

Nicole Eikmeier

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EDUCATION

- 2019 Ph.D. in Mathematics
 Purdue University, West Lafayette IN
 Thesis Adviser: David Gleich, Computer Science
- 2012 B.A. in Mathematics and Computer Science
 Concordia College, Moorhead MN

PROFESSIONAL EXPERIENCE

- 2019 – present Assistant Professor
 Department of Computer Science, Grinnell College
- 2016 – 2019 Research Assistant
 Department of Computer Science, Purdue University
- 2017 Summer Intern
 Air Force Research Laboratory Automatic Target Recognition
 Center
- 2016 Summer Research Fellow
 Applied Nuclear Physics Group, Lawrence Berkeley National Lab

RESEARCH

- *Indicates undergraduate student author
#Indicates authors listed in alphabetical order

Funded Grants

Faculty Career Enhancement (FaCE) grant. *Incorporation of Racial and Social Justice Issues into Mathematical Sciences and Computer Science Curriculum*. January 2022 \$25,000

Scialog Grant, Funded by US Department of Agriculture. *Darwin's naturalization conundrum predicts inter-species pathogen transmission potential*. December 2021 \$55,000

National Science Foundation Award #2028880. *RAPID: Collaborative Research: Quarantined Networks and the spread of COVID-19*. May 2020 \$22,554

Journal Articles

Phil Chodrow, Nicole Eikmeier[#], and Jamie Haddock. *Nonbacktracking spectral clustering of nonuniform hypergraphs*. SIAM Journal on Mathematics of Data Science, 5 (2), 251-279. December 2022 doi: [10.1137/22M1494713](https://doi.org/10.1137/22M1494713)

Riti Bahl*, Nicole Eikmeier[#], Alexandra Fraser*, Matthew Junge, Felicia Keesing, Kukai Nakahata*, Lily Z. Wang. *Modeling COVID-19 Spread in Small Colleges*. PLOS ONE 16 (8) e0255654. August 2021 doi: [10.1371/journal.pone.0255654](https://doi.org/10.1371/journal.pone.0255654)

Erin Beckman, Keisha Cook, Nicole Eikmeier[#], Sarai Hernandez-Torres, Matthew Junge. *Chase Escape with Death on Trees*. Annals of Probability, 49 (5), 2530-2547 (17 pages). July 2021 doi: [10.1214/21-AOP1514](https://doi.org/10.1214/21-AOP1514)

Mari Kawakatsu, Philip S. Chodrow, Nicole Eikmeier, Daniel B. Larremore. *Emergence of Hierarchy in Networked Endorsement Dynamics*. PNAS, 118 (16), April 2021 doi: [10.1073/pnas.2015188118](https://doi.org/10.1073/pnas.2015188118)

Miju Ahn, Nicole Eikmeier[#], Jamie Haddock, Lara Kassab, Alona Kryshchenko, Kathryn Leonard, Deanna Needell, R.W.M.A. Madushani, Elena Sizikova, Chuntian Wang. *On Large-Scale Dynamic Topic Modeling with Nonnegative CP Tensor Decomposition*. In Demir, Ilke, Lou, Yifei, Wang, Xu, and Welker, Kathrin (Eds.), *Advances in Data Science*. Springer International Publishing. December 2021 doi: [10.1007/978-3-030-79891-8_8](https://doi.org/10.1007/978-3-030-79891-8_8)

Nicole Eikmeier and David F. Gleich. *Classes of Preferential Attachment and Triangle Preferential Attachment Models with Power-law Spectra*. Journal of Complex Networks. October 2019 doi: [10.1093/comnet/cnz040](https://doi.org/10.1093/comnet/cnz040)

Arjun S. Ramani, Nicole Eikmeier, and David F. Gleich. *Coin-flipping, Ball-dropping, and Grass-hopping for Generating Random Graphs from Matrices of Edge Probabilities*. SIAM Review, 61(3), 549-595 (47 pages). August 2019. doi: [10.1137/17M1127132](https://doi.org/10.1137/17M1127132)

Tenzing H.Y. Joshi, Brian J. Quiter, Jonathan S. Maltz, Mark S. Bandstra, Andrew Haefner, Nicole Eikmeier, Eric Wagner, Tanushree Luke, Russel Malchow, and Karen McCall. *Measurement of the Energy-Dependent Angular Response of the ARES Detector System and Application to Aerial Imaging*. IEEE Transactions on Nuclear Science, 64(7), 1754-1760. doi: [10.1109/TNS.2017.2693988](https://doi.org/10.1109/TNS.2017.2693988)

Refereed Conference Papers

Lilith Hafner*, Chase Holdener*, and Nicole Eikmeier. *Functional Ball Dropping: A superfast hypergraph generation scheme*. 2022 IEEE International Conference on Big Data (Big Data), Osaka, Japan, 4606-4615, doi: [10.1109/BigData55660.2022.10020506](https://doi.org/10.1109/BigData55660.2022.10020506)

Anthony Bonato, Nicole Eikmeier[#], David F. Gleich, and Rehan Malik. *Centrality in Dynamic Competition Networks*. In: Cherifi H., Gaito S., Mendes J., Moro E., Rocha L. (eds), *Complex Networks and Their Applications VIII*. COMPLEX NETWORKS 2019. Studies in Computational Intelligence, vol 882. Springer, Cham. November 2019 doi: [10.1007/978-3-030-36683-4_9](https://doi.org/10.1007/978-3-030-36683-4_9)

Nicole Eikmeier, Arjun S. Ramani, and David F. Gleich. *The HyperKron Graph Model for Higher Order Features*. In Proceedings of the International Conference on Data Mining (ICDM), pages 941-946, 2018. doi: [10.1109/ICDM.2018.00115](https://doi.org/10.1109/ICDM.2018.00115)

Nicole Eikmeier and David F. Gleich. *Revisiting Power-law Distributions in Spectra of Real World Networks*. In Proceedings of the 23rd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, KDD '17, pages 817–826. ACM, New York, NY, USA, 2017. doi: [10.1145/3097983.3098128](https://doi.org/10.1145/3097983.3098128) (Includes all software and data.)

Refereed Workshop Papers

Anthony Bonato, Nicole Eikmeier[#], David F. Gleich, and Rehan Malik. *Dynamic Competition Networks: detecting alliances and leaders*. In Anthony Bonato, Pawel Pralat, and Andrei Raigorodskii, editors, *Algorithms and Models for the Web Graph*, pages 115–144, 2018. doi: [10.1007/978-3-319-92871-5_9](https://doi.org/10.1007/978-3-319-92871-5_9)

Nicole Eikmeier, Rachel Westerkamp, and Edmund Zelnio. *Development of CNNs for Feature Extraction*. Algorithms for Synthetic Aperture Radar Imagery XXV. Vol. 10647. International Society for Optics and Photonics, 2018. doi: [10.1117/12.2305394](https://doi.org/10.1117/12.2305394)

Theses

Nicole Eikmeier. *Spectral Properties and Generation of Realistic Networks*. PhD thesis. Purdue University, August 2019.

Supervised Student Papers

Huandong Chang* and Chuming Chen*. *The Hypertype Model for Clustering in Networks*. SUIRO. Vol 14. November 2021 doi: [10.1137/20S1369142](https://doi.org/10.1137/20S1369142)

AWARDS

2022 Harris Fellowship

2021 Scialog Fellowship

2020 Grace Hopper Conference (GHC) Faculty Scholarship

2019 AWM-NSF International Travel Grant

2017 Award Winning Poster, Computational Science and Engineering Conference, Purdue University

2016 Teaching Academy Graduate Teaching Award, Purdue University

2016 Department of Homeland Security Fellowship

2015 Excellence in Teaching Award, Mathematics Department of Purdue University

TEACHING EXPERIENCE

Grinnell College

Automata, Formal Languages, and Computational Complexity (Spring 2022)
 Tutorial (Fall 2021)
 Special Topic: Networks and Matrix Computations (Fall 2020)
 Functional Problem Solving (3 semesters Fall 2019 – Spring 2021)
 Analysis of Algorithms (5 semesters Spring 2020 – Spring 2022)
 Mentored Advanced Project (14 students total over 3 summers)

Purdue University

Applied Calculus 1 (Fall 2015, Spring 2015, Fall 2014)
 Plane Analytic Geometry and Calculus 2 (Summer 2014, Fall 2013)
 Algebra and Trigonometry 1 (Spring 2014)
 Plane Analytic Geometry and Calculus 1 (Spring 2013)
 Analytic Geometry and Calculus 1 (Fall 2012)

TEACHING DEVELOPMENT

Workshops at Grinnell College

- 2023 Rewriting the Reading Assignment
June 26-28
- 2023 Designing and Teaching Courses for the Global Learning Program
June 26-29
- 2023 Faculty Advising and the Shared Responsibility of Student Mentoring Across
Campus, June 5-9
- 2022 Survey Says! Creating Qualtrics Surveys
July 19-22
- 2022 Caregiving in the College Community
July 26-29
- 2021 Tutorial Instructors
July 19-23
- 2021 Revisiting Grading: For Sanity, Transparency, and Equity
June 22-25
- 2021 Creating Inclusive Learning Spaces: Feminism, Social Justice, and Belonging
at Grinnell, June 7-11
- 2020 Dealing Productively with Conflict: Restorative Practices and Community-
Building, June 15-17
- 2020 Making Assessment Work for Liberal Arts Colleges in the 21st Century,
February 28-29
- 2019 Assignment Workshop: Student Writing and Research, August

Other workshops

- 2022 Supporting Student Wellbeing and Academic Engagement (virtual)
- 2021 Cultural Competence in Computing (3C) Fellows Program (virtual)

- A 4-month long program designed to help faculty learn about Cultural Competency in CS, and develop relevance courses.
- 2020 NSF Virtual Grants Conference, November 2020 (virtual)
- 2020 Camp Operation Online Learning, July 6 – August 14 (virtual)
A 6-week boot-camp on developing courses for online learning.
- 2020 BRAID virtual summit, July 17 (virtual)
"BRAID is an initiative co-led by AnitaB.org and Harvey Mudd College that seeks to increase representation of women and underrepresented minority students in computer science departments across the country..."
- 2020 Council on Undergraduate Research (CUR) Dialogues
February 13-16, Washington D.C.

CONFERENCE ACTIVITY/PARTICIPATION

Research Presented

- 2023 The Simpliciality of Empirical Datasets
NetSci, July 10-14, Vienna, Austria
- 2023 Tractable approaches for the stationary distribution of hypergraph random walks
Joint Mathematics Meeting, January 4-7, Boston, MA
- 2023 Agent-based modeling of COVID-19 in small colleges
Joint Mathematics Meeting, January 4-7, Boston, MA
- 2022 Nonbacktracking Spectral Clustering of Nonuniform Hypergraphs
Conference on Complex Systems, October 17-21, Palma de Mallorca Spain
- 2022 Superfast Generation of Large Hypergraph Data
Siam Mathematics of Data Science, September 26 - 30, San Diego California
- 2022 Fast generation of models for large social hypergraphs
Sunbelt, July 12 – 16, Cairns Australia
- 2021 Efficient Generation of Clustered Hypergraphs
SIAM Workshop on Discrete Mathematics (DM21), July 20-23, (virtual)
- 2020 Emergence of Hierarchy in Networked Endorsement Dynamics
SIAM Workshop on Network Science (NS20), July 9-10, (virtual)
- 2020 Centrality in Dynamic Competition Networks¹
Sunbelt Conference. by the International Network for Social Network Analysis, June 2-7, Paris France
- 2020 Higher-order Preferential Attachment Models¹
SIAM Conference on Mathematics of Data Science (MDS20), May 5-8, Cincinnati, Ohio
- 2020 Higher-order Preferential Attachment Models
Joint Mathematics Meeting, January 15-18, Denver, Colorado
- 2019 A Generalized Preferential Attachment Model with Triangles
SIAM Network Science, May 22-23, Snowbird, Utah

¹ Did not occur due to COVID-19 pandemic

- 2019 The HyperKron Graph Model for Higher Order Features
Joint Mathematics Meeting, January 16-20, Baltimore Maryland
- 2018 The HyperKron Graph Model for Higher Order Features
International Conference on Data Mining, November 17-20, Singapore
- 2018 The HyperKron Graph Model for Higher Order Features
SIAM Discrete Math Conference, June 4-8, Denver, Colorado
- 2018 Dynamic Competition Networks: Detecting Alliances and Leaders
Workshop on Algorithms for the Web Graph, May 14-16, Moscow, Russia
- 2017 Revisiting Power-law distributions in Spectra of Real World Networks
Knowledge, Discovery and Data Mining Conference, August 13-17,
Halifax, Canada
- 2017 Revisiting Power-law distributions in Spectra of Real World Networks
SIAM Workshop on Network Science, July 13-14, Pittsburg, Pennsylvania

Other Conference Participation

- 2023 Grace Hopper Celebration of Women in Computing, September 26 – 29,
Orlando, Florida
- 2022 National Diversity in STEM conference (SACNAS), October 26 – 29, San
Juan, Puerto Rico
- 2022 Scialog Mitigating Zoonotic Threats, September 15-17, Tuscon, Arizona
- 2022 Mathematical Research Community, put on by the American Mathematical
Society, June 6-10, Java Center, New York
- 2021 Scialog Mitigating Zoonotic Threats, Sept 30 – October 1 (virtual)
- 2021 Mathematical and Computational Approaches to Social Justice, held at the
Institute for Computational and Experimental Research in Mathematics at
Brown University, March 7-9 (virtual)
- 2021 Complex Networks Winter Workshop, January 3-16 (virtual)
- 2020 Grace Hopper Celebration of Women in Computing, September 29 – October
2 (virtual)
- 2020 JuliaCon, July 28-31 (virtual)
- 2019 Complex Networks Winter Workshop, December 14-20, Montreal, Canada
- 2019 Women in Data Science and Mathematics, held at the Institute for
Computational and Experimental Research in Mathematics at Brown
University, July 29-August 2, Providence, Rhode Island
- 2019 Mathematical Research Community, put on by the American Mathematical
Society, June 10-15, West Greenwich, Rhode Island
- 2019 NetSci, May 27-31, Burlington, Vermont
- 2018 Grace Hopper Celebration of Women in Computing, September 26-28,
Houston, Texas
- 2017 Women in Data Science Conference, February 3, Palo Alto, California

TALKS

Invited Talks

- 2020 Emergence of Hierarchy in Networked Endorsement Dynamics
UC Riverside Computer Science and Engineering Colloquium
December 4
- 2020 The Havel Hakimi Algorithm: When can we create a graph?¹
Kelvin Lecture at Coe College, March 31

Internal Talks

- 2020 Predicting Leaders in Dynamic Competition Networks
Data Seminar Series at Grinnell College
- 2018 The Havel Hakimi Theorem for constructing graphs with given degree distributions
- 2018 How to create your department webpage
- 2018 Hodge Laplacians on Graphs
- 2017 Memory Efficient Generation of Q from Householder QR
- 2017 Graph Modeling with Kronecker Products
- 2016 Information Based Complexity Theory
- 2015 An Introduction to the fast Multipole Method

SERVICE

Peer-Review, Conference, and Program Committees

- 2022 – 2023 Organizer for Workshop for Associated Colleges of the Midwest:
*Incorporation of Racial and Social Justice Issues into
Mathematical Sciences and Computer Science Curriculum*
- 2021 Organizer for CMS Special Session on Applied Graph Theory
- 2021 Women in Network Science (WiNS) Treasurer
- 2021 Tapia Celebration of Diversity in Computing, Poster Reviewer
- 2020 NSF Panelist
- 2020 Paper Reviewing for the Web Conference, Oct 25 – Nov 13
- 2019 – present Journal Reviewing, SIAM Journal on Mathematics of Data Science
- 2019 – present Journal Reviewing, Statistical Analysis and Data Mining
- 2018 – present Journal Reviewing, Internet Mathematics
- 2018, 2020 Women in Data Science Ambassador¹
- 2020 Organizer for AMS Special Session on Network Science¹

Institutional Service

Grinnell College

- 2023-2024 Instructional Support Committee
- 2021-2022 Women and Gender Minorities in Computing Faculty Advisor
- 2021-2022 Ombuds Advisory Committee
- 2021-2022 Rosenfield Program Committee

¹ Did not occur due to COVID-19 pandemic

2020-2022 Scholarship Committee

Purdue University

2016 – 2017 Women in Sciences Leadership Team Member

2013 – 2016 Association for Women in Mathematics Purdue Chapter President,
Cabinet Member

2014 – 2015 Graduate Student Representative

PROFESSIONAL AFFILIATIONS

2012 – 2023 American Mathematical Society (AMS)

2020 – present Association for Computing Machinery (ACM)

2012 – present Association for Women in Mathematics (AWM)

2021 – present Complex Systems Society (CSS)

2018 – 2020 Mathematical Association of America (MAA)

2020 – present National Association of Mathematics (NAM)

2020 – present Society for the Advancement of Chicanos/Hispanics & Native
Americans in Science

2014 – present Society for Industrial and Applied Mathematics (SIAM)

2020 – present Special Interest Group on Computer Science Education (SIGSCE)