# CHARILAOS MYLONAS, PH.D.

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## Work Experience

**Feb 2022–Current** — **Deloitte AG**
*Senior Consultant*
- Developed machine learning techniques for money laundering risk estimation.
- Benchmarked and proposed approaches to speaker diarization for an in-house deep learning-based speech transcription model (large Swiss bank client).
- Gained hands-on experience in financial risk management (low-default portfolios default risk estimation, portfolio theory, liquidity and leverage regulatory reporting)
- Completed online course on Financial Engineering and Risk management (Coursera certificate [link])

**Sept 2016–Nov 2021** — **ETH Zurich**
*PhD Candidate/Research Assistant (**no corrections**, ETH Medal nomination)*
- 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/`)
- Engaged in industrial collaborations (raw data curation, deep learning for remaining useful life prediction, wind farm data processing)
- Tutored students on weather data interpolation using GAN-based optical flow computation (featured article in ETH-industry relations)

**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 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 Trading Tool Developer (internship)*
- Implemented and validated a high level interface for an option pricer (C++, R)
- Implemented a RESTful timeseries server and a scriptable front-end visualization trading signal identification tool (Python, JavaScript, MySQL)
- Developed unit tests & benchmarks

## 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

## Technical Strengths

| | | |
|---|---|---|
| **Programming Languages** | Python, Matlab, R | ●●●●●● |
| | C++, Java, JavaScript | ●●●●○○ |
| **Other software development skills** | Linux, Classical ML Algorithms, Scientific Computing, Software Design, Full–Stack Web Development, High Performance Computing, 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)

**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*"
· **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.

## 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.*)

***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)`