KYLE KLOSTER

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EDUCATION

Ph.D., Purdue University, Mathematics *May 2016*
Thesis: *Graph Diffusions and Matrix Functions: Fast Algorithms and Localization Results*
B.S., Fordham University, Mathematics · *Summa cum laude* *May 2010*

Github profile: `https://github.com/kkloste`
Google Scholar profile: `https://scholar.google.com/citations?user=gtM7-p4AAAAJ&hl=en`

PROFESSIONAL EXPERIENCE

Post-doc Researcher, Computer Science Department, North Carolina State University 2016—2018
Instructor, NCSU Computer Science Department, Discrete Math for Engineers 2018 Spring
Research Assistant, MIT Lincoln Laboratory, Cyber-analytics and Decision Systems group 2015
Research Assistant, Computer Science Department, Purdue University 2013—2016
Instructor, Computer Science Department, Purdue University 2014
Instructor, Mathematics Department, Purdue University 2011—2014
Recitation Instructor, Mathematics Department, Purdue University 2010—2011
Tutor, Mathematics Department, Fordham university 2009—2010
Research Assistant, Mathematics Department, Fordham University 2009 Summer

PUBLICATIONS

Conference Papers

1. E. D. Demaine, T. D. Goodrich, K. Kloster, B. Lavallee, Q. C. Liu, B. D. Sullivan, A. Vakilian, and A. van der Poel. Structural rounding: Approximation algorithms for graphs near an algorithmically tractable class. In *Proceedings of the 2019 European Symposium on Algorithms (ESA)*, 2019

2. K. Kloster, B. D. Sullivan, and A. van der Poel. Mining maximal induced bicliques using odd cycle transversals. In *Proceedings of the 2019 SIAM International Conference on Data Mining (SDM)*. SIAM, 2019

3. K. Kloster, P. Kuinke, M. P. O'Brien, F. Reidl, F. S. Villaamil, B. D. Sullivan, and A. van der Poel. A practical fpt algorithm for flow decomposition and transcript assembly. In *2018 Proceedings of the Twentieth Workshop on Algorithm Engineering and Experiments (ALENEX)*, pages 75–86. SIAM, 2018

4. K. Kloster, M. Spain, and S. Kelley. Scaling overlapping clustering. In *Twelfth Workshop on Mining and Learning with Graphs (MLG)*, 2016

5. K. Kloster and D. F. Gleich. Heat kernel based community detection. In *Proceedings of the 20th ACM SIGKDD international conference on Knowledge discovery and data mining (KDD)*, pages 1386–1395. ACM, 2014

Journal Papers

6. E. Horton, K. Kloster, and B. D. Sullivan. Subgraph centrality and walk-regularity. *Linear Algebra and its Applications*, 570:225–244, 2019

7. K. Kloster, D. Král', and B. D. Sullivan. Walk entropy and walk-regularity. *Linear Algebra and its Applications*, 546:115–121, 2018

8. Y. Li, K. He, K. Kloster, D. Bindel, and J. Hopcroft. Local spectral clustering for overlapping community detection. *ACM Transactions on Knowledge Discovery from Data (TKDD)*, 12(2):17, 2018

9. B. Jiang, K. Kloster, D. F. Gleich, and M. Gribskov. Aptrank: an adaptive pagerank model for protein function prediction on bi-relational graphs. *Bioinformatics*, 33(12):1829–1836, 2017

10. H. Nassar, K. Kloster, and D. F. Gleich. Localization in seeded pagerank. *Internet Mathematics*, 9062017(1):1757, 2017

11. D. Gleich and K. Kloster. Seeded pagerank solution paths. *European Journal of Applied Mathematics*, 27(6):812–845, 2016

12. D. F. Gleich and K. Kloster. Sublinear column-wise actions of the matrix exponential on social networks. *Internet Mathematics*, 11(4-5):352–384, 2015

Refereed Workshop Papers

13. H. Nassar, K. Kloster, and D. F. Gleich. Strong localization in personalized pagerank vectors. In *International Workshop on Algorithms and Models for the Web-Graph (WAW)*, pages 190–202. Springer, Cham, 2015

14. K. Kloster and D. F. Gleich. A nearly-sublinear method for approximating a column of the matrix exponential for matrices from large, sparse networks. In *International Workshop on Algorithms and Models for the Web-Graph (WAW)*, pages 68–79. Springer, 2013

Technical Reports

15. K. Kloster and Y. Li. Scalable and robust local community detection via adaptive subgraph extraction and diffusions. *arXiv preprint arXiv:1611.05152*

SKILLS AND TOOLS

Programming langauges
Competency: Python, C/C++, MATLAB, LaTeX
Familiarity: Bash, JavaScript, HTML

Packages
Scikit-learn, Numpy, Scipy, Matplotlib, Networkx

PRESENTATIONS

Invited Talks

1. *Walk-classes, centrality collisions, and spider donuts*, ICIAM, minisymposium on Networks, walks and matrix functions, University of Valencia. 2019
2. *A friendly introduction to math's most social subject, Graphs*, Math Department SUM Series Lecture, NCSU. 2016
3. *Diffusions for Network Analysis: fast algorithms and localization results*, Applied Math Seminar, UNC - Chapel Hill. 2016
4. *Scaling Overlapping Clustering*, KDD workshop on Mining Large Graphs 2016
5. *Graph clustering with modified spectral subspaces and functions of matrices*, ILAS, minisymposium on Matrix Methods in Network Analysis, KU Leuven 2016
6. *Tutorial on local diffusion algorithms for fast, personalized graph applications*, WAW School on Complex Networks and Graph Models, Eindhoven University of Technology. 2015
7. *Local Clustering with Graph Diffusions and Spectral Solution Paths*, SIAM Conference on Applied Linear Algebra, mini-symposium on Recent Spectral Approaches for Graph Clustering. 2015
8. *Overlapping Community Detection via Link Clustering*, Cyber-analytics and Decision Systems group, MIT Lincoln Labs. 2015

9. *Local community structure in social and information networks*, CS Department Machine Learning Seminar, Purdue University. 2014
10. *Bounding Facebook Friends with Fast Matrix Functions*, Math Department Graduate Research Day Symposium, Purdue University. 2014
11. *Heat Kernel Based Community Detection*, ACM SIGKDD International Conference on Knowledge Discovery and Data Mining. 2014
12. *A Nearly Sublinear Approximation to exp(P)ei for Large Sparse Matrices from Social Networks*, Workshop on Algorithms for the Web Graph, Harvard University. 2013

Invited Posters

13. *Heat Kernel Based Community Detection*, Google KDD Day. 2014
14. *Fast Relaxation Methods for Computing Functions of Matrices*, Massive Modern Data Sets, UC-Berkeley. 2014

Other Talks

15. *Gauss-Southwell method: intro & applications*, Student NLA Seminar, Purdue University. 2015
16. *The Fiedler and PageRank vectors* , Student NLA Seminar, Purdue University. 2015
17. *Spectral graph theory: eigenvalues & friendship*, Student Colloquium, Purdue University. 2015
18. Association for Women in Mathematics (AWM), Basic Skills seminar, Purdue University. 2015
19. *Circulant Matrices, the FFT, and Eigenvalues*, Student NLA Seminar, Purdue University. 2015
20. *Krylov and QR and Polynomials*, Student NLA Seminar, Purdue University. 2015
21. *A sub-linear method for computing columns of functions of sparse matrices*, CS Department Complexity Theory Seminar, Purdue University. 2014
22. *Computing Functions of Matrices: How and Why*, Student NLA Seminar, Purdue University. 2014
23. *A Quick and Dirty Approximation of exp*$(\mathbf{P})\mathbf{e}_i$ *for Huge Networks*, Gene Golub SIAM Summer School 2013, Fudan University. 2013
24. *A friendly introduction to Math's most social subject, Graphs: colorings, cliques, and combinatorics*, Mathematics Student Colloquium, Purdue University. 2013

AWARDS AND HONORS

Accepted to attend, travel funded · G2S3, *Randomization in Numerical Linear Algebra* 2015
KDD NSF Student Travel Award · ACM SIGKDD 2014
Excellence in Teaching Award · Purdue University Mathematics Department 2013
Accepted to attend, travel funded · G2S3, *Matrix Functions and Matrix Equations* 2013
Senior Mathematics Prize · Fordham University Mathematics Department 2010

TEACHING

For courses that provided a student evaluation of my teaching I list the median response on a scale of 1 to 5 to the question "Overall I would rate this instructor as _____".

Spring 2018 · Lecturer · NCSU: Discrete Math for Computer Engineers (CSC 226), one section 4.8
Fall 2014 · Co-instructor, Grader · Purdue: Graduate Numerical Linear Algebra (CS515), one section [N/A]
Fall 2014 · Instructor · Undergraduate Linear Algebra (MA 264), one section 5.0
Spring 2013 · Instructor · Intro Analysis II (MA 224), two sections 4.9, 4.9
Fall 2012 · Instructor · Intro Analysis I (MA 223), two sections 4.6, 4.9
Summer 2012 · Instructor · Plane Analytic Geometry & Calculus II (MA 162), one section 4.3
Spring 2012 · Instructor · Intro Analysis II (MA 224), two sections 4.2, 4.1
Fall 2011 · Instructor · College Algebra (MA 152), two sections 4.4, 4.1
Spring 2011 · Recitation Instructor · Plane Analytic Geometry & Calculus I (MA 161), two sections 4.8, 4.9
Fall 2010 · Recitation Instructor · Multivariate Calculus (MA 261), two sections 4.4, 4.8

SERVICE

Journal reviewing

ALENEX, Applied Numerical Mathematics, Journal of Complex Networks, Computing, IEEE Transactions on Network Science and Engineering, IEEE Transactions on Knowledge and Data Engineering, Mathematical Programming, Mathematical Reviews, SIMAX

Organizational duties and leadership roles

· Organizer CS Theory Seminar · NC State University 2016—2017
· Organizer, founder, Numerical Linear Algebra Student Seminar · Purdue University 2014—2016
· New Student Mentor, Association for Women in Mathematics · Purdue University 2013—2016
· Vice President, Association for Women in Mathematics (AWM) · Purdue Chapter 2013—2014
· Graduate student representative · Mathematics Department, Purdue University 2013—2014
· Organizer, Student Colloquium · Mathematics Department, Purdue University 2013—2014
· Co-organizer, Grad Student Recruitment Weekend · Mathematics Department, Purdue University 2013
· Co-organizer, Graduate Research Day · Mathematics Department, Purdue University 2013

AFFILIATIONS

· Association for Women in Mathematics (AWM)
· International Linear Algebra Society (ILAS)
· Society for Industrial and Applied Mathematics (SIAM)

REFERENCES

Post-doc Supervisor · Prof. Blair Sullivan · CS, NCSU blair_sullivan@ncsu.edu
Ph.D. Advisor · Prof. David F. Gleich · CS, Purdue dgleich@purdue.edu
Project Supervisor · Dr. Merrielle Spain · MIT Lincoln Lab merrielle.spain@ll.mit.edu
Teaching Supervisor · Dr. Dominic Naughton · Math, Purdue dnaughto@purdue.edu