

Linda Cook, Ph.D.

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🌐 <https://dimag.ibs.re.kr/home/cook/>

🌐 [Google Scholar](#)

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

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| August 2024 – present | Postdoctoral Fellow
Korteweg-de Vries Institute of Mathematics at the University of Amsterdam and the NETWORKS Consortium
Amsterdam, Netherlands
<i>Supervised by Ross Kang</i> |
| August 2021 – July 2024 | Postdoctoral Fellow
Discrete Math Group, Institute for Basic Science (IBS) Daejeon, Korea |

Education

Princeton University, Program in Applied and Computational Math

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| Sept 2017– May 2021 | Ph. D. awarded May 2021
Thesis Title: <i>On recognition algorithms and structure of graphs with restricted induced cycles</i>
Advisor: Paul Seymour |
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Rutgers University, New Brunswick

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| 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 |
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Preprints

- 1 Reuniting χ -boundedness with polynomial χ -boundedness. with M. Chudnovsky, J. Davies and S. Oum. arXiv:2310.11167, October 2023.
- 2 On polynomial degree-boundedness with R. Bourneuf, M. Bucić, J. Davies. arXiv:2311.03341. November 2023.

Conference Submissions

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

Journal Papers

- 4 Graphs with all holes the same length with J. Horsfield, M. Preissmann, C. Robin, P. Seymour, N. L. D. Sintiari, N. Trotignon, K. Vušković. (62 pages) Journal of Combinatorial Theory, Series B, Volume 168, 2024.
- 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. Ferreira 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

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| July 2024 | <i>A survey talk on χ-boundedness</i>
Early Career Researchers in Combinatorics Workshop
International Centre of Mathematics (ICMS), Edinburgh, Scotland |
| April 2024 | <i>On polynomial degree-boundedness</i>
Princeton University Discrete Math Seminar on April 4
<i>also given at Utrecht University Computer Science Seminar, Netherlands on April 15</i> |
| Dec 2023 | <i>On polynomial degree-boundedness</i>
Korean Institute for Advanced Studies Combinatorics Workshop, Busan |
| Nov 2023 | <i>Detecting a long even hole</i>
Seminar for Algorithmic Foundations for Social Advancement (AFSA) project
Kyoto University.

<i>Reuniting χ-boundedness with polynomial χ-boundedness</i>
The 3rd East Asia Workshop on Extremal and Structural Graph Theory in Okinawa, Japan.

<i>Reuniting χ-boundedness with polynomial χ-boundedness</i>
Research Institute for Mathematical Sciences (RIMS) Seminar, Kyoto University. |
| Sept 2023 | <i>Reuniting χ-boundedness with polynomial χ-boundedness</i>
Graphes@Lyon Seminar, a joint seminar of the graph theory groups of ENS de Lyon and Université de Lyon 1, France. |
| Nov 2022 | <i>Forbidding some induced cycles in a graph,</i>
Tutte Colloquium, University of Waterloo, Combinatorics and Optimization Department. |

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

Invited Talks (continued)

- 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.
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

Equity and Outreach (continued)

- 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