RASMUS KYNG

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CONTACT INFORMATION

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WORK AND EDUCATION

2018–present	Postdoctoral Fellow, Theory of Computation Group at SEAS, Harvard University, U.S.A.
Fall 2017	Postdoctoral Research Fellow, Simons Institute for Theoretical Computer Science, UC Berkeley, U.S.A.
2011–2017	PhD, Department of Computer Science, Yale University, U.S.A.
2008–2011	BA Hons Computer Science, University of Cambridge, United Kingdom First Class Honors.
2005–2008	Risskov Gymnasium, upper secondary school, Denmark Highest GPA in national exams.

PUBLICATIONS

STOC 2019	*Flows in Almost Linear Time via Adaptive Preconditioning* with R. Peng, S. Sachdeva and D. Wang.
SODA 2019	*Iterative Refinement for ℓ_p-norm Regression* with D. Adil, R. Peng, and S. Sachdeva.
FOCS 2018	*A Matrix Chernoff Bound for Strongly Rayleigh Distributions and Spectral Sparsifiers from a few Random Spanning Trees* with Z. Song.
FOCS 2018	*Solving Directed Laplacians in Nearly Linear Time through Sparse LU Factorizations* with M.B. Cohen, J. Kelner, J. Peebles, R. Peng, A.B. Rao, and A. Sidford.
STOC 2018	*Incomplete Nested Dissection* with R. Peng, R. Schwieterman, and P. Zhang.
FOCS 2017	*Hardness Results for Structured Linear Systems* with P.Zhang. Paper won **the Machtey Award for Best Student Paper**.
STOC 2017	*Sampling Random Spanning Trees Faster than Matrix Multiplication* with D. Durfee, J. Peebles, A.B. Rao, and S. Sachdeva.
SODA 2017	*A Framework for Analyzing Resparsification Algorithms* with J. Pachocki, R. Peng, and S. Sachdeva.
FOCS 2016	*Approximate Gaussian Elimination for Laplacians: Fast, Sparse, and Simple* with S. Sachdeva.
STOC 2016	*Sparsified Cholesky and Multigrid Solvers for Connection Laplacians* with Y.T. Lee, R. Peng, S. Sachdeva, and D.A. Spielman.
NIPS 2015	*Fast, Provable Algorithms for Isotonic Regression in all ℓ_p-norms* with S. Sachdeva and A. Rao.
COLT 2015	*Algorithms for Lipschitz Learning on Graphs* with S. Sachdeva, D.A. Spielman, and A. Rao.
STOC 2014	*Solving SDD Linear Systems in Nearly $m \log^{1/2} n$ Time* with M.B. Cohen, G.L. Miller, J.W. Pachocki, R. Peng, A. Rao, and S.C. Xu.

MANUSCRIPTS

Submitted — *Four Standard Deviations Suffice for Rank 1 Matrices.*
with K. Luh and Z. Song.

In preparation — *Packing LPs are Hard to Solve Accurately, Assuming Linear Equations are Hard*
with R. Peng, D. Wang, and P. Zhang.

AWARDS

2017 The FOCS Machtey Award for Best Student Paper

2017 Simons Institute Postdoctoral Research Fellowship

TEACHING EXPERIENCE

Spring 2018 Harvard Instructor for AM 221: Advanced Optimization

Fall 2013 Yale Teaching Fellow for AMTH/CPSC 462/562: Graphs and Networks

Spring 2013 Yale Teaching Fellow for CPSC 469/569: Randomized Algorithms

Fall 2012 Yale Teaching Fellow for CPSC 201: Introduction to Computer Science

SERVICE

Conference reviewer: STOC 2019, SODA 2019, SOSA 2019, FOCS 2018, SODA 2018, RANDOM 2017, APPROX 2017, ICALP 2017, FOCS 2017, FOCS 2016.
Journal reviewer: SICOMP 2018, Theory of Computing 2017.

CODE

`github.com/danspielman/Laplacians.jl`

Work in progress. Developing fast Laplacian linear system solvers in Julia.

`github.com/danspielman/YINSlex`

Fast Matlab and Java code for computing Lex-minimizers in directed and undirected graphs. See the paper *Algorithms for Lipschitz Learning on Graphs* for experiments.

`github.com/sachdevasushant/Isotonic`

Fast Matlab code for computing Isotonic Regression. See the paper *Fast, Provable Algorithms for Isotonic Regression in all ℓ_p-norms* for experiments.

WORK EXPERIENCE

Jun–Aug 2011 Research Assistant at Microsoft Research in Cambridge, UK

Employed through Brook Street. Worked for Senior Researchers Pushmeet Kohli and Jamie Shotton on tools for GPU-based 3D scene reconstruction using data from a moving Kinect device.

Jan 2011 Research Assistant at Microsoft Research in Cambridge, UK

Employed through Brook Street. Worked for Senior Researchers Pushmeet Kohli and Jamie Shotton on Kinect data collection and labeling tools for gesture recognition.

Summer 2010 Research Intern in Computational Geometry at the University of Utah

Supervised by Prof Suresh Venkatasubramanian. I worked on Johnson-Lindenstrauss-style dimensionality reduction from high- to low-dimensional simplices with Hellinger distance as the metric.

INVITED TALKS AND CONFERENCE PRESENTATIONS

2019 Beyond Randomized Rounding and the Probabilistic Method Workshop,
Geometry of Polynomials Program at the Simons Institute, Berkeley
A Matrix Chernoff Bound for Strongly Rayleigh Distributions and Spectral Sparsifiers from a few Random Spanning Trees.

2019 SODA, San Diego
Iterative Refinement for ℓ_p-norm Regression.

2018 Bridging Continuous and Discrete Optimization Reunion Workshop
The Simons Institute, Berkeley
Iterative Refinement for ℓ_p-norm Regression.

2018 Caltech Theory Seminar
Approximate Gaussian Elimination.

2018 Northwestern Quarterly Theory Workshop
Analysis Using Matrix Martingales.

2018 FOCS, Paris
A Matrix Chernoff Bound for Strongly Rayleigh Distributions and Spectral Sparsifiers from a few Random Spanning Trees.

2018 FOCS, Paris
Solving Directed Laplacians in Nearly Linear Time through Sparse LU Factorizations.

2018 Laplacians 2.0 Workshop, FOCS, Paris
Analysis Using Matrix Martingales.

2018 Randomized Numerical Linear Algebra and Applications Workshop,
Foundations of Data Science Program at the Simons Institute, Berkeley
Analysis Using Matrix Martingales.

2018 High-Performance Graph Algorithms Seminar, Dagstuhl
Optimization on Graphs.

2018 Discrepancy and Integer Programming Workshop, CWI Amsterdam
Matrix Approximation by Row Sampling.

2018 Graphs Across Domains Workshop, UC Berkeley
Optimization on Graphs.

2017 Michael Cohen Memorial Symposium, the Simons Institute, Berkeley
Michael Cohen and Directed Laplacians.

2017 Stanford Theory Seminar
Approximate Gaussian Elimination.

2017 FOCS, Berkeley
Hardness Results for Structured Linear Systems.

2017 UC Berkeley Theory Seminar
Hardness Results for Structured Linear Systems.

2017 Google Research Seminar, Mountain View
Hardness Results for Structured Linear Systems.

2017 Yale Department of Statistics and Data Science, YPNG Seminar
Approximate Gaussian Elimination.

2017 MSR Redmond
Regression, Elimination, and Sampling on Graphs.

2017 University of Copenhagen Theory Seminar
Approximate Gaussian Elimination.

2016 CMU Theory Seminar
Approximate Gaussian Elimination.

2016 Georgia Tech Theory Seminar
Approximate Gaussian Elimination.

2016 UC Berkeley Math Dept. Seminar
Approximate Gaussian Elimination.

2016 Google Research NYC
Approximate Gaussian Elimination.

2016 FOCS, New Brunswick
Approximate Gaussian Elimination.

2016 MIT A&C Seminar
Approximate Gaussian Elimination.

2016 Aarhus University Theory Seminar
Lipschitz Learning on Graphs.

2016 China Theory Week, Hong Kong
Approximate Gaussian Elimination.

2016 SIAM Annual Meeting, Boston
Approximate Cholesky Factorization.

2016 STOC, Boston
Sparsified Cholesky and Multigrid Solvers for Connection Laplacians.

2015 IT University of Copenhagen Theory Seminar
Lipschitz Learning and Isotonic Regression on Graphs.