

*Courant Institute of Mathematical Sciences  
New York University  
251 Mercer St, New York, NY 10012, USA*

*Flatiron Institute  
Simons Foundation  
162 5th Ave, New York, NY 10010, USA*

# David Persson

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## Research interests

Numerical analysis, numerical linear algebra, randomized algorithms, theoretical computer science, machine learning

## Professional appointments

- Sep. 2024 – date **Courant Instructor (Assistant Professor)**, *New York University, Courant Institute of Mathematical Sciences, USA*
- Sep. 2024 – date **Flatiron Research Fellow**, *Simons Foundation, Flatiron Institute (CCM), USA*  
Mentor: Alex Barnett

## Education

- Sep. 2020–Jun. 2024 **Ph.D. Mathematics**, *EPFL*, Chair of Numerical Algorithms and High-Performance Computing (ANCHP), Switzerland  
Supervisor: Daniel Kressner
- Feb. 2023 – Jun. 2023 **Visiting Research Scholar**, *New York University, USA*  
Mentor: Christopher Musco
- Oct. 2016–Aug. 2020 **MSci Mathematics with Economics**, *University College London, UK*, First Class Honours  
Advisor: Timo Betcke
- May. 2019–Sep. 2019 **Visiting Research Student**, *Karolinska Institutet, Sweden*  
Supervisor: Roland Nilsson
- Aug. 2018–May. 2019 **Exchange Student**, *National University of Singapore, Singapore, CAP: 4.85/5*
- May. 2018–Aug. 2018 **EPSRC Undergraduate Research**, *University College London, UK*  
Supervisor: Erik Burman

## Awards

- Jun. 2025 **IMA Leslie Fox Prize for Numerical Analysis, 2nd prize**  
For work on low-rank approximation of monotone matrix functions

- Aug. 2020 **Susan N. Brown Price**  
Awarded for the best performance in applied mathematics at University College London.
- Aug. 2020 **UCL Mathematical & Physical Sciences Faculty Dean's List**  
For being in the top 5% of graduating students.
- May 2019 **Erasmus+ Traineeship Grant**  
Received funding to conduct research at Karolinska Institutet.
- May 2019 **EPSRC Vacation Bursary**  
Received funding to conduct research at UCL.
- Aug. 2017 **UCL Department of Mathematics First Year Undergraduate Prize**  
Awarded for excellent exam results.

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## Publications

### Preprints

- [1] N. Amsel, P. Avi, T. Chen, F. D. Keles, C. Hegde, C. Musco, C. Musco, and D. Persson, *Query efficient structured matrix learning*, arXiv preprint arXiv:2507.19290, 2025.
- [2] D. Kressner, D. Persson, and A. Uschmajew, *On the randomized SVD in infinite dimensions*, arXiv preprint arXiv:2506.06882, 2025.
- [3] N. Amsel, D. Persson, C. Musco, and R. M. Gower, *The Polar Express: Optimal matrix sign methods and their application to the Muon algorithm*, arXiv preprint arXiv:2505.16932, 2025.
- [4] D. Persson, T. Chen, and C. Musco, *Randomized block-Krylov subspace methods for low-rank approximation of matrix functions*, arXiv preprint arXiv:2502.01888, 2025.

### Articles

- [5] N. Amsel, T. Chen, F. D. Keles, D. Halikias, C. Musco, C. Musco, and D. Persson, *Quasi-optimal hierarchically semi-separable matrix approximation*, SIAM Journal on Mathematics of Data Science, (to appear).
- [6] D. Persson, N. Boullé, and D. Kressner, *Randomized Nyström approximation of non-negative self-adjoint operators*, SIAM Journal on Mathematics of Data Science, vol. 7, no. 2, pp. 670–698, 2025.
- [7] D. Persson, R. A. Meyer, and C. Musco, *Algorithm-agnostic low-rank approximation of operator monotone matrix functions*, SIAM Journal on Matrix Analysis and Applications, vol. 46, no. 1, pp. 1–21, 2025.
- [8] T. Chen, F. D. Keles, D. Halikias, C. Musco, C. Musco, and D. Persson, *Near-optimal hierarchical matrix approximation from matrix-vector products*, in Proceedings of the 2025 Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), SIAM, Philadelphia, PA, 2025, pp. 2656–2692.

- [9] D. Persson and D. Kressner, *Randomized low-rank approximation of monotone matrix functions*, *SIAM Journal on Matrix Analysis and Applications*, vol. 44, no. 2, pp. 894–918, 2023.
- [10] D. Persson, A. Cortinovis, and D. Kressner, *Improved variants of the Hutch++ algorithm for trace estimation*, *SIAM Journal on Matrix Analysis and Applications*, vol. 43, no. 3, pp. 1162–1185, 2022.

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## Talks

- Oct. 2025 **Simons Institute workshop on Linear Systems and Eigenvalue Problems**, Berkeley, USA  
Poster: Quasi-optimal hierarchically semi-separable matrix approximation
- Jun. 2025 **IMA Leslie Fox Prize meeting**, Glasgow, UK  
Talk: Randomized low-rank approximation of monotone matrix functions
- Jun. 2025 **Conference on Random Matrix Theory and Numerical Linear Algebra II**, Seattle, USA  
Talk: Randomized Nyström approximation of non-negative self-adjoint operators
- Jun. 2025 **Householder Symposium XXII**, Ithaca, USA  
Talk: Randomized Nyström approximation of non-negative self-adjoint operators
- Mar. 2025 **EPFL Theory Coffee Seminar**, Lausanne, Switzerland  
Talk: Near-optimal hierarchical matrix approximation from matrix-vector products
- Jan. 2025 **SU & KTH Numerical Analysis Seminar**, Stockholm, Sweden  
Talk: Near-optimal hierarchical matrix approximation from matrix-vector products
- May 2024 **SIAM Conference on Applied Linear Algebra**, Paris, France  
Talk: Algorithm-agnostic low-rank approximation of operator monotone matrix functions
- Sep. 2023 **The  $f(A)$ bulous Workshop on Matrix Functions and Exponential Integrators**, Magdeburg, Germany  
Talk: Randomized low-rank approximation of monotone matrix functions
- Mar. 2023 **Perspectives on Matrix Computations: TCS meets Numerical Analysis**, Banff, Canada  
Talk: Randomized low-rank approximation of monotone matrix functions
- Sep. 2022 **Swiss Numerics Day**, Zurich, Switzerland  
Poster: Randomized low-rank approximation of monotone matrix functions
- Sep. 2022 **ApplMath22**, Brijuni, Croatia  
Poster: Randomized low-rank approximation of monotone matrix functions
- Aug. 2022 **Gene Golub SIAM Summer School on Financial Analytics**, L'Aquila, Italy  
Poster: Improved variants of the Hutch++ algorithm for trace estimation
- Jun. 2022 **EPFL MATHICSE Retreat**, Villars, Switzerland  
Talk: Improved variants of the Hutch++ algorithm for trace estimation

- Jun. 2022 **Conference on Random Matrix Theory and Numerical Linear Algebra**, Seattle, USA  
Poster: Improved variants of the Hutch++ algorithm for trace estimation
- Mar. 2022 **17th Copper Mountain Conference on Iterative Methods (virtual)**,  
Copper Mountain, USA  
Talk: Improved variants of the Hutch++ algorithm for trace estimation
- Sep. 2021 **Matrix Equations and Tensor Techniques IX**, Perugia, Italy  
Talk: Improved variants of the Hutch++ algorithm for trace estimation

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## Teaching

### Instructor (Undergraduate)

Fall 2025 **Ordinary Differential Equations**, NYU

Spring 2025 **Applied Partial Differential Equations**, NYU

Fall 2024 **Mathematics for Economics I**, NYU

### Instructor (Postgraduate)

Fall 2023 **Reading group in Quantum Computing**, EPFL

Organizer

### Supervision (Undergraduate)

Fall 2025 **Ian Taylor**, NYU, Semester project

### Supervision (Postgraduate)

Spring 2024 **Viacheslav Karpii**, EPFL, MSc Thesis (*Trace estimation of integral operators*)

Co-supervised with Daniel Kressner

Spring 2022 **Matthias Zeller**, EPFL, Semester project (*Randomized algorithms for Gaussian process regression*)

Co-supervised with Daniel Kressner

Fall 2021 **Tingting Ni**, EPFL, MSc Thesis (*On the approximation of vector-valued functions by samples*)

Co-supervised with Daniel Kressner

Fall 2020 **Claudio Boscolo**, EPFL, Semester project (*Randomized methods for compressing matrices with hierarchical low-rank structure*)

Co-supervised with Daniel Kressner

### Teaching assistant (Undergraduate)

Spring 2024 **Advanced Analysis II**, EPFL

Principal TA

Fall 2023 **Advanced Linear Algebra**, EPFL

Principal TA

Spring 2022 **Analysis III**, EPFL

Principal TA

Spring 2021 **Numerical Analysis**, EPFL

Principal TA

Fall 2020 **Analysis I**, EPFL

Principal TA

**Teaching assistant (Postgraduate)**

Fall 2022 **Low-rank Approximation Techniques**, EPFL

Principal TA

Fall 2021 **Programming Concepts in Scientific Computing**, EPFL

Principal TA