Sophie Huiberts

Curriculum Vitae, January 2024

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Work experience

Oct 2023 – present	**Charge de Recherche**, *CNRS, LIMOS laboratory, Clermont-Ferrand*
Jul 2022 – Aug 2023	**Postdoctoral fellow**, *Computer Science Department, Columbia University*
Dec 2017 – Jun 2022	**PhD candidate**, *Centrum Wiskunde & Informatica*

- Supervisor: Daniel Dadush
- Promotor: Gunther Cornelissen
- Thesis: Geometric Aspects of Linear Programming: Shadow Paths, Central Paths, and a Cutting Plane Method (Stieltjes Prize, Gijs de Leve Prize)

Feb 2017 – Nov 2017	**Research trainee**, *Centrum Wiskunde & Informatica*

Supervisor: Daniel Dadush. Subject: smoothed analysis of the simplex method.

Sep 2016 – Aug 2017	**Student board member**, *Department of Mathematics, Utrecht University*

Representing students' interests on education and policy matters. 0.4 fte.

Education

Feb 2016 – Jan 2018	**Master Mathematical Sciences**, *Utrecht University*
Sep 2012 – Aug 2017	**Bachelor Computer Science**, *Utrecht University*
Sep 2012 – Feb 2016	**Bachelor Mathematics**, *Utrecht University*

Honours

Jan 2024	**Gijs de Leve Prize**, *Landelijk Netwerk Mathematische Besliskunde*, best Dutch PhD thesis in operations research, 2021–2023
Apr 2023	**Stieltjes Prize**, *Platform Wiskunde Nederland*, best Dutch PhD thesis in mathematics, academic year 2021-2022
Jul 2022	**Junior Fellowship**, *Simons Society of Fellows*, $455,444 total award for a three-year appointment at an NYC university
Jun 2021	**Rising Star Speaker**, *TCS Women Spotlight Workshop*, ACM Symposium on Theory of Computing
Sep 2018	**Finalist**, *Master Thesis Prize*, Graduate School of Natural Sciences, Utrecht University

Featured in

- *Proof by example: Sophie Huiberts*, Clara Stegehuis and Francesca Arici, Nieuw Archief voor Wiskunde, December 2022.
- *Mathématiques: lumière sur les étranges performances de l'algorithme du simplexe*, Clémentine Laurens, Le Monde, 4 October 2022.
- *Het diversiteitsprobleem is geen vrouwenprobleem*, Ans Hekkenberg, CWI 75th anniversary special of New Scientist, 2021.

Publications

In my field of research, authors are listed in alphabetical order.

[1] S. Borst, D. Dadush, S. Huiberts, and D. Kashaev, "A nearly optimal randomized algorithm for explorable heap selection," in *Integer Programming and Combinatorial Optimization (IPCO)*, Springer International Publishing, May 2023, pp. 29–43. DOI: `10.1007/978-3-031-32726-1_3`.

[2] D. Dadush, C. Hojny, S. Huiberts, and S. Weltge, "A simple method for convex optimization in the oracle model," *Mathematical Programming*, Aug. 2023, Preliminary version in IPCO 2022. DOI: `10.1007/s10107-023-02005-8`.

[3] D. Dadush, S. Huiberts, B. Natura, and L. A. Végh, "A scaling-invariant algorithm for linear programming whose running time depends only on the constraint matrix," *Mathematical Programming*, Apr. 2023, Preliminary version in ACM STOC 2020. DOI: `10.1007/s10107-023-01956-2`.

[4] S. Huiberts, Y. T. Lee, and X. Zhang, "Upper and lower bounds on the smoothed complexity of the simplex method," in *Proceedings of the 55th Annual ACM Symposium on Theory of Computing (STOC)*, ACM, Jun. 2023. DOI: `10.1145/3564246.3585124`.

[5] G. Bonnet, D. Dadush, U. Grupel, S. Huiberts, and G. Livshyts, "Asymptotic Bounds on the Combinatorial Diameter of Random Polytopes," in *38th International Symposium on Computational Geometry (SoCG)*, vol. 224, Jun. 2022, 18:1–18:15. DOI: `10.4230/LIPIcs.SoCG.2022.18`.

[6] S. Borst, D. Dadush, S. Huiberts, and S. Tiwari, "On the integrality gap of binary integer programs with gaussian data," *Mathematical Programming*, May 2022, Preliminary version in IPCO 2021. DOI: `10.1007/s10107-022-01828-1`.

[7] D. Dadush and S. Huiberts, "Smoothed analysis of the simplex method," in *Beyond Worst Case Analysis*, T. Roughgarden, Ed., Cambridge University Press, 2021, ch. 14, pp. 309–333. DOI: `10.1017/9781108637435.019`.

[8] D. Dadush and S. Huiberts, "A friendly smoothed analysis of the simplex method," *SIAM Journal on Computing*, vol. 49, no. 5, STOC18-449–499, 2020, Preliminary version in ACM STOC 2018. DOI: `10.1137/18M1197205`.

Service to the community

2025	**Program Committee**, *Caleidoscope Research School in Computational Complexity*
2024	**Program Committee**, *International Colloquium on Automata, Languages and Programming (ICALP) 2024*
2023	**Program Committee**, *Integer Programming and Combinatorial Optimization (IPCO) 2024*
2023 – present	**Scientific Committee**, *Groupe de Travail Complexité et Algorithmes*
Spring 2022	**Research Assessment Committee**, *Applied Mathematics TU Delft 2015– 2020*
May 2018 – Mar 2022	**Works Council**, *Centrum Wiskunde & Informatica*
	A works council is an elected board within an organization which represents employee interests. Chair from March 2021 – March 2022.
Nov 2017 – Jun 2022	**Local Representative**, *European Women in Mathematics The Netherlands*

Aug 2020 – Dec 2020 **Seminar Organizer**, *Probability, Geometry, and Computation in High Dimensions Student Seminar*, Simons Institute for the Theory of Computing

Oct 2019 – Apr 2020 **Communications Team**, *European Girls Mathematical Olympiad 2020*

External reviewer for
- SODA 2019, 2021, 2024; STOC 2019, 2024; ESA 2020, 2021, 2022; ITCS 2021, 2022; ICALP 2022; STACS 2022, 2024;
- Discrete & Computational Geometry; Mathematical Programming; Mathematics of Operations Research; SIAM Journal on Computing; SIAM Journal on Discrete Mathematics; SIAM Journal on Optimization.

Software

Oct 2019 – Jan 2024 **Lead Author**, *LaTeX in Slack*
Mathematical remote collaboration software with over 3500 users. Browser extension that allows LaTeX formulas on chat service Slack.

Miscellaneous writing

- *Prizes and prejudice*, Bulletin of the European Association for Theoretical Computer Science, October 2022.
- *Wat maakt een algoritme snel? Op zoek naar de theorie achter de praktijk*, AG Connect, November 2021.

Teaching

Spring 2022 **Master intern co-supervision**, *Centrum Wiskunde & Informatica*

Spring 2018 **Introduction to Lattice Algorithms and Cryptography**, *Mastermath*, Teaching Assistant

November 2015 **LaTeX course**, *Utrecht University / A–Eskwadraat*

Presentations

- *Gijs de Leve Prize Talk*, LNMB Congres, January 15–17, 2024.
- *Open Problems about the Simplex Method*
  - 27th Seminar of the POC group, December 15th, 2023.
  - CWI Networks & Optimization Seminar, November 15th, 2023.
- *Stieltjes Prize Talk*, Nederlands Mathematisch Congres, April 11–12, 2023.
- *A Nearly Optimal Randomized Algorithm for Explorable Heap Selection*
  - University of Washington, May 30th, 2023.
  - École Polytechnique, March 14th, 2023.
- *Smoothed Analysis of the Simplex Method: Upper and Lower Bounds*
  - Workshop Complexité et Algorithmes de CoA, September 19–20, 2023.
  - SIAM Conference on Applied Algebraic Geometry, July 10–14, 2023.
  - Journées Polyèdres et Optimisation Combinatoire, June 28–30, 2023.
  - Mixed Integer Programming Workshop, May 22–25, 2023.
  - Copenhagen-Jerusalem Combinatorics Seminar, May 4, 2023.
  - University of Massachusetts Amerherst Theory Seminar, April 4th, 2023.
  - ICERM Combinatorics and Optimization Workshop, March 27–31, 2023.
  - CNRS LIMOS lab, March 9th, 2023.
  - Rutgers/DIMACS Theory of Computing Seminar, February 22nd, 2023.
  - CUNY Queens College CS Seminar, February 15th, 2023.

- University of Michigan Theory Seminar, January 27th, 2023.
- Aussois Combinatorial Optimization Workshop, January 9–13, 2023.
- Groningen Probability and Statistics Seminar, December 15th, 2022.
- EPFL Optimization Seminar, December 7th, 2022.
- CNRS LIPN lab, December 1st, 2022.
- NYU Theory Seminar, November 17th, 2022.
○ *Combinatorial Diameter of Random Polytopes*
  - Discrete Optimization Talks, October 21st, 2022.
  - Columbia CS Theory seminar, October 7th, 2022.
  - Cargese Workshop on Combinatorial Optimization, September 23rd, 2022.
  - Symposium on Computational Geometry (SoCG), June 8th, 2022.
  - Workshop *Convex Geometry and its Applications* at the Mathematisches Forschungsintitut Oberwolfach, December 12–18 2021.
  - Online Asymptotic Geometric Analysis Seminar, September 28th, 2021.
  - TU Berlin DISCOGA Research Seminar, September 14th, 2021.
  - Dutch Optimization Seminar, May 27th, 2021.
  - Simons Institute Polymath Project Talks, December 10th, 2020.
○ *Why Can We Solve (Integer) Linear Programs?*, STOC TCS Women Spotlight Workshop Rising Star Talk, June 22nd, 2021.
○ *On the Integrality Gap of Binary Programs with Gaussian Data*
  - UC Davis Mathematics of Data & Decisions Seminar, February 23rd, 2021.
  - London School of Economics PhD Seminar on Combinatorics, Games and Optimization, February 5th, 2021.
○ *Simple Iterative Methods for Linear Optimization over Convex Sets*
  - Integer Programming and Combinatorial Optimization (IPCO), June 27th, 2022.
  - CU Boulder CS Theory Seminar, February 2nd, 2021.
○ *Theoretical Analysis of Solving (Integer) Linear Programs*, UC Davis Mathematics of Data & Decisions Seminar, January 19th, 2021.
○ *Layered-Least-Squares Interior Point Methods — a Combinatorial Optimization Perspective*
  - CWI N&O Online seminar, May 14th, 2020.
  - TU Munich Applied Geometry and Discrete Mathematics Seminar, March 3rd, 2020.
○ *A Friendly Smoothed Analysis of the Simplex Method*
  - Utrecht University Algorithms Seminar, September 3rd, 2019.
  - *Computability in Europe* in Durham, July 15–19, 2019.
  - *SIAM Conference on Applied Algebraic Geometry* in Bern, July 9–13, 2019.
  - *Workshop on Polytopes* in Bochum, March 11–15, 2019.
  - *23rd Combinatorial Optimization Workshop* in Aussois, January 7–11, 2019.
  - Workshop *Convex Geometry and its Applications* at the Mathematisches Forschungsintitut Oberwolfach, December 9–15, 2018. Invitation-only workshop.
  - *DIAMANT Symposium* in Veenendaal, November 29–30, 2018.
  - *Ninth Cargese Workshop on Combinatorial Optimization* in Cargese, October 15–19, 2018. Invitation-only workshop.
  - *International Symposium on Mathematical Programming* in Bordeaux, July 1–6, 2018.
  - *Symposium on Theory of Computation* in Los Angeles, June 25–29, 2018.
  - *Highlights of Algorithms* in Amsterdam, June 4–6, 2018.