Craig Erickson

✉ cerickson30@hamline.edu   ⌂ cerickson30.github.io
🔗 www.linkedin.com/in/CraigJErickson

Education

Iowa State University, Ph.D. in Mathematics   **Ames, IA**
Advisor: Leslie Hogben. Dissertation title: Sign patterns that require eventual exponential nonnegativity   *2009 – 2014*

Minnesota State University, M.A. in Mathematics   **Mankato, MN**
Advisor: In-Jae Kim. Thesis Title: On nilpotence indices of sign patterns   *2007 – 2009*

Drake University, B.S., Major: Mathematics, Minor: Music   **Des Moines, IA**
                                                                                                              2004 – 2007

Academic Appointments

Hamline University   **Department of Mathematics**
Visiting Lecturer, Computational Data Science and Mathematics   *September 2018 – present*

Grand View University   **Department of Mathematics & Computer Science**
Assistant Professor of Mathematics   *August 2014 – May 2018*

Drake University   **Department of Mathematics & Computer Science**
Adjunct Instructor   *Fall 2012, Spring 2014*

Research Interests

Combinatorial Matrix Theory, Nonnegative Matrix Theory, Graph Theory, Computational Mathematics, Data Analysis

Courses taught

As instructor (with full responsibilities)...

Hamline University: Intro. to Programming ($\times 5$); Intro. to Computer Science ($\times 2$); Programming in MATLAB; Calculus I ($\times 4$); Statistics ($\times 11$); Elements of Statistical Learning ($\times 2$); Multivariable and Vector Calculus; Discrete Mathematics; Topics in Advanced Mathematics (Topics in Graph Theory); First Year Seminar (Uses and Misuses of Algorithms) ($\times 2$); Computational Data Science Capstone;
Guided Independent Studies: Programming and Modeling in R; Elements of Statistical Learning; Tensorflow Computer Vision

Grand View University: Intro. to Algebra ($\times 7$); Intermediate Algebra; Intro. & Intermediate Algebra ($\times 2$); Finite Mathematics ($\times 12$); Intro. to Discrete Structures; Applied Calculus; Applied Statistics; Intro. to Mathematical Reasoning; Intro. to Mathematical Modeling ($\times 3$); Intro. to Differential Equations; Discrete Computational Structures ($\times 2$); Intro. to Numerical Analysis; Senior Seminar ($\times 2$)

Drake University: Calculus I; Calculus II

Iowa State University: High School Algebra; College Algebra; Calculus I; Calculus II ($\times 2$); Elementary Differential Equations & Laplace Transforms

Minnesota State University – Mankato: College Algebra ($\times 4$)

As recitation leader...
Iowa State University: Discrete Math for Business & Social Sciences ($\times 2$); Calculus for Business & Social Sciences; Calculus II ($\times 2$); Calculus III ($\times 2$)

Other teaching experience..

Iowa State University: Grader for graduate Linear Algebra; REU Grad Student Mentor/Research Assistant

Honors and Awards

- Received internal mini-grant from Hamline University's MacCorkle fund to purchase hardware to build a self-driving robotic car, Spring 2021.
- Co-recipient on internal mini-grant to support weekly prep sessions for the ACM contest, Grand View University, Fall 2016.
- Received $1000 additional professional development funds from the Provost (competitive internal grant) to speak at the 20th ILAS Conference in Leuven, Belgium, Grand View University, July 2016.
- Graduate College Teaching Excellence Award, Iowa State University, Fall 2013.
- Graduate and Professional Student Senate Professional Advancement Grant to present at the 2-day workshop "Theoretical and Applied Aspects of Nonnnegative Matrices" at BIRS, 2012.
- SIAM Student Travel Award to present at the SIAM Annual Meeting, 2012.
- J.J.L. Hinrichsen Pure Mathematics Award (excellence in research), Iowa State University, 2012.
- AMS Graduate Student Travel Grant to present at the AMS Central Section Meeting at the University of Nebraska − Lincoln, NE, 2011.
- ILAS Travel Award to present at the 17th ILAS Conference in Braunschweig, Germany, 2011.
- Graduate and Professional Student Senate Professional Advancement Grant to present at the 17th ILAS Conference in Braunschweig, Germany, 2011.
- Graduate College travel grant to attend the Focused Research Group "Eventually Nonnegative Matrices and their Sign Patterns" at BIRS, 2011.
- 1st place (tie) in the Basil E. Gillam Freshman Mathematics Contest, Drake University, 2004.

Publications

In Preparation..

[12] (With S. Allred, K. Grace, H.T. Hall, A. Jensen) **A combinatorial bound on the number of distinct eigenvalues of a graph**.

[11] (With L. Gan, J. Kritschgau, J. C.-H. Lin, S. Spiro) **Complementarily vanishing graphs**.

Publications appeared/accepted..

[10] (With S. Butler, S. Fallat, H.T. Hall, B. Kroschel, J. C.-H. Lin, B. Shader, N. Warnberg, B. Yang) **Properties of a q-analogue for zero forcing**, *Graphs Combin.* **36** (2020), No. 5, 1401–1419.

[9] (With C. Bozeman, B. Brimkov, D. Ferrero, M. Flagg, L. Hogben) **Restricted power domination and zero forcing problems**, *J. Comb. Optim.* **37** (2019), No. 3, 935–956.

[8] (With S. Butler, L. Hogben, K. Hogenson, L. Kramer, R.L. Kramer, J.C.-H. Lin, R.R. Martin, D. Stolee, N. Warnberg, M. Young) **Rainbow arithmetic progressions**, *J. Comb.* **7** (2016), No. 4, 595–626.

[7] **Sign patterns that require eventual exponential nonnegativity**, *Electron. J. Linear Algebra* **30** (2015), 171–195.

[6] (With M. Archer, M. Catral, R. Haber, L. Hogben, X. Martinez-Rivera, and A. Ochoa) **Potentially eventually exponentially positive sign patterns**, *Involve* **6** (2013), No. 3, 261–271.

[5] (With J. Ekstrand, H.T. Hall, D. Hay, L. Hogben, R. Johnson, N. Kingsley, S. Osborne, T. Peters, J. Roat, A. Ross, D.D. Row, N. Warnberg, and M. Young) **Positive semidefinite zero forcing**, *Linear Algebra Appl.* **439** (2013), 1862–1874.

[4] (With J. Ekstrand, D. Hay, L. Hogben, and J. Roat) **Note on positive semidefinite maximum nullity and positive semidefinite zero forcing number of partial 2-trees**, *Electron. J. Linear Algebra* **23** (2012), 79–87.

[3] (With M. Catral, L. Hogben, D.D. Olesky, and P. van den Driessche) **Sign patterns that allow strong eventual**

nonnegativity, *Electron. J. Linear Algebra* **23** (2012), 1–10.

[2] (With M. Archer, M. Catral, R. Haber, L. Hogben, X. Martinez-Rivera, and A. Ochoa) **Constructions of potentially eventually positive sign patterns with reducible positive part**, *Involve* **4** (2011), No. 4, 405–410.

[1] (With I.-J. Kim) **On nilpotence indices of sign patterns**, *Commun. Korean Math. Soc.* **25** (2010), No. 1, 11–18.

Conferences and Talks

Invited Talks...

- "Restricted power domination," Special Session on The Inverse Eigenvalue Problem of a Graph and Zero Forcing, 52nd Southeastern International Conference on Combinatorics, Graph Theory, and Computing, Virtual, March 9, 2021.
- "Zero forcing and other games on graphs," Mathematics & Statistics Department Colloquium, Carleton College, Northfield, MN, April 17, 2018.
- "Upper triangular sign patterns that require eventual exponential nonnegativity," Special Session on Combinatorial Matrix Theory, AMS Central Section Meeting, Minneapolis, Oct. 30, 2016.
- "Upper triangular sign patterns that require eventual exponential nonnegativity," Minisymposium on Combinatorial Matrix Theory, 20th ILAS Conference, Leuven, Belgium, July 15, 2016.
- "Sign patterns that require eventual exponential nonnegativity," Minisymposium on Sign Pattern Matrices, 18th ILAS Conference, Providence, June 6, 2013.
- "Sign patterns that require eventual exponential nonnegativity," Special Session on Generalizations of Nonnegative Matrices and Their Sign Patterns, AMS Central Section Meeting, Ames, IA, April 27, 2013.
- "Sign Patterns That Allow Strong Eventual Nonnegativity," Minisymposium on Matrices and Graphs, 2012 SIAM Annual Meeting, Minneapolis, July 12, 2012.
- "Positive semidefinite maximum nullity is equal to positive semidefinite zero forcing number for partial 2-trees," Special Session on Matrices and Graphs, AMS Central Section Meeting, Lincoln, NE, Oct. 14, 2011.
- "Potentially eventually positive and potentially eventually exponentially positive sign patterns," Young Researchers Minisymposium on Combinatorial Matrix Theory, 17th ILAS Conference, Braunschweig, Germany, Aug. 23, 2011.
- "Strongly Eventually Nonnegative Matrices," Special Session on Matrices and Graphs, AMS Central Section Meeting, Saint Paul, April 11, 2010.

Contributed Talks...

- "Matrix sign patterns that require eventual exponential nonnegativity," MAA – Iowa Sectional Meeting, Waverly, IA, Oct. 19, 2013.
- "Sign patterns that allow strong eventual nonnegativity," Theoretical and Applied Aspects of Nonnnegative Matrices, Banff International Research Station (BIRS), Banff, Canada, July 28, 2012.
- "On Potentially Nilpotent Sign Patterns," MAA – North Central Sectional Meeting, St. Paul, MN, April 25, 2009.
- "On Potentially Nilpotent Sign Patterns," Minnesota State University – Mankato Graduate Research Conference, Mankato, MN, April 7, 2009.

Seminar Talks...

- "Zero forcing and other games on graphs," Math Department Seminar, Hamline University, Oct. 16, 2018.
- "Sign patterns that require eventual exponential nonnegativity," ISU Discrete Math Seminar, March 26, 2013.
- "On sign patterns that require eventual exponential nonnegativity," ISU Discrete Math Seminar, Nov. 27, 2012.
- "Sign patterns that allow strong eventual nonnegativity," ISU Discrete Math Seminar, Sep. 4, 2012.
- "Positive semidefinite maximum nullity is equal to positive semidefinite zero forcing number for partial 2-trees," ISU Discrete Math Seminar, Oct. 4, 2011.
- "On maximum positive semidefinite nullity and positive semidefinite zero forcing number of partial 2-trees," with D. Hay and J. Roat. ISU Discrete Math Seminar, April 12, 2011.

- "Potentially eventually exponentially positive sign patterns," ISU Discrete Math Seminar, Oct. 26, 2010.
- "On Nilpotence Indices of Sign Patterns," ISU Discrete Math Seminar, Sep. 22, 2009.

Posters Presented...

- "Eventually nonnegative matrices and related classes," 2010 NSF-CBMS Regional Conference: The Mutually Beneficial Relationship of Matrices and Graphs, Ames, IA, July 14, 2010.

Funded Workshop Participant..

- Mathematics Research Community: Finding Needles in Haystacks: Approaches to Inverse Problems using Combinatorics and Linear Algebra, American Mathematical Society, Virtual, June 6 – 11, 2021.
- The 2020 Uncoast Unconference R developer workshop, Minneapolis. Cancelled due to COVID-19.
- Zero forcing and its applications, American Institute of Mathematics, San Jose, Jan. 30 – Feb. 3, 2017.
- Theoretical and Applied Aspects of Nonnnegative Matrices, BIRS, Banff, Canada, July 27 – 29, 2012.
- Eventually Nonnegative Matrices and their Sign Patterns, focused research group, BIRS, Banff, Canada, May 15 – 22, 2011. (One of 5 co-organizers and attendees.)

Other Conferences Attended...

- Institute for Research on Statistics and its Applications (IRSA) Conference: Questions About Reproducibility in an Age of Big Data, Virtual, May 6 – 8, 2021.
- Joint Mathematics Meetings, Jan. 6 – 9, 2021.
- AMS Short Course Mathematical and Computational Methods for Complex Social Systems, Jan. 3 – 5, 2021.
- IRSA Conference: Causal Inference and Data Science, Minneapolis, May 2 – 3, 2019.
- Midwest Sports Analytics Meeting (MSAM), Pella, IA, Nov. 18, 2017.
- 21st International Linear Algebra Society (ILAS) Conference, Ames, IA, July 24 – 28, 2017.
- MAA – Iowa Section Meeting at Grand View University, Des Moines, IA, Oct. 7 – 8, 2016.
- MIdwestern GrapH TheorY (MIGHTY) LIII Conference, Ames, IA, Sep. 21 – 22, 2012.
- NSF-CBMS Regional Conference: The Mutually Beneficial Relationship of Matrices and Graphs, Ames, IA, July 12 – 16, 2010.
- MAA – North Central Section Meeting at Concordia College, Moorhead, MN, Oct. 17 – 18, 2008.

Service

Professional Service...

- Session Chair for contributed session at 21st ILAS Conference, Ames, IA, July 25, 2017.
- Session Chair for MAA – Iowa Section Meeting at Grand View University, Des Moines, IA, Oct. 7, 2016.
- Co-organizer (with A. Berliner and L. Deaett) of the minisymposium "Combinatorial Matrix Theory" at the 20th ILAS Conference, Leuven, Belgium, July 11 – 15, 2016.
- Reviewer for Mathematical Reviews® (MathSciNet®), 2015 – present.
- Referee: *Electronic Journal of Linear Algebra*, *Filomat* ($\times 2$), *Linear Algebra and its Applications* ($\times 3$), *Linear and Multilinear Algebra*, *Operators and Matrices*, *Special Matrices*.
- Member of the Planning Committee for the first ISU Graduate and Professional Student Research Conference, 2013-2014.
- Session Chair for MIdwestern GrapH TheorY (MIGHTY) LIII Conference, Ames, IA, Sep. 22, 2012.
- Session Chair for Iowa Summer Research Symposium, Ames, IA, July 29, 2010.

University Service...

- Contributed to expedited program reviews of Computational Data Science Major and Mathematics Major, Hamline University, Spring 2021.

- Hamline University faculty supervisor of student internships, Spring 2020 – present. (8 students)
- Developed three new courses and redesigned two existing courses for launch of Hamline University's Computational Data Science major, Fall 2019 – present.
- Involved in development of Hamline University's Computational Data Science major, Spring 2019.
- Involved in development of Grand View University's Business Analytics major, Fall 2017 – Spring 2018.
- Co-organizer of a Machine Learning reading group (of both faculty and students) at Grand View University, Fall 2017 – Spring 2018.
- Member of the Student Success Collaborative (SSC) software implementation Leadership Team, Spring 2017 – Spring 2018, including:
  - Chair of the "Success Marker Development" Group.
  - Member of the SSC software "Workflow Development" Group.
  - Member of the SSC software Training Team.
- Appointed by the university president to be involved in Institutional Planning Initiative, Spring 2017, including:
  - One of eight faculty member participants in a "Direction Setting" retreat with the GVU Board of Trustees, February 2017.
- Co-organizer of the Math & Computer Science Department Game Night, Spring 2017.
- Co-advisor of weekly prep sessions for the ACM programming contest, Fall 2016.
- Member of the Student Success Integration Team Task Force, 2016 – 2017.
- Academic Advising and Progression Committee, 2015 – 2017 (Chair: 2016 – 2017).
- Member of committee to choose new developmental math textbook, Spring 2016.
- Volunteer for ACM North Central North America Regional Programming Contest hosted at Grand View University, 2014 – 2015.
- First-year graduate student peer mentor: Jephian C.-H. Lin (2013 – 2014), Xavier Martinez-Rivera (2011 – 2012).
- Supervising TA for Math 150, web-based course. Trained and scheduled other TAs and monitored their instruction, Fall 2010.

Professional Memberships

- Association for Women in Mathematics (AWM), 2016 – present.
- International Linear Algebra Society (ILAS), 2010 – present.
- American Mathematical Society (AMS), 2008 – 2014; 2019 – present.
- Mathematical Association of America, 2015 – 2020.
- Iowa Section NExT (New Experiences in Teaching) Fellow, 2013 – 2018.
- Society for Industrial and Applied Mathematics (SIAM), 2013 – 2014.
- Associate member of Sigma Xi, The Scientific Research Society, 2012 – 2014.

Computer skills

Programming Languages and Software: Mathematica, MATLAB, Python, R, SageMath, SQL
Homework Systems: MyMathLab, MyProgrammingLab, WebAssign, WileyPLUS, Blackboard, Canvas
Markup Languages: LaTeX, Beamer, HTML, R Markdown

References

Luke Bennett	Professor of Mathematics	Grand View University	LBennett@grandview.edu
Art Guetter	Professor of Mathematics	Hamline University	aguetter@hamline.edu
Eric Hart	Professor of Mathematics	Grand View University	ehart@grandview.edu
Leslie Hogben	Professor of Mathematics	Iowa State University	hogben@aimath.org
Ryan Martin	Professor of Mathematics	Iowa State University	rymartin@iastate.edu