Josua Sassen | CURRICULUM VITÆ

Institute for Numerical Simulation – Endenicher Allee 60 – 53115 Bonn – Germany

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Education

Studies for Ph.D. in Mathematics　　　　　　　　　　　　　　　　　　**University of Bonn**
Advisor: Prof. Dr. Martin Rumpf　　　　　　　　　　　　　　*May 2019 – April 2023 (expected)*
Preliminary title of thesis: "Variational Problems in Shape Spaces and Shape Optimization"

Master of Science in Mathematics　　　　　　　　　　　　　　　　　　**University of Bonn**
Advisor: Prof. Dr. Martin Rumpf　　　　　　　　　　　　　　　　　*October 2016 – April 2019*
Master's thesis: "Discrete Gauß–Codazzi Equations for Efficient Triangle Mesh Processing"

Bachelor of Science in Mathematics　　　　　　　　　　　　　　　　**University of Bonn**
Advisor: Prof. Dr. Daniel Huybrechts　　　　　　　　　　　*October 2013 – September 2016*
Bachelor's thesis: "Resolution of singularities" in Algebraic Geometry

Research Experience

Institute for Numerical Simulation (INS)　　　　　　　　　　　　　　**University of Bonn**
Research Assistant　　　　　　　　　　　　　　　　　　　　　　*May 2019 – present*
Working on geometry processing and numerical analysis projects; partially funded by FWF NFN S117, Project 5 – "Geodesic Paths in Shape Space" and CRC1060, Project C06 – "Numerical optimization of shape microstructures"

Computer Science Department　　　　　　　　　　　　　**Carnegie Mellon University**
Research Visitor　　　　　　　　　　　　　　　　　　　*October 2021 – December 2021*
Visiting the group of Prof. Keenan Crane

Collaborative Research Centre 1060 / INS　　　　　　　　　　　　　**University of Bonn**
Student Research Assistant　　　　　　　　　　　　　　　　*November 2018 – April 2019*
Part of project C05 – "Discrete Riemannian calculus on shape space", supervised by Prof. Dr. Martin Rumpf

Fraunhofer SCAI　　　　　　　　　　　　　　　　　　　　　　　**Sankt Augustin**
Student Research Assistant　　　　*October 2016 – August 2017, April 2018 – March 2019*
Part of group "Numerical Data-Driven Prediction", supervised by Prof. Dr. Jochen Garcke

Publications

Preprints & Submitted Manuscripts..

1. Josua Sassen, Klaus Hildebrandt, Benedikt Wirth, and Martin Rumpf. "Parametrizing Product Shape Manifolds by Composite Networks". accepted at ICLR. 2023. URL: `https://openreview.net/forum?id=F_EhNDSamN`.

Peer-Reviewed...

2. Johanna Burtscheidt, Matthias Claus, Sergio Conti, Martin Rumpf, Josua Sassen, and Rüdiger Schultz. "A Pessimistic Bilevel Stochastic Problem for Elastic Shape Optimization". In: *Mathematical Programming* (2021). DOI: `10.1007/s10107-021-01736-w`.

3. Sandrine H. Künzel, Moritz Lindner, Josua Sassen, Philipp T. Möller, Lukas Goerdt, Matthias Schmid, Steffen Schmitz-Valckenberg, Frank G. Holz, Monika Fleckenstein, and Maximilian Pfau. "Association of Reading Performance in Geographic Atrophy Secondary to Age-Related Macular Degeneration With Visual Function and Structural Biomarkers". In: *JAMA Ophthalmology* (2021). DOI: `10.1001/jamaophthalmol.2021.3826`.

4. Janos Meny, Martin Rumpf, and Josua Sassen. "A Phase-field Approach to Variational Hierarchical Surface Segmentation". In: *Computer Aided Geometric Design* 89 (2021). DOI: `10.1016/j.cagd.2021.102025`.

5. Josua Sassen, Klaus Hildebrandt, and Martin Rumpf. "Nonlinear Deformation Synthesis via Sparse Principal Geodesic Analysis". In: *Computer Graphics Forum (Proc. SGP)* 39.5 (2020). DOI: `10.1111/cgf.14073`.

6. Josua Sassen, Behrend Heeren, Klaus Hildebrandt, and Martin Rumpf. "Geometric optimization using nonlinear rotation-invariant coordinates". In: *Computer Aided Geometric Design* 77 (2020). DOI: 10.1016/j.cagd.2020.101829.

Other

8. Josua Sassen, Behrend Heeren, Klaus Hildebrandt, and Martin Rumpf. "Solving Variational Problems Using Nonlinear Rotation-invariant Coordinates". In: *Symposium on Geometry Processing 2019 – Posters*. The Eurographics Association, 2019. DOI: 10.2312/sgp.20191213.

9. Josua Sassen. "Discrete Gauß–Codazzi Equations for Efficient Triangle Mesh Processing". Master's Thesis. University of Bonn, 2019.

Awards & Honors

GlobalMathNetwork — Exchange Scholarship
Hausdorff Center for Mathematics, Germany   *October 2021*
Funded 3 months research stay in the group of Keenan Crane at Carnegie Mellon University

Oberwolfach Leibniz Graduate Student
Mathematisches Forschungsinstitut Oberwolfach, Germany   *May 2020*
Oberwolfach Workshop on Mathematical Imaging and Surface Processing 2022

SIAM Student Travel Award
Society for Industrial and Applied Mathematics   *December 2019*
SIAM Conference on Analysis of Partial Differential Equations 2019

Talks & Posters

Workshop on Discrete Systems and Calculus of Variations	**TU Munich, Germany**
Talk: A Stochastic Bilevel Problem for Elastic Shape Optimization	*November 2022*
Curves and Surfaces 2022	**Arcachon, France**
Talk: A Phase-field Approach to Variational Hierarchical Surface Segmentation	*June 2022*
SIAM Conference on Geometric and Physical Modeling (GD/SPM21)	**Davis, CA, US (virtual)**
Talk: A Pessimistic Bilevel Stochastic Problem for Elastic Shape Optimization	*September 2021*
31st European Conference on Operational Research (EURO 2021)	**Athens, Greece (virtual)**
Talk: A Pessimistic Bilevel Problem for Elastic Shape Optimization under Stochastic Uncertainty	*July 2021*
ALGORITMY Conference on Scientific Computing	**Vysoke Tatry, Slovakia (virtual)**
Talk: Nonlinear Deformation Synthesis via Sparse Principal Geodesic Analysis	*September 2020*
Eurographics Symposium on Geometry Processing (SGP 2020)	**Utrecht, NL (virtual)**
Talk: Nonlinear Deformation Synthesis via Sparse Principal Geodesic Analysis	*July 2020*
SIAM Conference on Analysis of Partial Differential Equations (PD19)	**La Quinta, CA, US**
Talk: Solving Variational Problems on Triangle Meshes using Nonlinear Rotation-Invariant Coordinates	*December 2019*
Applied Geometry Research Seminar	**JKU Linz, Austria**
Talk: Constructing low-dimensional submanifolds in nonlinear rotation-invariant coordinates	*November 2019*
15th NFN Seminar Geometry + Simulation	**Strobl, Austria**
Talk: Geometric optimization using nonlinear rotation-invariant coordinates	*October 2019*
Sixth International Conference on Continuous Optimization (ICCOPT 2019)	**Berlin, Germany**
Talk: Geometric optimization using nonlinear rotation-invariant coordinates	*August 2019*
Eurographics Symposium on Geometry Processing (SGP 2019)	**Milan, Italy**
Poster: Geometric optimization using nonlinear rotation-invariant coordinates	*July 2019*
14th NFN Seminar Geometry + Simulation	**Strobl, Austria**
Talk: Discrete Gauß–Codazzi equations for triangle mesh processing	*March 2019*

Computer Graphics and Visualization Research Seminar   **TU Delft, Netherlands**
Talk: Variational problems in the space of lengths and angles   *November 2018*

Teaching Experience

Teaching Assistant	Graduate seminar "Mathematical Analysis of Machine Learning Methods"	*Summer 2021*
	Lecture "Engineering Mathematics III"	*Winter 2020/21*
	Lecture "Engineering Mathematics I"	*Winter 2019/20*
	Graduate seminar "Modelling and Mathematical Analysis of Deep Learning Methods"	*Summer 2019*
	Lecture "Linear Algebra for Computer Scientists"	*Summer 2016*
	Lecture "Introduction to Algebra"	*Winter 2015/16*
	Lecture "Linear Algebra II"	*Summer 2015*
	Lecture "Linear Algebra I"	*Winter 2014/15*
Teaching of Repetition Class	Lecture "Linear Algebra II"	*Summer 2014*

Professional Service

Reviewer   Eurographics 2021, Graphical Models 2021, SIAM Journal on Imaging Sciences 2022

Mentor   Mentor for Master's theses of Kai Echelmeyer (Bonn, 2020), Janos Meny (Bonn, 2020), Yannick Kees (Bonn, 2022), and Florine Hartwig (Bonn, 2022).

Project leader at MIT's Summer Geometry Institute 2021.

Mentor in the Young African Mathematicians – Bonn Visitor Program for Angelo Kitio (2022/23).

Outreach   Exhibition "Mathematics in Computer Graphics" at Univ. Bonn Summerfestival 2019.

Talk "How I Wrote My Master's Thesis In Numerics" for Master's students in Bonn 2020.

Industry Experience

ABB   **Ladenburg**
Corporate Research Intern   *January 2018 – March 2018*
Investigated machine learning algorithms on physical measurement and image data in specific power distribution systems (medium-voltage switchgears). Using Python, I evaluated ideas on model- and data-driven classification of asset health.

Deloitte   **Düsseldorf**
Intern – Financial Advisory – Analytics   *September 2017 – November 2017*
Worked on a client project on retail fraud detection, where I developed a comprehensive solution for the automatic creation of Excel reports for the client. This led to substantial time savings. Furthermore, I vastly improved the existing source code in Python & SQL and established Git as version control system.

Voluntary Activities

Co-founder & Deputy Chairperson   **Impfaufklärung in Deutschland e.V.**
Aim: raise awareness of the importance of vaccinating   *December 2017 – December 2021*

Chairperson   **Student Association of Mathematics Bonn**
        January 2015 – July 2017

Member of various University Committees   **Student Association of Mathematics Bonn**
Appointment committees, Board of the Mathematical   *April 2014 – March 2019*
Institute, Board of the Department of Mathematics