

Patrick Lin

Curriculum Vitæ

<https://patrickl.in/>
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he/they

Research Interests

Discrete/computational topology and geometry, with focus on surface-embedded graphs. Graph theory and algorithms, primarily structural perspectives. Generally, applying topological methods to achieve efficient algorithms.

Education

University of Illinois at Urbana-Champaign 2015–2021
Ph.D. in Computer Science. Advisor: *Jeff Erickson*.

NYU Polytechnic School of Engineering 2011–2015
M.S. in Mathematics. Advisor: *Lisa Hellerstein*.
B.S. in Computer Science, with honors.

Employment

Software Engineer, Google, Inc. 2021–Present

Teaching Assistant (Instructor), University of Illinois at Urbana-Champaign 2020–2021

Software Engineering Intern, Google, Inc. 2018, 2019, 2020

Teaching Assistant and Research Assistant, University of Illinois at Urbana-Champaign 2015–2019

Awards and Honors

List of Teachers Ranked as Excellent by Their Students Fall 2015*, Spring 2018*,
(*outstanding rating) Fall 2019*, Summer 2020

Outstanding Teaching Assistant Fall 2016, Fall 2019

Richard T. Cheng Endowed Fellowship 2015–2016

Research

Most of the papers listed below can be found at <https://patrickl.in/>. Papers are listed *once*, even if they have multiple versions. Following standard practice in theoretical computer science, coauthors are listed *alphabetically*.

Conference Publications

- [1] [Planar and Toroidal Morphs Made Easier](#). With Jeff Erickson. To appear in *Proceedings of the 29th International Symposium on Graph Drawing and Network Visualization (GD)*, 2021. arXiv:[2106.14086](https://arxiv.org/abs/2106.14086).
- [2] [How to Morph Graphs on the Torus](#). With Erin Wolf Chambers, Jeff Erickson, and Salman Parsa. In *Proceedings of the 2021 ACM-SIAM Symposium on Discrete Algorithms (SODA)*, pages 2759–2778, 2021. arXiv:[2007.07927](https://arxiv.org/abs/2007.07927).
- [3] [A Toroidal Maxwell–Cremona–Delaunay Correspondence](#). With Jeff Erickson. In *Proceedings of the 36th International Symposium on Computational Geometry (SoCG)*, pages 40:1–40:17, 2020. arXiv:[2003.10057](https://arxiv.org/abs/2003.10057). Preliminary version in *Abstracts of the Computational Geometry: Young Researchers Forum*, 2019. Full version invited to special issue of *Journal of Computational Geometry*.

- [4] [Scenario Submodular Cover](#). With Nathaniel Grammel, Lisa Hellerstein, and Devorah Kletenik. In *Proceedings of the 14th International Workshop on Approximation and Online Algorithms (WAOA)*, pages 116–128, 2016. arXiv:1603.03158.
- [5] [Discrete Stochastic Submodular Maximization](#). With Lisa Hellerstein and Devorah Kletenik. In *Proceedings of the 9th International Conference on Algorithms and Complexity (CIAC)*, pages 235–248, 2015. arXiv:1504.02146.

Abstracts, Preprints, Technical Reports, etc.

- [6] [Equilibrium Graphs on Flat Tori](#). Ph.D. dissertation, Computer Science Department, University of Illinois Urbana-Champaign, July 2021.
- [7] [A Note on Toroidal Maxwell–Cremona Correspondences](#). Preprint, September 2020. arxiv:2009.12205.
- [8] Boolean Function Evaluation Over A Sample. With Lisa Hellerstein and Devorah Kletenik. In *NIPS Workshop on Discrete and Combinatorial Problems in Machine Learning (DISCML)*, 2014. Sketches results improved and corrected in [4].

Invited Talks

- Toroidal Maxwell–Cremona Correspondences* [3, 7], 2021
Workshop on Progress and Open Problems in Rigidity Theory. Online.
- How to Morph Graphs on the Torus* [2], 2021
University of Wrocław Algorithms Seminar. Online.
- Maxwell-Cremona meets the Torus* [3], 2020
Virtual seminar on algebraic matroids and rigidity theory. Online.
- Maxwell-Cremona meets the Torus* [3], 2019
Saint Louis University. Missouri, USA.

Conference Talks and Workshop Presentations

- How to Morph Graphs on the Torus* [2], 2021
2021 ACM-SIAM Symposium on Discrete Algorithms (SODA’21). Online.
- A Toroidal Maxwell-Cremona Correspondence* [3], 2020
36th International Symposium on Computational Geometry (SoCG’20). Online.
- A Toroidal Maxwell-Cremona Correspondence* [3], 2019
Cmmputational Geometry: Young Researcher’s Forum (CG:YRF’19). Oregon, USA.
- Boolean Function Evaluation Over A Sample* [8], 2014
NIPS Workshop on Discrete and Combinatorial Problems in Machine Learning (DISCML’14). Montreal, CA.

Teaching

University of Illinois at Urbana Champaign

*Rated excellent based on student evaluations, as reported in the university’s “[List of Teachers Ranked as Excellent by Their Students](#)”. **Rated *outstanding* (top 10% campus-wide).

†Head Teaching Assistant.

Instructor:

CS 374	Intro to Algorithms & Models of Computation	Spring 2021
CS 173	Discrete Structures	Summer 2020*, Fall 2020

Teaching Assistant:

CS 173	Discrete Structures	Fall 2019**†
CS 498 ABD	Algorithms for Big Data	Spring 2019

CS 374	Intro to Algorithms & Models of Computation	Fall 2015**, Spring 2018**†
CS 473	Algorithms	Spring 2016, Fall 2016

NYU Polytechnic School of Engineering

Teaching Assistant:

CS 6753	Theory of Computation	Fall 2014
CS 5303	Introduction to Programming and Problem Solving	Fall 2013
CS 6003	Foundations of Computer Science	Fall 2013
MA 2312/2322	Discrete Mathematics	Fall 2012, Spring 2013

Mentorship

Former students

- [Alexandra Jakucewicz](#), PURE Mentee for Fall 2020
- [Shalin Mehta](#), PURE Mentee for Fall 2020

Service

Reviewing and Refereeing

- **Referee** for *Discrete & Computational Geometry*.
- **External Reviewer** for *Foundations of Software Technology and Theoretical Computer Science* (2017), *Symposium on Foundations of Computer Science* (2018), *Symposium on Computational Geometry* (2018), *International Workshop on Graph-Theoretic Concepts in Computer Science* (2021).