





Georg Müller

Dr. rer. nat.

RG Scientific Computing and Optimization 
Interdisciplinary Center for Scientific Computing
Universität Heidelberg – Im Neuenheimer Feld 205 - R 2.322
D-69210 Heidelberg
+49 6221 54 14631 
georg.mueller@uni-heidelberg.de 
[Webseite](#) 

Personal Information

Date of Birth	April 10, 1988
Place of Birth	Berlin
Family Status	Married, 1 Child (born 07/2018)
Current Position	Assistant Professor (Ak. Rat), RG Scientific Computing and Optimization, University of Heidelberg

University Education

09/2013 – 05/2019	Doctoral studies in mathematics – University of Bayreuth (Anton Schiela) Focus: Optimal control of nonsmooth partial differential equations and complementarity constrained problems Thesis title: <i>"Optimal Control of Time-Discretized Contact Problems"</i> Grade: Summa cum laude
10/2010 – 03/2013	Graduate studies in scientific computing – TU Berlin Focus: Nonlinear optimization, optimal control of partial differential equations Minor: Physics M.Sc. grade: 1.0
10/2007 – 11/2010	Undergraduate studies in mathematics – TU Berlin Focus: Differential equations Minor: Computer sciences / physics B.Sc. grade: 1.2

Research Positions

since 09/2021	Assistant Professor (Ak. Rat), RG Scientific Computing and Optimization, University of Heidelberg
04/2018 – 08/2021	Research assistant, WG Numerical Optimization, University of Konstanz
09/2016 – 03/2018	Research assistant, Chair of Applied Mathematics, University of Bayreuth
10/2014 – 08/2016	Research assistant, Chair of Applied Mathematics, University of Bayreuth (BMBF project 'SOAK' - <i>"Wear Simulation of Knee Implants and Shape Optimization for Patient-Group Specific Wear Minimization"</i>)
09/2013 – 09/2014	Research assistant, Chair of Applied Analysis, Technical University of Hamburg-Harburg (BMBF project 'SOAK')
02/2011 – 02/2012 & 08/2012 – 03/2013	Student researcher, research group <i>"Nonlinear Optimization and Inverse Problems"</i> , WIAS Berlin

Invited Research Stays

11/2019	Chair of Mathematical Optimization, TU Munich (with Lukas Hertlein and Michael Ulbrich)
06/2016	Research Group Numerical Mathematics, TU Chemnitz (with Gerd Wachsmuth and Roland Herzog)

Funding Proposals

12/2021	"Efficient solvers for life-cycle- and recycling models of roller bearings", BMBF call "Mathematics for Innovations"; with Peter Maaß (Bremen), Gabriele Steidl (Berlin), Christian Schenck (Bremen), Andreas Rademacher (Bremen); rejected, € 766237
12/2021	"AI-Based, Multicriteria Bilevel Design Assistant for Mechatronic Systems", DFG call for priority programme 2353; with Roland Herzog (Heidelberg); rejected, € 225000
01/2021	"Efficient Simulation of a Spatiotemporal SIR Model", UKN Zukunftskolleg call for Independent Research Grants; granted, € 5825
10/2020 & 10/2019	"Parameter Identification in Nonsmooth Systems Using Tailored Model Order Reduction", UKN Zukunftskolleg call for postdoctoral fellowship program; rejected
08/2020	"Coordinated Policies for Epidemic Outbreaks with respect to Health, Economic and Social Implications", DFG call for multidisciplinary research into epidemics; with Stefan Volkwein (Konstanz), Michael Dellnitz and Sebastian Peitz (Paderborn), Christof Schütte and Tim Conrad (Berlin), rejected
10/2018	"Multiobjective Optimization of Non-Smooth PDE-Constrained Problems" (Collaboration), DFG priority programme 1962; with Stefan Volkwein (Konstanz), Michael Dellnitz and Sebastian Peitz (Paderborn), granted
07/2013	"Shape Optimization for Induction Coils in Surface Hardening", PhD Scholarship, Berlin Mathematical School; granted but passed up, € 35232

Teaching

WS 2022	Exercises for <i>Introduction to Optimization</i> (Roland Herzog)
SS 2022	Seminar <i>Selected Topics in Optimization</i> with Roland Herzog
SS 2022	Exercises for <i>Introduction to Numerical Mathematics</i> (Roland Herzog)
WS 2021	Exercises for <i>Introduction to Optimization</i> (Roland Herzog)
SS 2021	Exercises for <i>Optimization III</i> (Stefan Volkwein) with Luca Mechelli
WS 2020	Seminar <i>Advanced Methods in Optimization and Control, with Applications in Pandemic and Climate Protection</i> (Gabriele Ciaramella)
WS 2020	Exercises for <i>Optimization II</i> (Gabriele Ciaramella)
SS 2020	Seminar <i>Advanced Numerical Optimization Methods</i> (Gabriele Ciaramella)
WS 2019	Exercises for <i>Optimization II</i> (Stefan Volkwein)
SS 2019	Exercises for <i>Optimization III</i> (Stefan Volkwein)
WS 2018	Exercises for <i>Optimization II</i> (Stefan Volkwein) mit J. Lu
SS 2018	Exercises for <i>Numerics of Partial Differential Equations II</i> (Stefan Volkwein)
WS 2017	Exercises for <i>Analysis I</i> (Lars Grüne)
SS 2017	Exercises for <i>Analysis II</i> (Anton Schiela)
WS 2016	Exercises for <i>Analysis I</i> (Anton Schiela)
10/2016 – 03/2018	Teaching in the University of Bayreuth's " Lernzentrum " (Interdisciplinary learning center for university mathematics focused on the entry level)

Theses Coadvised (Non-Official Capacity)

currently	Ph.D. thesis of Marco Bernreuther, University of Konstanz (with Stefan Volkwein)
currently	M.Sc. thesis of Leonie Kreis, <i>Multilevel Training of Deep Residual Neural Networks</i> , University of Heidelberg (with Roland Herzog)
currently	B.Sc. thesis of Nico Haaf, <i>Measure valued optimal control of PDEs</i> , University of Heidelberg (with Roland Herzog)
04/2019	M.Sc. thesis of Hai-Dang Nguyen Pham, <i>SIR Model Simulation with FEniCS</i> , University of Konstanz (with Stefan Volkwein)
09/2019	M.Sc. thesis of Marco Bernreuther, <i>RB-based PDE-Constrained Non-Smooth Optimization</i> , University of Konstanz (with Stefan Volkwein)
07/2016	M.Sc. thesis of Matthias Stöcklein, <i>Optimal Control of Static Contact Problems in Linear Elasticity</i> , University of Bayreuth (with Anton Schiela)

Reviews for

GAMM-Mitteilungen

SIAM Journal on Control and Optimization

Organization

since 09/2021	Organizing the “Seminar on Optimization”, University of Heidelberg
03/2022	“Heidelberg Seminar on Optimal Control”, Haus im Ennstal, Austria (cancelled)
12/2019	Co-organized “Workshop on Model Order Reduction, Parameter Identification and Optimization with Nonsmooth Partial Differential Equations”, Konstanz

Publications

1. Marco Bernreuther, Georg Müller and Stefan Volkwein. Efficient scalarization in multiobjective optimal control of a nonsmooth pde. [doi:10.1007/s10589-022-00390-y](https://doi.org/10.1007/s10589-022-00390-y).
2. Gabriele Ciaramella, Felix Kwok and Georg Müller. Nonlinear optimized schwarz preconditioner for elliptic optimal control problems.
3. Marco Bernreuther, Georg Müller and Stefan Volkwein. Reduced basis model order reduction in optimal control of a nonsmooth semilinear elliptic pde. In *Optimization and Control for Partial Differential Equations*, pages 1–32. De Gruyter.
4. Constantin Christof and Georg Müller (2021). Multiobjective optimal control of a non-smooth semilinear elliptic partial differential equation. *ESAIM. Control, Optimisation and Calculus of Variations*, 27:Paper No. S13, 31. [doi:10.1051/cocv/2020060](https://doi.org/10.1051/cocv/2020060).
5. Georg Müller (2019). *Optimal control of time-discretized contact problems*. PhD thesis, Bayreuth. [doi:10.15495/EPub_UBT_00004379](https://doi.org/10.15495/EPub_UBT_00004379).
6. Constantin Christof and Georg Müller (2018). A note on the equivalence and the boundary behavior of a class of Sobolev capacities. *GAMM-Mitteilungen*, 40(3):238–266. [doi:10.1002/gamm.201730005](https://doi.org/10.1002/gamm.201730005).
7. Georg Müller and Anton Schiela (2017). On the control of time discretized dynamic contact problems. *Computational Optimization and Applications. An International Journal*, 68(2):243–287. [doi:10.1007/s10589-017-9918-5](https://doi.org/10.1007/s10589-017-9918-5).

Publications in preparation (selected)

1. Gabriele Ciaramella, Christian Jäkle, Georg Müller and Stefan Volkwein. Lectures on numerical optimization. Single-lecture prestructured textbook on numerical optimization.

2. Gabriele Ciaramella, Michael Kartmann and Georg Müller. RAS-preconditioned Newton and quasi-Newton methods for regularized elliptic optimal control problems with L^1 -costfunctional. Journal article.
3. Gabriele Ciaramella, Felix Kwok and Georg Müller. Nonlinear optimized schwarz preconditioner for elliptic optimal control problems. Journal article of proceedings publication 2.

Presentations

1. *Solving Semi-Linear Elliptic Optimal Control Problems with L^1 -Cost via Regularization and RAS Preconditioned Newton*. FGP Conference on Optimization, University of Porto, PG. 05.05.2022.
2. *Multiobjective Optimal Control of a Non-Smooth Semi-Linear Elliptic PDE*. IWR Seminar Scientific Computing, IWR (University of Heidelberg) **(invited)**. 16.06.2021.
3. *Multiobjective Optimal Control of a Non-Smooth Semi-Linear Elliptic PDE*. SIGOPT 2020 Conference on Optimization, TU Dortmund. 06.03.2020.
4. *An Introduction to Version Control Using Git*. Seminar on Numerics, University of Konstanz. 17.12.2019.
5. *Multiobjective Optimal Control of a Non-Smooth Semi-Linear Elliptic PDE*. Workshop on Optimal Control, University of Konstanz. 03.12.2019.
6. *Multiobjective Optimal Control of a Non-Smooth Semi-Linear Elliptic PDE*. Special Semester on Optimization, Johan Radon Institute for Computational and Applied Mathematics, Linz, AT. 26.11.2019.
7. *Multiobjective Optimal Control of a Non-Smooth Semi-Linear Elliptic PDE*. Seminar of the International Research Training Group IGDK Munich – Graz, TU Munich **(invited)**. 21.11.2019.
8. *Multiobjective Optimal Control of a Non-Smooth Semi-Linear Elliptic PDE*. 6th International Conference on Continuous Optimization, TU Berlin. 07.08.2019.
9. *Improved Gradient Descent Schemes and the Barzilai-Borwein Method*. Seminar on Numerics, University of Konstanz. 23.07.2019.
10. *Optimal Control of Time Discretized Dynamic Contact Problems*. GAMM annual meeting, TU Munich. 20.03.2018.
11. *Optimal Control of Time Discretized Contact Problems*. SIAM Conference on Optimization, Vancouver, CA. 23.05.2017.
12. *Boundary Behavior of Sobolev Capacities and Implications for Contact Problems*. 9th Chemnitz Seminar on Optimization, Haus im Ennstal, AT. 14.02.2017.
13. *Optimal Control of Time Discretized Contact Problems*. Research Center for Modeling and Simulation (MODUS), University of Bayreuth. 27.06.2016.
14. *Optimal Control of Time Discretized Contact Problems*. Seminar on Scientific Computing, TU Chemnitz **(invited)**. 21.06.2016.
15. *Optimal Control of Time Discretized Dynamic Contact Problems*. GAMM / DMV annual meeting, TU Braunschweig. 08.03.2016.
16. *Optimal Control of Dynamic Contact – Modelling, Stationarity and Application*. 8th Chemnitz Seminar on Optimization, Haus im Ennstal, AT. 29.02.2016.
17. *Optimal Control of Dynamic Contact and Application to Knee Joint Prostheses*. 6th Conference on High Performance Scientific Computing, Hanoi, VN. 19.03.2015.
18. *Optimal Control of Dynamic Contact and Application to Knee Joint Prostheses*. 7th Chemnitz Seminar on Optimization, Haus im Ennstal, AT. 25.02.2015.

Programming Languages

C, C++	expert
Python	advanced
Fortran	basic

Software Used

Mathematical Tools	Matlab, DUNE , Kaskade7 , FEniCS , Latex
Version Control	Git, SVN
Visualization	Paraview, Gnuplot
Operating Systems	Linux, Windows
Website Development	Hugo, HTML
Software Development	Make, CMake

Languages

German	Native speaker
English	Very good command

Miscellaneous

09/2019	Fall School " <i>Quasi-Variational Inequalities: Theory, Algorithms, and Applications</i> ", Würzburg
04/2018 – 12/2018	Technology Transfer Liaison position at the University of Konstanz
07/2016	Grading the mathematics competition of the 11th Day of Mathematics , University of Bayreuth
07/2015	Co-Supervision of the lab " Planetary Orbits on the Computer " – 10 th Day of Mathematics, University of Bayreuth
08/2014	Gene Golub SIAM Summer School – " <i>Simulation, Optimization, and Identification in Solid Mechanics</i> ", RICAM, Linz, AT
03/2012 – 07/2012	MATHEON Technology Transfer Internship, Ingenieurgesellschaft Auto und Verkehr (IAV)
08/2004 – 06/2005	Stay abroad in student exchange program, Waterford, Michigan, USA (Kettering High-School)