

Oleg Balabanov

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Research appointments and employment

Research Scientist (previously Senior Postdoctoral Researcher)	Aug 2023 - Present
University of California, Berkeley; Lawrence Berkeley National Laboratory; International Computer Science Institute, United States	
Postdoctoral Researcher	Nov 2019 - Jun 2022
Inria & Sorbonne Université, France	
PhD Researcher	Oct 2015 - Oct 2019
Centrale Nantes, France & Universitat Politècnica de Catalunya, Spain	
Research Engineer	May 2014 - Sep 2014
Silvaco Inc., United Kingdom	

Education

PhD in Applied Mathematics, summa cum laude	2015 - 2019
Centrale Nantes, France & Universitat Politècnica de Catalunya, Spain	
MSc in Computational Mechanics, with distinction	2013 - 2015
Universitat Politècnica de Catalunya, Spain & Swansea University, United Kingdom	
BSc in Applied Mathematics; BSc in Electrophysics, with distinction	2009 - 2013
National Chiao Tung University, Taiwan (two full degrees)	

Publications

Journal articles

- M. Melnichenko, O. Balabanov, R. Murray, J. Demmel, M. W. Mahoney, and P. Luszczek. **CholeskyQR with Randomization and Pivoting for Tall Matrices (CQRRPT)**. *SIAM Journal on Matrix Analysis and Applications*, 46(3):1701-1734, 2025. [DOI](#).
- O. Balabanov and L. Grigori. **Randomized Block Gram-Schmidt Process for the Solution of Linear Systems and Eigenvalue Problems**. *SIAM Journal on Scientific Computing*, 47(1):A553-A585, 2025. [DOI](#).
- O. Balabanov and L. Grigori. **Randomized Gram-Schmidt Process with Application to GMRES**. *SIAM Journal on Scientific Computing*, 44(3):A1450-A1474, 2022. [DOI](#).
- O. Balabanov and A. Nouy. **Randomized Linear Algebra for Model Reduction. Part II: Minimal Residual Methods and Dictionary-based Approximation**. *Advances in Computational Mathematics*, 47, article 26, 2021. [DOI](#).
- O. Balabanov and A. Nouy. **Randomized Linear Algebra for Model Reduction. Part I: Galerkin Methods and Error Estimation**. *Advances in Computational Mathematics*, 45(5):2969-3019, 2019. [DOI](#).

Publications continued

Conference papers

Z. Liu, O. Balabanov, Y. Yang, and M. W. Mahoney. **Learning to Discover Iterative Spectral Algorithms**. NeurIPS, 2026 (accepted). [arXiv:2602.09530](#).

S. Yang, Z. Wang, O. Balabanov, N. B. Erichson, and M. W. Mahoney. **PRISM: Distribution-free Adaptive Computation of Matrix Functions for Accelerating Neural Network Training**. ICML, 2026. [arXiv:2601.22137](#).

Z. Liu, T. Pang, O. Balabanov, C. Yang, T. Huang, L. Yin, Y. Yang, and S. Liu. **LIFT the Veil for the Truth: Principal Weights Emerge after Rank Reduction for Reasoning-Focused Supervised Fine-Tuning**. ICML, PMLR 267:39219-39243, 2025. [Proceedings](#).

O. Balabanov, M. Beaupère, L. Grigori, and V. Lederer. **Block Subsampled Randomized Hadamard Transform for Nyström Approximation on Distributed Architectures**. ICML, PMLR 202:1564-1576, 2023. [Proceedings](#).

Preprints

O. Balabanov, C. Ju, K. He, A. Jeendgar, and M. W. Mahoney. **Preconditioning via Randomized Range Deflation (RandRAND)**. Preprint, 2025. [arXiv:2509.19747](#).

E. Timsit, L. Grigori, and O. Balabanov. **Randomized Orthogonal Projection Methods for Krylov Subspace Solvers**. Preprint, 2023. [arXiv:2302.07466](#).

O. Balabanov. **Randomized Cholesky QR Factorizations**. Preprint, 2022. [arXiv:2210.09953](#).

O. Balabanov, A. Nouy, and A. Pasco. **Random Sketching of Operators with Application to Learning Preconditioners**. Preprint, 2021. [arXiv:2104.12177](#).

Doctoral dissertation

O. Balabanov. **Randomized Linear Algebra for Model Order Reduction**. PhD dissertation, Centrale Nantes and Universitat Politècnica de Catalunya, 2019.