CHARILAOS MYLONAS

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Work Experience

Sept 2016–Sept 2021 | **ETH Zürich**
PhD Researcher
- Research on applications of probabilistic machine learning for structural condition monitoring of wind turbines and efficient probabilistic ML for wind farms (Python, TensorFlow)
- Implemented and open sourced a message-passing Graph Neural Networks (GNNs) library (`https://github.com/mylonasc/tf-gnns/`)
- Performed large–scale Monte–Carlo simulations for wind turbines and wind farms (Bash, Cluster computing)
- Proposed and implemented novel applications that fuse stochastic gradient variational Bayes and GNNs
- Engaged in industry collaboration (raw data curation, deep learning for remaining useful life prediction)

Dec 2015–Sept 2016 | **ETH Zürich**
Research Assistant
- Implemented and tested automated hyper-parameter tuning and training strategies for a CP-tensor decomposed regression module (Matlab)
- Implemented and tested several algorithms related to uncertainty quantification
- Authored technical reports and documentation.

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 Zürich**
PhD in Machine Learning for Structural Health Monitoring under Uncertainty
Advisor: Prof. Eleni Chatzi

Sept 2012 – Sept 2015 | **ETH Zürich**
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 the Finite Elements*
Implementation in COMSOL and FreeFem++

Technical Strengths

Programming Languages	Python, Matlab, C++, R, Java, JavaScript, MySQL
Other software development skills	Bash, Linux, Git, Classical ML Algorithms, Scientific Computing, Software Design, Full–Stack Web Development, High Performance Computing (parallel/distributed), OpenCV, microcontroller programming
Deep learning	Probabilistic Generative Models (GANs/VAEs/Normalizing flows), Graph Neural Networks. Personal projects on CV and NLP.

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*

Selected Publications

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

February 2021 ***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

December 2020 ***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*)

November 2020 ***Mylonas C.*** *& Chatzi E.* Remaining Useful Life Estimation Under Uncertainty with Causal GraphNets. *arXiv preprint arXiv:2011.11740, 2020*

Lai, Z., ***Mylonas, C****., Nagarajaiah, S. and Chatzi, E., 2021.* Structural identification with physics-informed neural ordinary differential equations. Journal of Sound and Vibration, 508, p.116196.

January 2019 ***Mylonas, C.****, Abdallah, I., & Chatzi, E. N. (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.*

May 2017 Konakli K., ***Mylonas C.***, Marelli S., Sudret B. UQlab User Manual - Canonical low-rank approximations *Report UQLab-V1.0-108, Chair of Risk, Safety & Uncertainty Quantification, ETH Zurich, 2017.*

Personal Interests

Electronics & Microcontrollers | Deep Learning in Art | Guitar playing | Neuroscience & AI