David Persson

Academic positions

New York University Courant Instructor *September 2024 - Current*

Flatiron Institute Flatiron Research Fellow *September 2024 - Current*
Mentor: Alex Barnett

Education

École Polytechnique Fédérale de Lausanne Ph.D. Mathematics *September 2020 - July 2024*
Advisor: Prof. Daniel Kressner

New York University Visiting research scholar *February 2023 - July 2023*
Advisor: Prof. Christopher Musco

University College London MSci Mathematics with Economics *October 2016 - August 2020*
MSci thesis advisor: Prof. Timo Betcke
Awarded First Class Honours

National University of Singapore Exchange student *August 2018 - May 2019*
CAP: 4.85/5

Katedralskolan Linköping International Baccalaureate *August 2012 - June 2015*
Grade: 42/45

Publications and current work

Journal/Conference articles

- D. Persson, N. Boullé, and D. Kressner, *Randomized Nyström approximation of non-negative self-adjoint operators*, SIAM Journal on Mathematics of Data Science (2025). `https://epubs.siam.org/doi/abs/10.1137/24M165082X`
- T. Chen, F. D. Keles, and D. Halikias, C. Musco, C. Musco, D. Persson, *Near-optimal hierarchical matrix approximation from matrix-vector products*, in Proceedings of the Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2025. `https://epubs.siam.org/doi/abs/10.1137/1.9781611978322.871`
- 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 (2025). `https://epubs.siam.org/doi/abs/10.1137/23M1619435`
- D. Persson and D. Kressner, *Randomized low-rank approximation of monotone matrix functions*, SIAM Journal on Matrix Analysis and Applications (2023). `https://epubs.siam.org/doi/abs/10.1137/22M1523923`
- D. Persson, A. Cortinovis, and D. Kressner, *Improved variants of the Hutch++ algorithm for trace estimation*, SIAM Journal on Matrix Analysis and Applications (2022). `https://epubs.siam.org/doi/abs/10.1137/21M1447623`

Preprints

- N. Amsel, T. Chen, F.D. Keles, D. Halikias, C. Musco, C. Musco, and D. Persson, *Quasi-optimal hierachically semi-separable matrix approximation (2025).* `https://arxiv.org/pdf/2505.16937`
- N. Amsel, D. Persson, C. Musco, and R.M. Gower, The Polar Express: Optimal matrix-sign methods and their application within the Muon method, (2025). `https://arxiv.org/pdf/2505.16932`
- D. Persson, T. Chen, and C. Musco, *Randomized block-Krylov subspace methods for low-rank approximations of matrix functions*, (2025). `https://arxiv.org/pdf/2502.01888`

Awards

Susan N. Brown Price (UCL) *August 2020*
Awarded for the best performance in applied mathematics.

UCL Mathematical & Physical Sciences Faculty Dean's List *August 2020*
For being in the top 5% of graduating students.

Erasmus+ Traineeship Grant *May 2019*
Received funding to conduct research at Karolinska Institutet.

EPSRC Vacation Bursary *May 2018*
Received funding to conduct research at UCL.

UCL Department of Mathematics First Year Undergraduate Prize *August 2017*
Awarded for excellent exam results.

Teaching experience

NYU

- Applied Partial Differential Equations, Spring 2025
- Mathematics for Economics I, Fall 2024

École Polytechnique Fédérale de Lausanne

- MSc Thesis co-supervision, Viacheslav Karpii (*Trace estimation of integral operators*), Spring 2024
- Principal TA, MATH-105 (b) Advanced Analysis II, Spring 2024
- Organiser and lecturer, MATH-646 Reading group in Quantum Computing, Fall 2023
- Principal TA, MATH-110 (a) Advanced Linear Algebra, Fall 2023
- Principal TA, MATH-403 Low-rank approximation techniques, Fall 2022
- Semester project co-supervision, Matthias Zeller (*Randomized algorithms for Gaussian process regression*), Spring 2022
- Principal TA, MATH-202 (c) Analysis III, Spring 2022
- MSc Thesis co-supervision, Tingting Ni (*On the approximation of vector-valued functions by samples*), Fall 2021
- Principal TA, MATH-458 Programming concepts in scientific computing, Fall 2021
- Principal TA, MATH-250 Numerical Analysis, Spring 2021
- Semester project co-supervision, Claudio Boscolo Cegion (*Randomized methods for compressing matrices with hierarchical low-rank structure*), Fall 2020
- Principal TA, MATH-101 (en) Analysis I, Fall 2020

Talks

EPFL Theory coffee seminar *March 2025*
Near-optimal hierarchical matrix approximation from matrix-vector products (talk) Lausanne, Switzerland

SU & KTH Numerical analysis seminar *January 2025*
Near-optimal hierarchical matrix approximation from matrix-vector products (talk) Stockholm, Sweden

SIAM Conference on Applied Linear Algebra *May 2024*
Algorithm-agnostic low-rank approximation of operator monotone matrix functions (talk) Paris, France

The $f(A)b$ulous workshop on matrix functions and exponential integrators *September 2023*
Randomized low-rank approximation of monotone matrix functions (talk) Magdeburg, Germany

Perspectives on Matrix Computations: TCS meets Numerical Analysis *March 2023*
Randomized low-rank approximation of monotone matrix functions (talk) Banff, Canada

Swiss Numerics Day *September 2022*
Randomized low-rank approximation of monotone matrix functions (poster) Zurich, Switzerland

ApplMath22 *September 2022*
Randomized low-rank approximation of monotone matrix functions (poster) Brijuni, Croatia

Gene Golub SIAM Summer School on Financial Analytics *August 2022*
Improved variants of the Hutch++ algorithm for trace estimation (poster) L'Aquila, Italy

EPFL MATHICSE retreat *June 2022*
Improved variants of the Hutch++ algorithm for trace estimation (talk) Villars, Switzerland

Conference on random matrix theory and numerical linear algebra *June 2022*
Improved variants of the Hutch++ algorithm for trace estimation (poster) Seattle, USA

17th Copper Mountain Conference on Iterative Methods (Virtual) *March 2022*
Improved variants of the Hutch++ algorithm for trace estimation (talk) Copper Mountain, USA

Matrix equations and tensor techniques IX *September 2021*
Improved variants of the Hutch++ algorithm for trace estimation (talk) Perugia, Italy

Professional experience

Karolinska Institutet Visiting undergraduate research May 2019 - September 2019

- Investigated optimization methods to determine metabolic fluxes from measurement data.
- Developed GAMS software to determine metabolic fluxes from measurement data.
- Supervised by Prof. Roland Nilsson.

University College London Undergraduate research June 2018 - August 2018

- Investigated a numerical method to solve the obstacle problem.
- Supervised by Prof. Erik Burman.

Programming languages

MATLAB, Python, Julia, C++, R, GAMS, STATA.

Languages

Swedish (native), English (fluent), German (C1 level).