CHARILAOS MYLONAS

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Work Experience

Sept 2016–Nov 2021 | **ETH Zurich**
Research Assistant/PhD Candidate
- Research on applications of scalable probabilistic machine learning for structural condition monitoring of wind turbines and wind farms (Python, TensorFlow)
- Implemented a message-passing graph neural network library (`https://github.com/mylonasc/tf-gnns/`)
- Performed large–scale Monte–Carlo simulations (Bash, cluster computing)
- Engaged in collaborations with industrial partners (raw data curation, deep learning for remaining useful life prediction using time series)

Dec 2015–Sept 2016 | **ETH Zurich**
Research Assistant
- Implemented and tested automated hyper-parameter tuning and training strategies for a CP-tensor decomposed regression module (Matlab)
- Implemented and tested uncertainty quantification and sensitivity analysis algorithms
- Developed a full-stack proof-of-concept web interface to sensitivity analysis and regression module (PHP, JavaScript, Matlab)

Dec 2014–Aug 2015 | **ETH Zurich**
(MSc Thesis, C++)

Jul 2014–Dec 2014 | **Credit Suisse**
Full-Stack Software Developer (internship)
- Implemented and validated a high level interface for an option pricer, achieved more than 10-fold improvement by replacing pre-existing interface (C++, R)
- Implemented a REST server to retrieve data from a time series database and an interactive web GUI for time series visualization (Python, JavaScript, MySQL)
- Implemented a web-based script editor for an internal domain specific language for sharing time series processing pipelines and visualizations
- Developed unit tests & benchmarks, including automated inter-commit benchmarking scripts (Python)

Education

Sept 2016 – Sept 2021 | **ETH Zurich**
PhD in Machine Learning for Structural Health Monitoring under Uncertainty
Advisor: Prof. Eleni Chatzi

Sept 2012 – Sept 2015 | **ETH Zurich**
MSc in Computational Science and Engineering
Specialization: Computational Electromagnetics
Thesis: *Shape Optimization with Boundary Elements*
Advisor: Prof. Ralf Hiptmair

Sept 2005 – May 2012 | **Aristotle University of Thessaloniki**
MSc Civil Engineering
Thesis: *Computational Homogenization for Composites With Finite Elements*
Implementation in COMSOL and FreeFem++

Technical Strengths

Programming Languages	Python, Matlab, R	●●●●●●
	C++, Java	●●●●○○,
	JavaScript, SQL	●●●○○○
Other software development skills	Bash, Linux, Git, Classical ML Algorithms, Scientific Computing, Software Design, Full–Stack Web Development, High Performance Computing (parallel/distributed), Microcontroller Programming	
Deep learning	Probabilistic Generative Models (GANs/VAEs), Graph Neural Networks, personal projects on CV and NLP (see personal website)	

Other information

Teaching assistant roles

- High Performance Computing for CSE (C++, OpenMP) (2020) (Prof. O. Schenk)
- Method of Finite Elements (Matlab) (2017 – 2019) (Prof. E. Chatzi)
- Linear Algebra Lab (2008) (Prof. C. Charalambous)

Other academic engagement

- *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) for the paper "*On an application of graph neural networks in population based SHM*"
- *Human Subject Reseach Certificate* (Data or Specimens Only) CITI-Program Training (April 2020)
- **SIAM Gene Golub Scholarship** for PhD summer school on "*High-Performance Data Analytics*" *Aussois, France 2019*

Journal Publications

***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`

Tsialiamanis, G., ***Mylonas, C.**, et al.* Foundations of population-based SHM, Part IV: The geometry of spaces of structures and their feature spaces. Mechanical Systems and Signal Processing, 157, 107692.

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

Selected Conference Papers & Preprints

***Mylonas, C.**, Abdallah, I., Chatzi, E.* (2021) Relational VAE: A Continuous Latent Variable Model for Graph Structured Data `https://arxiv.org/abs/2106.16049`

***Mylonas, C.**, Tsialiamanis, G., Worden, K. and Chatzi, E.* Bayesian graph neural networks for strain-based crack localization. arXiv:2012.06791 (*to appear in 39th IMAC conference proc.*)

Tsialiamanis G., ***Mylonas C.**, Chatzi E., Wagg, D.J., Dervilis N., Worden, K.* On an application of graph neural networks in population based SHM arXiv:2103.03655 (*to appear in 39th IMAC conference proceedings*)

***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.*

Theses

· Machine Learning for Structural Health Assessment under Uncertainty, with applications in Wind Energy, Ph.D. Dissertation (`link`)

· Shape optimization with Boundary Elements, M.Sc. Thesis (`link`)

Personal Interests

Electronics & Microcontrollers

Digital art