Charilaos Mylonas, Ph.D.

✉ mylonas.charilaos@gmail.com
🌐 https://mylonasc.netlify.app
○ https://github.com/mylonasc
in https://www.linkedin.com/in/charilaos-mylonas-phd-54691948/
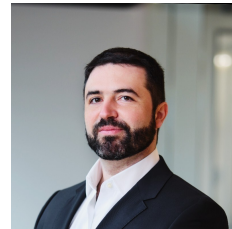
About

I am a scientific computing and data science expert with a strong high-performance-computing background and eight years of deep learning experience. I hold a Ph.D. in Machine Learning from ETH Zurich, where I contributed original geometric deep-learning techniques (GNNs) and developed my own message-passing neural-network library in TensorFlow. My experience includes planning and executing long-term, end-to-end data science projects. Throughout my academic and consulting career, I have a proven track record of influencing teams to adopt maintainable, modular software engineering and DevOps practices, fostering a culture of collaboration and continuous learning.

Work Experience

Feb 2025–Jun 2025   **Modulai** Senior Machine Learning Engineer
- Extended the client's fraud detection pipeline to include graph features resulting to up to 7% reduction in false positives.
- Implemented scalable algorithms for large-scale community detection, and computed transaction graph embeddings for the entire user base of the client (more than 35 million users).

Sep 2024–Jan 2025   **Deloitte** Assistant Manager
- Proposed and implemented a machine learning-enhanced methodology for improving the effectiveness of compliance monitoring for pharma (risk indicator computation and clustering).

Feb 2022–Aug 2024   **Deloitte** Senior Consultant
- Designed and implemented retrieval augmented generation GenAI prototypes.
- Implemented and benchmarked a deep learning-based speech processing system for the compliance department of a large swiss bank.
- Served as product owner and co-creator of a python package to interface with parts of legacy credit risk analytics code of a large Swiss bank (Python, Excel, R).
- Created a customized dataset and fine–tuned speech foundation models (Whisper).

Sep 2016–Nov 2021   **ETH Zurich** Ph.D. Candidate/Research Assistant
- Introduced conditional deep generative models (CVAEs, Graph-structured VAEs) for structural health monitoring problems of wind turbines and wind farms (Python, TensorFlow).
- Implemented a message-passing GNN library (`https://github.com/mylonasc/tf-gnns/`).
- Engaged in industrial collaborations (raw data curation, deep learning for remaining useful life prediction, wind farm data processing).
- Performed large-scale Monte-Carlo simulations (Bash, distributed computing).

Dec 2015–Aug 2016   **ETH Zurich** Research Assistant
- Implemented advanced statistical learning algorithms (high-dimensional regression with tensor decompositions), including original automated model selection pipelines (Matlab).
- Contributed to the popular computational statistics software UQLab by implementing uncertainty quantification and sensitivity analysis algorithms

Jul 2014–Dec 2014   **Credit Suisse** Full-Stack Trading Tool Developer at Derivatives trading desk (internship)
- Implemented a RESTful time series server and a scriptable front-end visualization trading signal identification tool (Python, JavaScript, MySQL).
- Implemented and validated a high level interface for an option pricer (C++, R), achieving more than 10-fold improvement by replacing pre-existing interface.

Education

SEPT 2016 – SEPT 2021	**ETH Zurich** Ph.D. in MACHINE LEARNING FOR STRUCTURAL HEALTH MONITORING UNDER UNCERTAINTY Advisor: Prof. Eleni Chatzi
SEPT 2012 – SEPT 2015	**ETH Zurich** M.Sc. in COMPUTATIONAL SCIENCE AND ENGINEERING Specialization: Computational Electromagnetics Advisor: Prof. Ralf Hiptmair

Technical Strengths

Programming Languages	Python, Matlab, R C++, Java, JavaScript	●●●●●● ●●●●○○
Other software development skills	Linux, Docker, Kubernetes, Classical ML Algorithms, Scientific Computing, Software Design, Web Development, High Performance Computing, Retrieval Augmented Generation systems, Microcontroller Programming	
Deep Learning	Probabilistic Generative Models (GANs, VAEs, Normalizing Flows, Denoising Diffusion models), Graph Neural Networks, Strong familiarity of all core Deep Learning architectures (gated RNNs, CNNs, Attention Mechanisms & Transformers) and how they apply to different data modalities (text, audio, images, tabular data).	

Other Information

Teaching assistant roles

· High Performance Computing for CSE (C++, OpenMP) (2020) (Prof. O. Schenk).
· Method of Finite Elements (Matlab, Python) (2017 – 2019) (Prof. E. Chatzi).

Other academic engagements

· *Mentorship*: Serving as mentor for Ph.D. students at ETH Zurich (upon invitation).
· *Student project supervision*: 6 MSc theses and semester projects and consulted on several others.
· *Reviewer assignments*: for Mechanical Systems and Signal Processing and Journal of Sound and Vibration.

Distinctions and certificates

· **Best paper award** in 39th IMAC conference (Feb. 2021).
· **SIAM Gene Golub Scholarship** for Ph.D. summer school on "*High-Performance Data Analytics*" *Aussois, France 2019.*

Selected Publications

Please refer to Google Scholar [link] for full list and updated citation count.

Mylonas, C. (ETH Ph.D. Dissertation) Machine Learning for Structural Health Assessment under Uncertainty, with applications in Wind Energy, [link]

Mylonas C, Chatzi E. Remaining Useful Life Estimation for Engineered Systems Operating under Uncertainty with Causal GraphNets. Sensors. 2021; 21(19):6325. https://doi.org/10.3390/s21196325

Mylonas, C., Abdallah, I., Chatzi, E. Conditional variational autoencoders for probabilistic wind turbine blade fatigue estimation using SCADA data. Wind Energy. 2021; 1- 18. https://doi.org/10.1002/we.2621

Lai, Z., Mylonas, C., Nagarajaiah, S., & Chatzi, E. Structural identification with physics-informed neural ordinary differential equations. Journal of Sound and Vibration, 508, 116196.

Mylonas, C., Abdallah, I., Chatzi, E. (2021) Relational VAE: A Continuous Latent Variable Model for Graph Structured Data [link]

Mylonas, C., Tsialiamanis, G., Worden, K. & Chatzi, E. Bayesian graph neural networks for strain-based crack localization. (*39th IMAC conference proc.*) [link]

Mylonas, C., Abdallah, I., & Chatzi, E. (2020). Deep Unsupervised Learning For Condition Monitoring and Prediction of High Dimensional Data with Application on Windfarm SCADA Data. *In Model Validation and Uncertainty Quantification, Volume 3 (pp. 189-196). Springer, Cham.*