Mario Teixeira Parente

CV / Résumé

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Personal information

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

Professional experience

03/2021 – now *University of Applied Sciences Munich* (HM)
Lecturer
Uncertainty Quantification (english), Linear Algebra

10/2020 – now *Jülich Centre for Neutron Science* (JCNS)
Postdoctoral researcher
Autonomization of neutron spectroscopy experiments using machine learning techniques

10/2016 – 09/2020 *Technical University of Munich* (TUM)
Scientific employee
Research and teaching in applied mathematics

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 Munich* (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 of the State of Bavaria** (Max Weber-Programm Bayern)
10/2011 – 03/2012 **Deutschlandstipendium**

Volunteering

10/2021 – now **Mentor for the Max Weber Program of the State of Bavaria**, Supervision of scholarship holders, Munich

2016 – now **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.)

Functional Prog. **F#**, **Haskell** (both hobby)

Theory **Lambda calculus**, **formal languages**, **computability** (all hobby)

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

Talks, Conferences, etc.

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

Teaching

As lecturer at HM

Winter 2022/23 **Linear Algebra**

Summer 2022 **Fundamentals of Uncertainty Quantification**

Winter 2021/22 **Linear Algebra**

Summer 2021 **Fundamentals of Uncertainty Quantification**

As scientific employee at TUM

Summer 2020 **Mathematical Models for UQ in Hydrology**, *Module construction*

Winter 2019/20 **Introduction to Numerical Linear Algebra**, *Exercise coordinator*

Summer 2019 **Numerics of PDEs for Engineers**, *Exercise coordinator*

Winter 2018/19 **Modeling and Simulation with ODEs**, *Tutor*

Summer 2018 **Numerics of ODEs**, *Tutor*

Winter 2017/18 **Introduction to Numerical Linear Algebra**, *Tutor*

Summer 2017 **Introduction to Programming**, *Tutor*

Summer 2017 **Hauptseminar: Uncertainty Quantification with Efficient Monte Carlo Methods**, Tutor

As student

Winter 2015/16 **Stochastics**, *Tutor*, LMU

Winter 2014/15 **Analysis I**, *Tutor*, LMU

Winter 2011/12 **Linear Algebra**, **Software Engineering**, *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**, *Introductory* and *Advanced Level*, TUM ProLehre

Research

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

Kirchheim b. München, April 20, 2023