Databases and Artificial Intelligence Group
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Marie-Louise Lackner

Curriculum vitæ

Personal information

Birth date	27 July 1987
Nationality	Austrian
Mail	`marie-louise.lackner@tuwien.ac.at`
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Education

2011 – 2015 **PhD studies in Mathematics**, *TU Wien*, PhD thesis in Discrete Mathematics "Patterns in Labelled Combinatorial Objects" supervised by Alois Panholzer.
Graduated with distinction, academic title: Dr.techn.

2005 – 2011 **Studies in Technical Mathematics**, *TU Wien*, Specialization: *Mathematics in Science*, Diploma thesis "Restricted Permutations on Multisets".
Graduated with distinction, academic title: Dipl.-Ing.
Dr. Maria Schaumayer Prize awarded for diploma thesis

2008 **Erasmus exchange term**, *Royal Institute of Technology (KTH), Sweden*.

1993 – 2005 **Lycée Français de Vienne**, Section S (Science).
French Baccalauréat and Austrian Matura passed with distinction

Employment history (selection)

2019 – present **Postdoctoral researcher**, *TU Wien, Databases and Artificial Intelligence Group*, Until Nov 2024: Christian Doppler Laboratory for Artificial Intelligence and Optimization for Planning and Scheduling, project led by Nysret Musliu.
Application-oriented and fundamental research in the area of production planning and scheduling, modelling of real-life optimization problems, design of algorithmic solution methods using artificial intelligence tools, dissemination of research results
January 2023: Birth of my son, followed by 9 months parental leave
August 2019: Birth of my daughter, followed by 12 months parental leave

2018 **Sabbatical**, *hiking and skiing 3000km in Scandinavia*.

2016 – 2017 **Research Facilitator**, *University of Oxford, Department of Statistics*.
Supporting academics both pre-award and post-award: identifying best funding opportunities, assisting with the preparation of proposals, managing research grants.

2016 **Tutor**, *University of Oxford, Balliol College*.
College tutorials *Linear Algebra* and *Discrete Mathematics* for students in Computer Science

2014 – 2017 **External lecturer**, *Karl Landsteiner Privatuniversität Krems, Austria*.
Part-time lecturer with full responsibility for the course *Mathematics for Medicine*

2015 – 2016 **Postdoctoral researcher**, *TU Wien, Institute of Discrete Mathematics and Geometry*.
Identifying and investigating research questions in combinatorics, disseminating research, writing project reports and lecturing for first-year Mathematics students
2016: Research visit at the University of Oxford (3 months)

2011 – 2015 **Graduate teaching and research assistant**, *TU Wien, Institute of Discrete Mathematics and Geometry*.
Independent research towards obtaining a PhD in Mathematics, disseminating research results, teaching and grading, active participation in proposal writing.
2014: Research visit at the University of Florida (1 month)

2012 – 2015 **External lecturer**, *FH Campus Wien – University of Applied Sciences*.
Small group tutoring in *Calculus 1* for Electrical Engineering students

2012 **Consultancy work**, *Vienna Science and Technology Fund WWTF*.
Policy analysis for the report *OECD Reviews of Innovation Policy for Sweden*

2009 – 2011 **Undergraduate teaching assistant**, *TU Wien, Institute of Discrete Mathematics and Geometry*.
Small group tutoring in Mathematics for Mechanical and Civil Engineering students

2006 **Summer intern**, *Vienna Science and Technology Fund WWTF*.
Performing internet searches, evaluating ongoing research projects, and providing administrative support

Research areas

I have 8 years of experience working as a researcher in Computer Science and Discrete Mathematics. My research lies at the interplay of Algorithms and Combinatorics. I am interested in the design of efficient algorithms for combinatorial problems, in particular for combinatorial optimization problems. I have also worked on enumerative aspects of labelled combinatorial objects.

- Combinatorial optimization: Real-world problems from production scheduling and planning that require tailored solutions, employment of AI-techniques
- Complexity analysis: classical and parametrized complexity theory, design of algorithms
- Social Choice Theory: Connection between domain restrictions and permutation patterns, likelihood of domain restrictions; combinatorial and probabilistic methods
- Enumeration: permutation patterns, generalized parking functions, patterns in trees and mappings; exact and asymptotic results, generating functions and bijections, log-concavity

Scientific activity

Publications	24 peer-reviewed publications at international conferences and in journals, e.g. in *Algorithmica*, *Journal of Combinatorial Theory, Series A*, *Journal of Scheduling* one publication in recreational mathematics: *Mountainous patterns*, a playful introduction to some of my research see appendix for full publication list
International collaborations	Francesca Da Ros, Luca Di Gaspero and Andrea Schaerf, Università degli Studi di Udine, Italy Miklós Bóna and Vincent Vatter, University of Florida, U.S.A. Bruce Sagan, Michigan State University, U.S.A Michael H. Albert, Univeristy of Otago, New Zealand Cyril Banderier, Université de Paris 13, France Paul Harrenstein, University of Oxford, U.K.
Talks	Extensive experience giving scientific presentations in English more than 20 talks at international events
Reviews	Article Reviewing for 10 international journals and conferences
Supervision	Co-supervision of two Master's theses in computer science
Teaching	Extensive teaching experience (since 2009): both lecturing in front of large audiences (up to 500 students) and small group tutoring; more than ten university courses held at TU Wien, FH Campus Wien, Karl Landsteiner Privatuniversität Krems and the University of Oxford; delivered research-oriented mini-course at the *ALEA in Europe Young Researchers' Workshop 2015* (University of Bath)
Organization	Co-organization of four international scientific meetings: CSASC 2011 (Krems, Austria), AofA 2015 (Strobl, Austria), CPAIOR 2020 (online), CPAIOR 2021 (hybrid event, online and in Vienna, Austria), Organization of research group retreat (March 2024) TODO UPDATE also group retreat

Computer skills

- General IT skills: Microsoft 365 and LibreOffice; Windows and Linux; git version control
- On- and offline publishing: Latex, HTML, Wordpress, Microsoft Publisher
- Optimization Software: MiniZinc, CP Optimizer
- Programming languages: Python, C#
- Design and setup of computational experiments: use of a Linux computing cluster (slurm for job scheduling), extraction and processing of data with Python

Languages

German	native language	English	proficiency (C2 on CEFR scale)
French	proficiency (C2)	Swedish	upper intermediate (B2)

Certificates

Oct 2007	*Driving licence (B)*, full Austrian driving license that is accepted in the UK
Mar 2016	Certificate of Proficiency in English, University of Cambridge Grade A

Professional training

Dec 2024	Hochschuldidaktische Basisausbildung, TU Wien
Nov 2024	Revitalize – Healthy Working Habits, LBG Career Center, Ludwig Boltzmann Gesellschaft
Jul–Sep2016	X5 costing creators training, University of Oxford
Jul–Aug2016	Oracle Financials training, University of Oxford
Mar 2015	Article Reviewing, Katherine Thiede
Nov 2014	Activating methods for academic teaching, Thomas Tribelhorn
Apr 2014	Effective Scientific Writing Part 2, Katherine Thiede
Nov 2013	Communication and interaction in university courses, Paul Lahninger
Apr 2013	Effective Scientific Writing Part 1, Katherine Thiede

Other Interests

Sports and Nature	Trekking, cycling, backcountry skiing, kayaking, swimming During the summer of 2015, I hiked, paddled and cycled from Oslo to Vienna in 70 days (600 km of hiking, 200 km of sea-kayaking and 2100 km of cycling). In 2018, I hiked from the North Cape to Mora, Sweden (2261 km in 127 days).
Crafts	Creative sewing and dressmaking, knitting, embroidery, woodworking and baking

Appendix

List of Publications

Publications before 2015 were made under the name *Marie-Louise Bruner*.

2025 *Multi-neighborhood simulated annealing for the oven scheduling problem*
with Francesca Da Ros, Luca Di Gaspero, Nysret Musliu and Felix Winter, Computers & Operations Research, Volume 177, May 2025.

2025 *Search Trajectory Networks Applied to a Real-world Parallel Batch Scheduling Problem*
with Francesca Da Ros, Luca Di Gaspero, Nysret Musliu and Michael Soprano, accepted for publication in the Proceedings of the 28th International Conference on the Applications of Evolutionary Computation (EvoApplications 2025)

2025 *Instance Space Analysis and Algorithm Selection for a Parallel Batch Scheduling Problem*
with Francesca Da Ros, Luca Di Gaspero and Nysret Musliu, accepted for publication in the Proceedings of the 25th European Conference on Evolutionary Computation in Combinatorial Optimization (EvoCOP 2025)

2024 *Solving the Employee Task Distribution Problem with Multiple Objectives*
with Matthias Horn, Christoph Mrkvicka, Nysret Musliu, Jakob Preininger and Felix Winter, Proceedings of the 14th International Conference on the Practice and Theory of Automated Timetabling - PATAT 2024

2024 *Theoretical Lower Bounds for the Oven Scheduling Problem*
with Francesca Da Ros and Nysret Musliu, Proceedings of the 14th International Conference on the Practice and Theory of Automated Timetabling - PATAT 2024

2024 *Reducing Energy Consumption in Electronic Component Manufacturing through Large Neighborhood Search*
with Francesca Da Ros, Luca Di Gaspero and Nysret Musliu, GECCO Companion 2024: 1706-1714.

2024 *Local Search Algorithms for the Oven Scheduling Problem*
with Francesca Da Ros, Luca Di Gaspero, Nysret Musliu and Felix Winter, GECCO Companion 2024: 191-194.

2023 *Exact methods for the Oven Scheduling Problem*
with Christoph Mrkvicka, Nysret Musliu, Daniel Walkiewicz and Felix Winter, Constraints, 28(2), 320–361.

2022 *Solving an Industrial Oven Scheduling Problem with a Simulated Annealing Approach*
with Nysret Musliu and Felix Winter, Proceedings of the 13th International Conference on the Practice and Theory of Automated Timetabling - PATAT 2022

2022 *Exact and meta-heuristic approaches for the production leveling problem*
with Johannes Vass, Christoph Mrkvicka, Nysret Musliu and Felix Winter, Journal of Scheduling, 1 (2022), 1; 1-32.

2021 *Minimizing Cumulative Batch Processing Time for an Industrial Oven Scheduling Problem*
with Christoph Mrkvicka, Nysret Musliu, Daniel Walkiewicz and Felix Winter, Proceedings of the 27th International Conference on Principles and Practice of Constraint Programming (CP 2021), 37:1–37:18.

2020 *A Mathematical Analysis of an Election System Proposed by Gottlob Frege*
with Paul Harrenstein and Martin Lackner, Erkenntnis, 1 (2020), 1-36

2020 *Runs in labelled trees and mappings*
with Alois Panholzer, Discrete Mathematics, 343(9): 111990

2020 *Latticepathology and Symmetric Functions (Extended Abstract)*
with Cyril Banderier, and Michael Wallner, Proceedings of the 31st International Conference on Probabilistic, Combinatorial and Asymptotic Methods for the Analysis of Algorithms (AofA 2020)

2017 *On the Likelihood of Single-peaked Preferences*
with Martin Lackner, Social Choice and Welfare, 48(4), 717-745

2017 *Longest Increasing Subsequences and Log Concavity*
with Miklós Bóna and Bruce Sagan, Annals of Combinatorics volume 21, 535–549

2016 *Mountainous patterns*
self-published by Marie-Louise Lackner and printed by epubli, Berlin;
ISBN: 9783741817038,

2016 *The Complexity of Pattern Matching for 321-Avoiding and Skew-Merged Permutations*
with Michael H. Albert, Martin Lackner and Vincent Vatter, Discrete Mathematics & Theoretical Computer Science, vol. 18 no. 2, Permutation Patterns 2015

2016 *Parking Functions for Mappings*
with Alois Panholzer, Journal of Combinatorial Theory, Series A, 142, 1-28.

2016 *A Fast Algorithm for Permutation Pattern Matching Based on Alternating Runs*
with Martin Lackner, Algorithmica: 75(1), 84-117

2015 *Patterns in Labelled Combinatorial Objects*, PhD thesis, TU Wien

2014 *The Likelihood of Structure in Preference Profiles*
with Martin Lackner, Proceedings of the 8th Multidisciplinary Workshop on Advances in Preference Handling (MPref 2014)

2013 *On Restricted Permutations on Regular Multisets*
Permutation Patterns 2012 Proceedings, Special Issue of Pure Mathematics and Applications, 24 (2): 59-82.

2013 *The Computational Landscape of Permutation Patterns*
with Martin Lackner, Permutation Patterns 2012 Proceedings, Special Issue of Pure Mathematics and Applications, 24 (2): 83-101.

2012 *From Peaks to Valleys, Running Up and Down: Fast Permutation Pattern Matching*
with Martin Lackner, Tiny Transactions on Computer Science

2012 *A Fast Algorithm for Permutation Pattern Matching Based on Alternating Runs*
with Martin Lackner, Algorithm Theory – SWAT 2012

2011 *Restricted Permutations on Multisets*, Master's thesis, TU Wien