

Pia Stammer

Personal information

Date of birth September 05, 1994
Nationality German

Academic Career and Education

Doctoral researcher

- 22nd March 2023 PhD defense at the Department of Mathematics, Karlsruhe Institute of Technology • Final grade: summa cum laude (1.0)
• PhD thesis: "Uncertainty quantification and numerical methods in charged particle radiation therapy"
- 2019–2023 PhD at Karlsruhe Institute of Technology in the group "Computational Science and Mathematical Methods" of Prof. Martin Frank
- 2019–2023 Associated doctoral researcher at the German Cancer Research Center (DKFZ) in the Department of Medical Physics in Radiation Oncology
- 2019–2022 Doctoral researcher in the Helmholtz Information & Data Science School for Health (HIDSS4Health)

Master studies in Mathematics and Economics

- 2016–2019 Master at Karlsruhe Institute of Technology • Study Focus: Optimization - Graph Theory - Data Science - Game Theory • Final grade: 1.3
• Master thesis: "Displacement interpolation"

Bachelor studies in Economics Engineering

- 2013–2016 Bachelor at Karlsruhe Institute of Technology • Study Focus: Mathematical Modelling and Simulation, Game Theory • Final grade: 1.4
• Bachelor thesis: "Coordination Problems in Multiple Public Goods Games"

Abitur

- 2004–2013 Abitur at Karolinen Gymnasium Frankenthal • Final grade: 1.2

Other professional experience

- 2016 Internship, Social and behavioural research at the Institute for World Economy, Kiel, Germany • Statistical Data Analysis - Participation in the Design and Execution of Laboratory Experiments - Co-writing of Policy Article - Literature Research
- 2014 Internship, Financial grants at L-Bank, Karlsruhe, Germany • Creation of Wiki for Work Manuals and Integration in Directory - Assessment of Credit Requests

Funding and competitions

- 2022 H³ – Helmholtz Herbst Hackathon
- 2021 HIDSS4Health HiWi funding (40h/month for 6 months)
- 2020 WiDS Datathon Maastricht

Teaching experience

- SS 2022 Exercise Optimization theory
- SS 2021 Exercise Uncertainty quantification
- SS 2020 Exercise Uncertainty quantification
- WS 2018/2019 Tutorial Statistics II
- SS 2018 Tutorial Foundations of Informatics I
- WS 2015/2016 Tutorial Foundations of Informatics II

Volunteering and Outreach

- 2020 - 2022 Annual participation in Girl's day - offering interactive workshops on applied mathematics research for female high school students
- 2019 - 2022 Supervision of mathematical modeling projects for high school and university students during CAMMP weeks
- 2021 Participation in Science Week: Communicating science to the general public
- 2021 Participation in "Der Zauber der Daten": Visualizing complex research data using generative graphics
- 2020 - 2021 Mentor at CyberMentor: Supporting, advising and organizing workshops/small research projects for female students interested in STEM
- 2013 - 2018 Swimming instructor: Teaching adults and children how to swim and improve their technique

Conferences and workshops

- April 2023 MMKT 2023, Poster • Cost and memory efficient moment methods in radiation therapy and their open-source implementation
- February 2023 SIAM CSE 2023, Invited talk • Minisymposium: Efficient Numerical Frameworks for Kinetic And Related Models • Talk: Efficient Solution of the Linear Boltzmann Equation for Radiation Therapy Using the Dynamical Low- Rank Approximation
- September 2022 GMC SIMAI Young 2022, Invited talk • Minisymposium: Young developments on dynamical low-rank approximation. • Talk: A robust collision source method for rank adaptive dynamical low-rank approximation in radiation therapy • In: p.129 of abstract book.
- July 2022 MCQMC 2022, Contributed Talk • Using importance sampling to speed up non-intrusive uncertainty quantification for Monte Carlo simulations • In: p. 205 of abstract book.
- May 2022 ESTRO 2022, Poster • PO-1728 Efficient modeling and quantification of time-dependent errors in IMPT. • In: Radiotherapy and Oncology 170 (2022), S1529–S1531. <https://www.sciencedirect.com/journal/radiotherapy-and-oncology/vol/170/suppl/S1>
- June 2021 PTCOG59 2021, Contributed Talk • O044 - Efficient uncertainty estimates in Monte Carlo dose calculation using importance re-weighting. • In: International Journal of Particle Therapy, Proceedings to the 59th Annual Conference of the Particle Therapy Cooperative Group (PTCOG59 2021 Online) (Oct. 2022), p. 24. <https://doi.org/10.14338/IJPT-22-PTCOG59-9.3>

Coordination & Organization

- April 2023 Local Organizer of the International Workshop on Moment Methods in Kinetic Theory IV
- April 2023 Design & Maintenance of the CSMM group website

Supervised Theses

- 2023 Bachelor thesis: *Uncertainty-aware Dose Optimization in Radiation Therapy*, Alexander Kaschta
- 2022 Master thesis: *Modelisation of Uncertainties for Treatment Planning*, Jean Radig
- 2021 Master thesis: *First Collision Source Methods for Radiation Therapy*, Tony Peters

Previous and current collaboration partners

- Martin Frank, Steffen Schotthöfer, Jannick Wolters, Thomas Camminady (Karlsruher Institute of Technology, Germany)
- Oliver Jäkel, Niklas Wahl, Lucas Norberto Burigo (German Cancer Research Center, Heidelberg, Germany)
- Jonas Kusch, Lukas Einkemmer (University of Innsbruck, Austria)
- Tianbai Xiao (Chinese Academy of Sciences, Beijing, China)
- Bruno Dubroca, Than-ha Nguyen (University of Bordeaux, France)
- Danny Lathaouwers (TU Delft, Netherlands)

Publication Links

- ResearchGate: <https://www.researchgate.net/profile/Pia-Stammer>
- Google scholar: <https://scholar.google.de/citations?hl=de&pli=1&user=8nEdZy0AAAAJ>

Preprints

- [Kus+22] Jonas Kusch, Steffen Schotthöfer, Pia Stammer, Jannick Wolters, and Tianbai Xiao. "KiT-RT: An extendable framework for radiative transfer and therapy". In: *arXiv preprint arXiv:2205.08417* (2022).

Journal Articles

- [Sta+21] Pia Stammer, Lucas Burigo, Oliver Jäkel, Martin Frank, and Niklas Wahl. "Efficient Uncertainty Quantification for Monte Carlo Dose Calculations Using Importance (Re-)Weighting". In: 66.20 (Oct. 2021), p. 205003. ISSN: 0031-9155. DOI: 10.1088/1361-6560/ac287f.
- [KS22] Jonas Kusch and Pia Stammer. "A Robust Collision Source Method for Rank Adaptive Dynamical Low-Rank Approximation in Radiation Therapy". In: *ESAIM: Mathematical Modelling and Numerical Analysis* (Nov. 2022). ISSN: 2822-7840, 2804-7214. DOI: 10.1051/m2an/2022090.
- [Sta+23] Pia Stammer, Lucas Burigo, Oliver Jäkel, Martin Frank, and Niklas Wahl. "Multivariate error modeling and uncertainty quantification using importance (re-)weighting for Monte Carlo simulations in particle transport". In: *Journal of Computational Physics* 473 (2023), p. 111725. ISSN: 0021-9991. DOI: <https://doi.org/10.1016/j.jcp.2022.111725>.

Theses

- [Sta23] Pia Stammer. "Uncertainty quantification and numerical methods in charged particle radiation therapy". Link: <https://bwsyncandshare.kit.edu/s/3rPF5XbnYstSPR6>. PhD thesis. 2023.

Open Source Software

TITUS

<https://github.com/CSMMLab/TITUS> • Project together with Jonas Kusch. • The TITUS framework offers open source solvers for time and memory efficient deterministic proton and electron dose calculations in 2D/3D using GPU acceleration.

KiT-RT

<https://github.com/CSMMLab/KiT-RT> • Project together with Jonas Kusch, Stefan Schotthöfer, Jannick Wolters and Tianbai Xiao. • The KiT-RT (Kinetic Transport Solver for Radiation Therapy) framework is a high-performance open source platform for radiation transport. To enable problem-specific method selection, the framework provides different deterministic solver types.

matRad

<https://e0404.github.io/matRad/> • Project developed and maintained within the research group Radiotherapy Optimization at the German Cancer Research Center (DKFZ). • MatRad is an open source software for radiation treatment planning of intensity-modulated photon, proton, and carbon ion therapy.

Programming Skills

- Languages: Matlab, Julia, Python, C++, Bash, LaTeX
- Frameworks: Scrum, OpenMP, Git, CI/CD-workflows, Linux, MS-office

Languages

German (native) • English (C2) • French (A2)

Further education and courses

Scientific Writing and Publishing • Wissenschaft besser visualisieren (Visualizing science better) • Communicating Science Online • Corruption prevention • Data protection