravity, and ragdoll effects. Implemented sprite animations, and dynamic difficulty scaling
- Implemented an game loop with event-driven scripts in **C#** for refined gameplay at high frame rates

## Technical Skills

**Programming Languages**: Python, JavaScript, Typescript, Java, C#, Rust, SQL, HTML/CSS, Bash
**Data Science & Machine Learning:** Tensorflow, Keras, Sklearn, Pandas, Numpy, Scipy, Matplotlib, Seaborn
**Web Development & Dev Tools:** React, Next.js, Flask, Tauri, Firebase, Supabase, Docker, CI/CD, Git