Mario Teixeira Parente

CV / Résumé

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Personal information

Date of birth **29.12.1988** in Munich
Nationality **German**

Professional experience

10/2024 – today *Pforzheim University* (HSPF)
Professor of Mathematics (W2)
Teaching and research in applied mathematics
Areas teaching: Calculus, Linear Algebra, Stochastics, Numerics

04/2024 – 09/2024 *Entrix GmbH*
Senior Data Scientist
Optimal energy trading and marketing of battery storages
Optimization, time series analysis, Python

10/2023 – 03/2024 *Ludwig-Maximilians-Universität München* (LMU)
Interim Professor for Computational Statistics & Data Science (W2)
Teaching courses and supervising students
Courses: Advanced mathematical methods in statistics (German),
Optimization in Machine Learning (English)

03/2021 – 09/2023 *University of Applied Sciences Munich* (HM)
Lecturer
Teaching courses and supervising student projects
Courses: Uncertainty Quantification (English), Linear Algebra (German)

10/2020 – 09/2023 *Jülich Centre for Neutron Science* (JCNS)
Scientific employee
Part of a data-driven service group for neutron researchers
Machine learning (active learning), Python (scikit-learn), data visualization

10/2016 – 09/2020 *Technical University of Munich* (TUM)
Scientific employee
Research and teaching in applied mathematics
Bayesian statistics, dimension reduction, Python (scikit-learn, pandas), data preparation

Education

10/2016 – 09/2020 *Technical University of Munich* (TUM)
Mathematics (Dr. rer. nat.)
PhD Thesis Active Subspaces in Bayesian Inverse Problems

10/2013 – 04/2016 *Ludwig-Maximilians-Universität München* (LMU)
Mathematics (M.Sc.) (Final grade: 1.72)
Master Thesis Brownian Motion and the Dirichlet Problem

10/2010 – 09/2013 *University of Applied Sciences Munich* (HM)
Scientific Computing (B.Sc.) (Final grade: 1.2)
Bachelor Thesis N.V. Krylov's Proof of the de Moivre-Laplace Theorem

09/2007 – 09/2010 *Rohde & Schwarz GmbH & Co. KG*
IHK apprenticeship as software developer (dt.: Fachinformatiker Anwendungsentwicklung)

09/2005 – 07/2007 *Fachoberschule Erding*
Fachhochschulreife (Final grade: 2.0)

09/1999 – 07/2005 *Johann-Andreas-Schmeller-Realschule Ismaning*
Mittlere Reife (Final grade: 1.27)

Scholarships

04/2012 – 05/2016 **German Academic Scholarship Foundation** (Studienstiftung des deutschen Volkes)
04/2012 – 04/2016 **Max Weber Program** (Max Weber-Programm Bayern)
10/2011 – 03/2012 **Deutschlandstipendium**

Volunteering

10/2021 – 09/2024 **Mentor for the Max Weber Program**. Supervision of scholarship holders. Munich
2016 – 2021 **Committee member for admissions seminars of the German Academic Scholarship Foundation**. Evaluation of personal interviews and group discussions. Germany
03/2015 – 02/2016 **Volunteer at Salesianum München**. Support for refugees and other disadvantaged young people

Projects

Python **Software for AI-assisted neutron spectroscopy** (ARIANE, `jugit.fz-juelich.de`)
2020 – 2023 Scientific server application for autonomization of three-axes spectrometry experiments; active learning-based methodology using probabilistic function approximation with log-Gaussian processes. *Contribution:* All.

Python **Tools for dimension reduction in Bayesian inverse problems** (uq-tools, `bitbucket.org`)
2017 – 2020 Script-based academic software framework with tools for uncertainty quantification, Bayesian inverse problems, and dimension reduction via active subspaces; applications to several scientific disciplines, e.g., hydrology, marine biochemistry, or Ebola modeling. *Contribution:* All.

Java **Framework for pedestrian simulation** (VADERE, `vadere.org`)
02/2012 – 07/2012, 06/2016 – 09/2016 Long-term ongoing academic software project providing a GUI-based environment for pedestrian simulations or evacuation scenarios. *Contribution:* Backend design of a class hierarchy for logging simulation-related information.

C/C++ **Software for radio monitoring** (R&S®RAMON, `rohde-schwarz.com`)
04/2009 – 03/2011 Multi-component commercial software for radio monitoring and location. *Contribution:* Refactoring of an interface for an authentication system unifying communications of internal and external applications; several bug fixes related to threading and parallel computing.

C#/ASP.NET **Electronic examination system for applicants** (RSiExam)
04/2008 – 03/2009 Desktop and web application with SQL server connection to automatically assess applicants for apprenticeships. *Contribution:* Object-oriented design and implementation of class hierarchies representing the general setup of a test; GUI with custom design; ASP.NET website with simple and quick illustration of test results for examiners.

Programming languages

Scientific Computing **Python** (NumPy, SciPy, scikit-learn, pandas; ∼7 yrs.), **MATLAB** (study projects), **Julia** (hobby)
Desktop **C/C++** (∼2 yrs.), **C#** (∼1.5 yrs.), **Java** (∼1 yr.)
Database **SQL** (∼2 yrs.)
Functional Prog. **F#**, **Haskell** (both hobby)
Theory **Lambda calculus**, **formal languages**, **computability** (all hobby)
Environment **Linux/Bash** (∼7 yrs.), **VS Code** (∼7 yrs.)

Experience abroad

05+08/2019 **Research stay abroad**. Department of Statistics, Lund University. Topic: Theory of active subspaces

02/2019 – 03/2019 **Research stay abroad**. University of Texas at Austin (UT). Project: UNcertainties due to boundary conditions in predicting MIXing in groundwater (UNMIX)

04/2016 – 05/2016 **Research internship**. Yale University (USA). Image processing of nanoscopic images in cell biology

10/2012 – 02/2013 **Study stay abroad**. University of West Bohemia (Pilsen). Bachelor and Master courses

Journal articles

2023 **TP., M.**, Brandl, G., Franz, C., Stuhr, U., Ganeva, M. & Schneidewind, A. (2023). Active learning-assisted neutron spectroscopy with log-Gaussian processes. *Nature Communications* **14**, 2246. doi: 10.1038/s41467-023-37418-8

2022 **TP., M.**, Schneidewind, A., Brandl, G., Franz, C., Noack, M., Boehm, M., & Ganeva, M. (2022). Benchmarking autonomous scattering experiments illustrated on TAS. *Frontiers in Materials* **8**, 772014. doi: 10.3389/fmats.2021.772014

2020 **TP., M.**, Wallin, J., & Wohlmuth, B. (2020). Generalized bounds for active subspaces. *Electronic Journal of Statistics* **14**(1), 917–943. doi: 10.1214/20-EJS1684

2020 Bittner, D., **TP., M.**, Mattis, S., Wohlmuth, B., & Chiogna, G. (2020). Identifying relevant hydrological and catchment properties in active subspaces: An inference study of a lumped karst aquifer model. *Advances in Water Resources* **135**, 103472. doi: 10.1016/j.advwatres.2019.103472

2019 **TP., M.**, Bittner, D., Mattis, S., Chiogna, G., & Wohlmuth, B. (2019). Bayesian calibration and sensitivity analysis for a karst aquifer model using active subspaces. *Water Resources Research* **55**(8), 7086–7107. doi: 10.1029/2019WR024739

2019 **TP., M.**, Mattis, S., Gupta, S., Deusner, C., & Wohlmuth, B. (2019). Efficient parameter estimation for a methane hydrate model with active subspaces. *Computational Geosciences* **23**(2), 355–372. doi: 10.1007/s10596-018-9769-x

Conferences / Talks

06/2023 **Helmholtz AI Conference 2023**. *Active learning-assisted neutron spectroscopy with log-Gaussian processes*. Helmholtz AI, Helmholtz Association

04/2023 **Machine Learning Workshop**. *Active learning-assisted neutron spectroscopy with log-Gaussian processes*. Lawrence Berkeley National Laboratory

03/2023 **ECNS 2023**. *AI-assisted neutron spectroscopy - Log-Gaussian processes for TAS*. Heinz Maier-Leibnitz Zentrum

10/2022 **JCNS Workshop** (invited talk). *AI-assisted neutron spectroscopy - Log-Gaussian processes for TAS*. Jülich Centre for Neutron Science

12/2021 **MLZ User Meeting**. *Benchmarking autonomous TAS experiments*. Heinz Maier-Leibnitz Zentrum

11/2021 **Workshop on SAXS@XFELs and HI & HE laser driven matter**. *Benchmarking autonomous TAS experiments*. Helmholtz-Zentrum Dresden-Rossendorf

10/2021 **Workshop on Innovative Inelastic Neutron Scattering**. *Benchmarking autonomous scattering experiments illustrated on TAS*. Institut Laue-Langevin

02/2021 **Workshop on Autonomous Discovery in Science and Engineering**. *Autonomous Experiments for Neutron Three-Axis Spectrometers (TAS) with Log-Gaussian Processes*. Center for Advanced Mathematics for Energy Research Applications, Lawrence Berkeley National Laboratory

03/2020 **SIAM UQ 2020**. *Solving a Bayesian Inverse Problem for a Karst Aquifer Model with Active Subspaces*. Garching (canceled due to outbreak of SARS-CoV-2)

05/2019 **Statistics Seminar**. *Active subspaces in Bayesian inverse problems*. Department of Statistics, Lund University

03/2018 **M2 Oberseminar**. *Active subspaces for Bayesian inversion, Application for a methane hydrate model*. Garching

Awards / Prizes

12/2023 **Helmholtz AI Award.** Best Paper 2023

Teaching

As professor at HSPF

Summer 2025 **Calculus 2** (German)
Summer 2025 **Linear Algebra 2** (German)
Summer 2025 **Mathematics 2** (for Engineers) (German)
Winter 2024/25 **Linear Algebra 1** (German)
Winter 2024/25 **Mathematics 1** (for Engineers) (German)
Winter 2024/25 **Programming in Python** (German)

As interim professor at LMU

Winter 2023/24 **Advanced mathematical methods in statistics** (German)
Winter 2023/24 **Optimization in Machine Learning** (English)

As lecturer at HM

Summer 2023 **Fundamentals of Uncertainty Quantification** (English)
Winter 2022/23 **Linear Algebra** (German)
Summer 2022 **Fundamentals of Uncertainty Quantification** (English)
Winter 2021/22 **Linear Algebra** (German)
Summer 2021 **Fundamentals of Uncertainty Quantification** (English)

As scientific employee at TUM

Summer 2020 **Mathematical Models for UQ in Hydrology** (English). *Module construction*
Winter 2019/20 **Introduction to Numerical Linear Algebra** (German). *Exercise coordinator*
Summer 2019 **Numerics of PDEs for Engineers** (German). *Exercise coordinator*
Winter 2018/19 **Modeling and Simulation with ODEs** (German). *Tutor*
Summer 2018 **Numerics of ODEs** (German). *Tutor*
Winter 2017/18 **Introduction to Numerical Linear Algebra** (German). *Tutor*
Summer 2017 **Introduction to Programming** (German). *Tutor*
Summer 2017 **Seminar: UQ with Efficient Monte Carlo Methods** (English). *Tutor*

As student

Winter 2015/16 **Stochastics** (German). *Tutor*. LMU
Winter 2014/15 **Calculus I** (German). *Tutor*. LMU
Winter 2011/12 **Linear Algebra** (German). *Tutor*. HM
Winter 2011/12 **Software Engineering** (German). *Tutor*. HM

Trainings

03/2017 **Parallel Programming of High Performance Systems**. Leibniz Computing Centre (LRZ)
02/2017 **Advanced C++ with Focus on Software Engineering**. Regionales RechenZentrum Erlangen (RRZE)

Other academic experience

Teaching

2017 – 2019 **Certificate for Teaching in Higher Education of the Bavarian Universities**. *Advanced Level*. TUM ProLehre
2017 – 2019 **Certificate for Teaching in Higher Education of the Bavarian Universities**. *Foundation Level*. TUM ProLehre

Research

Project VADERE **Student assistant**. HM. Project: Modeling and simulation of pedestrian movement

Kirchheim b. München, March 10, 2025