Linda Cook, Ph.D.

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Research Interests

Structural graph theory and algorithms, especially as it pertains to forbidden induced subgraphs. Broadly, discrete math, theoretical computer science and applications.

Employment History

August 2021 – present   **Postdoctoral Fellow**
                          Discrete Math Group, Institute for Basic Science (IBS) Daejeon, Korea

Education

Princeton University, Program in Applied and Computational Math

Sept 2017– May 2021   **Ph. D. awarded May 2021**
                          Thesis Title: *On recognition algorithms and structure of graphs with restricted induced cycles*
                          Advisor: Paul Seymour

Rutgers University, New Brunswick

Sept 2013 – May 2017   B.A. in Mathematics, B.A. in Computer Science awarded May 2017

                          Highest honors in Computer Science, High honors in Mathematics

Preprints

Accepted

1. Graphs with all holes the same length *with J. Horsfield, M. Preissmann, C. Robin, P. Seymour, N. L. D. Sintiari, N. Trotignon, K. Vušković.* (56 pages) October 2021, Accepted at Journal of Combinatorial Theory, Series B in April 2024.

Journal Submissions

2. Reuniting χ-boundedness with polynomial χ-boundedness. *with M. Chudnovsky, J. Davies and S. Oum.* arXiv:2310.11167, October 2023.

3. On polynomial degree-boundedness *with R. Bourneuf, M. Bucić, J. Davies.* arXiv:2311.03341. November 2023.

Conference Submissions

4. Local certification of forbidden subgraphs *with Nicolas Bousquet, Laurent Feuilloley, Théo Pierron, Sébastien Zeitoun,* arXiv:2402.12148, February 2024.

Journal Papers

5. On tree decompositions whose trees are minors *with P. Blanco, M. Hatzel, C. Hilaire, F. Illingworth, R. McCarty,* in J. Graph Theory. (2024), 1–11. https://doi.org/10.1002/jgt.23083

6. Proving a directed analogue of the Gyárfás-Sumner conjecture for orientations of P_4 *with T. Masařík, M. Pilipczuk, A. Reinald, U. S. Souza.* Electronic Journal of Combinatorics, Volume 30, Issue 3, September 2023.

7 Detecting a long even hole *with P. Seymour*, European Journal of Combinatorics, Volume 104, August 2022.

8 Excluding the fork and antifork, *with M. Chudnovsky, and P. Seymour.* Discrete Mathematics, Volume 343, Issue 5, May 2020. (Awarded editor's choice).

9 Quantifying Structural Relationships of Metal Binding Sites Suggests Origins of Biological Electron Transfer *Y. Bromberg, A. Aptekmann, Y. Mahlich, L. Cook, S. Senn, M. Miller, V. Nanda, D. Ferreiro and P. Falkowski*, Science Advances[1], Volume 8, Issue 2, January 2022.

Refereed Conference Papers

10 Reconstructing Graphs from Connected Triples *with P. Bastide, J. Erickson, C. Groenland, M. van Kreveld, I. Mannens, and J. L. Vermeulen* . In Proceedings of the 49th International Workshop on Graph-Theoretic Concepts in Computer Science (WG'2023).

11 A tight local algorithm for the minimum dominating set problem in outerplanar graphs *with M. Bonamy, C. Groenland and A. Wesolek.* International Symposium on Distributed Computing (DISC), 2021.

- An extended abstract version of **6** (*Proving a directed analogue of the Gyárfás-Sumner conjecture for orientations of P_4*) was published in the proceedings of European Conference on Combinatorics, Graph Theory and Applications (EUROCOMB'23)

Invited Talks

April 2024	*On polynomial degree-boundedness* Princeton University Discrete Math Seminar on April 4 *also given at* Utrecht University Computer Science Seminar, Netherlands on April 15
Dec 2023	*On polynomial degree-boundedness* Korean Institute for Advanced Studies Combinatorics Workshop, Busan
Nov 2023	*Detecting a long even hole* Seminar for Algorithmic Foundations for Social Advancement (AFSA) project Kyoto University. *Reuniting χ-boundedness with polynomial χ-boundedness* The 3rd East Asia Workshop on Extremal and Structural Graph Theory in Okinawa, Japan. *Reuniting χ-boundedness with polynomial χ-boundedness* Research Institute for Mathematical Sciences (RIMS) Seminar, Kyoto University.
Sept 2023	*Reuniting χ-boundedness with polynomial χ-boundedness* Graphes@Lyon Seminar, a joint seminar of the graph theory groups of ENS de Lyon and Université de Lyon 1, France.
Nov 2022	*Forbidding some induced cycles in a graph,* Tutte Colloquium, University of Waterloo, Combinatorics and Optimization Department.
Oct 2022	*Detecting a Long Even Hole* Bonn Workshop on Combinatorial Optimization, University of Bonn, October 2022.
June 2022	*Forbidding any orientation of P_4 and any clique bounds the dichromatic number.* Seymour is $70 + \epsilon$, ENS de Lyon, France.

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[1]*Science Advances* is an open access journal from the publisher of the journal *Science*.

Invited Talks (continued)

	Structural graph theory and algorithms: Detecting a long even hole and other problems Combinatorial Optimization and Logistics Research Seminar, University of Bremen, Germany (online).
Feb 2022	*Detecting a Long Even Hole* Graph Theory Seminar, LABRI, University of Bordeaux (online).
Dec 2021	*When all holes have the same length.* Special Session in Extremal Combinatorics, Korean SIAM Annual Meeting, Busan.
	Detecting a Long Even Hole Algorithms Seminar, University of Utrecht, Netherlands (online).
Oct 2021	*Detecting a Long Even Hole* Online Algorithmic Graph Theory Seminar organized by Martin Golumbic, University of Haifa, Isreal.

Teaching Experience

Fall 2018	Teaching Assistant, Advanced Graph Theory (MAT 477) , Princeton University *Taught 1/12 weeks (8%)*
May 2018	Teaching Assistant in Mathematical Computing Women and Math Summer School, Institute of Advanced Studies
Fall 2019	Teaching Assistant, Advanced Graph Theory (MAT 477), Princeton University *Taught 2/12 weeks (17%)*
May 2019	Teaching Assistant in Mathematical Computing Women and Math Summer School, Institute of Advanced Studies
Spring 2020	Teaching Assistant, Introductory Graph Theory (MAT 375), Princeton University
Spring 2021	Grader Linear Algebra with Applications, Princeton University

Equity and Outreach

October 2023	*Interview for general public* -Discussed my research and advice for students in video by Korean Ministry of Science. -35,000 views on Youtube.
Fall 2019 - Spring 2020	*Princeton University Women in Math Speaker Series, Organizer* -Secured funding for and co-organized a seminar inviting female math researchers to give undergraduate level colloquium talks for Princeton University math majors
Fall 2013- Spring 2016	*Douglas-DIMACS Computing Corps Member, Rutgers University* -Developed and organized computer programming clubs and events for middle school students around New Brunswick, NJ
Fall 2016- Spring 2017	*Douglass STEM Research Advisory Board member* - Mentored Rutgers undergraduate women during their first academic STEM research experience through the Douglass Project for Women in STEM as a part of their introduction to scientific research course (06:090:130). - Organized and taught a beginner-level computer programming workshop for 40 undergraduate researchers from the Douglass Project.

Research Internships

Summer 2018	*Network analysis of aquatic food webs* International Institute of Applied Systems Analysis, Laxenberg, Austria. Advisors: U. Dieckmann (Evolution and Ecology Program) and E. Rovenskaya (Applied Systems Analysis) Duration: 7 weeks
Summer 2016	*Colin de Verdière invariant of strongly regular graphs* University of Waterloo, Funded as a Rutgers University Rodkin's Scholar. Advisor: K. Guo (Combinatorics and Optimization Department) Duration: 2 months
Summer, 2015	*Complexity of three-dimensional numerical matching* DIMACS REU, Rutgers University Advisor: J. Baron, Mathematics Department, Rutgers University *Participated in the Midsummer Combinatorial Workshop at Charles University in Prague in July 2015 as a part of the DIMACS-DIMATIA exchange program* Duration: 2 months
Summer 2014	*Network analysis & evolutionary relationships between proteins* Advisor: Y. Bromberg, Dept of Biochemistry and Microbiology, Rutgers University. Total Duration: 24 weeks

Misc.

Referee Activity	*Journals:* Discrete Math (2x), Journal of Graph Theory (2x), European Journal of Combinatorics, Electronic Journal of Combinatorics, Journal of Combinatorial Theory Series B, *Conferences:* STOC, SODA, ISAAC, WG, STACS.
Computing	Experience in: Python, High Performance Computing, Unix, Sage, C, Java
Languages	English (native), German (Fluent, Goethe C1 Certification), French (Intermediate)
Citizenship	USA & Germany