Charilaos Mylonas, Ph.D.

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About

I am a computing and machine learning expert, with 7 years of experience on deep learning, with hands-on experience using and combining all standard ML architectures, and more than 10 years of software engineering experience. I have published original research in graph neural networks and probabilistic deep learning for predictive maintenance, and I have 4 years of consulting experience (hands-on planning and contribution to ML-related projects, stakeholder management, business development) with clients mainly in financial services. Moreover, have experience finetuning LLMs and using agentic frameworks (LangGraph, Llama models, LoRA).

Work Experience

Feb 2025 – current	**Modulai** Senior Machine Learning Engineer · Implemented scalable (streaming) algorithms for large-scale community detection, and computed transaction graph embeddings for the entire user base of the client (more than 35 million users). · Extended the client's fraud detection pipeline to include graph–based features resulting to up to 7% reduction in false positives (XGBoost). · Provided strategic advisory on innovative product ideas for transaction risk and trust scoring, and the creation of transaction foundation models.
Sept 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). · Contributed to successful business development activities on AI in energy trading, through subject matter expertise on AI and trading and being part of the client–facing team.
Feb 2022 – Sept 2024	**Deloitte** Senior Consultant · Designed and created GenAI prototypes using retrieval augmented generation. · 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, R Shiny). · Created a customized dataset and fine–tuned speech foundation models for speech processing tasks (OpenAI Whisper). · Implemented and benchmarked a deep learning-based speech processing system for the compliance department of a large swiss bank.
Sept 2016–Nov 2021	**ETH Zurich** Ph.D. Candidate/Research Assistant · Researched scalable probabilistic machine learning for structural condition monitoring of wind turbines and wind farms (Python, TensorFlow). · Developed original techniques and deep learning models for time-series prediction tasks (e.g., predictive maintenance applications). · Implemented a message-passing GNN library (`https://github.com/mylonasc/tf-gnns/`).
Dec 2015–Sept 2016	**ETH Zurich** Research Assistant · Implemented advanced statistical learning algorithms (high-dimensional regression with tensor decompositions), including original automated model selection pipelines (Matlab).
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).

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.*