

# Curriculum Vitae

## Name and surname

Christian Günther

## Contact information

### Work address (Summersemester 2020):

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### Work address:

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## Education

**Ph.D. degree “Mathematics”:** November 2018; Martin Luther University Halle-Wittenberg, Germany; dissertation title: “On generalized-convex constrained multi-objective optimization and application in location theory”; advisor: Prof. Dr. Christiane Tammer

**Master degree “Business Mathematics”:** October 2013; Martin Luther University Halle-Wittenberg, Germany; thesis title: “Dekomposition mehrkriterieller Optimierungsprobleme und Anwendung bei nichtkonvexen Standortproblemen”; advisor: Prof. Dr. Christiane Tammer

**Bachelor degree “Business Mathematics”:** October 2011; Martin Luther University Halle-Wittenberg, Germany; thesis title: “Standort-Medianprobleme mit variablen Anlagen”; advisor: Prof. Dr. Christiane Tammer

## Grants

### 06/2014 - 06/2017:

Supported by the state of Saxony-Anhalt (Graduate scholarship)

## Languages

German and English

## Positions held

### 09/2019 – :

Research assistant in the working group “Bioinformatics” of Prof. Dr. Ivo Grosse (Institute of Informatics, Martin Luther University Halle-Wittenberg, Germany).

**05/2018 – 07/2019:**

Research assistant in the working group “Optimization” of Prof. Dr. Christiane Tammer (Institute of Mathematics, Martin Luther University Halle-Wittenberg, Germany).

**11/2017 – 04/2018:**

Research assistant in the working group “Bioinformatics” of Prof. Dr. Ivo Grosse (Institute of Informatics, Martin Luther University Halle-Wittenberg, Germany).

**Awards**

**2015:** Student research award sponsored by Dr. Jan Spitzner at the Martin Luther University Halle-Wittenberg

**Courses taught**

- Exercise “**DNA Sequence Analysis**” (Wintersemester 2019/2020, Institute of Informatics, Martin Luther University Halle-Wittenberg).
- Exercise “**Linear Optimization**” (Summersemester 2019, Institute of Mathematics, Martin Luther University Halle-Wittenberg).
- Exercise “**Nonlinear Optimization**” (Summersemester 2019, Institute of Mathematics, Martin Luther University Halle-Wittenberg).
- Lecture “**Operations Research**” (Wintersemester 2018/2019, Institute of Mathematics, Martin Luther University Halle-Wittenberg).
- Exercise “**Linear Optimization**” (Summersemester 2018, Institute of Mathematics, Martin Luther University Halle-Wittenberg).
- Exercise “**Nonlinear Optimization**” (Summersemester 2018, Institute of Mathematics, Martin Luther University Halle-Wittenberg).
- Exercise “**DNA Sequence Analysis**” (Wintersemester 2017/2018, Institute of Informatics, Martin Luther University Halle-Wittenberg).
- Tutorial “**Analysis I and II**” (in the period between Wintersemester 2010/2011 and Summersemester 2013 at the Institute of Mathematics of the Martin Luther University Halle-Wittenberg).

**Main research interests****Mathematics**

Multi-Objective Optimization, Convex Analysis, Generalized Convex Analysis, Duality Theory

**Applications**

Location Theory, Bioinformatics, Statistical Mechanics, Economics

**Research stays and collaborations****04/2016 - Invited guest at the Babes-Bolyai University Cluj-Napoca, Romania**

Cooperation with Prof. Dr. Nicolae Popovici; External collaborator in the project “The structure and sensitivity of the solution sets of variational inequalities, optimization and equilibrium problems under generalized monotonicity”

(see [http://www.cs.ubbcluj.ro/~grupanopt/PN-II-ID-PCE-2011-3-0024/index\\_eng.htm](http://www.cs.ubbcluj.ro/~grupanopt/PN-II-ID-PCE-2011-3-0024/index_eng.htm)).

## Research projects

### Project Facility Location Optimizer

Facility Location Optimizer (FLO) is a MATLAB-based software for solving different types of single- as well as multi-objective location problems. The development of the software started in 2011 with the initiation of my Bachelor's thesis under the supervision of Prof. Dr. Christiane Tammer. During my master program, which included the completion of a Master's thesis, the program continued to evolve under my active development. Since April 22, 2015, the Software FLO can be downloaded for free, see <http://www.project-flo.de>.

## Other professional activities

### Guest editor of:

Applied Analysis and Optimization - Special Issue on "International Workshop on Applied Analysis and Optimization (IWAAO 2018)" which was held in Taichung (Taiwan) on 30-31 May, 2018.

### Referee of:

Journal of Multi-Criteria Decision Analysis,  
Journal of Optimization Theory and Applications,  
Optimization,  
Optimization Letters  
SIAM Journal on Optimization (SIOPT)

### Reviewer of:

Mathematical Reviews

**Member of the Organizing Committee** of International Conference on Variational Analysis and Nonsmooth Optimization (ICVANO) - dedicated to Boris Mordukhovich (Halle (Saale), Germany, June 28 – July 01, 2018)

## Publications

### Book chapters

1. C. Günther : **Vectorial penalization in multi-objective optimization**, Chapter 9 in "Variational Analysis and Set Optimization", A. Khan, E. Köbis, and C. Tammer (Eds.), CRC Press (Taylor & Francis Group), pp. 233-263, 2019.

### Research articles in peer-reviewed journals

2. B. Khazayel, A. P. Farajzadeh, C. Günther and C. Tammer, **On the intrinsic core of convex cones in real linear spaces**, 2019 (submitted)  
Preprint: [http://www.optimization-online.org/DB\\_HTML/2019/08/7349.html](http://www.optimization-online.org/DB_HTML/2019/08/7349.html)
3. C. Günther, E. Köbis and N. Popovici, **On strictly minimal elements w.r.t. preorder relations in set-valued optimization**, Applied Set-Valued Analysis and Optimization, Volume 1, Issue 3, pp 205-219, 2019 (DOI: 10.23952/asvao.1.2019.3.02)

4. C. Günther and N. Popovici, **The role of nonlinear scalarization functions in characterizing generalized convex vector functions**, Journal of Applied and Numerical Optimization, Volume 1, Issue 3, pp 325-333, 2019
5. C. Günther and N. Popovici, **Characterizations of explicitly quasiconvex vector functions w.r.t. polyhedral cones**, Journal of Nonlinear and Convex Analysis, Volume 20, Issue 12, 2653-2665, 2019
6. C. Günther, E. Köbis, and N. Popovici : **Computing minimal elements of finite families of sets w.r.t. preorder relations in set optimization**, Journal of Applied and Numerical Optimization, Volume 1, Issue 2, pp. 131-144, 2019 (DOI: [10.23952/jano.1.2019.2.04](https://doi.org/10.23952/jano.1.2019.2.04))
7. C. Günther, C. Tammer, and J.-C. Yao : **Necessary optimality conditions in generalized convex multi-objective optimization involving nonconvex constraints**, Applied Analysis and Optimization, Volume 2, Issue 3, pp. 403-421, 2018.
8. C. Günther and N. Popovici : **New algorithms for discrete vector optimization based on the Graef-Younes method and cone-monotone sorting functions**, Optimization, Volume 6, Number 7, pp. 975-1003, 2018 (DOI: [10.1080/02331934.2018.1474469](https://doi.org/10.1080/02331934.2018.1474469)).
9. C. Günther : **Pareto efficient solutions in multi-objective optimization involving forbidden regions**, Revista de Investigacion Operacional, Volume 39, Issue 3, pp. 353-390, 2018.
10. C. Günther and C. Tammer : **On generalized-convex constrained multi-objective optimization**, Pure and Applied Functional Analysis, Volume 3, Issue 3, pp. 429-461, 2018.
11. S. Alzorba, C. Günther, N. Popovici, and C. Tammer : **A new algorithm for solving planar multiobjective location problems involving the Manhattan norm**, European Journal of Operational Research, Volume 258, Issue 1, pp. 35-46, 2017 (DOI: [10.1016/j.ejor.2016.10.045](https://doi.org/10.1016/j.ejor.2016.10.045)).
12. C. Günther and C. Tammer : **Relationships between constrained and unconstrained multi-objective optimization and application in location theory**, Mathematical Methods of Operations Research, Volume 84, Issue 2, pp. 359-387, 2016 (DOI: [10.1007/s00186-016-0547-z](https://doi.org/10.1007/s00186-016-0547-z)).
13. S. Alzorba, C. Günther and N. Popovici : **A special class of extended multicriteria location problems**, Optimization, Volume 64, Issue 5, pp. 1305-1320, 2015 (DOI: [10.1080/02331934.2013.869810](https://doi.org/10.1080/02331934.2013.869810)).

## Conference proceedings

1. S. Alzorba and C. Günther : **Algorithms for multicriteria location problems**, Numerical Analysis and Applied Mathematics ICNAAM, AIP Conference Proceedings, Vol. 1479, pp. 2286-2289, 2012 (DOI: [10.1063/1.4756650](https://doi.org/10.1063/1.4756650)).

## Selected talks

- **Computing minimal elements of finite families of sets w. r. t. Preorder relations in set optimization**, SIGOPT 2020, Dortmund, Germany, March 04-06, 2020
- **Relationships between Clarke-Ye type penalization and vectorial penalization in multi-objective optimization**, ICCOPT 2019, Berlin, Germany, August 05-08, 2019.
- **A Penalization Approach for Vector Optimization Problems Involving Polyhedral Ordering Cones**, EURO 2019, Dublin, Ireland, June 23-26, 2019.
- **Vectorial Penalization in Multi-Objective Optimization and Application in Location Theory**, EWGLA 2019, Brussel, Belgium, June 05-07, 2019.
- **Vectorial penalization in multi-objective optimization and applications**, International Workshop on Applied Analysis and Optimization, Taishung, Taiwan, May 30-31, 2019.
- **On the efficiency concept in vector optimization with respect to polyhedral ordering cones**, Colloquium Vector- and Set-Valued Optimization, Wittenberg, Germany, October 25-26, 2018.
- **Pareto efficient solutions in multi-objective optimization involving forbidden regions**, 16th EUROPT Workshop on Advances in Continuous Optimization, Almería, Spain, July 12-13, 2018.
- **On generalized-convex constrained multi-objective optimization and application in location theory**, 29th European Conference On Operational Research (EURO), Valencia, Spain, July 8-11, 2018.
- **Jahn-Graef-Younes type algorithms for discrete vector optimization based on cone-monotone sorting functions**, Third Central European Set-Valued and Variational Analysis Meeting (CESVVAM), Chemnitz, Germany, November 25, 2017.
- **Jahn-Graef-Younes type algorithms for discrete vector optimization based on cone-monotone sorting functions**, 18th French - German - Italian Conference on Optimization, Paderborn, Germany, September 25-28, 2017.

## Citations

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The article [C. Günther and Chr. Tammer : **Relationships between constrained and unconstrained multi-objective optimization and application in location theory**, Mathematical Methods of Operations Research, Volume 84, Issue 2, pp. 359-387, 2016] cited in:

- M. Durea, R. Strugariu, and C. Tammer : On Some Methods to Derive Necessary and Sufficient Optimality Conditions in Vector Optimization, Journal of Optimization Theory and Applications, Volume 175, Issue 3, pp. 738-763, 2017.
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The article [S. Alzorba, C. Günther, N. Popovici, and C. Tammer : **A new algorithm for solving planar multiobjective location problems involving the Manhattan norm**, European Journal of Operational Research, Volume 258, Issue 1, pp. 35-46, 2017] cited in:

- C. Bosch, C.L. García, T. Gilsdorf, C. Gómez-Wulschner, and R.Vera : Fixed points of set-valued maps in locally complete spaces, Fixed Point Theory and Applications, Volume 2017:13, 2017.
  - T. Chelmuş, M. Durea, E.-A. Florea : Directional Pareto efficiency: concepts and optimality conditions, arXiv:1808.09133 [math.OC], 2018.
- 

The article [C. Günther, C. Tammer, and J.-C. Yao : **Necessary optimality conditions in generalized convex multi-objective optimization involving nonconvex constraints**, Applied Analysis and Optimization, Volume 2, Issue 3, pp. 403-421, 2018] cited in:

- Y.-B. Xiao, N.V. Tuyen, J.-C. Yao, and C.-F. Wen : Locally Lipschitz vector optimization problems: second-order constraint qualifications, regularity condition and KKT necessary optimality conditions, Positivity, pp 1–25, 2019