

CONTACT Office 36.HB 04.230
INFORMATION Research group Discrete Mathematics and Optimization
Delft Institute of Applied Mathematics (DIAM)
Faculty Electrical Engineering, Mathematics and Computer Science
Delft University of Technology
Mekelweg 4, 2628 CD Delft
Tel: +31623695418



Homepage: www.frankdemeijer.com
Linkedin: <https://www.linkedin.com/in/frank-de-meijer>
E-mail: f.j.j.demeijer@tudelft.nl

- ACADEMIC POSITIONS
- Postdoctoral Researcher at **Delft University of Technology**, The Netherlands 2024–present
- My research project concerns the development of novel operations research methodologies and optimization based methods applied to health care.
 - Delft Institute of Applied Mathematics.
 - Research group Discrete Mathematics and Optimization.
 - Supervisor: Dr. Theresia van Essen
- Lecturer at **Delft University of Technology**, The Netherlands 2023–present
- Delft Institute of Applied Mathematics.
 - Research group Discrete Mathematics and Optimization.
 - Teaching several courses in Calculus, Mathematical Analysis and Linear Algebra.
- Research and Teaching Assistant at **Tilburg University**, The Netherlands. 2017–2023
- Department of Econometrics and Operations Research.
 - Working on several research projects as part of my PhD track in Mathematical Optimization.
 - Serving as TA in several courses in optimization, operations research, linear algebra and mathematics.
- EDUCATION
- Tilburg University**, The Netherlands 2019–2023
- Ph.D. in Mathematical Optimization, Department of Econometrics and Operations Research.
 - Supervisor: Prof. dr. ir. Renata Sotirov.
 - Supervisor: Prof. dr. Dion Gijswijt.
- Tilburg University**, The Netherlands. 2018–2019
- M.Sc., Research Master in Business: track Operations Research. GPA: **9.6/10** – via 60 credits.
 - Thesis: *Semidefinite Programming for the Quadratic Cycle Cover Problem*, grade: 9.5/10.
 - Graduated Cum Laude.
- Tilburg University**, The Netherlands. 2017–2018
- M.Sc., Business Analytics and Operations Research. GPA: **9.4/10**– via 60 credits
 - Thesis: *Bounds on the Minimum Reload Cycle Cover Problem*, grade: 10/10.
 - Graduated Cum Laude.
- Tilburg University**, The Netherlands. 2014–2017
- B.Sc., Econometrics and Operations Research. GPA: **9.0/10**– via 180 credits
 - Thesis: *Column Generation for the Vehicle Routing Problem with Time Windows*, grade: 9.5/10.
 - Graduated Cum Laude.

RESEARCH INTERESTS Mathematical Optimization, Discrete Optimization, Conic Optimization, Semidefinite Programming, Linear Programming, Integer Programming, Healthcare Optimization, Scheduling, Graph Theory, Networks, Machine Learning, Reinforcement Learning, Quantum Computing, Symmetry Reduction.

RESEARCH PUBLICATIONS **Publications in Peer-Reviewed Journals:**

- “The Chvátal-Gomory procedure for integer SDPs with applications in combinatorial optimization”, with Renata Sotirov. *Mathematical Programming, Series A*, 209:323–395, 2024.
- “On integrality in semidefinite programming for discrete optimization”, with Renata Sotirov. Accepted for publication in *SIAM Journal on Optimization*, 34(1):1071-1096, 2024.
- “Automorphism groups of Cayley graphs generated by general transposition sets”, *The Electronic Journal of Combinatorics*, 31(3), 2024.
- “Partitioning through projections: Strong SDP bounds for large graph partition problems”, co-authored with Renata Sotirov, Angelika Wiegele and Shudian Zhao. *Computers and Operations Research*, 151, March 2023.
- “SDP-based bounds for the Quadratic Cycle Cover Problem via cutting plane augmented Lagrangian methods and reinforcement learning”, co-authored with Renata Sotirov. *INFORMS Journal on Computing*, 33(4), 1262–1276, 2021.
 - Winner of INFORMS Meritorious Paper Award 2021
- “The Quadratic Cycle Cover Problem: special cases and efficient bounds”, co-authored with Renata Sotirov. *Journal of Combinatorial Optimization*, 39:1096–1128, 2020.

Preprints:

- “Lagrangian Duality for Mixed-Integer Semidefinite Programming: Theory and Algorithms”, with Renata Sotirov. January 2025, in first review round for publication in *Mathematics of Operations Research*.
- “Spanning and Splitting: Integer Semidefinite Programming for the Quadratic Minimum Spanning Tree Problem”, with Melanie Siebenhofer, Renata Sotirov and Angelika Wiegele. October 2024, in first review round for publication in *European Journal of Operational Research*.
- “Exploiting Symmetries in Optimal Quantum Circuit Design”, with Dion Gijswijt and Renata Sotirov. January 2024, in first review round for publication in *Discrete Optimization*.

Other publications:

- *Integrality and Cutting Planes in Semidefinite Programming Approaches for Combinatorial Optimization*, Doctoral thesis, TiSEM Dissertation series, CentER, November 2023.

Work in Progress:

- “On improved SDP relaxations for the quadratic traveling salesman problem via cutting planes”, single-authored.

Publications in Non-Refereed Journals:

- “Facial reduction for Semidefinite Programming Problems”, single-authored. *Nekst, Triangle*, 28:2, 2019.
- “Bounds on the Minimum Reload Cost Cycle Cover Problem”, single-authored. *Nekst, Practical Report*, 27:1, 2018.
- “Recognizing DNA patterns by solving the quadratic traveling salesman problem”, single-authored. *Nekst, Triangle*, 29:4, 2021.

Conference Talks:

- [European Conference on Operational Research \(EURO\) 2024](#), invited minisymposium
 - Title:* Exploiting Symmetries for Optimal Quantum Circuit Design
 - Date:* July 3, 2024.
 - Location:* Technical University of Denmark (DTU), Copenhagen, Denmark.
- [SIAM Conference on Optimization \(OP23\)](#), invited minisymposium
 - Title:* Integer semidefinite programming formulations for combinatorial optimization problems and applications
 - Date:* June 2, 2023.
 - Location:* The Sheraton Grand Seattle, Seattle, WA, USA.
- [International Conference on Continuous Optimization 2022 \(ICCOPT2022\)](#), invited minisymposium
 - Title:* The Chvátal-Gomory procedure for integer SDPs with applications in combinatorial optimization
 - Date:* July 25, 2022
 - Location:* Lehigh University, Bethlehem, PA, USA.
- [SIAM Conference on Optimization \(OP20\)](#), invited minisymposium
 - Title:* Discrete Semidefinite Programming Techniques for the Quadratic Traveling Salesman Problem
 - Date:* July 21, 2021
 - Location:* Virtual
- [LNMB Conference 2021](#)
 - Title:* A cutting plane augmented Lagrangian method to solve SDP relaxations of binary quadratic problems
 - Date:* January 22, 2021
 - Location:* Virtual

Seminars:

- [Discrete Optimization Seminar](#), Technische Universität Dortmund, Department of Mathematics
 - Title:* Chvátal-Gomory cuts for integer SDPs with applications in combinatorial optimization
 - Date:* February 8, 2023
 - Location:* Technische Universität Dortmund, Dortmund, Germany.
- [Tutte Colloquium](#), University of Waterloo, Department of Combinatorics and Optimization
 - Title:* The Chvátal-Gomory procedure for integer SDPs with applications in combinatorial optimization
 - Date:* May 21, 2022
 - Location:* Virtual
- [TU/e seminar on Combinatorial Optimization](#), Eindhoven University of Technology, Department of Mathematics and Computer Science. Research Group Statistics, Probability and Operations Research
 - Title:* The Chvátal-Gomory procedure for integer SDPs with applications in combinatorial optimization
 - Date:* May 13, 2022
 - Location:* Eindhoven University of Technology, Eindhoven, The Netherlands.
- [Doctoral Seminar](#), Alpen-Adria Universität Klagenfurt, Department of Mathematics
 - Title:* SDP-based bounds for the Quadratic Cycle Cover Problem via cutting plane augmented Lagrangian methods and reinforcement learning
 - Date:* June 16, 2021
 - Location:* Virtual

- OR Seminar, Tilburg University, Department of Econometrics and Operations Research
 - Title:* SDP-based bounds for the Quadratic Cycle Cover Problem via cutting plane augmented Lagrangian methods and reinforcement learning
 - Date:* May 20, 2021
 - Location:* Virtual

Poster Presentations:

- Integer Programming and Combinatorial Optimization (IPCO2022)
 - Title:* The Chvátal-Gomory procedure for integer SDPs with applications in combinatorial optimization
 - Date:* June 27-29, 2022
 - Location:* Eindhoven University of Technology, Eindhoven, The Netherlands
- CRM/DIMACS Workshop on Mixed-Integer Nonlinear Programming
 - Title:* Semidefinite Programming for the Quadratic Cycle Cover Problem
 - Date:* October 7, 2019
 - Location:* École Polytechnique de Montréal, Montréal, Canada

RESEARCH ACTIVITIES

Attended Workshops:

- 50th LNMB Conference on Mathematics of Operations Research
 - Date:* January 13-15, 2025
 - Location:* Soesterberg, Utrecht, Netherlands.
- ICCOPT Summer School 2022
 - Date:* July 23-24, 2022
 - Location:* Lehigh University, Bethlehem, PA, USA.
- Summer School Integer Programming and Combinatorial Optimization (IPCO2022)
 - Date:* June 25-26, 2022
 - Location:* Eindhoven University of Technology, Eindhoven, The Netherlands
- Mixed Integer Programming Workshop (MIP2021)
 - Date:* May 24-27, 2021.
 - Location:* Virtual
- POEMA Online Workshop 2
 - Date:* October 20, November 26, December 11, 2020.
 - Location:* Virtual
- CRM/DIMACS Workshop on Mixed-Integer Nonlinear Programming
 - Date:* October 7-10, 2019
 - Location:* École Polytechnique de Montréal, Montréal, Canada

Research Visits:

- University of Waterloo, Department of Combinatorics and Optimization
 - Period:* July 13-22, 2022.
 - Host:* Henry Wolkowicz.
- Alpen-Adria Universität Klagenfurt, Department of Mathematics
 - Period:* June 15-18, 2021.
 - Host:* Angelika Wiegele.

TEACHING
EXPERIENCE

- **Calculus I**, undergraduate
 - 1st year BA Mechanical and Maritime Engineering, Delft University of Technology.
 - Lecturer: 2023-2024, 2024-2025.
- **Calculus II**, undergraduate
 - 1st year BA Mechanical and Maritime Engineering, BA Applied Earth Sciences, Delft University of Technology.
 - Lecturer: 2023-2024, 2024-2025.
- **Analysis I**, undergraduate
 - 1st year BA Aerospace Engineering, Delft University of Technology.
 - Lecturer: 2023-2024.
- **Calculus II for Engineering**, undergraduate
 - Various pre-master programmes, Delft University of Technology.
 - Lecturer: 2023-2024.
- **Linear Algebra I**, undergraduate
 - 1st year BA Mechanical and Maritime Engineering, 1st year BA Civil Engineering, Delft University of Technology.
 - Lecturer: 2023-2024, 2024-2025.
- **Linear Algebra II**, undergraduate
 - 1st year BA Mechanical and Maritime Engineering, , 1st year BA Civil Engineering, Delft University of Technology.
 - Lecturer: 2023-2024, 2024-2025.
- **Advanced Linear Algebra**, undergraduate
 - 2nd year BA Econometrics and Operations Research, Tilburg University.
 - TA: 2022-2023.
- **Linear Algebra**, undergraduate
 - 1st year BA Econometrics and Operations Research, Tilburg University.
 - TA: 2019-2020, 2020-2021, 2021-2022, 2022-2023.
- **Operations Research Methods**, undergraduate
 - 3rd year bachelor Econometrics and Operations Research, Tilburg University.
 - SA: 2017-2018, 2018-2019, TA: 2019-2020, 2020-2021, 2021-2022, 2022-2023.
- **Wiskunde**, undergraduate
 - 1st year BA Business Economics, BA Fiscal Economics, BA Economics and Business Economics, Tilburg University.
 - TA: 2019-2020, 2020-2021, 2021-2022.
- **Combinatorial Optimization**, undergraduate
 - 1st year BA Econometrics and Operations Research, Tilburg University.
 - SA: 2017-2018, 2018-2019.
- **Quantitative Methods in Business and Economics**, undergraduate
 - 2nd year BA Liberal Arts and Sciences, Tilburg University.
 - SA: 2017-2018, 2018-2019.

AWARDS AND
SCHOLARSHIPS

Awards:

- **Excellent Teacher Award 2022-2023, Course: Advanced Linear Algebra**
Price awarded by Tilburg School of Economics and Management (TiSEM) to educational personnel based on total student evaluation scores.
- **INFORMS Meritorious Paper Award 2021**
Price awarded by editor-in-chief of INFORMS Journal on Computing for papers that are recognized as “truly superior in their field”.
- **Jan Brouwer Thesis Award 2019**
National prize for the best Master’s thesis of the Netherlands in the field Economics awarded by the Royal Dutch Society of Sciences and Humanities (Dutch: Koninklijke Hollandse Maatschappij der Wetenschappen).
- **Socrates Award 2014**
Nominated for prize for the best Dutch student on secondary education in the class of 2014 based on overall GPA.

Scholarships:

- **Contract Extension via Excellence PhD Program, 2022-2023**
Offered by CentER Graduate School.
- **Koopmans Scholarship 2018-2019**
Offered by CentER Graduate School.

SKILLS

Computer: Python (advanced), Matlab (advanced), Julia (advanced), Microsoft Excel (advanced), Microsoft Office (advanced), Aimms (intermediate), R (intermediate), Arena (intermediate), Stata (intermediate), SQL (intermediate).

Language: Dutch (fluent), English (fluent), German (intermediate).

OTHER
ACTIVITIES

- **Participant in Integrated Healthcare Timetabling Competition 2024**, in collaboration with Cindy Pistorius.
- **Member of Socrates Honours Society**, 2014-present
Society consisting of top 10% students graduated secondary education
- **Giving tutorships in Mathematics, Physics and Chemistry**, 2012-2020
Tutor in Physics and Chemistry to secondary education students and tutor in Mathematics to secondary education students and undergraduate university students.

REFERENCES

Prof. Dr. Ir. **Renata Sotirov**
Department of Econometrics and Operations Research, Tilburg University.
E-mail: r.sotirov@tilburguniversity.edu

Prof. Dr. **Angelika Wiegele**
Department of Mathematics, Alpen-Adria Universität Klagenfurt.
E-mail: angelika.wiegele@aau.at

Prof. Dr. **Dion Gijswijt**
Delft Institute of Applied Mathematics, Delft University of Technology.
E-mail: dion.gijswijt@gmail.com