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 quanification 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	H^3 – 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
2022	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	GIMC 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, Steffen 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