Mikhail Lepilov, Postdoctoral Research Fellow

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CONTACT
INFORMATION

Mathematics and Science Center E427
Emory University
400 Dowman Dr.
Atlanta, Georgia 30307

mlepilo@emory.edu
(404) 727-5641

RESEARCH
INTERESTS

Data science and numerical linear algebra: analysis of kernel matrix spectra, random matrices, rank-structured matrices, matrix algorithms

EDUCATION

Purdue University

Ph.D., Mathematics, May 2022

- Dissertation Topic: Rank Structures in Kernel Matrix Methods with Applications
- Advisor: Jianlin Xia

Reed College

B.A. in Mathematics, May 2013

- Thesis: Quantum State Discrimination of Symmetric Mixed States
- Thesis Advisor: James Pommersheim

PUBLICATIONS

M. LEPILOV, *A multidimensional proxy point method,* pre-print (available upon request)

M. LEPILOV, *Fast spectrum estimation of some kernel matrices,* submitted, SIAM J. Matrix Anal. Appl.

M. LEPILOV, J. XIA, *Accuracy analysis of the proxy point method with applications to Toeplitz matrices,* to be submitted, SIAM J. Sci. Comput.

M. LEPILOV, J. XIA, *Rank-structured approximation of some Cauchy matrices with sublinear complexity,* Numer. Linear Algebra Appl. (2023), e2526.

M. LEPILOV, J. O'ROURKE, AND I. SWANSON *Frobenius numbers of numerical semigroups generated by three consecutive squares or cubes,* Semigroup Forum **91** (2015), no. 1, 238-259.

CONFERENCE
TALKS

Spectral Shape Estimation of Kernel Matrices, 22nd International Conference on Preconditioning Techniques for Scientific and Industrial Applications, Georgia Institute of Technology, Atlanta, Georgia. (June 2024)

Invited talk, *Randomized Eigenvalue Estimation of Kernel Matrices*, 2024 SIAM Conference on Applied Linear Algebra, Paris, France. (May 2024)

Estimating Kernel Eigenvalues, Conference on Fast Direct Solvers 2023, West Lafayette, Indiana. (November 2023)

Geometric Estimates for Kernel Matrix Eigenvalues, 25th Conference of the International Linear Algebra Society, Madrid, Spain. (June 2023)

A Multidimensional Proxy Point Method and Its Applications, 17th Copper Mountain Conference on Iterative Methods, Frisco, Colorado. (April 2022; held virtually)

Proxy point method for multidimensional low-rank approximations of some analytic kernels, AMS Spring Central Sectional Meeting, Indiana. (March 2022; held virtually)

Proxy point method for low-rank approximations of analytic kernels with applications to some Toeplitz problems, Conference on Fast Direct Solvers 2021, West Lafayette, Indiana. (October 2021; held virtually)

Accelerating Computations Involving Cauchy Matrices, SIAM Conference on Computational Science and Engineering 2021, Fort Worth, Texas. (March 2021; held virtually)

Invited talk, *Robust SIF Preconditioners for SPD Matrices*, 22nd Conference of the International Linear Algebra Society, Fundacão Getulio Vargas, Rio de Janeiro. (July 2019)

Hierarchical Approximation Analysis for Sparse Matrices, 20th International Conference on Preconditioning Techniques for Scientific and Industrial Applications, University of Minnesota, Minneapolis. (July 2019)

OTHER TALKS *Estimating Kernel Eigenvalues*, <codes> at Emory, Emory University. (November 2023)

Numerical semigroups and the Frobenius number, Northwest Undergraduate Mathematics Symposium, Lewis and Clark College. (March 2012)

AWARDS AND HONORS Student travel award, SIAM Conference on Applied Linear Algebra 2021, held virtually. (October 2021)

Student travel award, SIAM Conference on Computational Science and Engineering 2021, held virtually. (Originally in Fort Worth, Texas; March 2021)

MENTORING Group Mentor, Emory Research Experience for Undergraduates (REU) on Computational Mathematics and Data Science, Atlanta. (June/July 2024)

PROFESSIONAL ACTIVITIES Minisymposium co-organizer, *Preconditioning Techniques for Gaussian Processes*, 20th International Conference on Preconditioning Techniques for Scientific and Industrial Applications, Georgia Institute of Technology, Atlanta, Georgia. (June 2024)

Minisymposium co-organizer, *Low-Rank Structures of Dense and Sparse Matrices*, SIAM Conference on Computational Science and Engineering 2021, Fort Worth, Texas. (March 2021)

SELECTED TEACHING EXPERIENCE	Fall	2014	Recitation Instructor, Plane Analytic Geometry and Calculus II (MA 162)
	Fall	2018	Recitation Instructor, Linear Algebra and Differential Equations (MA 262)
	Spring	2018	Instructor, Precalculus: Functions and Trigonometry (MA 158)
	Spring	2019	Instructor, Applied Calculus II (MA 16020)
	Fall	2019	Instructor, Applied Calculus I (MA 16010)
	Fall	2022	Instructor, Differential Equations (Math 212)
	Spring	2023	Instructor, Multivariable Calculus (Math 211)
	Spring	2024	Instructor, Abstract Vector Spaces (Math 321)

RELEVANT SKILLS	Languages:	English (fluent), Russian (fluent), French (working knowledge)