THEODOROS PANAGIOTAKOPOULOS

Ph.D Physicist ~ Data Engineer

SUMMARY

Data Scientist and Ph.D. Physicist building scalable Deep Learning models and end-to-end data pipelines to accelerate scientific discovery and reduce computational cost in **HPC** environments.

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theodorospanagiotakopoulos

Orlando, FL, USA

in TheoPhD

SKILLS

Python, Julia, R, C/C++, C#, SQL, Bash Languages: Neural Networks, Decision Trees, Convo-AI Tools:

lutional Neural Networks

Platforms: Linux, Git, HPC

EDUCATION -

08/2019 - present Ph.D: Computational Physics

GPA: 4.0/4.0

10/2017 - 07/2019 M.S.: Physics

GPA: 9.2/10. Valedictorian

10/2011 - 07/2017 B.S. Physics

University of Central Florida

National and Kapodistrian University of Athens

National and Kapodistrian University of Athens

PROFESSIONAL EXPERIENCE

5/2025 - 8/2025 Modeling Product Engineer Intern

ASML, Silicon Valley, CA

- Engineered a terabyte-scale CNN analysis pipeline, scaling from ThreadPoolExecutor for I/O and ProcessPoolExecutor for compute to Dask to overcome DataFrame limits, cutting analysis time by 80% and exposing critical overfitting.
- · Trained a ResNet-18 from scratch in PyTorch with metric learning (triplet loss) to remediate uncovered overfitting by detecting redundant or near-duplicate images and rebalancing the train/validation split, achieving target performance.
- Implemented a Physics-Informed Neural Network to solve the 2D Helmholtz equation achieving high simulation accuracy as a **surrogate** for traditional solvers.

Python / C/C++ / Bash

5/2024 - 8/2024 Modeling Product Engineer Intern

ASML, Silicon Valley, CA

- · Optimized a geometric simulation parameter, reducing runtime 5% and memory usage 10% in production software used by ASML customers.
- Designed and executed optimization experiments for a core optical parameter, cutting runtime 10% and memory usage 34% in ASML's commercial release.
- Developed **Python libraries** and **ETL pipelines** that were adopted by ASML's product engineering teams, which standardized large-scale simulation data cleaning, preprocessing, and analysis.

Python / C/C++ / Bash

8/2019 - present DOE - NSF Funded

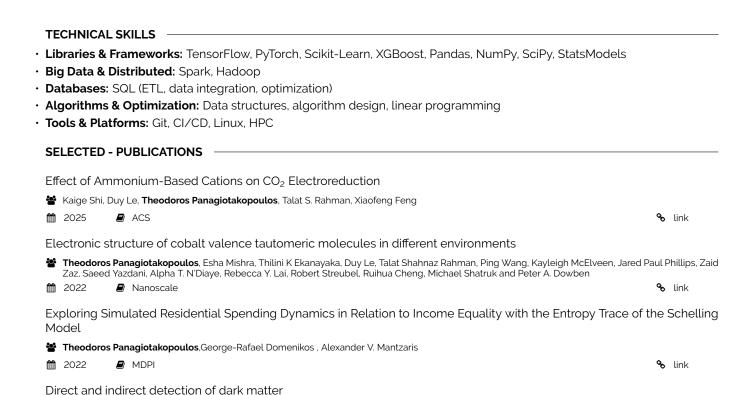
Research Assistant

University of Central Florida

- Engineered numerical methods to model complex system properties and predict critical thresholds, establishing a high-fidelity baseline for predictive modeling.
- Developed a two-stage PyTorch framework that delivered highly accurate energy predictions for largescale systems beyond traditional simulations, pivotal in securing NSF research funding.
- Implemented a 3D CNN in PyTorch on voxelized atomic data to predict structural outcomes of deposition processes, accelerating simulations by producing accurate results in seconds instead of hours.
- Built a Graph Neural Network pipeline for incomplete graphs, achieving 94% accuracy on sparse data and reducing computational overhead in material design simulations.
- · Automated data preprocessing, feature engineering, and model training by designing end-to-end ETL and ML pipelines in Python and Bash, improving iteration speed.
- · Authored and maintained three Python libraries for fabrication modeling, electrochemical simulations, and 3D-to-2D visualization, adopted by university engineering teams.
- Devised a voltage-control algorithm for electrochemical simulations, reducing computational costs while generating high-fidelity data for predictive modeling.
- · Established analytical workflows for complex HPC simulation data, uncovering novel reaction mechanisms and identifying root causes of enhanced catalytic performance in clean energy processes.
- · Designed and deployed an end-to-end data pipeline to evaluate CO2 reduction catalysts, delivering key insights that guided experimental work and contributed to securing DOE funding.
- · Debugged and optimized software for materials science applications on Linux-based HPC systems, accelerating data processing and reducing time to results.
- · Created a centralized **SQL database** for multi-GB simulation datasets, improving data accessibility and accelerating validation across research teams.

Python / Julia / C/C++ / Bash / SQL

GitHub



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Theodoros Panagiotakopoulos, Vasilios Spanos

2017

Theodoros Panagiotakopoulos, Arkadios Manousakis

Pergamos library, National and Kapodistrian University of Athens

Pergamos library, National and Kapodistrian University of Athens

Description of the method development for separating the Daliz from the normal π^0 in the CDF detector