

Roland Herzog

Prof. Dr. rer. nat.

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Personal Information

Date of Birth July 31, 1974
Place of Birth Hannover, Germany
Marital Status Married
Birth Name Griesse
Children one daughter, one son
Citizenship German



Professional Record

Apr 2021 – present W3 (full) professor in *Scientific Computing and Optimization*
Interdisciplinary Center for Scientific Computing, Heidelberg University, Germany

Jul 2020 Offer for a W3 (full) professorship in *Scientific Computing*
Heidelberg University, Germany (accepted in November 2020)

Mar 2008 – Mar 2021 W3 (full) professor in *Numerical Mathematics and PDEs*
Technische Universität Chemnitz, Germany

Apr 2017 – Aug 2017 Visiting professorship
University of British Columbia, Vancouver, Canada

Jan 2016 Offer for a W3 (full) professorship in *Mathematical Optimization*
Technische Universität Braunschweig, Germany

Apr 2011 Offer for a W3 (full) professorship in *Optimization and Inverse Problems*
University of Stuttgart, Germany

Aug 2007 Offer for a W3 (full) professorship in *Numerical Mathematics and PDEs*
Technische Universität Chemnitz, Germany (accepted in November 2007)

Aug 2007 Offer for a W2 (associate) professorship in *Continuous Optimization*
RWTH Aachen, Germany

Jul 2007 Offer for a W2 (associate) professorship in *Numerical Methods in Optimal Control*
TU Dresden, Germany

Oct 2006 – Feb 2007 W3 (full) replacement professorship in *Numerical Mathematics and PDEs*
Technische Universität Chemnitz, Germany

Sep 2004 Offer for a W1 (junior) professorship in *Numerical Methods in Optimal Control*
University of Hamburg, Germany

- Aug 2004 – Senior Scientist, [Johann Radon Institute for Comp. and Appl. Mathematics \(RICAM\)](#)
- Feb 2008 Austrian Academy of Sciences, Linz, Austria (group of Prof. Karl Kunisch)
- Mar 2003 – Postdoctoral Research Assistant
- Jul 2004 Karl Franzens University Graz, Austria (group of Prof. Karl Kunisch)
- Oct 1999 – Scientific Assistant
- Feb 2003 University of Bayreuth, Germany (group of Prof. Hans Josef Pesch)

Education

- Jun 2008 Habilitation at Karl Franzens University Graz, Austria
Title of Habilitation Thesis: *Stability and Sensitivity Analysis in Optimal Control of Partial Differential Equations*
- Feb 2003 Doctorate degree from the University of Bayreuth, Germany
Title of Dissertation: *Parametric Sensitivity Analysis for Control-Constrained Optimal Control Problems Governed by Systems of Parabolic Partial Differential Equations* (Supervisor Prof. Hans Josef Pesch, second supervisor Prof. Fredi Tröltzsch)
- Aug 1999 Diploma with Honors in Applied Mathematics from TU Clausthal, Germany
Title of Thesis: *Optimal and Suboptimal Control of the Navier-Stokes Equations* (Supervisor Prof. Hans Josef Pesch)
- 1996 – 1997 First year Ph.D. program in Mathematics at Tulane University, New Orleans, USA
- 1994 – 1999 Study in Applied Mathematics (Minors: Mechanical Engineering, Fluid Dynamics and Computer Science) at TU Clausthal, Germany

Teaching Experience

- Apr 2021 – Heidelberg University, Germany
present Introduction to Optimization, Nonlinear Optimization, Introduction to Numerical Analysis
- Sep 2018 Short Course for Members of the Research Training Group π^3 , University of Bremen, Germany
Introduction to PDE-Constrained Optimization
- Aug 2014 Gene Golub SIAM Summer School 2014, RICAM Linz, Austria
Optimization subject to Complementarity Constraints
- Apr 2013 Short Course for Members of the International Research Training Group IGDK 1754, TU München, Germany
Introduction to PDE-Constrained Optimization
- Jul 2010 Summer School on Analysis and Numerics of PDE Constrained Optimization, Lambrecht, Germany
Algorithms and Preconditioning for PDE-Constrained Optimization
- Apr 2008 – Technische Universität Chemnitz, Germany
- Mar 2021 [Various lectures](#) on Optimization, Optimal Control of PDEs and ODEs, Numerical Methods for PDEs and ODEs, Mathematics for Engineers, Optimization for Engineers
- Mar 2008 Short Course at Middle East Technical University, Ankara, Turkey
Sensitivity Analysis in Optimal Control
- Apr 2007 Short Course at Universidad Autónoma de Aguascalientes, Mexico
Optimalsteuerung von PDEs
- Oct 2006 – Technische Universität Chemnitz, Germany
- Feb 2007 Lecture and tutorial classes in Numerical Methods for ODEs, and Optimal Control of PDEs

- Jan 2006 Short Course at University of Bremen
Infinite-Dimensional Optimization
- 2005 Johannes Kepler University Linz, Austria
Lecture and tutorial classes in Control Theory
- 2004 – 2005 Johannes Kepler University Linz, Austria
Tutorial classes in Real Analysis
- 2003 – 2004 Karl Franzens University Graz, Austria
Occasional stand-in lectures in Numerical Analysis
- 1999 – 2003 University of Bayreuth, Germany
Full time Teaching Assistant for Mathematics for Engineers and advanced courses in applied mathematics, occasional stand-in lectures in Mathematics for Engineers and Optimal Control
- 1997 – 1999 Clausthal University of Technology, Germany
Teaching Assistant for Mathematics for Engineers and Real Analysis
- 1996 – 1997 Tulane University, New Orleans, USA
Teaching Assistant for various Calculus classes, including honors classes
- 1995 – 1996 Clausthal University of Technology, Germany
Teaching Assistant for Real Analysis

Educational Training

- Apr 2020 Webinar on the web conferencing system BigBlueButton for teaching
- Jan 2018 Workshop on Flipped Classroom Techniques for STEM Education
- Oct 2016 Workshop on Academic Teaching
- Dec 2014 Student Motivation in Academic Teaching
- Nov 2003 English Presentation Skills
- Jun 2002 Didactic Training: Planning a lecture
- Sep 1996 Training for Teaching Assistants, Tulane University

Professional Training

- Nov 2016 Leadership Skills at the University
DHV (German Association of University Professors and Lecturers)

Fellowships

- 1998 – 1999 Fellow of the German National Merit Foundation (Studienstiftung des deutschen Volkes)
- 1996 – 1997 Fellowship Tulane University, New Orleans, USA

Professional Responsibilities

- Nov 2023 – Managing Director, Interdisciplinary Center for Scientific Computing (IWR), Heidelberg University
present
- Jan 2023 – Member of the Board of Directors, Interdisciplinary Center for Scientific Computing
present (IWR), Heidelberg University
- Jun 2022 – Liaison Officer of GAMM at Heidelberg University
present

- Apr 2022 – Member of the language jury for the KlarText prize for science communication by the present Klaus Tschira Foundation
- Jan 2022 – GAMM Delegate at the European Mathematical Society (EMS) present
- Oct 2021 – Chairman of the study commission (Studienkommission) of the Degree Program M.Sc. present Scientific Computing, Heidelberg University
- Oct 2021 – Vice Chairman of the board of examiners (Prüfungsausschuss) of the Degree Program present M.Sc. Scientific Computing, Heidelberg University
- Oct 2021 – Member of the Admission Committee of the Degree Program M.Sc. Scientific Com- present puting, Heidelberg University
- Jan 2021 – Principal Investigator, Heidelberg Graduate School of Mathematical and Computa- present tional Methods for the Sciences (HGS MathComp), Heidelberg University
- Apr 2019 – Academic Advisor for Industrial Mathematics, TU Chemnitz
Dec 2020
- Apr 2019 – Member of the study commission (Studienkommission) of the Degree Program M.Sc. Dec 2020 Data Science, TU Chemnitz
- Jan 2019 – Member of the Managing Board of GAMM
Dec 2024
- May 2018 – Member of the board of examiners (Prüfungsausschuss) of the Degree Program M.Sc. Dec 2020 Data Science and of the Degree Program Diplom Mathematics, TU Chemnitz
- Oct 2017 – Vice speaker of the research field *Materials and Intelligent Systems*, TU Chemnitz
Dec 2020
- Apr 2017 – Member of the advisory committee (Fakultätsrat) of the Faculty of Mathematics, Dec 2020 TU Chemnitz
- Mar 2017 – Member of the advisory board (Kuratorium) of the Institute of Mechatronics, Chemnitz
Aug 2022
- Sep 2016 – Member of the board of examiners (Prüfungsausschuss) of the International Degree Dec 2020 Program M.Sc./Ph.D. Mathematics, TU Chemnitz
- Sep 2016 – Member of the board of examiners (Prüfungsausschuss) of the Degree Program Dec 2020 B.Sc./M.Sc. Mathematics, TU Chemnitz
- Oct 2015 – Vice Chairman of the board of examiners (Prüfungsausschuss) of the Degree Program Dec 2020 M.Sc. Finance, TU Chemnitz
- Apr 2015 – Member of the Extended Senate, TU Chemnitz
Mar 2021
- Apr 2015 – Member of the board of examiners (Prüfungsausschuss) of the Degree Program M.Sc. Dec 2020 Finance, TU Chemnitz
- Jan 2015 – Vice speaker of the research field *Resource Efficient Production and Lightweight Dec 2020 Construction*, TU Chemnitz
- Oct 2014 – (Provisional) Academic Advisor for Business Mathematics, TU Chemnitz
Oct 2016
- Sep 2014 – Speaker of the [GAMM activity group on optimization with PDE constraints](#)
Sep 2017
- Apr 2014 – Member of the Council (Beirat) of the Center for Teacher Training, TU Chemnitz
Mar 2021

- Apr 2014 – Member of the study commission (Studienkommission) of the Center for Teacher
Apr 2016 Training, TU Chemnitz
- Apr 2013 – Member of the Senate Commission on Education and Studies, TU Chemnitz
May 2016
- Apr 2013 – Dean of Studies (Studiendekan) of the Faculty of Mathematics, TU Chemnitz
Mar 2016
- May 2011 – Vice speaker of the [GAMM activity group on optimization with PDE constraints](#)
Sep 2014
- May 2010 – Member of the study commission (Studienkommission) and Academic Advisor for
Mar 2013 Industrial Mathematics, TU Chemnitz
- Dec 2009 – Chairman of the board of examiners (Prüfungsausschuss) of the Faculty of Mathematics,
Mar 2013 TU Chemnitz
- Nov 2009 – Member of the advisory committee (Fakultätsrat) of the Faculty of Mathematics,
Mar 2016 TU Chemnitz
- Sep 2008 – Member of the scientific committee of the Chemnitz FEM Symposium
present
- Oct 2004 – Chairman of the Employees of the Johann Radon Institute for Computational and
Oct 2007 Applied Mathematics

Membership in Professional Societies

- DANTE (German T_EX Users Association)
- SIAM (Society for Industrial and Applied Mathematics), and member of its activity groups on optimization, imaging and linear algebra
- DMV (German Mathematical Society)
- DHV (German Association of University Professors and Lecturers)
- GAMM (International Association of Applied Mathematics and Mechanics), and member of its activity groups on optimization with PDE constraints, uncertainty quantification, numerical analysis, mathematical signal and image processing, and computational and mathematical methods in data science
- IPIA (Inverse Problems International Association)
- MOS (Mathematical Optimization Society)
- Friends of Oberwolfach
- Committee for Mathematical Modeling, Simulation and Optimization (KoMSO e.V.)

Involvement in Successful Coordinated Research Proposals

- Mar 2021 – Co-Proposer and Member of the Program Committee of DFG Priority Program
present SPP 2353 *Daring More Intelligence – Design Assistants in Mechanics and Dynamics*;
coordinator: Peter Eberhard
- Sep 2018 – Member of the Executive Board of SFB/Transregion 96
present
- Oct 2016 – Member of the Steering Committee of DFG Priority Program SPP 1962
present

Mar 2015 Co-Proposer of DFG Priority Program SPP 1962 *Non-Smooth and Complementarity-Based Distributed Parameter Systems: Simulation and Hierarchical Optimization*; coordinator: Michael Hintermüller

Funded Research Projects (4 601 000 € in Total)

- May 2022 – *Multilevel Architectures and Algorithms in Deep Learning*
Apr 2025 DFG grant (209 000 €) within the Priority Program 2298, together with Anton Schiela, Bayreuth; investigator: Leonie Kreis
- Apr 2022 – *Optimal Control and Optimal Experimental Design for MRI and Photoacoustic Imaging*
Mar 2028 Project (400 000 €) within the Carl Zeiss Center *Model-Based AI: Physical Models and Deep Learning for Imaging and Cancer Treatment*, together with Jürgen Hesser, Robert Scheichl and others; investigator: Karina Koval
- Mar 2022 – *Optimization and Visualization Support System for Cardiac Arrhythmia Management*
Dec 2024 Project (108 000 €) within *Informatics4Life*, an initiative by the Klaus Tschira Foundation, together with Ann-Kathrin Rahm; investigator: Reyhaneh Majidi
- Feb 2022 – *Machine Learning and Optimal Experimental Design for Thermodynamic Property Modeling*
Jan 2025 DFG grant (298 000 €) within the Priority Program 2331, together with Markus Richter, Chemnitz; investigator: Viktor Martinek
- May 2020 – *Simulation Based Optimization of the Time-Dependent Pulse Power for Laser Beam Welding of Aluminum Alloys in Order to Avoid Hot Cracks*
Oct 2022 AiF Project (203 770 €) in Forschungsvereinigung Schweißen und verwandte Verfahren e.V., together with Jean-Pierre Bergmann, Ilmenau; Mitarbeiter: Dmytro Strelnikov
- Jun 2021 – *A Calculus for Non-Smooth Shape Optimization with Applications to Geometric Inverse Problems*
May 2024 DFG grant (215 000 €) within the Priority Program 1962, together with Stephan Schmidt, Berlin; investigator: Manuel Weiß
- Jan 2020 – *High Entropy Alloys as Coating Materials for Surface Protection*
Dec 2022 Project within an ESF junior research group (200 000 €); investigator: Felix Ospald
- Jul 2019 – *Model Predictive Parameter and State Estimation and Optimal Sensor Placement*
Jun 2023 DFG grant (732 000 €) within the Collaborative Research Center SFB/TR 96, together with Martin Stoll, Chemnitz; investigator: Andreas Naumann
- Jan 2017 – *A Calculus for Non-Smooth Shape Optimization with Applications to Geometric Inverse Problems*
Dec 2019 DFG grant (189 700 €) within the Priority Program 1962, together with Stephan Schmidt, Würzburg; investigator: José Vidal-Núñez
- Oct 2016 – *Optimal Control of Dissipative Solids: Viscosity Limits and Non-Smooth Algorithms*
May 2020 DFG grant (126 400 €) within the Priority Program 1962, together with Dorothee Knees, Kassel, and Christian Meyer, Dortmund; investigator: Ailyn Stötzner
- Jul 2015 – *Model Predictive Parameter and State Estimation and Optimal Sensor Placement*
Jun 2019 DFG grant (242 400 €) within the Collaborative Research Center SFB/TR 96; investigator: Ilka Riedel
- Apr 2015 – *Impulse Control Problems and Adaptive Numerical Solution of Quasi-Variational Inequalities in Markovian Factor Models*
May 2018 DFG grant (350 600 €), together with Thorsten Schmidt; investigator: Jan Blechschmidt
- Nov 2012 – *Bivalent and Multi-Criteria Optimization of Coupled Simulations of Manufacturing and Loading of Hybrid Structures*
Okt 2017 Project within DFG Cluster of Excellence (364 000 €); investigators: Andreas Günnel and Felix Ospald

- Oct 2012 – *Preconditioned SQP Solvers for Nonlinear Optimization Problems with PDEs*
 Sep 2015 DFG grant (178 000 €); investigator: Susann Mach
- Jul 2011 – *Correction Algorithms and High Dimensional Characteristic Diagrams*
 Jun 2015 DFG grant (264 800 €) within the Collaborative Research Center SFB/TR 96, together with Ulrich Priber, Fraunhofer IWU, Chemnitz, Germany; investigator: Ilka Riedel
- Oct 2009 – *Optimal Control in Elastoplasticity*
 Sep 2012 DFG grant (319 600 €) within the Priority Program 1253, together with Christian Meyer, TU Dortmund, Germany; investigators: Gerd Wachsmuth and Frank Schmidt
- Aug 2007 – *Optimal Control of Stefan Problems with Constraints*
 Dec 2010 FWF grant (105 431 €), together with Karl Kunisch, Graz, Austria; investigator: Martin Bernauer
- Sep 2005 – *SSC and SQP for Mixed Constrained Optimal Control Problems*
 Aug 2008 FWF grant (95 141 €), together with Arnd Rösch, Duisburg-Essen, Germany; investigator: Nataliya Metla

Other Grants (108 000 € in Total)

- Sep 2023 [European Conference on Computational Optimization \(EUCCO 2023\)](#) (20 000 €) awarded by DFG
- Aug 2014 [Gene Golub SIAM Summer School](#) (63 000 €) awarded by SIAM, together with Winnifried Wollner, Esther Klann, Michael Stingl
- Jul 2013 ESF support (17 000 €) for the [3rd European Conference on Computational and Applied Mathematics \(EUCCO\)](#), Chemnitz, Germany
- Jul 2011 DAAD travel grant (2221 €) to attend the ICIAM meeting, Vancouver, Canada
- Jul 2010 – DAAD travel grant (4723 €) for cooperation visits with the group of Andy Wathen,
 Jun 2011 University of Oxford, together with Ekkehard Sachs, Trier, Germany
- Aug 2009 DAAD (German Academic Exchange Service) travel grant (1465 €) to attend the IFIP TC7 conference, Buenos Aires, Argentina

Reviewer for Habilitation Theses

- 2020 Stefan Takacs
Robust Multigrid Solvers and Related Topics (Johannes Kepler University of Linz)
- 2017 Andreas Potschka
Efficient Numerical Methods for Large-Scale Nonlinear Problems (University of Heidelberg)
- 2017 Gerd Wachsmuth
Optimization Problems with Complementarity Constraints in Infinite-Dimensional Spaces (TU Chemnitz)
- 2016 Martin Stoll
Fast Iterative Solvers for Time-Dependent PDE-Constrained Optimization Problems (University of Magdeburg)

Dissertation Theses Supervised

- current [Eric Legler](#), [Masoumeh Hashemi](#), [Manuel Weiß](#), [Reyhaneh Majidi](#), [Viktor Martinek](#), [Leonie Kreis](#)
- 2022 [Jan Blechschmidt](#)
Numerical Methods for Stochastic Control Problems with Applications in Financial Mathematics

- 2022 Estefanía Loayza
A Discrete Perspective on PDE-Constrained Shape Optimization Problem
- 2019 Felix Ospald
Contributions to the Simulation and Optimization of the Manufacturing Process and the Mechanical Properties of Short Fiber-Reinforced Plastic Parts
- 2018 Ailyn Stötzner
Optimal Control of Thermoviscoplasticity
- 2014 Andreas Günnel
Numerical Aspects in Optimal Control of Elasticity Models with Large Deformations
- 2011 Gerd Wachsmuth
Optimal Control of Quasistatic Plasticity — An MPCC in Function Space
- 2010 Martin Bernauer
Motion Planning for the Two-Phase Stefan Problem in Level Set Formulation
- 2008 Nataliya Metla
The Sequential Quadratic Programming Method for Elliptic Control Problems with Mixed Control-State Constraints (together with Arnd Rösch, Duisburg-Essen, Germany)

Second Reviewer for Dissertation Theses

- 2022 Jesús Bellver Arnau
Optimal Mosquito Release Strategies for Vector-Borne Disease Control (supervised by Luis Almeida, Sorbonne, Paris and Yannick Privat, Strasbourg)
- 2022 Ahmad Bokhari
Material Distribution-Based Topology Optimization for Wave Propagation Problems (supervised by Eddie Wadbro, Karlstadt)
- 2021 Marc Herrmann
The Total Variation on Surfaces and as Shape Prior (supervised by Stephan Schmidt, Humboldt University Berlin, and myself)
- 2020 Tomáš Gergelits
Krylov Subspace Methods—Analysis and Application (supervised by Zdeněk Strakoš, Charles University, Prague)
- 2019 Florian Wechsung
Shape Optimisation and Robust Solvers for Incompressible Flow (supervised by Patrick Farrell, University of Oxford)
- 2019 Georg Müller
Optimal Control of Time-Discretized Contact Problems (supervised by Anton Schiela, University of Bayreuth)
- 2019 Yona Frekers
Investigation of Thermal Boundary Conditions at Contact Interfaces (supervised by Reinhold Kneer, Institute of Heat and Mass Transfer, Faculty of Mechanical Engineering, RWTH Aachen)
- 2018 Niels Goldberg
Homogenisierung und Modellierung des Materialverhaltens kurzfaserverstärkter Thermoplaste (supervised by Jörn Ihlemann, Faculty of Mechanical Engineering, TU Chemnitz)
- 2017 Magne Nordaas
Operator Preconditioning for PDE-Constrained Optimisation and Multiscale Problems (supervised by Kent-Andre Mardal, University of Oslo)

- 2016 Juri Merger
Optimal Control and Function Identification in Biological Processes (supervised by Alfio Borzi, University of Würzburg)
- 2016 Kathrin Welker
Efficient PDE Constrained Shape Optimization in Shape Spaces (supervised by Volker Schulz, University of Trier)
- 2016 Hans Wulf
Modellierung und Simulation von Selbstorganisationsprozessen in belasteten technischen Gummiwerkstoffen (supervised by Jörn Ihlemann, Faculty of Mechanical Engineering, TU Chemnitz)
- 2015 Moritz Keuthen
Second Order Shape Optimization with Geometric Constraints (supervised by Michael Ulbrich, TU München)
- 2015 Dirk Schellenberg
Identifikation und Optimierung im Kontext technischer Anwendungen (supervised by Jörn Ihlemann, Faculty of Mechanical Engineering, TU Chemnitz)
- 2015 Thomas Betz
Optimal Control of Two Variational Inequalities Arising in Solid Mechanics (supervised by Christian Meyer, TU Dortmund)
- 2015 Max Winkler
Finite Element Error Analysis for Neumann Boundary Control Problems on Polygonal and Polyhedral Domains (supervised by Thomas Apel, University of the Armed Forces, Munich)
- 2013 Markus Kollmann
Efficient Iterative Solvers for Saddle Point Systems arising in PDE-Constrained Optimization Problems with Inequality Constraints (supervised by Walter Zulehner, University of Linz)
- 2012 Dominik Skanda
Robust Optimal Experimental Design for Model Discrimination of Kinetic ODE Systems (supervised by Dirk Lebiedz, University of Freiburg)
- 2012 Armin Rund
Contributions in Optimal Control of Partial Differential Algebraic Equations (supervised by Hans Josef Pesch, University of Bayreuth)
- 2011 Ira Neitzel
Numerical Analysis of PDE Constrained Optimal Control Problems with Pointwise Inequality Constraints on the State and the Control (supervised by Fredi Tröltzsch, TU Berlin)
- 2011 Sabine Repke
Adjoint-Based Optimization Approaches for Stationary Free Surface Flows (supervised by René Pinnau, TU Kaiserslautern)
- 2010 Tyrone Rees
Preconditioning Iterative Methods for PDE Constrained Optimization (supervised by Andy Wathen, University of Oxford)
- 2010 Wolfgang Hess
Geometry Optimization with PDE Constraints and Applications to the Design of Branched Sheet Metal Products (supervised by Stefan Ulbrich, TU Darmstadt)

Master's Theses Supervised (64 in Total)

- current Isabel Gernand
Prediction of Optimal Trajectories by Neural Networks
- 2023 Johannes Wagner
Physics-Informed Neural Networks for Optimal Control Problems

- 2023 Melissa Weber
Duality and Sensitivity in Linear Optimization
- 2022 Leonie Kreis
Multilevel Training of Residual Neural Networks
- 2022 Renée Dornig
Constrained Optimization on Manifolds (supervised by Ronny Bergmann)
- 2022 Sven Jacob
Computational Methods for Universal Kriging Models
- 2021 Manuel Weiß
The Chambolle-Pock Algorithm for Geometry Labeling and Segmentation based on the Normal Vector Field
- 2021 Johannes Bierschneider
Implementation and comparison of different machine learning forecasting methods in the logistics area of Lidl International
- 2019 Felix Maschke
Constrained Geodesic Regression on Manifolds
- 2019 Maximilian Bochmann
Finite Element Methods and Iterative Algorithms for Total-Variation Problems
- 2018 Robin Herz
Optimal Experimental Design for Bayesian Inversion (together with Oliver Ernst)
- 2018 Hatice Tavli
Variable Metric Bundle Methods for Non-Smooth Non-Convex Optimization Problems
- 2017 Marcus Pelz
Markov Based Prediction of Driving Manoeuvres using Reinforcement Learning
- 2017 Luca Landwehrjohann
Variational Problems with Convexity Constraints (supervised by Gerd Wachsmuth)
- 2017 Annemarie Kühn
Modelling the Dependency Structure of a Portfolio and Impact on Risk Measures (supervised by Dana Uhlig)
- 2017 Friedrich Salzer
Parameter Optimization for Flow Chart Based Acyclic Simulation Models
- 2017 Felix Lacher
Stability of the Semi-Smooth Newton Method (supervised by Gerd Wachsmuth)
- 2017 Florian Modrzik
Text Mining — Presentation of Various Classifiers and their Application to the Assessment of the Ideological Quality of Texts (together with the professorship Wirtschaftsinformatik I)
- 2017 Robert Schiffmann
Error Compensation in Auxiliary Drives of Machine Tools with Rotating Tools
- 2017 Alexander Köwitsch
Shape Optimization of Measurement Devices for Identification Problems in Stationary Fluid Flow
- 2016 Sandy Bitterlich
Numerical Methods for the Solution of Support Vector Machines
- 2016 Felix Harder
Optimal Control of the Obstacle Problem Using the Value Function (supervised by Gerd Wachsmuth)

- 2016 Nadine Erath
Adapting Distributions in Household Insurance Premium Modelling
- 2016 Toni Kowalewitz
Numerical Methods of Option Pricing in Jump Markets
- 2016 Hussain Obaid
Identification Problems in Heat Conducting Networks
- 2016 Saber Jalilzadeh-Galaeh
Identification of the Topology of Heat Conducting Networks (A Comparison between Continuous and Discrete Optimization Techniques)
- 2015 Christina Schubert
The Traveling Salesman Problem with Range Constraints
- 2015 Tobias Hofmann
Dynamic Price Optimization in E-Commerce
- 2015 [Martin Uhlmann](#)
Dynamic Valve Train Simulation for Four-Cylinder, Four-Stroke Engines (together with the professorship Advanced Powertrains)
- 2014 Martin Uhlig
Optimum Experimental Design for Parameter Identification and Model Discrimination
- 2014 [Stephan Schleicher](#)
Shape Optimization Problems in FEniCS
- 2014 Robert Schaffrath
Calculus of Variations Problems under Convexity Constraints (supervised by Gerd Wachsmuth)
- 2014 Jörn Richter
Modeling of Heat Transfer in the Air Gap of Electrical Machines (together with the professorship Elektrische Energiewandlungssysteme und Antriebe)
- 2014 Niklas Nostitz
Simulation of Contact Forces under the Influence of Adhesion and Surface Roughness
- 2014 Michael Heinz
Parameter Identification for Yield Surfaces in Plane Stress Situations (supervised by Rene Schneider and Gerd Wachsmuth)
- 2013 Stephan Schlömer
Optimal Control of Planned Trajectories
- 2013 [Christopher Robert Pech](#)
Quality and Stability Assessment of Dynamic Object Recognition in Monocular Fish Eye Cameras under Egomotion (together with [intenta GmbH](#))
- 2013 Marcel Nicklas
A Trajectory Planner for Highly Automatic Driving in Dynamic Traffic Environments (together with [IAV GmbH](#))
- 2013 [Rolf Springer](#)
Solution of Hamilton-Jacobi-Bellman Equations on Sparse Grids
- 2013 [Felix Ospald](#)
Implementation of Geometric Multigrid in FEniCS
- 2013 Jens Müller
Methods for Statistical Design of Experiments and Simulation with Applications in Engine Development (together with [IAV GmbH](#))

- 2013 [Jan Blechschmidt](#)
Adaptive Solution of Portfolio Optimization Problems
- 2013 Anna Bauer
Optimization Methods for the Resource Efficient Design of Assembly Lines (together with [Fraunhofer Institute for Machine Tools and Forming Technology](#))
- 2013 Johannes Obermeier
Optimal Control with Sparsity Structures in Polar Coordinates
- 2013 Philipp Menzel
Geometric Methods for Hamiltonian Systems: Theory and Applications
- 2012 [Tommy Etling](#)
Optimum Experimental Design for the Identification of Heat Transfer Coefficients (together with [Lehrstuhl für Wärme- und Stoffübertragung, RWTH Aachen](#))
- 2012 Sarah Stoppe
Numerical Simulation of Plastic Materials under Large Deformations
- 2012 [Ilka Riedel](#)
Open and Closed Loop Control of the Nonlinear Inverse Pendulum
- 2011 Tom Waldenburger
Intersection of Bézier Curves with Applications in Shape Optimization (supervised by Rene Schneider)
- 2011 [Sandra Hartl](#)
Preconditioned Solvers for Stationary Problems in Magneto hydrodynamics
- 2011 Mario Krüger
Shape Optimization of Material Boundaries in Isothermal, Stationary, Incompressible Fluid Flows in Layered Porous Media (supervised by Rene Schneider)
- 2011 [Susann Mach](#)
Primal-Dual Algorithms for Color Image Restoration Problems
- 2011 Marie Müllner
Implementation of a Three-Dimensional Advection Scheme for the COSMO Dynamical Core (together with [Meteo Schweiz](#))
- 2010 [Judith Will](#)
An Optimal Control Problem in Electromagnetic Induction Heating
- 2010 [Eric Schmidl](#)
Simulation and Parameter Optimization of an Electromagnetic Cloaking Device
- 2010 Stefan Wild
Numerical Simulation of Elasticity in FENICS
- 2009 Katharina Urbach
Optimization of the Velocity Profile for Five-Axis Machine Tools (together with [Chiron AG](#))
- 2009 Carolin Kraft
Convex Bodies of Minimal Resistance
- 2009 [Hansjörg Schmidt](#)
Parallelization of Surrogate-Based Optimization Methods (together with [IAV GmbH](#))
- 2008 [Gerd Wachsmuth](#)
Elliptic Optimal Control Problems with Sparsity Constraints
was awarded the thesis prize of the university 2009 and a prize of the DMV students' conference 2009

- 2008 Silvia Wieser
Numerical Solution of Optimal Control Problems using FENICS
- 2007 Frank Schmidt
Inexact Newton Methods and their Applications in Solving Semilinear PDEs
was awarded a prize of the Förderverein Mathematik zu Chemnitz
- 2007 Martin Bernauer
A Robustification Approach in Unconstrained Optimization and its Application in Optimal Control
- 2005 Kerstin Brandes
Robustness of optimal solutions for optimal control problems with PDEs

— Bachelor's Theses Supervised (28 in Total)

- current Anna Häfner
The PageRank Algorithm and Extensions
- current Karina Kniel
Parametric Linear Optimization Using Neural Networks
- 2023 Max Jungmann
Introduction to Stochastic Linear Programming
- 2023 Phil Neitzel
Iterative Solution of Markov Decision Processes
- 2023 Nico Haaf
Optimal Control Problems with Measures
- 2023 Tomislav Popov
A Survey of Generalized Convexity and Generalized Monotonicity
- 2022 Fidelius von Manstein
Planning Optimal Smart-Homes using Integer Linear Programming
- 2022 Jan-Philipp Pfaue
Constrained Optimization on Riemannian Manifolds using Geodesic Polygonal Sets (supervised by Ronny Bergmann)
- 2020 Tom-Christian Riemer
The Riemannian BFGS Method and its Implementation in Julia (supervised by Ronny Bergmann)
- 2020 Josie König
The Generalized Labelled Multi-Bernoulli Particle Filter for Multiple Object-Tracking
- 2019 Renée Dornig
Regularized Clustering of Manifold-Valued Data
- 2019 Manuel Weiß
Modelling and Numerical Simulation Methods for a Pendulum on a Rope
- 2019 Zihan Wang
Solution Techniques for the Radiosity Equation
- 2018 Theresa Wagner
Linear Programming to Determine Extremal Loads in Hybrid Engine Drivetrains
- 2017 Felix Maschke
Approximation of Estimated Domains via Level-Set Method

- 2017 Florian Pasch
Topographical Properties of Least-Squares Functions (together with the professorship Solid Mechanics)
- 2016 Felix Queitzsch
Hidden Markov Decision Processes in Finite Time
- 2016 Luca Landwehrjohann
Method for Optimal Placement of Measurement Times in Time-Dependent Systems
- 2016 Marcus Pelz
Uncertainty Quantification in Optimal Control Problems with ODEs (together with Oliver Ernst)
- 2016 Sophie Henning
Numerical Methods for the Solution of a Mean Field Game
- 2016 Robin Herz
Linear Stochastic Optimization Problems and Applications
- 2015 Sandy Bitterlich
Algorithms for Reinforcement Learning
was awarded a prize of the DMV students' conference 2015
- 2015 Eric Huster
Approximation of Measurement Points by Piecewise Euler Spirals
- 2015 [Eric Legler](#)
Toll Optimization as an MPCC
was awarded a prize of the DMV students' conference 2015
- 2014 Alexander Köwitsch
Optimization of a Frame Structure under Dynamical Loads (supervised by Gerd Wachsmuth)
- 2012 Tamara Giering
Digit Recognition by Support Vector Machines
- 2011 Johannes Obermeier
Globalization Approaches for Optimization Problems with 1-Norm-Objectives
- 2010 Stephan Schlömer
Maximal Overhang

Activities as Organizer

- Jul 2024 Member of the Scientific Committee for the *International Symposium on Mathematical Programming*
Montreal, Canada (2024)
- Sep 2023 Co-Organization of the *European Conference on Computational Optimization (EU-CCO)*,
Heidelberg, Germany
- Aug 2023 Organization of a minisymposium on *Emerging Methods for Shape and Topology Optimization*
ICIAM, Tokyo, Japan (together with Stephan Schmidt, Trier)
- Aug 2022 Co-Organization of the *International Conference on Preconditioning and Industrial Applications*, 115 participants
Chemnitz, Germany (together with Martin Stoll, Esmond Ng, Yousef Saad, Andy Wathen)

- Nov 2020 Organization of a mini-workshop on *Computational Optimization on Manifolds*
Oberwolfach (together with Pierre-Antoine Absil, Louvain-la-Neuve and Gabriele Steidl, Berlin;
via video conference)
- Sep 2020 Organization of a minisymposium on *Optimization on Manifolds: Theory and Numerics*
DMV Annual Meeting, Chemnitz, Germany (together with André Uschmajew, Leipzig)
- Oct 2019 Organization of an international workshop on *New Trends in PDE Constrained Optimization*
RICAM, Linz, Austria (together with Emmanuel Trélat, Paris)
- Aug 2019 Organization of an international workshop on *Optimization on Manifolds*
Chemnitz, Germany (together with Ronny Bergmann, Glaydston de Carvalho Bento)
- Aug 2019 Organization of a minisymposium on *Geometric Methods in Optimization of Variational Problems*
ICCOPT, Berlin, Germany (together with Anton Schiela, Bayreuth)
- Jul 2019 Organization of a minisymposium on *Inverse Problems in Shape and Geometry*
ICIAM, Valencia, Spain (together with Bastian von Harrach, Frankfurt and Jan-Frederik Pietschmann, Chemnitz)
- Jun 2019 Organization of a minisymposium on *Advanced Shape Optimization: Non-Smoothness and Time-Dependency*
SIAM Conference on Computational Geometric Design, Vancouver, Canada (together with Stephan Schmidt, Würzburg)
- Jun 2019 Organization of an international workshop on *Beyond the Discrete: Iterative Methods from the Continuum Perspective*
Hamilton Mathematics Institute, Dublin, Ireland (together with Kirk Soodhalter, Matthias Bolten, Stefan Güttel, John Pearson, Jennifer Pestana)
- Jul 2018 Organization of a minisymposium on *Optimum Experimental Design*
28th IFIP TC7 Conference, Essen, Germany (together with Ekatarina Kostina, Heidelberg)
- Jun 2018 Organization of a minisymposium on *Images and Finite Elements*
SIAM Conference on Imaging Sciences, Bologna, Italy (together with Stephan Schmidt, Würzburg)
- May 2018 Organization of a minisymposium on *Preconditioning for PDE Constrained Optimization*
SIAM Conference on Applied Linear Algebra, Hong Kong, China (together with John Pearson, Edinburgh)
- Oct 2017 Member of the Scientific Committee for the workshop *Optimization of Infinite Dimensional Non-Smooth Distributed Parameter Systems*
Darmstadt, Germany (2017)
- May 2017 Organization of a minisymposium on *Infinite Dimensional Nonsmooth Optimization*
SIAM Conference on Optimization, Vancouver, Canada (together with Christian Meyer, Dortmund)
- Aug 2016 Organization of a session on *Optimal Control of Coupled Systems*
International Conference on Continuous Optimization, Tokyo, Japan
- Oct 2015 – present Member of the Scientific Committee for the conference series *European Conference on Computational Optimization (EUCCO)*
Leuven, Belgium (2016); Trier, Germany (2018)
- Sep 2015 – Aug 2017 Member of the Scientific Committee for the GAMM Annual Meeting
Ilmenau/Weimar, Germany (2017); Munich, Germany (2018)

- Aug 2014 Organization of the Gene Golub SIAM Summer School 2014 on [Simulation, Optimization, and Identification in Solid Mechanics](#)
Linz, Austria (together with Winnifried Wollner, Esther Klann, Michael Stingl)
- Sep 2013 Organization of a minisymposium on *Stability, Sensitivity and Error Analysis for Optimal Control Problems*
26th IFIP TC7 Conference, Klagenfurt, Austria (together with Arnd Rösch, Duisburg-Essen)
- Jul 2013 Organization of the *3rd European Conference on Computational Optimization (EU-CCO)*, 115 participants
Chemnitz, Germany (together with Peter Benner, Michael Hinze, Arnd Rösch, Anton Schiela, Volker Schulz)
- Aug 2012 Organization of a session on *Nonsmooth Phenomena in Optimal Control* and a session on *Preconditioning in PDE-Constrained Optimization*
International Symposium on Mathematical Programming (ISMP), Berlin, Germany
- Mar 2012 Organization of a section on *Optimization of Differential Equations*
GAMM Annual Scientific Meeting, Darmstadt, Germany (together with Barbara Kaltenbacher, Klagenfurt)
- Nov 2011 Organization of an international workshop on [Optimal Control of Partial Differential Equations](#)
Klaffenbach, Germany (together with Christian Meyer, Darmstadt, and Arnd Rösch, Duisburg-Essen)
- Sep 2011 Organization of a minisymposium on *Optimal Control of Nonlinear PDEs and Variational Inequalities*
25th IFIP TC7, Berlin, Germany (together with Arnd Rösch, Duisburg-Essen)
- Jul 2011 Organization of a minisymposium on *Saddle-Point Problems in Large-Scale Optimization*
ICIAM, Vancouver, Canada (together with Andy Wathen, Oxford, UK)
- Jul 2011 Organization of a minisymposium on *Nonlinear Aspects in Optimal Control*
ICIAM, Vancouver, Canada (together with Arnd Rösch, Duisburg-Essen)
- May 2011 Organization of a minisymposium on *Preconditioning in PDE-Constrained Optimization*
SIAM Conference on Optimization, Darmstadt, Germany (together with Martin Stoll, Magdeburg)
- Apr 2011 Organization of a minisymposium on *Sparsity in Inverse Problems and Optimal Control*
GAMM Annual Scientific Meeting, Graz, Austria (together with Dirk Lorenz, Braunschweig)
- Jul 2009 Organization of a minisymposium on *Stability, Sensitivity and Error Analysis for Optimal Control Problems*
24th IFIP TC7 Conference, Buenos Aires, Argentina (together with Arnd Rösch, Duisburg-Essen, and Fredi Tröltzsch, Berlin)
- Apr 2008 Organization of a section on *Flow Control*
GAMM Annual Scientific Meeting, Bremen, Germany (together with Andre Thess, Ilmenau)
- Jul 2007 Organization of a minisymposium on *PDE-Constrained Optimization: Numerical Analysis and Scientific Computing*, sponsored by the SIAM Activity Group on Optimization
ICIAM, Zurich, Switzerland (together with Arnd Rösch, Duisburg-Essen)

- Feb 2006 Organization of a special session on *Optimal Control of Applications described by DAEs/PDEs/PDAEs*
MATHMOD, Vienna, Austria (together with Kurt Chudej, Bayreuth)
- Oct 2005 Organization of a section on *Control and Optimization Problems in Mechanics* within the Special Semester on Computational Mechanics
RICAM, Linz, Austria (together with Karl Kunisch, Graz, Austria, Ekkehard Sachs, Trier, and Boris Vexler, Linz, Austria)
- May 2005 Organization of a minisymposium on *Numerical Methods in PDE-Constrained Optimization*
SIAM Meeting on Optimization, Stockholm, Sweden (together with Stefan Volkwein, Graz, Austria)
- Mar 2005 Organization of a Young Researchers' Minisymposium on *Computational Optimization with Differential Equations*
GAMM Annual Scientific Meeting, Luxembourg (together with Andrea Walther, Dresden)

Editorial Activities

- Jun 2021 – Editorial board member for *Advances in Discrete and Continuous Models*
Jun 2023
- Jul 2018 – Editorial board member for *SMAI Journal of Computational Mathematics*
present
- Jan 2018 – Editorial board member for *SIAM Journal on Control and Optimization*
Dec 2023
- 2017 Guest editor for *GAMM Reports 40(3-4)*, special issue on *Nonsmooth Models in Continuum Mechanics—Analysis and Optimization*
jointly with Dorothee Knees, Kassel and Christian Meyer, Dortmund
- Jan 2016 – Editorial board member for *SIAM Journal on Numerical Analysis*
present
- Nov 2015 – Editorial board member for *Journal of Optimization Theory and Applications*
present
- Jan 2014 – Editorial board member for *Electronic Transactions on Numerical Analysis*
present
- 2013 Guest editor for *Computational Optimization and Applications*, special issue associated with the *3rd European Conference on Computational and Applied Mathematics (EUCCO)*, Chemnitz, Germany
jointly with Peter Benner, Magdeburg, Michael Hinze, Hamburg, Arnd Rösch, Duisburg-Essen, Anton Schiela, Berlin, and Volker Schulz, Trier
- Nov 2012 – Co-Founder of and editorial board member for the *OPTPDE Problem Collection*
present
- Jun 2012 – Editorial board member for *Optimization Methods and Software*
present
- 2011 Guest editor for *Control & Cybernetics*, special issue on the occasion of the 60th birthday of Prof. Fredi Tröltzsch
jointly with Christian Meyer, Dortmund, Arnd Rösch, Duisburg-Essen, and Jan Sokolowski, Nancy

Manuscripts Refereed for Journals

I received an Outstanding Reviewer Award from the Journal *Inverse Problems* in 2019. My peer reviewing activities can also be found on [Publons](#).

Applicable Analysis
Applied Mathematical Modelling
Applied Mathematics and Optimization (2x)
Applied Numerical Mathematics (2x)
Advances in Computational Mathematics
Arabian Journal for Science and Engineering
Calcolo
Communications in Mathematical Sciences
Computational and Applied Mathematics (3x)
Computational Methods in Applied Mathematics (3x)
Computational Optimization and Applications (8x)
Computers and Fluids
Control and Cybernetics (2x)
Electronic Transactions on Numerical Analysis (2x)
ESAIM Control, Optimisation and Calculus of Variations (5x)
ESAIM Mathematical Modelling and Numerical Analysis
European Journal of Applied Mathematics
Foundations of Computational Mathematics
GAMM Mitteilungen
IEEE Signal Processing Letters
IEEE Transactions on Automatic Control
IET Systems Biology
IMA Journal on Numerical Analysis (3x)
IMA Journal of Mathematical Control and Information
International Journal of Computer Mathematics (2x)
International Journal for Numerical Methods in Engineering
Inverse Problems (8x)
Inverse Problems and Imaging
Journal of Applied Mathematics and Mechanics (6x)
Journal of Computational Mathematics
Journal of Computational Physics
Journal of Differential Equations
Journal of Industrial and Management Optimization (2x)
Journal of Mathematical Analysis and Applications
Journal of Mathematical Imaging and Vision
Journal of Numerical Functional Analysis and Optimization (2x)
Journal of Optimization Theory and Applications (9x)
Journal of Process Control
Journal of Scientific Computing (5x)
Mathematical and Computer Modelling of Dynamical Systems (2x)
Mathematical and Computational Applications
Mathematical Control and Related Fields (3x)
Mathematical Methods in the Applied Sciences (2x)
Mathematical Programming (3x)
Mathematical Programming Computation
Nonlinear Analysis: Real World Applications
Nonlinear Analysis: Modelling and Control

Numerical Algorithms (2x)
Numerical Functional Analysis and Optimization (2x)
Numerical Linear Algebra with Applications
Numerische Mathematik (2x)
Open Journal on Mathematical Optimization
Optimization (3x)
Optimization and Engineering (2x)
Optimization Methods and Software (4x)
Optimal Control Applications and Methods
Proceedings of the Royal Society A
Pure and Applied Functional Analysis (2x)
SIAM Journal on Control and Optimization (10x)
SIAM Journal on Imaging Sciences
SIAM Journal on Matrix Analysis and Applications (2x)
SIAM Journal on Numerical Analysis (2x)
SIAM Journal on Optimization (9x)
SIAM Journal on Scientific Computing (13x)

Publications

Publications in Journals

1. R. Herzog, J.-F. Pietschmann, and M. Winkler (2023). “Optimal control of Hughes’ model for pedestrian flow via local attraction”. In: *Applied Mathematics and Optimization* 88. DOI: [10.1007/s00245-023-10064-8](https://doi.org/10.1007/s00245-023-10064-8). arXiv: [2011.03580](https://arxiv.org/abs/2011.03580)
2. K. Bergermann, C. Deibel, R. Herzog, R. C. I. MacKenzie, J.-F. Pietschmann, and M. Stoll (2023). “Preconditioning for a phase-field model with application to morphology evolution in organic semiconductors”. In: *Communications in Computational Physics* 34.1, pp. 1–17. DOI: [10.4208/cicp.oa-2022-0115](https://doi.org/10.4208/cicp.oa-2022-0115). arXiv: [2204.03575](https://arxiv.org/abs/2204.03575)
3. C. Mages et al. (2023). “Recurrent ventricular tachycardia originating from the ”LV summit” effectively eliminated by stereotactic irradiation - a case report”. In: *HeartRhythm Case Reports*. DOI: [10.1016/j.hrcr.2023.08.009](https://doi.org/10.1016/j.hrcr.2023.08.009)
4. O. Frotscher, V. Martinek, R. Fingerhut, X. Yang, J. Vrabec, R. Herzog, and M. Richter (2023). “Proof of concept for fast equation of state development using an integrated experimental-computational approach”. In: *International Journal of Thermophysics* 44.7. DOI: [10.1007/s10765-023-03197-z](https://doi.org/10.1007/s10765-023-03197-z)
5. R. Herzog and D. Strelnikov (2023). “An optimal control problem for single-spot pulsed laser welding”. In: *Journal of Mathematics in Industry* 13.1. DOI: [10.1186/s13362-023-00132-7](https://doi.org/10.1186/s13362-023-00132-7). arXiv: [2109.10788](https://arxiv.org/abs/2109.10788)
6. M. Hashemi, R. Herzog, and T. M. Surowiec (2023). “Optimal control of the stationary Kirchhoff equation”. In: *Computational Optimization and Applications* 85.2, pp. 479–508. DOI: [10.1007/s10589-023-00463-6](https://doi.org/10.1007/s10589-023-00463-6). arXiv: [2112.01067](https://arxiv.org/abs/2112.01067)
7. R. Bergmann, R. Herzog, J. Ortiz López, and A. Schiela (2022). “First- and second-order analysis for optimization problems with manifold-valued constraints”. In: *Journal of Optimization Theory and Applications* 195.2, pp. 596–623. DOI: [10.1007/s10957-022-02107-x](https://doi.org/10.1007/s10957-022-02107-x). arXiv: [2110.04882](https://arxiv.org/abs/2110.04882)
8. L. Baumgärtner, R. Bergmann, R. Herzog, S. Schmidt, and J. Vidal-Núñez (2023). “Total generalized variation for piecewise constant functions on triangular meshes with applications in

- imaging”. In: *SIAM Journal on Imaging Sciences* 16.1, pp. 313–339. DOI: [10.1137/22m1505281](https://doi.org/10.1137/22m1505281). arXiv: [2206.12331](https://arxiv.org/abs/2206.12331)
9. R. Herzog and E. Loayza-Romero (2022). “A manifold of planar triangular meshes with complete Riemannian metric”. In: *Mathematics of Computation* 92.339, pp. 1–50. DOI: [10.1090/mcom/3775](https://doi.org/10.1090/mcom/3775). arXiv: [2012.05624](https://arxiv.org/abs/2012.05624)
 10. M. Silva Louzeiro, R. Bergmann, and R. Herzog (2022). “Fenchel duality and a separation theorem on Hadamard manifolds”. In: *SIAM Journal on Optimization* 32.2, pp. 854–873. DOI: [10.1137/21m1400699](https://doi.org/10.1137/21m1400699). arXiv: [2102.11155](https://arxiv.org/abs/2102.11155)
 11. R. Altmann and R. Herzog (2021). “Continuous Galerkin schemes for semiexplicit differential-algebraic equations”. In: *IMA Journal of Numerical Analysis* 42.3, pp. 2214–2237. DOI: [10.1093/imanum/drab037](https://doi.org/10.1093/imanum/drab037). arXiv: [2011.09336](https://arxiv.org/abs/2011.09336)
 12. R. Herzog (2021). “Dimensionally consistent preconditioning for saddle-point problems”. In: *Computational Methods in Applied Mathematics* 21.3, pp. 593–607. DOI: [10.1515/cmam-2020-0037](https://doi.org/10.1515/cmam-2020-0037). arXiv: [2003.09478](https://arxiv.org/abs/2003.09478)
 13. F. Ospald, K. Bergemann, and R. Herzog (2021). “An extension of the strain transfer principle for fiber reinforced materials”. In: *Computational Mechanics* 67.5, pp. 1453–1463. DOI: [10.1007/s00466-021-01997-4](https://doi.org/10.1007/s00466-021-01997-4). arXiv: [2010.05857](https://arxiv.org/abs/2010.05857)
 14. O. Frotscher, R. Herzog, and M. Richter (2021). “Planning of measurement series for thermodynamic properties based on optimal experimental design”. In: *International Journal of Thermophysics* 42.7. DOI: [10.1007/s10765-021-02827-8](https://doi.org/10.1007/s10765-021-02827-8). arXiv: [2012.12098](https://arxiv.org/abs/2012.12098)
 15. R. Bergmann, R. Herzog, M. Silva Louzeiro, D. Tenbrinck, and J. Vidal-Núñez (2021). “Fenchel duality theory and a primal-dual algorithm on Riemannian manifolds”. In: *Foundations of Computational Mathematics* 21.6, pp. 1465–1504. DOI: [10.1007/s10208-020-09486-5](https://doi.org/10.1007/s10208-020-09486-5). arXiv: [1908.02022](https://arxiv.org/abs/1908.02022)
 16. J. Blechschmidt, R. Herzog, and M. Winkler (2020). “Error estimation for second-order partial differential equations in nonvariational form”. In: *Numerical Methods for Partial Differential Equations* 37.3, pp. 2190–2221. DOI: [10.1002/num.22678](https://doi.org/10.1002/num.22678). arXiv: [1909.12676](https://arxiv.org/abs/1909.12676)
 17. T. Etling, R. Herzog, E. Loayza, and G. Wachsmuth (2020). “First and second order shape optimization based on restricted mesh deformations”. In: *SIAM Journal on Scientific Computing* 42.2, A1200–A1225. DOI: [10.1137/19m1241465](https://doi.org/10.1137/19m1241465). arXiv: [1810.10313](https://arxiv.org/abs/1810.10313)
 18. R. Bergmann, M. Herrmann, R. Herzog, S. Schmidt, and J. Vidal-Núñez (2020a). “Discrete total variation of the normal vector field as shape prior with applications in geometric inverse problems”. In: *Inverse Problems* 36.5, p. 054003. DOI: [10.1088/1361-6420/ab6d5c](https://doi.org/10.1088/1361-6420/ab6d5c). arXiv: [1908.07916](https://arxiv.org/abs/1908.07916)
 19. R. Bergmann, M. Herrmann, R. Herzog, S. Schmidt, and J. Vidal-Núñez (2020b). “Total variation of the normal vector field as shape prior”. In: *Inverse Problems* 36.5, p. 054004. DOI: [10.1088/1361-6420/ab6d5b](https://doi.org/10.1088/1361-6420/ab6d5b). arXiv: [1902.07240](https://arxiv.org/abs/1902.07240)
 20. J. Hart, B. van Bloemen Waanders, and R. Herzog (2020). “Hyper-differential sensitivity analysis of uncertain parameters in PDE-constrained optimization”. In: *International Journal for Uncertainty Quantification* 10.3, pp. 225–248. DOI: [10.1615/int.j.uncertaintyquantification.2020032480](https://doi.org/10.1615/int.j.uncertaintyquantification.2020032480). arXiv: [1909.07336](https://arxiv.org/abs/1909.07336)

21. T. Etling, R. Herzog, and M. Siebenborn (2019). “Optimum experimental design for interface identification problems”. In: *SIAM Journal on Scientific Computing* 41.6, A3498–A3523. DOI: [10.1137/18M1208125](https://doi.org/10.1137/18M1208125). arXiv: [1808.05776](https://arxiv.org/abs/1808.05776)
22. R. Bergmann and R. Herzog (2019). “Intrinsic formulation of KKT conditions and constraint qualifications on smooth manifolds”. In: *SIAM Journal on Optimization* 29.4, pp. 2423–2444. DOI: [10.1137/18M1181602](https://doi.org/10.1137/18M1181602). arXiv: [1804.06214](https://arxiv.org/abs/1804.06214)
23. M. Herrmann, R. Herzog, S. Schmidt, J. Vidal-Núñez, and G. Wachsmuth (2019). “Discrete total variation with finite elements and applications to imaging”. In: *Journal of Mathematical Imaging and Vision* 61.4, pp. 411–431. DOI: [10.1007/s10851-018-0852-7](https://doi.org/10.1007/s10851-018-0852-7). arXiv: [1804.07477](https://arxiv.org/abs/1804.07477)
24. R. Herzog, J. W. Pearson, and M. Stoll (2019). “Fast iterative solvers for an optimal transport problem”. In: *Advances in Computational Mathematics* 45.2, pp. 495–517. DOI: [10.1007/s10444-018-9625-5](https://doi.org/10.1007/s10444-018-9625-5). arXiv: [1801.04172](https://arxiv.org/abs/1801.04172)
25. R. Herzog, I. Riedel, and D. Uciński (2018). “Optimal sensor placement for joint parameter and state estimation problems in large-scale dynamical systems with applications to thermo-mechanics”. In: *Optimization and Engineering* 19.3, pp. 591–627. DOI: [10.1007/s11081-018-9391-8](https://doi.org/10.1007/s11081-018-9391-8)
26. S.-J. Kimmerle, M. Gerdts, and R. Herzog (2018a). “An optimal control problem for a rotating elastic crane-trolley-load system”. In: *IFAC-PapersOnLine* 51.2, pp. 272–277. DOI: [10.1016/j.ifacol.2018.03.047](https://doi.org/10.1016/j.ifacol.2018.03.047)
27. R. Herzog and A. Stötzner (2019). “Hadamard differentiability of the solution map in thermoviscoplasticity”. In: *Pure and Applied Functional Analysis* 4.2, pp. 271–295
28. P. Benner, R. Herzog, N. Lang, I. Riedel, and J. Saak (2019). “Comparison of model order reduction methods for optimal sensor placement for thermo-elastic models”. In: *Engineering Optimization* 51.3, pp. 465–483. DOI: [10.1080/0305215X.2018.1469133](https://doi.org/10.1080/0305215X.2018.1469133)
29. T. Etling and R. Herzog (2018). “Optimum experimental design by shape optimization of specimens in linear elasticity”. In: *SIAM Journal on Applied Mathematics* 78.3, pp. 1553–1576. DOI: [10.1137/17M1147743](https://doi.org/10.1137/17M1147743)
30. M. Herrmann, R. Herzog, H. Kröner, S. Schmidt, and J. Vidal-Núñez (2018). “Analysis and an interior point approach for TV image reconstruction problems on smooth surfaces”. In: *SIAM Journal on Imaging Sciences* 11.2, pp. 889–922. DOI: [10.1137/17M1128022](https://doi.org/10.1137/17M1128022)
31. S.-J. Kimmerle, M. Gerdts, and R. Herzog (2018b). “Optimal control of an elastic crane-trolley-load system—A case study for optimal control of coupled ODE-PDE systems”. In: *Mathematical and Computer Modelling of Dynamical Systems* 24.2, pp. 182–206. DOI: [10.1080/13873954.2017.1405046](https://doi.org/10.1080/13873954.2017.1405046)
32. R. Herzog and K. Soodhalter (2017). “A modified implementation of MINRES to monitor residual subvector norms for block systems”. In: *SIAM Journal on Scientific Computing* 39.6, A2645–A2663. DOI: [10.1137/16M1093021](https://doi.org/10.1137/16M1093021)
33. R. Herzog and W. Wollner (2017). “A conjugate direction method for linear systems in Banach spaces”. In: *Journal of Inverse and Ill-Posed Problems* 25.5, pp. 553–572. DOI: [10.1515/jiip-2016-0027](https://doi.org/10.1515/jiip-2016-0027)
34. R. Herzog, C. Meyer, and A. Stötzner (2017). “Existence of solutions of a thermoviscoplastic model and associated optimal control problems”. In: *Nonlinear Analysis: Real World Applications* 35, pp. 75–101. DOI: [10.1016/j.nonrwa.2016.10.008](https://doi.org/10.1016/j.nonrwa.2016.10.008)

35. R. Herzog and F. Ospald (2017). “Parameter identification for short fiber-reinforced plastics using optimal experimental design”. In: *International Journal for Numerical Methods in Engineering* 110.8, pp. 703–725. DOI: [10.1002/nme.5371](https://doi.org/10.1002/nme.5371)
36. J. C. de los Reyes, R. Herzog, and C. Meyer (2016). “Optimal control of static elastoplasticity in primal formulation”. In: *SIAM Journal on Control and Optimization* 54.6, pp. 3016–3039. DOI: [10.1137/130920861](https://doi.org/10.1137/130920861)
37. J. Merger, A. Borzì, and R. Herzog (2017). “Optimal control of a system of reaction-diffusion equations modeling the wine fermentation process”. In: *Optimal Control Applications and Methods* 38.1, pp. 112–132. DOI: [10.1002/oca.2246](https://doi.org/10.1002/oca.2246)
38. R. Herzog and S. Mach (2016). “Preconditioned solution of state gradient constrained elliptic optimal control problems”. In: *SIAM Journal on Numerical Analysis* 54.2, pp. 688–718. DOI: [10.1137/130948045](https://doi.org/10.1137/130948045)
39. A. Günnel and R. Herzog (2016). “Optimal control problems in finite strain elasticity by inner pressure and fiber tension”. In: *Frontiers in Applied Mathematics and Statistics* 2.4. DOI: [10.3389/fams.2016.00004](https://doi.org/10.3389/fams.2016.00004)
40. E. Casas, R. Herzog, and G. Wachsmuth (2017). “Analysis of spatio-temporally sparse optimal control problems of semilinear parabolic equations”. In: *ESAIM: Control, Optimisation and Calculus of Variations* 23.1, pp. 263–295. DOI: [10.1051/cocv/2015048](https://doi.org/10.1051/cocv/2015048)
41. R. Herzog and E. Sachs (2015). “Superlinear convergence of Krylov subspace methods for self-adjoint problems in Hilbert space”. In: *SIAM Journal on Numerical Analysis* 53.3, pp. 1304–1324. DOI: [10.1137/140973050](https://doi.org/10.1137/140973050)
42. R. Herzog, J. Obermeier, and G. Wachsmuth (2015). “Annular and sectorial sparsity in optimal control of elliptic equations”. In: *Computational Optimization and Applications* 62.1, pp. 157–180. DOI: [10.1007/s10589-014-9721-5](https://doi.org/10.1007/s10589-014-9721-5)
43. R. Herzog and I. Riedel (2015). “Sequentially optimal sensor placement in thermoelastic models for real time applications”. In: *Optimization and Engineering* 16.4, pp. 737–766. DOI: [10.1007/s11081-015-9275-0](https://doi.org/10.1007/s11081-015-9275-0)
44. A. Günnel, R. Herzog, and E. Sachs (2014). “A note on preconditioners and scalar products in Krylov subspace methods for self-adjoint problems in Hilbert space”. In: *Electronic Transactions on Numerical Analysis* 41, pp. 13–20. URL: <https://etna.mcs.kent.edu/volumes/2011-2020/vol141/>
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131. R. Griesse and S. Volkwein (2004). “A semi-smooth Newton method for optimal boundary control of a nonlinear reaction-diffusion system”. In: *Proceedings of the Sixteenth International Symposium on Mathematical Theory of Networks and Systems (MTNS), Leuven, Belgium*
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Further Documents

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139. R. Griesse: *The RICAM Information Leaflet* (Information for Incoming Ph.D. Students, Postdocs, and Visiting Scientists), 2005
140. R. Griesse (2003b). “Parametric Sensitivity Analysis for Control-Constrained Optimal Control Problems Governed by Systems of Parabolic Partial Differential Equations”. PhD thesis. Universität Bayreuth
141. R. Griesse: *Optimale und suboptimale Steuerung der Navier-Stokes-Gleichungen* (in German), Diploma Thesis, TU Clausthal, 1999

Presentations

Invited/Plenary Conference Talks

1. *A Brief History of Optimal Control of Partial Differential Equations: Past, Present and Future*, German SIAM Student Chapters meet Algorithmic Optimization, Trier, Germany, July 2023
2. *Total (Generalized) Variation for Images and Shapes*, Workshop Numerik im Ländle, Freiburg, Germany, May 2023
3. *The Role of the Metric in Numerical Linear Algebra and Optimization*, 25th International Symposium on Mathematical Theory of Networks and Systems, Bayreuth, Germany, September 2022
4. *Total Variation and Total Generalized Variation of the Normal Vector*, Workshop on Geometric Curvature Functionals and Optimization, Göttingen, Germany, March 2020
5. *An Optimum Experimental Design Problem for Interface Identification*, Indo-German Conference on Computational Mathematics, Bangalore, India, December 2019
6. *Data-Driven Imaging and Inverse Problems on Manifolds*, 7th Sino-German Symposium on Computational and Applied Mathematics, Kiel, Germany, August 2019
7. *Optimization and Inverse Problems on Manifolds*, Workshop on Numerical Methods for Optimal Control and Inverse Problems (OCIP), Munich, Germany, March 2019
8. *Total Variation Image Reconstruction on Surfaces*, 4th Conference on Optimization Methods and Software, Havana, Cuba, December 2017
9. *Preconditioning Techniques for Nonlinear Optimal Control Problems*, Austrian Numerical Analysis Days, Linz, Austria, May 2015
10. *Optimal Control of Static Elastoplasticity in Primal and Dual Formulations*, Workshop on Modeling, Analysis and Computing in Nonlinear PDEs, Chateau Liblice, Czech Republic, September 2014
11. *PDE-Constrained Optimization — A Linear Algebra Perspective*, SIAM Conference on Applied Linear Algebra, Valencia, Spain, June 2012
12. *On Optimal Control Problems with Sparsity Terms*, SIGOPT International Conference on Optimization, Lambrecht, Germany, June 2011
13. *Semismooth Newton Methods for Portfolio Optimization Problems*, 1st Latin American Workshop on Optimization and Control, Quito, Ecuador, July 2008

14. *Stability and Sensitivity Analysis in PDE-Constrained Optimization*, Czech-French-German Conference on Optimization, Heidelberg, Germany, September 2007
15. *Optimal Control Challenges in Magnetohydrodynamics*, Simposium Internacional de Optimización y Ecuaciones Diferenciales, Universidad Autónoma de Aguascalientes, Mexico, April 2007
16. *Finite Elements for Magnetohydrodynamics and its Optimal Control*, Finite Element Symposium, Chemnitz, September 2006
17. *Optimal Control in Magnetohydrodynamics*, New Trends in Simulation and Control of PDEs, WIAS, Berlin, September 2005

Conference Talks in Minisymposia

18. *Optimal Control of Some Nonlocal PDEs*, ICIAM 2023, Tokyo, Japan, August 2023
19. *Total Generalized Variation with Finite Elements and Applications*, GAMM Annual Scientific meeting, Kassel, Germany, March 2021 (via video conference)
20. *Total Variation and Total Generalized Variation of the Normal Vector*, DMV Annual Meeting, Chemnitz, Germany, September 2020
21. *Total Variation of the Normal as a Prior in Geometric Inverse Problems*, ICIAM 2019, Valencia, Spain, July 2019
22. *Fast Solvers for Optimal Experimental Design Problems*, ICIAM 2019, Valencia, Spain, July 2019
23. *Total Variation of the Normal: Properties, Discretization and Variational Problems*, SIAM Conference on Computational Geometric Design, Vancouver, Canada, June 2019
24. *Total Variation of the Normal as a Prior in Geometric Inverse Problems*, GAMM Annual Scientific Meeting, Vienna, Austria, February 2019
25. *Intrinsic KKT Conditions on Smooth Manifolds*, EUCCO, Trier, Germany, September 2018
26. *An Optimum Experimental Design Problem for Interface Identification*, IFIP TC7 Conference, Essen, Germany, July 2018
27. *Discrete Total Variation with Finite Elements*, SIAM Conference on Imaging Sciences, Bologna, Italy, June 2018
28. *Total Variation Image Reconstruction on Smooth Surfaces*, SIAM Conference on Optimization, Vancouver, Canada, May 2017
29. *Solution of Structured Saddle-Point Systems with Applications in Optimal Control*, EUCCO, Leuven, Belgium, August 2016
30. *Formulations and Algorithms for Continuous Optimum Experimental Design Revisited*, EUCCO, Leuven, Belgium, August 2016
31. *Solution of Structured Saddle-Point Systems with Minres*, ICCOPT, Tokyo, Japan, August 2016
32. *A Conjugate Direction Method for Linear Systems in Banach Space*, European Congress of Mathematics, Berlin, Germany, July 2016
33. *Preconditioned Solution of Nonlinear Optimal Control Problems by Trust-Region SQP Methods*, DMV Annual Meeting, Hamburg, September 2015

34. *First- and Second-Order Optimality Conditions for Optimal Control Problems with Directional Sparsity Constraints*, AIMS, Madrid, Spain, July 2014
35. *Optimal Control of Elastoplastic Processes*, 21st International Symposium on Mathematical Programming (ISMP), Berlin, Germany, August 2012
36. *On the Preconditioning of Linear Systems arising in Trust-Region Methods*, GAMM Annual Scientific Meeting, Darmstadt, Germany, March 2012
37. *Analysis of an Elliptic Control Problem with Non-Differentiable Cost Functional*, ICIAM 2011, Vancouver, Canada, July 2011
38. *A Preconditioned Conjugate Gradient Method for Optimal Control Problems with Control and State Constraints*, SIAM Conference on Optimization, Darmstadt, Germany, May 2011
39. *A Preconditioned Conjugate Gradient Method for Optimal Control Problems with Control and State Constraints*, 2nd IMA Conference on Numerical Linear Algebra and Optimisation, Birmingham, UK, September 2010
40. *Optimal Control Problems with Directional Sparsity*, IFIP TC7 (System Modelling and Optimization), Buenos Aires, Argentina, August 2009
41. *An SQP Method for Semilinear Optimal Control Problems with Mixed Constraints*, ENUMATH 2007, Graz, Austria, September 2007
42. *Update Strategies for Perturbed Nonsmooth Equations*, IFIP TC7 (System Modelling and Optimization), Cracow, Poland, July 2007
43. *KKT Systems in Optimal Control of Magnetohydrodynamics*, ICIAM 2007, Zurich, Switzerland, July 2007
44. *Mathematical Methods in MHD Flow Control*, GAMM Annual Scientific Meeting (within ICIAM), Zurich, Switzerland, July 2007
45. *Elliptic Optimal Control Problems with Mixed Constraints*, DMV Annual Meeting, Bonn, September 2006
46. *Preconditioning of Linear Systems Arising in the Optimal Control of Magnetohydrodynamics*, GAMM-SIAM Conference on Applied Linear Algebra, Düsseldorf, Germany, July 2006
47. *Optimal Control in Magnetohydrodynamics*, MAFELAP, Uxbridge, Great Britain, June 2006
48. *Postcorrection Strategies for Perturbed Nonsmooth Equations*, High Performance Scientific Computing, Hanoi, Vietnam, March 2006
49. *Modeling of an MHD Free Surface Problem Arising in CZ Crystal Growth*, MATHMOD Vienna, Austria, February 2006
50. *Optimal Control in Magnetohydrodynamics*, ÖMG/DMV (Austrian/German Mathematical Society) Annual Meeting, Klagenfurt, September 2005
51. *Optimal Control in Magnetohydrodynamics*, IFIP TC7 (System Modelling and Optimization), Turin, Italy, July 2005
52. *Matrix-Free AD-Based Preconditioning of KKT Systems*, GAMM 2005, Luxembourg, March 2005

53. *Parametric Sensitivity Analysis for 3D Reaction-Diffusion Control Problems*, DMV (German Mathematical Society) Annual Meeting, Heidelberg, Germany, September 2004
54. *Parametric Sensitivities for Perturbed Reaction-Diffusion Optimal Control Problems*, EUCCO, Dresden, Germany, March 2004
55. *Post-optimal Parametric Sensitivity Analysis for Control-Constrained Reaction-Diffusion Optimal Control Problems*, SCICADE, Trondheim, Norway, July 2003
56. *Using AD-generated Adjoint in Optimal Control of an Industrial Robot*, Dresden University of Technology, Germany, ECMI (European Consortium of Mathematics in Industry), Jurmala, Latvia, September 2002

Other Conference Talks

57. *Total Generalized Variation with Finite Elements and Applications*, Finite Element Symposium, Seggau, Austria, September 2023
58. *A Second-Order Method for Mesh Denoising and Inpainting*, GAMM Annual Scientific Meeting, Dresden, Germany, May 2023
59. *An Introduction to Nonlinear Programming*, Computational Science Summer School and Workshop, KMUTT, Bangkok, Thailand, March 2023
60. *The SCOOP Template Engine*, 12th Heidelberg Seminar on Optimal Control, Haus im Ennstal, Austria, February 2023
61. *On Discretized Shape Optimization Problems*, Workshop on Mathematical Data Science, Control and Optimization, Graz, Austria, September 2022
62. *Efficient Solution of a Nonlocal Optimal Control Problem*, Finite Element Symposium, Herrsching, Germany, September 2022
63. *A Unified View of Residual Minimizing Krylov Subspace Methods*, GAMM Annual Scientific Meeting, Aachen, Germany, August 2022
64. *An Introduction to Optimal Experimental Design*, XIV Congreso de Ciencias Exactas, Aguascalientes, Mexico, November 2020 (via video conference)
65. *A Discretize-then-optimize Approach for PDE-Constrained Shape Optimization Problems*, Finite Element Symposium, Mülheim, Germany, September 2019
66. *SUBMINRES: An Extended Implementation of MINRES to Monitor Residual Subvector Norms*, Workshop Beyond the discrete: iterative methods from the continuum perspective, Dublin, Ireland, June 2019
67. *First and Second Order Shape Optimization Based on Restricted Mesh Deformations*, 11th Chemnitz Seminar on Optimal Control, Haus im Ennstal, Austria, February 2019
68. *Discrete Total Variation with Finite Elements*, Finite Element Symposium, Chemnitz, Germany, September 2018
69. *GMRES in the ℓ_∞ -Norm*, SIAM Conference on Applied Linear Algebra, Hong Kong, May 2018
70. *On Optimal Control Problems in Thermoelastoplasticity*, Workshop: Challenges in Optimal Control of Nonlinear PDE-Systems, Oberwolfach, Germany, April 2018

71. *Discrete Total Variation with Finite Elements and Applications in Imaging, Inverse Problems and Optimal Control*, GAMM Annual Scientific Meeting, Munich, Germany, March 2018
72. *An Introduction to Differential Geometry*, 10th Chemnitz Seminar on Optimal Control, Haus im Ennstal, Austria, February 2018
73. *Preconditioned GMRES Revisited*, International Conference on Preconditioning Techniques for Scientific and Industrial Applications, Vancouver, Canada, July 2017
74. *SUBMINRES: An Extended Implementation of MINRES to Monitor Residual Subvector Norms*, Cascade Rain Meeting, Vancouver, Canada, April 2017
75. *Preconditioned GMRES Revisited*, GAMM Annual Scientific Meeting, Weimar, Germany, March 2017
76. *Preconditioned GMRES revisited with an introduction of Krylov subspace methods*, 9th Chemnitz Seminar on Optimal Control, Haus im Ennstal, Austria, February 2017
77. *Iterative Solution of Optimality Systems in Optimal Control*, Workshop: Adaptive Methods for Control Problems Constrained by Time-Dependent PDEs, Oberwolfach, Germany, January 2017
78. *Postprocessing for Finite Element Solutions of HJB Equations*, Workshop Numerical methods for Hamilton-Jacobi equations in optimal control and related fields, RICAM Linz, Austria, November 2016
79. *Solution of structured saddle-point systems with applications in optimal control*, IFIP Workshop Optimal Control meets Inverse Problems, Essen, Germany, September 2016
80. *Optimum Experimental Design by Shape Optimization of Specimens in Linear Elasticity*, GAMM Annual Scientific Meeting, Braunschweig, Germany, March 2016
81. *Solution of structured saddle-point systems using MINRES: residuals, energies, physics, and preconditioning*, 8th Chemnitz Seminar on Optimal Control, Haus im Ennstal, Austria, February 2016
82. *A Conjugate Direction Method for Linear Systems in Banach Spaces*, Finite Element Symposium, Burgstädt, Germany, September 2015
83. *Hamilton-Jacobi-Bellman Quasi-Variational Inequalities in Portfolio Optimization and their Discretization by Finite Elements*, Workshop From Open to Closed Loop Control, Graz, Austria, June 2015
84. *A Conjugate Direction Method in Banach Space*, 7th Chemnitz Seminar on Optimal Control, Haus im Ennstal, Austria, February 2015
85. *Preconditioning of Trust-Region SQP Methods in PDE-Constrained Optimization*, Workshop of GAMM activity group on optimization with PDE constraints, Dortmund, Germany, September 2014
86. *Optimal Control Problems with Sparsity Constraints*, Workshop of MPI Magdeburg, Ringberg Castle, Germany, June 2014
87. *Old and New Convergence Results for Krylov Subspace Methods in Hilbert Space*, GAMM Annual Scientific Meeting, Erlangen, Germany, March 2014

88. *Old and New Convergence Results for Krylov Subspace Methods in Hilbert Space*, DK/RICAM Workshop on PDE-Constrained Optimization, Linz, Austria, March 2014
89. *Old and New Convergence Results for Krylov Subspace Methods in Hilbert Space*, 6th Chemnitz Seminar on Optimal Control, Haus im Ennstal, Austria, February 2014
90. *An Introduction to Optimum Experimental Design*, Conference of Mathematical Student Bodies of German-Speaking Universities, Chemnitz, Germany, November 2013
91. *On the Preconditioning of Optimal Control Problems with State Gradient Constraints*, International Conference on Preconditioning Techniques for Scientific and Industrial Applications, Oxford, UK, June 2013
92. *Methods of Optimum Experimental Design*, Meeting of the Interest Group on Experiments, SFB/Transregio 96, Aachen, Germany, April 2013
93. *Tools for the Scientific Workflow*, 5th Chemnitz Seminar on Optimal Control, Haus im Ennstal, Austria, March 2013
94. *Optimum Experimental Design in Heat Transfer Experiments*, Workshop: Numerical Methods for PDE Constrained Optimization with Uncertain Data, Oberwolfach, Germany, January 2013
95. *Optimum Experimental Design for the Determination of Heat Transfer Coefficients*, Colloquium of SFB/Transregio 96, Chemnitz, Germany, October 2012
96. *An Introduction to Optimum Experimental Design*, Summer School of the International Doctorate Program *Identification, Optimization and Control in Technical Applications*, Pommersfelden, Germany, July 2012
97. *Optimal Control Problems with Directional Sparsity Terms*, Workshop on Numerical Methods for Optimal Control and Inverse Problems, Munich, Germany, March 2012
98. *An Introduction to Optimum Experimental Design*, 4th Chemnitz Seminar on Optimal Control, Haus im Ennstal, Austria, February 2012
99. *Optimality Conditions in Optimal Control of Elastoplasticity*, Workshop on Control and Optimisation of PDEs, Graz, Austria, October 2011
100. *A Priori Error Estimates for an Elliptic Control Problem with Non-Differentiable Cost Functional*, Finite Element Symposium, Holzgau, Germany, September 2011
101. *On Nonlinear Optimal Control Problems with an L^1 Norm*, Workshop on Inverse Problems and Optimal Control for PDEs, Warwick, UK, May 2011
102. *Krylov Methods in Hilbert Space*, 3rd Chemnitz Seminar on Optimal Control, Haus im Ennstal, Austria, March 2011
103. *Four Aspects in Optimal Control of PDEs*, Workshop on Optimization, Design and Control, Oxford, UK, September 2010
104. *Regularization and C-Stationarity for an Optimal Control Problem in Static Plasticity*, Workshop on Optimal Control and Partial Differential Equations, Greifswald, Germany, August 2010
105. *Preconditioning of KKT Systems in PDE-Constrained Optimization*, 2nd Chemnitz Seminar on Optimal Control, Haus im Ennstal, Austria, March 2010

106. *Optimal Control of Variational Inequalities in Plasticity*, Annual Meeting of the DFG Priority Program 1253 (Optimization with Partial Differential Equations), Bad Staffelstein, Germany, October 2009
107. *Preconditioned Conjugate Gradient Method for Optimal Control Problems with Control and State Constraints*, Finite Element Symposium, Oberwiesenthal, Germany, September 2009
108. *Semismooth Newton Methods for Portfolio Optimization*, Workshop Statistics meets Finance and Insurance, Chemnitz, Germany, September 2009
109. *Elliptic Equations with Gradient Constraints*, 15th South East German Colloquium on Numerical Mathematics, Chemnitz, Germany, May 2009
110. *Introduction to Nonlinear Optimization*, 1st Chemnitz Seminar on Optimal Control, Gerlosberg, Austria, March 2009
111. *Optimal Control of Static Plasticity*, Fourth German Polish Conference on Optimization, Moritzburg, Germany, March 2009
112. *Optimal Control Problems with Directional Sparsity*, Workshop: Optimal Control of Coupled PDE Systems, Oberwolfach, Germany, January 2009
113. *A Semismooth Newton Method for Solving Elliptic Equations with Gradient Constraints*, Workshop: Optimal Control of Coupled PDE Systems, Oberwolfach, Germany, March 2008
114. *A Semismooth Newton Method for Tikhonov Functionals with Sparsity Constraints*, Workshop: Hybrid Imaging, Sparsity, and Mathematical Biology, Obergurgl, Austria, January 2008
115. *Optimal Control for MHD Flows*, Colloquium of SFB 609, Schmochtitz, Germany, September 2007
116. *Optimal Boundary Control of Phase Transitions in a Crystal Growth Process*, Workshop: Optimization Methods, Approximation, and Adaptivity in PDE-Constrained Optimization (DFG Priority Program 1253), RICAM Linz, Austria, March 2007
117. *Control Issues in Magnetohydrodynamics*, Miniworkshop: Control of Free Boundaries, Oberwolfach, Germany, February 2007
118. *Optimal Control in Magnetohydrodynamics*, GAMM Annual Scientific Meeting, Berlin, March 2006
119. *Modeling and Optimal Control in Instationary Magnetohydrodynamics*, Workshop: Control of Complex Fluids, Special Semester on Computational Mechanics, RICAM Linz, Austria, October 2005
120. *Optimal Control in Magnetohydrodynamics*, Workshop: Optimal Control of Coupled PDE Systems, Oberwolfach, Germany, April 2005
121. *Parametric Sensitivity Analysis and Applications*, Workshop: Inverse Problems and 1st Austrian Numerical Analysis Day, Obergurgl, Austria, April 2005
122. *Parametric Sensitivity Analysis for a Perturbed 3D Reaction-Diffusion Problem*, Nonlinear Large Scale Optimization, Erice, Italy, June 2004
123. *A Nonlinear Primal-Dual Active Set Method for Optimal Boundary Control of a 3D Reaction-Diffusion Model*, EUCCO, Dresden, Germany, March 2004

124. *Optimal Control of a Reaction-Diffusion Process*, Workshop: Optimization in Partial Differential Equations and Applications, Heidelberg, Germany, October 2002
125. *Optimal Control of Time-dependent Partial Differential Equations with Strict Terminal Conditions*, Workshop: Adjoints — Analysis and Applications, Děčín, Czech Republic, September 2001
126. *Distributed and Neumann Boundary Control of Reaction-Diffusion Equations*, IFIP TC7 (System Modeling and Optimization), Trier, Germany, July 2001
127. *Neumann Boundary Control of Reaction-Diffusion Equations*, SIAM Optimal Control and Applications, San Diego, July 2001
128. *Calculation of Sensitivity Derivatives for Perturbed Parabolic Optimal Control Problems*, Workshop: Stability and Sensitivity of Continuous Control Problems, Burg, Germany, April 2001
129. *An Adaptive POD Algorithm for Optimal Control Problems of the Heat Equation*, Workshop on POD and its applications, Graz, Austria, May 2000
130. *Instantaneous Control of the Navier-Stokes Equations*, GAMM Annual Scientific Meeting 2000, Göttingen, Germany, April 2000

Colloquium and Seminar Talks

131. *Total (Generalized) Variation for Images and Shapes*, heiAIMS Kick-Off Event, Heidelberg, July 2023
132. *Total Variation and Total Generalized Variation: From Optimal Control to Geometry Processing*, Mathematical Colloquium, TU Clausthal, January 2023
133. *Constrained Optimization on Manifolds*, Jour fixe in the STRUCTURES cluster of excellence, Heidelberg, Germany November 2022
134. *Constrained Optimization on Manifolds*, Research Seminar Optimization, Heidelberg, Germany, November 2022
135. *Constraint Handling in Linear Programming*, First Integrative Think Tank, Heidelberg University, Germany, July 2022
136. *Total Variation and Total Generalized Variation: From Optimal Control to Geometry Processing*, Seminar, Umeå University, Sweden, April 2022
137. *Large-Scale Optimization and Applications*, Inaugural Lecture, Heidelberg University, Germany, January 2022
138. *Optimum Experimental Design Meets Shape Optimization*, Seminar, HU Berlin, Germany, June 2021 (via video conference)
139. *Large-Scale Optimization and Applications*, Informatics4Life Colloquium, Heidelberg University, Germany, April 2021 (via video conference)
140. *Total Variation and Total Generalized Variation: From Optimal Control to Geometry Processing*, CMAI Colloquium, George Mason University, USA, April 2021 (via video conference)
141. *First and Second Order Shape Optimization based on Restricted Mesh Deformations*, Seminar, IISER Thiruvananthapuram, India, November 2020 (via video conference)

142. *Total Variation of the Normal as a Prior in Geometric Inverse Problems*, Applied Mathematics Seminar Series, University of Birmingham, UK, January 2020
143. *First and Second Order Shape Optimization used on Restricted Mesh Deformations*, Optimisation and Numerical Analysis Seminars, University of Birmingham, UK, January 2020
144. *The Total Variation in PDE-Constrained Optimization: Optimal Control, Imaging, and Shape Optimization*, University of Heidelberg, Germany, January 2020
145. *Optimization and Inverse Problems on Manifolds*, University of Göttingen, Germany, May 2019
146. *Data-Driven Imaging and Inverse Problems on Manifolds*, University of Edinburgh, UK, March 2019
147. *Families of Finite Elements and Their Applications*, University of Halle, Germany, February 2019
148. *An Introduction to Optimal Experimental Design with PDEs*, TU Darmstadt, Germany, December 2018
149. *An Introduction to Optimization on Manifolds*, Trinity College, Dublin, November 2018
150. *An Introduction to Optimal Experimental Design with PDEs*, University of Stuttgart, Germany, October 2018
151. *Optimal control in thermoelastoplasticity: analysis, numerics, and applications*, University of Erlangen, Germany, January 2018
152. *Analysis and Algorithms for Optimal Control Problems with Sparsity Terms*, Simon Fraser University, Vancouver, Canada, July 2017
153. *Total Variation Image Reconstruction on Smooth Surfaces*, Simula Research Laboratory, Oslo, Norway, May 2017
154. *Total Variation Image Reconstruction on Smooth Surfaces*, SCAIM Seminar, Vancouver, Canada, April 2017
155. *Large-Scale Optimization Problems and Applications*, Colloquium at TU Ilmenau, Germany, December 2016
156. *Optimization Problems with Partial Differential Equations: from Optimal Control via Parameter Estimation to Shape Optimization*, Colloquium at Karlsruhe Institute of Technology, Germany, June 2016
157. *Optimum Experimental Design by Shape Optimization of Specimens in Linear Elasticity*, Colloquium at University of Duisburg-Essen, Germany, February 2016
158. *Numerical Analysis and Efficient Solution for Optimal Control Problems with Sparsity Terms*, Colloquium at University of Augsburg, Germany, January 2016
159. *Function Space Aspects of Optimal Control Problems*, Colloquium at DTU Lyngby, Denmark, December 2015
160. *Optimum Experimental Design for Models Involving Ordinary and Partial Differential Equations*, Colloquium at TU Braunschweig, Germany, June 2015
161. *An Introduction to Optimum Experimental Design*, Colloquium at University of Hamburg, Germany, June 2015

162. *An Introduction to Optimum Experimental Design*, Colloquium at University of the Armed Forces, Munich, Germany, November 2014
163. *Analysis and Numerical Methods for Optimization Problems in Elastoplasticity*, Colloquium at University of Zurich, Zurich, Switzerland, October 2014
164. *Analysis and Numerics for Optimization Problems in Elastoplasticity*, Colloquium at University of Freiburg, Germany, June 2014
165. *An Introduction to Optimum Experimental Design*, Colloquium at University of Würzburg, Germany, May 2014
166. *An Introduction to Optimum Experimental Design*, Colloquium at University of Paderborn, Germany, May 2014
167. *An Introduction to Optimal Control*, Research Seminar Analysis and Stochastics, Chemnitz, Germany, June 2013
168. *An Introduction to Optimum Experimental Design*, Colloquium at the Institute of Scientific Computing, TU Braunschweig, Germany, May 2013
169. *On Optimal Control Problems with Sparsity Constraints*, Colloquium at the Institute of Computational Mathematics, Linz, Austria, May 2013
170. *PDE-Constrained Optimization — A Linear Algebra Perspective*, Colloquium at Charles University Prague, Czech Republic, February 2013
171. *An Introduction to Optimum Experimental Design*, Colloquium of the Institute of Materials Science and Engineering, Chemnitz, Germany, November 2012
172. *Simulation and Optimization of Macroscopic Mechanical Systems*, Fraunhofer ENAS, Chemnitz, Germany, October 2012
173. *An Introduction to Optimum Experimental Design*, Research Seminar Scientific Computing, Chemnitz, Germany, March 2012
174. *Optimierung — Studieren geht über Probieren*, Open House Day, TU Chemnitz, Germany, January 2012
175. *Optimal Control Problems with L^1 Terms*, Universität der Bundeswehr, München, Germany, June 2011
176. *On the Relation of Preconditioning and Inner Products in Krylov Subspace Methods*, Research Seminar Numerical Mathematics, Chemnitz, Germany, May 2011
177. *On the Relation of Preconditioning and Inner Products in Krylov Subspace Methods*, MPI for Dynamics of Complex Technical Systems, Magdeburg, Germany, February 2011
178. *Optimization with Complementarity Constraints and Applications in Elastoplasticity*, University of Stuttgart, Germany, November 2010
179. *Optimal Control with Partial Differential Equations: an Introduction*, University of Freiburg, Germany, June 2010
180. *Optimal Control Challenges in Magnetohydrodynamics*, University of Kiel, Germany, May 2010

181. *A Preconditioned Conjugate Gradient Method for Optimal Control Problems with Control and State Constraints*, University of Oxford, UK, May 2010
182. *Techniques for Simulation and Optimal Control of Static Plasticity*, University of Heidelberg, Germany, February 2010
183. *Optimization with Partial Differential Equations*, Colloquium at Johannes-Gutenberg University, Mainz, Germany, January 2010
184. *Preconditioned Conjugate Gradient Method for Optimal Control Problems with Control and State Constraints*, Research Seminar Numerical Mathematics, Chemnitz, Germany, January 2010
185. *Sparse Control and Applications*, Colloquium on the occasion of the 60th birthday of Hans Josef Pesch, Bayreuth, Germany, October 2009
186. *Numerical Techniques for Portfolio Optimization Problems with Transaction Costs*, Dresden Mathematical Seminar, TU Dresden, Germany, May 2009
187. *Optimale Steuerung — Studieren geht über Probieren*, Open House Day, TU Chemnitz, Germany, January 2009
188. *Optimal Control of Coupled Systems*, MPI for Dynamics of Complex Technical Systems, Magdeburg, Germany, December 2008
189. *Optimale Steuerung — Studieren geht über Probieren*, Inaugural Lecture, TU Chemnitz, Germany, October 2008
190. *Stability and Sensitivity Analysis in Optimal Control of Partial Differential Equations*, Karl Franzens University Graz, Austria, June 2008
191. *A Semismooth Newton Method for Solving Elliptic Equations with Gradient Constraints*, University of Greifswald, Germany, May 2008
192. *Optimal Control in Magnetohydrodynamics*, Middle East Technical University, Ankara, Turkey, March 2008
193. *Optimal Control Challenges in Magnetohydrodynamics*, University of Regensburg, Germany, July 2007
194. *The SQP Method for Optimal Control Problems with Mixed Control-State Constraints*, University of Trier, Germany, June 2007
195. *Stability and Sensitivity in Optimization with Partial Differential Equations*, TU Kaiserslautern, Germany, June 2007
196. *Coupled Field Problems in Magnetohydrodynamics and Their Optimal Control*, TU Chemnitz, Germany, May 2007
197. *Optimal Control Challenges in Magnetohydrodynamics*, University of Edinburgh, UK, March 2007
198. *Numerical Methods for Large-Scale Optimal Control Problems*, University of Basel, Switzerland, February 2007
199. *Numerical Methods in PDE-Constrained Optimization*, TU Chemnitz, Germany, January 2007
200. *From Finite-Dimensional Optimization to Optimal Control*, RWTH Aachen, Germany, January 2007

201. *Analytical and Numerical Treatment of Optimal Control Problems in Magnetohydrodynamics*, TU Dresden, Germany, January 2007
202. *Continuous Optimization — Applications and Prospects*, TU Kaiserslautern, Germany, July 2006
203. *Numerical Methods in PDE-Constrained Optimization*, TU Darmstadt, Germany, May 2006
204. *Optimal Control in Magnetohydrodynamics*, RICAM Scientific Board Meeting, Linz, Austria, April 2006
205. *Analysis, Numerical Simulation and Optimal Control of Coupled PDE Systems*, University of Münster, Germany, December 2005
206. *A Stokes-MHD Problem*, RICAM Linz, Austria, December 2005
207. *Modeling and Optimal Control in Magnetohydrodynamics*, TU Berlin, Germany, September 2005
208. *Preconditioning of Linear Systems in PDE-Constrained Optimization*, RICAM Linz, Austria, July 2005
209. *Parametric Sensitivity Analysis for Constrained Optimal Control Problems*, ZIB, Berlin, Germany, February 2005
210. *Towards Simulation and Control in Magnetohydrodynamics*, RICAM Linz, Austria, February 2005
211. *Parametric Sensitivity Analysis for 3D Reaction-Diffusion Control Problems*, TU Vienna, Austria, November 2004
212. *Parametric Sensitivity Derivatives of Perturbed Optimal Control Problems*, TU Chemnitz, Germany, June 2004
213. *Recent Advances in Magnetohydrodynamics*, Karl Franzens University Graz, Austria, May 2004
214. *Parametric Sensitivity Derivatives of Constrained Optimal Control Problems*, University of Hamburg, Germany, May 2004
215. *Parametric Sensitivities for Perturbed Reaction-Diffusion Optimal Control Problems*, University of Heidelberg, Germany, March 2004
216. *Automatic Differentiation and Constrained Optimization*, Karl Franzens University Graz, Austria, December 2003
217. *Post-Optimal Sensitivity Analysis for Control-Constrained Optimal Control Problems*, Karl Franzens University Graz, Austria, March 2003
218. *Strongly Regular Generalized Equations and Sensitivity Derivatives for Perturbed Parabolic Control Problems*, Dresden University of Technology, Germany, January 2003
219. *Parametric Optimization and Applications*, University of Jena, Germany, January 2003
220. *Parametric Sensitivity Analysis for Perturbed Reaction-Diffusion Control Problems*, Karl Franzens University Graz, Austria, July 2002
221. *Computation of Sensitivity Derivatives for Perturbed Parabolic Control Problems*, Dresden University of Technology, Germany, December 2001

- 222. *The Newton-Lagrange Method and Variants for Optimal Control of Time-dependent Partial Differential Equations*, Berlin University of Technology, Germany, September 2001
- 223. *Optimal Control of a Reaction-Diffusion Process — Comparison of Time Integration Methods*, Dresden University of Technology, Germany, January 2001
- 224. *The Newton-Lagrange Method for Solving Unconstrained Optimal Control Problems with Partial Differential Equations*, Berlin University of Technology, August 2000
- 225. *Suboptimal Control Problems for the Navier-Stokes Equations using FEATFLOW*, University of Dortmund, Germany, March 2000

Public Talks

- 226. *Official Speech at the Finals for the Nation-Wide Round of the 58th German Mathematical Olympiad*, Chemnitz, Germany, May 2019
- 227. *Current Mathematical Problems within the MERGE Cluster of Excellence*, TU Chemnitz, September 2014
- 228. *LEGO Models for Reality*, TU Chemnitz, Girls' Day, Germany, April 2013
- 229. *LEGO Models for Reality*, TU Chemnitz, Technikwoche, Germany, October 2012
- 230. *Official Speech at the Finals for the 3rd Round of the 48th German Mathematical Olympiad*, Kepler High School, Chemnitz, Germany, February 2009

Volunteer Activities

1992 – 1999 Active Member of the Volunteer Fire Department, Gleidingen, Germany

Foreign Language Skills

German	native language
English	written and oral fluency
Spanish	good knowledge
French	good knowledge
Swedish	beginning level

Hobbies

Photography
 Playing the piano
 Latte Art
 Marathon race (personal best: 3:24:15, Berlin 2007)
 Grouse Grind (personal best: 0:47:21, 2017)
 Riding road and mountain bikes

Heidelberg, October 30, 2023