

Victoria Tiki

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Physics PhD candidate (UIUC) and data scientist specializing in ML for noisy time series, forecasting, and anomaly detection. Experienced with scalable deep learning in Python (PyTorch, TensorFlow), HPC workflows, and interactive data visualization.

TECHNICAL SKILLS

Languages & Libraries: Python (PyTorch, PyTorch Lightning, TensorFlow, scikit-learn, NumPy, pandas)

Infrastructure & DevOps: Linux, Git, GitHub, SLURM/HPC, Docker

Visualization: Matplotlib, Plotly, Dash, Mathematica

SELECTED PROJECTS

Gravitational-Wave Forecasting on Numerical Relativity Data (Machine Learning)

- Used transformers on multi-terabyte gravitational-wave time-series data to forecast nonlinear signal dynamics.
- Delivered $\sim 10\times$ faster inference and raised signal similarity from 0.99 to 0.996 with a smaller model on more complex data.
- Stack: PyTorch Lightning, HDF5, SLURM/HPC.

Aquatic Biodiversity Visualization (Data Visualization / Web App)

- Shipped an interactive Dash app to explore 70,000 aquatic species with API-backed data integration and responsive UX.
- Stack: Python (Dash), HTML/CSS; Docker, Fly.io deployment.

Gravitational-Wave Detection on Real LIGO Data (ML / Federated Learning)

- Developed ML models for signal detection in noisy astrophysical time-series data within a federated learning framework.
- Reduced false positives by $\sim 10\times$ relative to prior approaches while maintaining recall.

Uncertainty Quantification (Astrophysics / ML)

- Conducted research on uncertainty quantification using normalizing flows applied to astrophysical data.
- Preliminary results presented at the NeurIPS 2024 Physical Sciences Workshop.

EXPERIENCE

Graduate Research Assistant

Feb 2022 – Present

University of Illinois at Urbana-Champaign — Physics (Urbana, IL) | Argonne — Data Science & Learning (Lemont, IL)

- ML for gravitational-wave time series (detection and forecasting).
- Uncertainty quantification and interpretability for normalizing-flow and transformer models.

MSc Research Assistant

Feb 2019 – Aug 2020

Leiden University — Lorentz Institute (Leiden, NL) | Nikhef — National Institute for Subatomic Physics (Amsterdam, NL)

- Modeling and analysis of astrophysical and particle-physics datasets, including dark-matter and neutrino experiments.

Intern

May 2017 – Aug 2017; Jul 2016 – Aug 2016

CERN — ALICE & AEGIS experiments (Geneva, CH) | Stefan Meyer Institute (Vienna, AT)

- Detector instrumentation & data analysis: setup and calibration, timing and spatial-resolution studies, and beamline testing.

EDUCATION

PhD, Physics (Computational Science & Engineering) — University of Illinois Urbana-Champaign

2020–Present

MSc, Theoretical Physics — Leiden University (*summa cum laude*)

2018–2020

BSc, Engineering Physics — Vienna University of Technology (*with honors*)

2014–2018

SELECTED AWARDS & PUBLICATIONS

2025 — Renato Bobone Award — UIUC Physics departmental award for outstanding international graduate students

2025 — Outstanding Summer REU FoDoMMaT Mentor — mentored an undergraduate research intern

2024 — HPCwire Editors' Choice: Best Use of HPC in Physical Sciences — first-author project on transformer signal forecasting.

RADAR — Radio Afterglow Detection and AI-driven Response, *ApJS*, 280, 71 (2025). Parth Patel, Alessandra Corsi, E. A. Huerta, Kara Merfeld, [Victoria Tiki](#), *et al.* doi:10.3847/1538-4365/adfbea

Sequence Modeling of Higher-Order Wave Modes of Binary Black-Hole Mergers, Preprint (2025), [Victoria Tiki](#), Kiet Pham, E. A. Huerta, arXiv:2409.03833