Antonios Vozikis

Personal Website ❖ +31 630 111 775 ❖ Amsterdam, Netherlands ❖ LinkedIn ❖ GitHub

SUMMARY

MSc AI candidate in a cooperative program between Vrije Universiteit (VU) and Universiteit van Amsterdam (UvA), with a strong foundation in **Geometric Deep Learning, Generative AI** and **Physics-Inspired Neural Networks**, actively seeking a **PhD** position for Spring 2025. Proven expertise in developing advanced AI models, including a 25x speedup in molecule generation **featured** at **ICML** 2024's GRaM Workshop, demonstrating a commitment to pushing the boundaries of research in the field of AI. Reliable, transparent, resourceful and proactive team player, adept in PyTorch, Python and collaborative research.

EDUCATION

Cooperative program VU-UvA Amsterdam **Sep 2023 – Spring 2025**
Artificial Intelligence, 2 year MSc, 120 ECTS (Grade 8.1/10) *Amsterdam, Netherlands*
- Fields of Interest: Geometric Deep Learning, Generative AI, Dynamical Systems

University of Thessaly **Aug 2020**
Electrical and Computer Engineering, 5 year BSc with Integrated Master, 300 ECTS *Volos, Greece*
- Thesis: Adaptive Consensus Control for Multi-Agent Systems using Neural Networks (Grade: 10/10).

WORK EXPERIENCE

Centrum Wiskunde & Informatica (CWI) **Jun 2024 – Sep 2024**
Research Intern under the supervision of Eric Pauwels *Amsterdam, Netherlands*
- Conducted **Anomaly Detection** and advanced analysis on **Timeseries** data from engine sensors, employing **Interpretability** methods to identify key contributing factors and optimize predictive maintenance strategies.
- Integrated data-driven insights into a **Large Language Model** (LLM) to facilitate automated reasoning, complex troubleshooting, and detailed step-by-step problem-solving guidance. CWI Research Project
- Performed in-depth literature review, focusing on the Mathematics Frameworks, advanced Machine Learning (ML) methodologies underlying the research and their applications in timeseries, interpretability and LLMs.

'NEO' Educational Organization **Nov 2020 – Aug 2023**
Programming and Advanced Mathematics Teacher *Athens, Greece*
- **Python programming tutor**, with more than **1000** hours in organizing and conducting hands-on programming sessions in **Python**. Tutored more than **200** students on how, implement algorithms and basic ML models.
- **Mathematics tutor**, with over **2000** hours dedicated to instructing advanced Mathematical principles in Calculus, Statistics, and Linear Algebra, vital for the comprehension and formulation of ML algorithms.
- Pursued continuous professional growth in Machine Learning through comprehensive online courses.

Hellenic Army – Military Service (N.D.A) **Jan 2020 – Oct 2020**
Computer Engineer *Larisa, Greece*
- Developed an algorithm to streamline task scheduling, leading to 100% increase in operational efficiency.
- Engineered an autonomous tracking system for UAVs, enhancing surveillance capabilities by 30%.

Self-Employed **Sep 2015 – Dec 2019**
Private tutor *Volos, Greece*
- Guided students towards successfully passing the exams in subjects like Linear Algebra, Algorithms, Data Structures, C-Programming, Object-Oriented Programming, Java, Python, and Computer Algebra, as well as Mathematics and Physics.

RESEARCH EXPERIENCE

University of Amsterdam **Jun 2024 – Present**
Master Student Researcher *Amsterdam, Netherlands*

- Exploring, under the guidance and supervision of Efstratios Gavves and his team, the **integration of physical laws** into generative video models. This research aims to enhance the realism of video generation by grounding the content in fundamental physical principles, producing highly realistic and scientifically accurate simulations.
- Specialize researching and implementing the most recent methods to **learn equations from data**. Applying **Symbolic Regression** techniques to interpret models capturing the fundamental structures of physical systems.
- Engaging in **Hamiltonian equation learning from data**, exploring energy preservation in the system by using different approaches to discover functions and structure-preserving dynamics in those systems. Additionally, carrying a comprehensive literature review on both Hamiltonian methods and **Physics-Inspired Neural Networks** to deepen my understanding and strengthen my grasp of these concepts.
- Collaborating with team members, including Postdoc, PhD and master students combining expertise in Machine Learning, Physics, and Mathematics pushing the boundaries of data-driven modeling with the end goal of giving back to society and publishing our work at international conferences.

Centrum Wiskunde & Informatica (CWI) **Jun 2024 – Sep 2024**
Research intern *Amsterdam, Netherlands*

- Researched State of the Art (SOA) Machine Learning methodologies and Mathematical Frameworks for Anomaly Detection in Timeseries data, with a particular focus on Interpretability and Predictive Maintenance applications. My work involved an extensive literature review and the integration of these insights into Large Language Models in order to benefit from their automated reasoning and problem-solving capabilities.

University of Amsterdam **Apr 2024 – May 2024**
Master Student Researcher *Amsterdam, Netherlands*

- Explored advanced topics in modern **Geometric Deep Learning** (GDL), like **Group Convolutional Networks** (**G-CNNs**), **Steerable G-CNNs**, and **Equivariant Graph NNs**, applying these methodologies to cutting-edge computational chemistry. Researched **Generative AI** techniques, e.g., **Diffusion** Models (**DDPM**, **Score Matching**), **Consistency** Models, and how they can be effectively implemented in the GDL framework.
- Innovated on generative AI by transitioning model architecture from Diffusion to Consistency, leading to a **25X speedup** compared to the previous model. Our work was feature in **ICML 2024** under the **GRaM** Workshop.

PUBLICATIONS

- Sedlacek, M., **Vozikis, A**., Bartak, P., Cadigan, L., & Guo, M. (2024, July). *Equivariant Diffusion for Molecule Generation in 3D using Consistency Models.* Peer-reviewed blog post, **ICML, GRaM Workshop**. Link

SKILLS & INTERESTS

- **Skills:** PyTorch; Python; Generative AI; Geometric Deep Learning; Physics Inspired Neural Networks; Machine Learning; Deep Learning; NumPy; Jax; Linear Algebra; Statistics; Advanced Calculus.
- **Soft skills:** Problem solving; Leading; Project oriented; Committed; Focused; Public Speaking; Critical Thinking; Strategic Planning; Time Management; Active Listening; Emotional Intelligence; Negotiation; Decision Making.
- **Interests:** Technology; Investing; Business; Finance; Self-Improvement; Healthy Lifestyle; Science; Psychology.
- **Hobbies:** Value investing in the Stock Market; Reading nonfiction books; Travelling; Exploring nature; Swimming.