Maximilian **Bernkopf**

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Summary

I am a project assistant and PhD candidate under the supervision of Jens Markus Melenk in the doctoral program Dissipation and Dispersion in Nonlinear PDEs funded by the FWF at TU Wien.

My research interest is concerned with numerical discretizations of time-harmonic wave propagation problems in a high frequency regime as well as least squares finite element methods with focus on minimal regularity assumptions on the data.

Besides that and due to my financial mathematics background I am interested in the connection to stochastics. Further interests of mine are the broad field of data science and machine learning. I gained my initial data science experience working at start-ups in Vienna.

Education

PhD Candidate in Computational Mathematics *Vienna, Austria*
TU Wien *09/2017-current*

- Doctoral thesis: ”Finite Element Analysis of the Heterogeneous Helmholtz Equation and Least Squares Methods”
- Supervisor: Prof. Jens Markus Melenk, PhD

Dipl.-Ing. (equivalent MSc) in Financial and Actuarial Mathematics *Vienna, Austria*
TU Wien *11/2015-06/2016*

- Master thesis: ”Analysis of the alpha-hypergeometric stochastic volatility model”
- Supervisor: Prof. Dr. Stefan Gerhold

BSc in Financial and Actuarial Mathematics *Vienna, Austria*
TU Wien *07/2011-11/2015*

Matura (High school graduation equivalent) *Vienna, Austria*
Schottengymnasium *10/2002-06/2010*

Work Experience

Data Scientist *Vienna, Austria*
IntraBase *09/2016-09/2017*

- Focus on statistical learning and outlier detection.
- Development of statistical algorithms for unsupervised outlier detection.
- High dimensional anomaly detection of categorical and numerical data.

Data Scientist *Vienna, Austria*
Mantigma *08/2016-09/2017*

- Focus on time series analysis and supervised learning.
- Account balance forecasting for retail banking.
- Electricity demand forecasting utilizing classical mathematical time series models as well as novel deep learning techniques.
- Machine learning based credit scoring models.

Research Assistant *Vienna, Austria*
TU Wien, Research Unit of Financial and Actuarial Mathematics *10/2015-06/2016*

- Focus on credit risk models and their implementation.

Internship *Vienna, Austria*
FMA Finanzmarktaufsicht Österreich *09/2013-12/2013*

- Focus on Solvency II.

Community Service / Paramedic *Vienna, Austria*
Arbeiter-Samariter-Bund *12/2010-08/2011*

Research Stays

Université Polytechnique Hauts-de-France *Valenciennes, France*
WORKING WITH PROF. DR. SERGE NICAISE *09/2020-12/2020*

Universität Zürich *Zürich, Switzerland*
WORKING WITH PROF. DR. STEFAN SAUTER *09/2019-12/2019*

Teaching

Tutor - Analysis 1 *Vienna, Austria*
TU WIEN, INSTITUTE OF ANALYSIS AND SCIENTIFIC COMPUTING *03/2021-current*

Seminar Instructor - Seminar on inverse problems *Vienna, Austria*
TU WIEN, INSTITUTE OF ANALYSIS AND SCIENTIFIC COMPUTING *03/2019–07/2019*

Seminar Instructor - Seminar on uncertainty quantification and approximation theory of neural networks *Vienna, Austria*
TU WIEN, INSTITUTE OF ANALYSIS AND SCIENTIFIC COMPUTING *10/2018–02/2019*

Tutor - Analysis 1-3 *Vienna, Austria*
TU WIEN, INSTITUTE OF ANALYSIS AND SCIENTIFIC COMPUTING *10/2017–02/2019*

Tutor - Computer Mathematics *Vienna, Austria*
TU WIEN, INSTITUTE OF ANALYSIS AND SCIENTIFIC COMPUTING *03/2016-07/2016*

Tutor - Computer Mathematics *Vienna, Austria*
TU WIEN, INSTITUTE OF ANALYSIS AND SCIENTIFIC COMPUTING *03/2015-07/2015*

Publications

[5] Wavenumber-explicit stability and convergence analysis of hp Finite Element discretizations of Helmholtz problems in piecewise smooth media, in preparation
M. Bernkopf, T. Chaumont-Frelet, J. M. Melenk
2021

[4] Optimal convergence rates in L^2 for a first order system least squares finite element method. Part II: inhomogeneous boundary conditions, in preparation
M. Bernkopf, J. M. Melenk
2021

[3] Solvability of Discrete Helmholtz Equations, submitted
M. Bernkopf, S. Sauter, C. Torres, A. Veit
arXiv e-prints arXiv:2105.02273, 2021

[2] Optimal convergence rates in L^2 for a first order system least squares finite element method. Part I: homogeneous boundary conditions, submitted
M. Bernkopf, J. M. Melenk
arXiv e-prints arXiv:2012.12919, 2020

[1] Analysis of the hp-Version of a First Order System Least Squares Method for the Helmholtz Equation
M. Bernkopf, J. M. Melenk
Advanced Finite Element Methods with Applications: Selected Papers from the 30th Chemnitz Finite Element Symposium 2017, 2019

Skills

R	tidyverse (dplyr, ggplot2, tibble, purrr, readr etc.), dbplyr, data.table, shiny, forecast, caret, tidymodels, plotly, rmarkdown
Python	ngsolve, numpy, pandas, matplotlib, scipy, sklearn
Proficient in	Matlab, Maple, Mathematica, LaTeX, git
Basic Knowledge of	SQL, Hugo, C, C++, Java
Languages	German (native), English (fluent), Russian (basic)
Operating System of Choice	Linux + i3wm

Hobbies and Random Bits

Sports	Calisthenics, Climbing, Bouldering, Gymnastics & Acrobatics
Non-athletic Hobbies	Dancing, Reading stoic philosophy, Non-modern Art, Listening to audiobooks at 2x the speed
Less Usefull Skills	Juggling, Yoyo-tricks, Solving the Rubik's cube
Guilty Pleasures	Selfimprovement books, Reddit, Memes, Cheese
Random Facts	Can fit at least three Soletti sideways in his mouth, Dyed his hair blond to be Son Goku for Halloween, Google Local Guide Level 7, Weirdly enthusiastic about his Dyson