Georgios (Yorgos) Psarellis

Machine Learning Researcher | Baltimore, MD

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Professional Summary

- PhD Candidate, graduating on Summer 2022 working on Machine Learning problems in Biology and Chemical Engineering.
- Experience in Manifold Learning, Neural Networks and Bayesian Optimization.
- **Looking to work in an inclusive working environment as a Machine Learning Scientist.**

Skills

- Advanced Numerical Methods for Dynamical Systems
- Neural Networks (TensorFlow)
- Gaussian Processes
- Unsupervised Learning/ Manifold Learning
- Bayesian Optimization
- Stochastic simulation and agent-based modeling
- Coding languages: Python (Expert), Fortran (Intermediate), C++ (basic)
- Scientific Software: Matlab, AUTO, SCIGMA, Comsol, ANSYS
- Languages: English (fluent), Greek (native), German (fluent), Spanish (beginner)

Education

8/2017-8/2022 **PhD, Chemical and Biomolecular Engineering**
Johns Hopkins University, Baltimore

Using artificial intelligence together with advanced simulation methods to reveal the underlying laws behind complex systems, such as neuronal networks, bacteria ensembles and oscillating chemical adsorbates.
Principal Investigator: Prof. Yannis Kevrekidis

8/2017-5/2021 **Masters, Applied Mathematics and Statistics (Dual Degree) [3.81/4]**
Johns Hopkins University, Baltimore

Academic curriculum focused on probability theory, stochastic simulation and dynamical systems.

9/2012-2/2017 **Bachelor, Chemical Engineering [9.26/10]**
National Technical University of Athens, Athens, Greece

Top 2% of my cohort, graduated a semester earlier than expected.
Undergraduate research and thesis focused on Inorganic Chemistry, Catalysis and Computational Fluid Dynamics.

Work Experience

5/2018-1/2019 **Technology Fellow, Center of Educational Resources**

- Awarded up to $5,000 funding for the project "Turning a Nonlinear Dynamics Class into a Visual Laboratory".
- Designed educational material for the class "Introduction to Nonlinear Dynamics and Chaos"
- Prepared software demos, tutorials and instructions

9/2016-11/2016 **Hazard Communication Intern, BASF Hellas, Sindos Site, Thessaloniki, Greece**

Selected Research Projects

Learning Data Driven Partial Differential Equations for Chemotaxis

- Trained Neural Network models that learn a nonlinear PDE.
- Trained Gaussian Process models that learn a nonlinear PDE.
- Two manuscripts under review.

Dynamic Catalysis

- Optimized dynamic catalytic reactors using Bayesian Optimization.
- Accelerated up to 150% the discovery of periodic solutions under various conditions.

Circadian Rhythmicity

- Simulated a 8925-dimensional neuronal network and calculated its synchronization limits.
- Investigated the effect of drugs that correct the circadian rhythmicity.

Neural Network Pathologies

Studied pathologies of Neural Networks when used as surrogate models for nonlinear dynamical systems.

Exploration of Potential Energy Landscapes

Developed an algorithmic pipeline that fully explores complex energy surfaces, by discovering all critical points and how they are connected.

Embeddings for Directed Graphs

Explored different operators for dimensionality reduction of directed graphs and recovery of effective potential surfaces.

Selected Awards [2/9]

2018: Jay D. Samstag Engineering Fellowship, Johns Hopkins University

Awarded to outstanding incoming doctoral students accepted to the graduate programs of the Johns Hopkins University ($10,000).

2018: Onassis Scholarship, Onassis Foundation

Awarded by the Onassis Foundation to 135 students of Greek origin doing innovative research worldwide ($24,000).

Leadership and Outreach

2019 - **PhD Student Advisory Committee, Member**

- Selected to serve as one out of three representatives from the Whiting School of Engineering
- Contributed to policies about Advisor-Advisee Mentorship Requirements, Diversity and Inclusion, Graduate Student Mental Health

2019-2020 **Graduate Student Liaison Committee (GSLC), Vice President**

- Represented the Kevrekidis Research Group.
- Organized social, professional and networking events for graduate students for over 40 graduate students.
- Oversaw the registration of GSLC as a student organization.

2015-2017 **Chemecon, Co-founder, Chairman and Coordinator**

- Cofounded and served as General Coordinator at Chemecon, the first Association of Young Chemical Engineers in Greece.
- Increased the size of the organization by 150%
- Organized and supervised 8 field visits to industrial plants
- Organized and supervised 4 workshops and 4 seminars.