

**RESEARCH INTERESTS** Theory of convex polyhedra, especially polyhedral projection and its connection to set-valued- and vector-optimisation, algorithms for computing polyhedra and their efficient implementation (vertex enumeration, convex hull, face lattice); linear optimisation; continuous and discrete multi-criteria optimisation; set-valued and vector optimisation and applications in financial mathematics (set valued measures of risk) and mathematical statistics; development of optimisation software; algorithms for solving set-valued and vector optimisation problems; parallel computing.



## GRADUATION AND ACADEMIC POSITIONS

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today April 2021	<b>Substitute Professorship ‘Operationenforschung’ (Operations Research), FSU JENA</b> responsibilities: <ul style="list-style-type: none"><li>› teaching (9SWS, ca. 80h/year)</li><li>› research (currently working on the research project <i>A new two-phase algorithm for the bi-objective integer minimum cost flow problem</i>, together with Lavinia Amorosi (University of Rome, Sapienza, Italy) and Matthias Ehrgott (Lancaster University Management School, UK))</li><li>› student counselor for study programme economathematics</li></ul>
March 2021 April 2016	<b>Research Assistant, FSU JENA</b> Research Group Mathematical Optimisation (Prof. Dr. Andreas Löhne), Faculty for Mathematics and Computer Science funding through DFG-project <i>Algorithmen zur Projektion von konvexen Mengen und deren Anwendung zum Lösen von nichtkonvexen Optimierungsproblemen und für ein Kalkül konvexer Mengen</i> (271835661) responsibilities: <ul style="list-style-type: none"><li>› research</li><li>› development/maintenance of mathematical optimisation software (<b>bensolve</b>, <b>bensolve tools</b>)</li><li>› maintenance of workgroup-server</li></ul>
October 2017	<b>Doctorate, FSU JENA</b> <ul style="list-style-type: none"><li>› <i>Dr. rer. nat.</i>, grade <i>Magna cum laude</i></li><li>› Mathematics</li><li>› Title doctoral thesis: <i>The Polyhedral Projection Problem</i></li><li>› Reviewer:<ul style="list-style-type: none"><li>› Prof. Dr. Andreas Löhne (FSU Jena, Supervisor)</li><li>› Prof. Dr. Andreas Hamel (Free University Bozen/Bolzano, Italy)</li><li>› Prof. Dr. Matthias Ehrgott (University of Lancaster, UK)</li></ul></li></ul>
März 2016 Juli 2015	<b>Research Assistant, FREE UNIVERSITY BOZEN/BOLZANO, ITALY</b> <ul style="list-style-type: none"><li>› Research project <i>Set-Valued Optimization in Finance and Economics</i></li><li>› <i>Faculty of Economics and Management</i></li><li>› Prof. Dr. Andreas Hamel</li></ul>
Juni 2015	<b>Research Stay, UNIVERSITY OF LANCASTER, UK</b> <ul style="list-style-type: none"><li>› visited Prof. Dr. Matthias Ehrgott</li><li>› project: ‘Multi-criteria Integer Minimal Cost Flow Problems’</li></ul>
Juni 2015 Oktober 2012	<b>Doctorate Studies, MLU HALLE–WITTENBERG</b> <ul style="list-style-type: none"><li>› Supervisor: Prof. Dr. Andreas Löhne (now: FSU Jena)</li><li>› Funding through scholarship by the state of Saxony Anhalt</li><li>› additional grant for travelling expenses from the university MLU Halle–Wittenberg</li></ul>

September 2012	<b>Diploma in Economathematics, MLU HALLE–WITTENBERG</b> <ul style="list-style-type: none"> <li>➤ Title of thesis: <i>Eine Primaldarstellung des mengenwertigen Average Value at Risk.</i> (A primal representation of the Average Value at Risk.)</li> <li>➤ Grade: 1.0 (<i>excellent</i>)</li> <li>➤ Supervisor <ul style="list-style-type: none"> <li>➤ Jun. Prof. Dr. Frank Heyde (now: TU Bergakademie Freiberg)</li> <li>➤ Prof. Dr. Andreas Löhne (now: FSU Jena)</li> </ul> </li> </ul>
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## TEACHING

WS 2021/22	<b>Undergraduate course, LINEARE OPTIMIERUNG, FSU Jena</b> <ul style="list-style-type: none"> <li>➤ introduction to linear programming</li> <li>➤ simplex algorithm, interior point algorithms</li> <li>➤ software for solving linear programmes</li> </ul> <b>Graduate course, OPTIMIZATION II, FSU Jena</b> <ul style="list-style-type: none"> <li>➤ course in english language</li> <li>➤ overview of existing algorithms and heuristics for real world problems, especially <i>Vehicle Routing Problems (VRP)</i></li> <li>➤ <i>external lecturer: Dr. Harald Hempel, Head of Innovation &amp; Research at DAKO GmbH</i></li> <li>➤ <i>students developed and implemented heuristics for solving a real world instance of a VRP</i></li> </ul>
SS 2021	<b>Graduate course, OPTIMIZATION I, FSU Jena</b> <ul style="list-style-type: none"> <li>➤ course in english language</li> <li>➤ computational geometry, vector optimisation, polyhedral projection problems</li> <li>➤ discussion of key concepts of computational geometry</li> <li>➤ lecture + exercises</li> <li>➤ polyhedral projection problems</li> </ul> <b>Undergraduate course, PRAKTISCHE MATHEMATIK UND MODELLIERUNG: OPTIMIERUNG, FSU Jena</b> <ul style="list-style-type: none"> <li>➤ introduction to linear programming</li> <li>➤ introduction to combinatorial optimisation, key concepts of graph theory</li> <li>➤ emphasis on modelling</li> </ul> <b>Graduate / PhD course, SEMINAR DISCRETE OPTIMIZATION, FSU Jena</b> <ul style="list-style-type: none"> <li>➤ seminar participants gave talks / presentations concerning their current work (bachelor- / master- / PhD-thesis)</li> <li>➤ joint seminar with different institutions (FSU Jena, EAH Jena (Prof. Schneider), TU Ilmenau (Prof. Eichfelder))</li> </ul>
WS 2019/20	<b>Teaching Assistant, Undergraduate Course, MATHEMATIK WIRTSCHAFTSINFORMATIK (MATHEMATICS FOR BUSINESS INFORMATION SYSTEMS), EAH Jena</b> <ul style="list-style-type: none"> <li>➤ Wirtschaftsingenieurwesen B.Sc. und E-Commerce B.Sc.</li> <li>➤ 3 × 2 SWS</li> </ul>
WS 2018/19	<b>Graduate course, POLYHEDRAL OPTIMIZATION, FSU Jena</b> <ul style="list-style-type: none"> <li>➤ Lecture in english language for M.Sc. Mathematics and Economathematics</li> <li>➤ Vector Optimisation, Polyhedral Projection Problems</li> </ul>
SS 2018	<b>Undergraduate seminar, PRACTICAL OPTIMIZATION, FSU Jena</b> <ul style="list-style-type: none"> <li>➤ students work on different projects, implement algorithms and elaborate a presentation</li> <li>➤ topics: statistical learning, convex programming</li> </ul>
WS 2018/19	<b>Teaching Assistant, Graduate course, MATHEMATISCHE MODELLE FÜR OPTIMIERUNGSPROBLEME, FSU Jena</b> <ul style="list-style-type: none"> <li>➤ mathematical models for optimisation problems</li> <li>➤ study programme: Computational and Data Science M.Sc.</li> </ul>
WS 2018/19	<b>Teaching Assistant, Undergraduate course, CONTINUOUS OPTIMISATION, FSU Jena</b> <ul style="list-style-type: none"> <li>➤ study programmes: Mathematics &amp; Economathematics B.Sc.</li> </ul>
WS 2017/18	<b>Teaching Assistant, Undergraduate course, CONTINUOUS OPTIMISATION, FSU Jena</b> <ul style="list-style-type: none"> <li>➤ study programmes: Mathematics &amp; Economathematics B.Sc.</li> </ul>
30. Juni 2017 21. Juni 2017	<b>Tutor, PhD course, SUMMER SCHOOL, Free University Bozen–Bolzano, Italy</b> <ul style="list-style-type: none"> <li>➤ <i>International Summer School &amp; Colloquium: Set Optimization for Applications</i></li> <li>➤ Lecture &amp; Tutorial</li> </ul>

WS 2014/15 SS 2010	<b>Teaching Assistant, SEVERAL UNDERGRADUATE COURSES, MLU Halle–Wittenberg</b> <ul style="list-style-type: none"> <li>› Institute for Mathematics: <ul style="list-style-type: none"> <li>› Analysis I/II (Tutor) (SS 2010–SS 2012)</li> <li>› Optimisation (SS 2012)</li> <li>› Analysis and Linear Algebra (SS 2013–WS 2014/15)</li> </ul> </li> <li>› Faculty of Economics: <ul style="list-style-type: none"> <li>› Investition und Finanzierung (Finance) (WS 2010/11–WS 2014/15)</li> </ul> </li> </ul>
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## SUPERVISION OF QUALIFICATION THESES

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Jonas Tatje	Supervision of thesis for M.Sc.
Anne Götz	Supervision of thesis for M.Sc.
Felix Graf	Supervision Examensarbeit Staatsprüfung LAG
David Hartel	Co-Supervision of thesis for B.Sc.
Anne Götz	Co-Supervision of thesis for B.Sc.
Niklas Hey	Co-Supervision of thesis B.Sc. and M.Sc.
Daniel Dörfler	Co-Supervision of thesis for B.Sc.
Daniel Ciripoi	Co-Supervision of thesis for M.Sc.

## ACADEMIC ADMINISTRATION

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FSU	Student counselor for study programme economathematics
FSU	Member of 'Institutsrat', as representative for non-professorial teaching staff
FSU	Member of appointment committee for professorship W3 'Systemsoftware'
FSU	Maintenance of computer server of chair mathematical Optimisation

## SCIENTIFIC ORGANISATION

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2022	Local Organising Committee GPCO 2022—8th German–Polish Conference on Optimization, Apolda, Germany
2019	Local Organising Committee SOFA 2019—Set Optimization for Applications, Jena, Germany
2017	Organisation of a Tutorial Session at Summer School & Colloquium: Set Optimization for Applications, Bruneck–Brunico, Italy
2014	Organisation of a Session at the Annual International Conference of the German Operations Research Society, Aachen, Germany
2014	Organisation of a Tutorial Session: Computational Issues in Set Optimization, Co-Organiser with Andreas Löhne; at SOMF2—Second International Conference on Set-Valued Variational Analysis and Optimization with Applications in Finance, 2014

## RESEARCH GRANTS

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DFG	Application for 'Sachmittel für eigene Stelle', together with Prof. Dr. Martin Bücker (Computer Science, FSU) and Prof. Dr. Gerhard Zumbusch (Scientific Computing, FSU) and Prof. Dr. Andreas Löhne (Optimization, FSU). Insistent endorsement by both reviewers, <b>rejection</b> by DFG-board in comparative review
FSU Jena	'Programm zur Förderung der Drittmittelfähigkeit', 2016–2019, <b>grant 5,843€</b>
DAAD	Travel grant Yinchuan (China), 2017, <b>grant 1,233€</b>
DAAD	Travel grant Tokyo (Japan), 2016, <b>grant 1,650€</b>
MLU Halle	'Reisestipendium' (grant for travelling expenses), Oct 2012 – Sep 2015, <b>ca. 3,500€ p.a.</b>
LSA	Landes-Graduiertenförderung (research grant of the state of Saxony Anhalt), Oktober 2012 – März 2015, <b>895€ per month</b>



## PROGRAMMING LANGUAGES

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C	●	●	●	●	●
Python	●	●	●	●	●
Octave / Matlab	●	●	●	●	○
R	●	●	○	○	○
T <sub>E</sub> X, L <sup>A</sup> T <sub>E</sub> X	●	●	●	●	○



## LANGUAGE

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German	Proficient reading/writing, C2 (mother tongue)
English	Proficient reading/writing, C1

- [1] Daniel Dörfler, Andreas Löhne, Christopher Schneider and Benjamin Weißing. ‘A Benson-type algorithm for bounded convex vector optimization problems with vertex selection’. In: *Optimization Methods and Software* 0.0 (2021), pp. 1–21. doi: [10.1080/10556788.2021.1880579](https://doi.org/10.1080/10556788.2021.1880579).
- [2] Benjamin Weißing. ‘The polyhedral projection problem’. In: *Math Meth Oper Res* 91.2 (2020), pp. 55–72. doi: [10.1007/s00186-019-00677-7](https://doi.org/10.1007/s00186-019-00677-7).
- [3] Andreas Löhne, Daniel Dörfler, Alexandra Rittmann and Benjamin Weißing. ‘Solving bilevel problems with polyhedral constraint set’. In: *J Appl Numer Optim* 1 (2019), pp. 243–251. doi: [10.23952/jano.1.2019.3.04](https://doi.org/10.23952/jano.1.2019.3.04).
- [4] Daniel Ciripoi, Andreas Löhne and Benjamin Weißing. ‘Calculus of convex polyhedra and polyhedral convex functions by utilizing a multiple objective linear programming solver’. In: *Optimization* 68.10 (2019), pp. 2039–2054. doi: [10.1080/02331934.2018.1518447](https://doi.org/10.1080/02331934.2018.1518447).
- [5] H. Martin Bücker, Andreas Löhne, Benjamin Weißing and Gerhard Zumbusch. ‘On Parallelizing Benson’s Algorithm: Limits and Opportunities’. In: *Computational Science and its Applications – ICCSA 2018*. Vol. 46. Lecture Notes in Computer Science. Springer International Publishing, 2018. doi: [10.1007/978-3-319-95165-2\\_46](https://doi.org/10.1007/978-3-319-95165-2_46).
- [6] Daniel Ciripoi, Andreas Löhne and Benjamin Weißing. ‘A vector linear programming approach for certain global optimization problems’. In: *J Glob Optim* 72.2 (Oct. 2018), pp. 347–372. doi: [10.1007/s10898-018-0627-0](https://doi.org/10.1007/s10898-018-0627-0).
- [7] Andreas Löhne and Benjamin Weißing. ‘The vector linear program solver *Bensolve*– notes on theoretical background’. In: *European J Oper Res* 260.3 (2017), pp. 807–813. doi: [10.1016/j.ejor.2016.02.039](https://doi.org/10.1016/j.ejor.2016.02.039).
- [8] Andreas Löhne and Benjamin Weißing. ‘Equivalence between polyhedral projection, multiple objective linear programming and vector linear programming’. In: *Math Meth Oper Res* 84.2 (2016), pp. 411–426. doi: [10.1007/s00186-016-0554-0](https://doi.org/10.1007/s00186-016-0554-0).

## Mathematical Software

- [9] Daniel Ciripoi, Andreas Löhne and Benjamin Weißing. *Bensolve-Tools*. Version 1.3. URL: <http://tools.bensolve.org>.
- [10] Andreas Löhne and Benjamin Weißing. *Bensolve*. Version 2.1.0. URL: <http://bensolve.org>.

 CONFERENCE TALKS (SELECTION)

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| 2022 | EURO 2022. Espoo, Finland, July 3–6, 2022   |
| 2019 | International Conference on Nonlinear Analysis and Convex Analysis (NACA) International Conference on Optimization: Techniques and Applications (ICOTA). Hakodate, Japan, August 26–31, 2019  |
| 2019 | Workshop on Set Optimization Methods for Multivariate Statistics. Bruneck–Brunico, Italy, November 22, 2019   |
| 2019 | Set Optimization for Applications, Fourth International Conference on Set-Valued Variational Analysis and Set Optimization with Applications to Economics, Finance, Statistics and Game Theory. Jena, Germany, February 11–15, 2019   |
| 2018 | Computational Science and Its Applications - ICCSA 2018. Melbourne, VIC, Australia, July 2–5, 2018  |
| 2016 | The Fifth International Conference on Continuous Optimization. Tokyo, Japan, August 6–11, 2016  |
| 2016 | The Fifth Asian Conference on Nonlinear Analysis and Optimization. Niigata, Japan, August 1–6, 2016   |
| 2016 | Set Optimization for Applications, Third International Conference on Set-Valued Variational Analysis and Set Optimization with Applications to Economics, Finance, Statistics and Game Theory. Vienna, Austria, September 19–23, 2016 |
| 2015 | 27th European Conference on Operational Research, Glasgow, UK, July 12–15, 2015   |
| 2014 | Annual International Conference of the German Operations Research Society. Aachen, Germany, September 2–5, 2014   |
| 2014 | Set Optimization meets Finance, Second International Conference on Set-Valued Variational Analysis and Optimization with Applications in Finance. Bruneck–Brunico, Italy, September 8–12, 2014  |
| 2014 | 12th EUROPT Workshop on Advances in Continuous Optimization. Perpignan, France, July 10–12, 2014  |
| 2013 | The 26th European Conference on Operational Research - EURO 2013. Rome, Italy, July 1–4, 2013   |
| 2013 | Meeting of the Continuous Optimization Group of EURO. Florence, Italy, June 26–28, 2013   |
| 2013 | The annual conference of ANZIAM. City of Newcastle, Australia, February 3–7, 2013   |
| 2012 | Set Optimization meets Finance, International Mini-Conference on Set-Valued Variational Analysis and Optimization with Applications in Finance. Lutherstadt Wittenberg, Germany, August 16–19, 2012                                   |