



# Maximilian Bernkopf

MATH GEEK · DATA NERD

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🏠 maximilianbernkopf.github.io/esa/

📄 MaximilianBernkopf

📺 maximilianbernkopf

🎓 Google Scholar

## Summary

Max is pursuing his PhD in computational mathematics at the TU Wien focussing on the numerics of time-harmonic wave propagation problems. Besides mathematics, he is a true data nerd. He loves handling and visualizing big data sets and discovering the unique stories they can tell. His languages of choice are R and Python, depending on the task at hand. He gained his data science experience working at start-ups in Vienna, where he solved problems involving time series analysis and outlier detection.

## Education

### PhD Candidate in Computational Mathematics

TU WIEN

[Vienna, Austria](#)

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

TU WIEN

[Vienna, Austria](#)

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

TU WIEN

[Vienna, Austria](#)

07/2011-11/2015

### Matura (High school graduation equivalent)

SCHOTTENGYMNASIUM

[Vienna, Austria](#)

10/2002-06/2010

## Work Experience

### Data Scientist

INTRABASE

[Vienna, Austria](#)

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

MANTIGMA

[Vienna, Austria](#)

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

TU WIEN, RESEARCH UNIT OF FINANCIAL AND ACTUARIAL MATHEMATICS

[Vienna, Austria](#)

10/2015-06/2016

- Focus on credit risk models and their implementation.

### Internship

FMA FINANZMARKTAUFSICHT ÖSTERREICH

[Vienna, Austria](#)

09/2013-12/2013

- Focus on Solvency II.

### Community Service / Paramedic

ARBEITER-SAMARITER-BUND

[Vienna, Austria](#)

12/2010-08/2011

## Skills

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

## Hobbies and Random Bits

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<b>Sports</b>	Calisthenics, Climbing, Bouldering, Gymnastics & Acrobatics
<b>Non-athletic Hobbies</b>	Dancing, Reading stoic philosophy, Non-modern Art, Listening to audiobooks at 2x the speed
<b>Less Usefull Skills</b>	Juggling, Yoyo-tricks, Solving the Rubiks cube
<b>Guilty Pleasures</b>	Selfimprovement books, Reddit, Memes, Cheese
<b>Random Facts</b>	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

## Teaching

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<b>Tutor - Analysis 1-3, Computer Mathematics</b>	<i>Vienna, Austria</i>
TU WIEN, INSTITUTE OF ANALYSIS AND SCIENTIFIC COMPUTING	2015-2021
<b>Seminar Instructor - Seminar on inverse problems</b>	<i>Vienna, Austria</i>
TU WIEN, INSTITUTE OF ANALYSIS AND SCIENTIFIC COMPUTING	03/2019-07/2019
<b>Seminar Instructor - Seminar on uncertainty quantification and approximation theory of neural networks</b>	<i>Vienna, Austria</i>
TU WIEN, INSTITUTE OF ANALYSIS AND SCIENTIFIC COMPUTING	10/2018-02/2019

## Research Stays

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<b>Université Polytechnique Hauts-de-France</b>	<i>Valenciennes, France</i>
WORKING WITH PROF. DR. SERGE NICAISE	09/2020-12/2020
<b>Universität Zürich</b>	<i>Zürich, Switzerland</i>
WORKING WITH PROF. DR. STEFAN SAUTER	09/2019-12/2019

## Publications

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- [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