MICHAEL WILLIAM SCHROEDER

Curriculum Vitæ

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Research Interests

My mathematical research interests are in combinatorics, graph theory, and matrix theory. In recent years, my interests also include data-driven research projects from community partners. I currently maintain active research both with theoretical mathematics and with data-driven research projects involving students, which I am able to supervise given my knowledge of applied mathematics and combinatorics, as well as additional training I have completed in data science.

Experience

- Associate Professor, Tenured, Marshall University ..... August 2017 - Present
- Assistant Professor (Tenure Track), Marshall University ..... August 2011 - May 2017

Education

- Ph.D., Mathematics, University of Wisconsin – Madison, Madison, WI ..... May 2011
  Thesis: *ϕ-symmetric Hamilton cycle decompositions of complete multipartite graphs* (in Combinatorics)
  Advisor: Richard A. Brualdi
  Minor: Applied Mathematics
- M.S., Mathematics, University of Florida, Gainesville, FL ..... May 2005
- B.S., Mathematics, University of Florida, Gainesville, FL ..... May 2003
- Proficient in C++, Python, R, Perl, HTML, LaTeX, ArcGIS, Microsoft Office products and macro development

Research Publications in Print

22. On a completion problem for Latin arrays, with **Kevin Akers***, **Stacie Baumann***, **Sarah Gustafson***, Jaromy Kuhl, and **Olivia Mosrie***, *Australas. J. Combin.*, Volume 83 (2022), pages 20–39.
21. Primitive cycle decompositions of K_n and $K_n - I$, with John Asplund, Chandra Dinavahi, and **Kira Owsley***, *J. Combin. Des.*, Volume 30, Issue 3 (2022), pages 152–192.
20. Completing partial transversals of Cayley tables of Abelian groups, with Jaromy Kuhl and Donald McGinn, *Electron. J. Combin.*, Volume 28, Issue 3 (2021), #P3.60, 15 pages.
19. On monochromatic pairs with nondecreasing diameters, with **Adam O'Neal***, *Electron. J. Combin.* Volume 26, Issue 2 (2019), #P2.15, 12 pages.
18. On the existence of partitioned incomplete Latin squares with five parts, with Jaromy Kuhl and Donald McGinn, *Australas. J. Combin.*, Volume 74 (2019), pages 46–60.
17. On erasure combinatorial batch codes, with JiYoon Jung, Carl Mummert, and Elizabeth Niese, *Adv. Math. Comm.*, Volume 12, Issue 1 (2018), pages 49–65.
16. Circulant matrices and mathematical juggling, with Richard Brualdi, *Art Disc. App. Math.*, Volume 1, Issue 2 (2018), #P2.01, 17 pages.

*Student co-authors

15. Latin squares with disjoint subsquares of two orders, with Jaromy Kuhl, *J. Combin. Des.*, Volume 26, Issue 5 (2018), pages 219–236.

14. Alternating sign matrices and their Bruhat order, with Richard Brualdi, *Discrete Math.*, Volume 340, Issue 8 (2017), pages 1996–2019.

13. A bijection on classes enumerated by the Schröder numbers, with Rebecca Smith, *DMTCS*, Volume 18, Issue 2 (2016), paper 15, 15 pages.

12. Completing partial Latin squares with one nonempty row, column, and symbol, with Jaromy Kuhl, *Electron. J. Combin.*, Volume 23, Issue 2 (2016), #P2.23, 13 pages.

11. Completing partial Latin squares with blocks of non-empty cells, with Jaromy Kuhl. *Graphs and Comb.*, Volume 32, Issue 1 (2016), pages 241–256.

10. ϕ-symmetric Hamilton cycle decompositions of graphs. *Discrete Math*., Volume 338, Issue 9 (2015), pages 1586–1594.

9. On Hamilton cycle decompositions of r-uniform, r-partite graphs, with Jaromy Kuhl. *Discrete Math.*, Volume 315, Issue 1 (2014), pages 1–8.

8. Patterns of alternating sign matrices, with R. A. Brualdi, K. P. Kiernan, and S. A. Meyer, *Linear Algebra Appl.*, Volume 438, Issue 10 (2013), pages 3967–3990.

7. Hamilton cycle decompositions of k-uniform k-partite hypergraphs, with Jaromy Kuhl. *Australas. J. Combin.*, Volume 56 (2013), pages 23–37.

6. Cyclic matching sequencibility of graphs, with R. A. Brualdi, K. P. Kiernan, and S. A. Meyer, *Australas. J. Combin.*, Volume 53 (2012), pages 245–256.

5. On the t-term rank of a $(0,1)$-matrix, with R. A. Brualdi, K. P. Kiernan, and S. A. Meyer, *Linear Algebra Appl.*, Volume 436, Issue 6 (2012), pages 1632–1643.

4. Symmetric Hamilton cycle decompositions of complete graphs minus a 1-factor, with R. A. Brualdi, *J. Combin. Des.*, Volume 19, Issue 1 (2011), pages 1–15.

3. Combinatorial batch codes and transversal matroids, with R. A. Brualdi, K. P. Kiernan, and S. A. Meyer, *Adv. Math. Comm.*, Volume 4, Issue 3 (2010), pages 419–431. Corrigendum, Volume 4, Issue 3 (2010), page 597.

2. Signed domination of graphs and (0,1)-matrices, with A. Berliner, R. A. Brualdi, L. Deaett, K. P. Kiernan, and S. A. Meyer, *Combinatorics and Graphs*, *Contemp. Math.*, Volume 531 (2009), pages 19–42.

1. Row and column orthogonal (0,1)-matrices, with A. Berliner, R. A. Brualdi, L. Deaett, and K. P. Kiernan, *Linear Algebra Appl.*, Volume 429, Issues 11–12 (2008), pages 2732–2745.

Submitted Research Publications

1. Primitive C_4-decompositions of $K_n - I$, submitted to the Journal of Combinatorial Designs

Research Publications in Preparation

3. On 2-primitive 3-cycle decompositions of K_n and $K_n - I$, with **Joseph Stamm*** and **Ian Waddell***.

2. On cyclic, symmetric Hamilton cycle decompositions of complete multipartite graphs, with **Fatima Akinola***.

1. A classification of the null space for dense alternating sign matrices, with Pauline van den Driessche.

Other Relevant Publications

1. University of Wisconsin Madison - College Algebra Worktext, Kendall Hunt Publishing (2010).

Grants and Other Monetary Awards

- **Quinlan grant recipient – Fall 2022 ..... $280**

  The Quinlan grant is an internal award for faculty travel to present research. This award was for presenting at the 34th Midwest Conference on Combinatorics and Combinatorial Computing.

- **INCO grant recipient – Summer 2019 ..... $1200**

  The INCO grant is an internal award for faculty travel for professional development. This award is for attending Mathfest in August 2019 with student presenters.

- **NSF Student Travel Support – July 2018 ..... $4,000**

  Two students and I traveled to CJC65, a combinatorics conference in Singapore. The students each were awarded their full travel cost by the grant. My travel was supported by the College of Science and the Department of Mathematics.

- **NSF Grant recipient – February 2018 ..... $16,000**

  This was a conference grant to host the 30th Cumberland Conference in Combinatorics at Marshall University. It was used primarily to support participant travel. (DMS-1822390)

- **MU-DASA Award recipient – Spring 2017 ..... $1,000**

  This campus-wide research award was given as a group award including myself, Elizabeth Niese, and Carl Mummert for our work on hosting an REU at Marshall University and the resulting work which came out from it. This included a $1000 award per recipient.

- **INCO grant recipient – Fall 2016 ..... $600**

  The INCO grant is an internal award for faculty travel for professional development. This award is for attending the Joint Mathematics Meeting in January 2017 to present on supervising undergraduate research.

- **Quinlan grant recipient – Fall 2016 ..... $333**

  The Quinlan grant is an internal award for faculty travel to present research. This award was for presenting an invited talk at the AMS Central meeting in October 2016.

- **Marshall REU grant – Summer 2016 ..... $85000**

  This grant was funded by the NSA to host nine students from the Appalachian region at Marshall and engage them in mathematical research in Combinatorics. I contributed significantly to the scripting of the proposal and supervised students as part of the program. I helped in orchestrating this program with Elizabeth Niese and Carl Mummert. Due to stipulations on the grant, only two individuals may be listed as investigators (and we numbered three), and drew the short straw and was not listed as an investigator in the proposal.

- **Pickens-Queen Teaching Award recipient – Spring 2016 ..... $1000**

  This campus-wide award is given to at most three probationary faculty each year based on their teaching and student engagement. This honor came with a $1000 award and a one-course release in Spring 2017.

- **PIC Math participant – Spring 2016 ..... $3000**

  In Spring 2016, I received $3000 as a continuing participant of the PIC Math program, which is funded by the MAA, SIAM, and NSF (grant DMS-1345499)

- **Quinlan grant recipient – Spring 2015 ..... $500**

  This award was for presenting at the Cumberland conference in Morgantown, WV in May 2015.

- **PIC Math participant – Spring 2015 ..... $5000**

  In Spring 2015, I received $5000 as an initial participant of the PIC Math program, which is funded by the MAA, SIAM, and NSF (grant DMS-1345499)

- **Quinlan grant recipient – Spring 2014 ..... $500**

  This award was for presenting at the Combinatorics 2014 conference in Gaeta, Italy in June 2014.

Graduate Student Recognitions and Awards

- UW-Madison Exceptional Service Award nominee ..... Spring 2011
- UW-Madison Exceptional Service Award nominee ..... Spring 2010
- TEL Grant Funding recipient ..... Fall 2009 – Spring 2010
- NSF VIGRE Fellowship recipient ..... Spring 2008
- Math Department Teaching Award recipient ..... Spring 2007

Seminar Talks

22. Primitive Graph Decompositions (University of West Florida) ..... April 15, 2022
21. Teaching with Teams - Case Study (Mountwest Community and Technical College) ..... August 10, 2021
20. Null Spaces of Maximum Density ASMs (Marshall University) ..... November 18, 2020
19. Putting Numbers in Grids: Theory and Applications (Marshall University) ..... April 17, 2019
18. Group Research Collaboration, Third Thursday (Marshall University) ..... February 15, 2018
17. A Brief History on Graph Decompositions (Northern Illinois University) ..... April 14, 2017
16. A Brief Survey on Graph Decompositions (Marshall University) ..... September 21, 2016
15. One Row, One Column, One Symbol (West Virginia University) ..... March 10, 2016
14. Scheduling Tournaments and More (Marshall University) ..... September 23, 2015
13. Completing Partial Latin Squares (University of West Florida) ..... April 14, 2015
12. Completing Partial Latin Squares (University of Wisconsin - Madison) ..... March 9, 2015
11. Latin Squares and their Completions (University of West Florida) ..... January 23, 2015
10. Latin Squares and their Completions (Marshall University) ..... October 1, 2014
9. What are Latin Squares? (University of Findlay) ..... November 8, 2013
8. Cyclic Matching Sequencibility of Graphs (Marshall University) ..... January 25, 2012
7. A Generalization of Symmetric Hamilton Cycles (University of Wisconsin - Madison) ..... March 28, 2011
6. ϕ Hamilton Cycle Decompositions of Graphs Redux (University of Wisconsin - Madison) ..... October 18, 2010
5. ϕ-Invariant Hamilton Cycle Decompositions of Graphs (University of Wisconsin - Madison) ..... April 26, 2010
4. Symmetric Hamilton Cycle Decompositions (University of Wisconsin - Madison) ..... November 23, 2009
3. Latin Squares Composed of Intercalates (University of Wisconsin - Madison) ..... April 27, 2009
2. IC-colorings of Connected Graphs (University of Wisconsin - Madison) ..... February 11, 2008
1. The m-Colored Composition Poset (University of Wisconsin - Madison) ..... April 23, 2007

Conference Presentations and Posters

34. MAA Ohio Section Meeting, Cedarville University, Cedarville, OH, October 28, 2022, *Modeling Surgical Site Infections*, Contributed Talk.
33. Midwest Conference on Combinatorics, Cryptography, and Computing, Illinois State University, Normal, IL, October 21, 2022, *Primitive decompositions of graphs*, Contributed Talk.

32. 24th Conference of the International Linear Algegra Society, National University of Ireland, Galway, Ireland, June 22, 2022, *Graduate research projects with Richard Brualdi*, Invited Talk.

31. MAA Ohio Section Meeting, Xavier University, Cincinnati, OH, March 25, 2022, *Primitive Graph Decompositions*, Contributed Talk.

30. MAA Ohio Section Meeting, Shawnee State University, Portsmouth, OH, October 25, 2019, *Transversals in Cayley tables*, Contributed Talk.

29. Midwest Conference on Combinatorics, Cryptography, and Computing, Rochester Institute of Technology, Rochester, NY, October 12, 2019, *Embeddings in diagonally cyclic Latin squares*, Contributed Talk.

28. 31st Cumberland Conference, University of Central Florida, Orlando, FL, May 19, 2019, *Diagonally cyclic Latin squares*, Contributed Talk.

27. CJC65, Nanyang Technological University, Singapore, July 16, 2018, *On erasure combinatorial batch codes*, Contributed Talk.

26. WVU Graph Theory Conference, West Virginia University, Morgantown, WV, September 14, 2017, *Adding and removing structure from graph decompositions*, Invited Talk.

25. AMS Central Section Meeting, University of North Texas, Denton, TX, September 10, 2017, *Primitive cycle systems of graphs*, Invited Talk.

24. HyGraDe 2017, Sant'Alessio Siculo, Sicily, Italy, June 23, 2017, *Partitioned incomplete Latin squares with two part sizes*, Contributed Talk.

23. MAA Ohio Section NExT meeting, Sinclair Community College, Dayton, OH, March 31, 2017, *Engaging students in research outside your area of expertise*, Contributed Talk.

22. Joint Mathematics Meeting, Atlanta, GA, January 6, 2017, *Successes and trials with PIC Math and beyond*, Contributed Talk.

21. AMS Central Sectional Meeting, University of St. Thomas, Minneapolis, Minnesota, October 30, 2016, *Alternating sign matrices and the Bruhat order*, Invited Talk.

20. Midwest Conference on Combinatorics, Cryptography, and Computing, Illinois State University, Normal, IL, October 15, 2016, *Permutations and Schröder paths (no relation)*, Contributed Talk.

19. Midwest Conference on Combinatorics, Cryptography, and Computing, College of Charleston, Charleston, SC, October 18, 2015, *Partial Latin squares with one row, column, and symbol*, Contributed Talk.

18. 28th Cumberland Conference, University of South Carolina, Columbia, SC, May 17, 2015, *Latin squares with disjoint subsquares (new results)*, Contributed Talk.

17. AMS Central Sectional Meeting, University of Wisconsin-Eau Claire, Eau Claire, WI, September 20, 2014, *New constructions of ϕ-symmetric Hamilton cycle decompositions*, Invited Talk.

16. 27th Cumberland Conference, West Virginia University, Morgantown, WV, May 16, 2014, *Latin squares with disjoint subsquares*, Contributed Talk.

15. Combinatorics 2014, Gaeta, Italy, June 4, 2014, *Latin squares with disjoint subsquares*, Contributed Talk.

14. Midwest Conference on Combinatorics, Cryptography, and Computing, Southwestern University, Georgetown, Texas, October 19, 2013, *r-semi Latin squares and case of Häggkvist's conjecture*, Contributed Talk.

13. AMS Southeastern Sectional Meeting, University of Mississippi, Oxford, MS, March 2, 2013, *Hamilton cycle decompositions of complete r-uniform r-partite hypergraphs*, Contributed Talk.

12. MAA Florida local meeting, University of West Florida, Pensacola, FL, November 16, 2012, *Hamilton cycle decompositions of complete r-uniform r-partite hypergraphs*, Contributed Talk.

11. International Conference on Cycles in Graphs, Vanderbilt University, Nashville, TN, May 31, 2012, *Hamilton cycle decompositions of complete r-uniform r-partite hypergraphs*, Contributed Talk.

10. AMS Southeastern Sectional Meeting, University of South Florida, Tampa, FL, March 11, 2012, *Symmetric Hamilton cycle decompositions of cocktail-party graphs*, Contributed Talk.
9. AMS Central Sectional Meeting, University of Nebraska – Lincoln, Lincoln, NE, October 15, 2011, *Cyclic matching sequencibility of graphs*, Contributed Talk.
8. Linear Algebraic Techniques in Combinatorics and Graph Theory, BIRS, Banff, Alberta, Canada, January 30 - February 4, 2011, Invited Participant.
7. Joint Mathematics Meeting, New Orleans, LA, January 8, 2011, *ϕ-symmetric Hamilton cycle decompositions of graphs*, Contributed Talk.
6. 24th Midwestern Conference on Combinatorics, Cryptography, and Computing, Illinois State University, Normal, IL, September 12, 2010, *ϕ-symmetric Hamilton cycle decompositions of graphs*, Contributed Talk.
5. The Mutually Beneficial Relationship of Matrices and Graphs CBMS Regional Conference, Iowa State University, Ames, IA, July 16, 2010, *ϕ-symmetric Hamilton cycle decompositions of graphs*, Poster.
4. Coimbra Meeting on $(0, 1)$-Matrix Theory and Related Topics, University of Coimbra, Department of Mathematics, Coimbra, Portugal, June 21, 2010, *Symmetric Hamilton cycle decompositions of graphs*, Contributed Talk.
3. AMS Central Sectional Meeting, Macalester College, St. Paul, MN, April 11, 2010, *Symmetric Hamilton cycle decompositions of graphs*, Contributed Talk.
2. Combinatorial Configurations and their Applications, Michigan Technological University, Houghton, MI, August 7, 2009, *Latin squares of intercalates*, Contributed Talk.
1. Chat Yin Ho Memorial Conference on Combinatorics and Groups, University of Florida, Gainesville, FL, February 23, 2008, *Symmetric joint orthogonal realizations of graphs*, Contributed Talk.

Graduate Theses

4. **Ian Waddell** ..... (Spring 2023)
   Triangle decompositions of cocktail party graphs which are 2-primitive.
3. **Fatima Akinola** ..... Spring 2021
   Hamilton cycle decompositions of complete multipartite graphs which are cyclic and symmetric
2. **Kevin McDaniel** ..... Fall 2019
   An Inference-Driven Branch and Bound Optimization Strategy for Planning Ambulance Services[†]
1. **Adam O'Neal** ..... Spring 2019
   Monochromatic Sets of Nondecreasing Diameter

Undergraduate Student Research

18. **Joseph Stamm** - The Skolem construction and 2-primitive triangle decompositions of K_n and $K_n - I$ .... Spring 2021
17. **Isaac Brown** - Hamilton cycle decompositions of hypergraphs ..... Fall 2020
16. **Jordyn Bryson** - Analyzing 2-primitivity in Steiner Triple Systems ..... Fall 2020
15. **Anna Craft** - Primitive Cycle Decompositions ..... Spring 2020
14. **Olivia Mosrie** - Partitioning Latin Arrays ..... Fall 2019
13. **Kira Owsley** - On Cyclic-Symmetric Hamilton Cycle Decompositions of Complete Multipartite Graphs ..... Fall 2018
12. **Ben Hughes** - On (n, k)-linear passwords ..... Fall 2017

[†]This graduate thesis was in data science.

11. **Kira Owsley** - Cycle systems with even cycle length (Sponsored by a NASA Space Grant) .... Spring 2017 - Fall 2018
10. **Stacie Baumann (West Virginia Wesleyan College)** - Latin arrays and semi-latin squares ..... Fall 2016
9. **Nathaniel Shipe** - Cycle systems with large cycles and no subsystems ..... Fall 2016
8. **Kevin Akers, Stacie Baumann, Sarah Gustafson** (Marshall Math REU) ..... Summer 2016
   Partial latin squares arising from latin arrays
7. **Adam O'Neal** - t-sets with nondecreasing diameter ..... Fall 2015
6. **Shane Stevens** - Graphical passwords in two dimensions ..... Fall 2015
5. **Nathaniel Ratcliff** - Graphical passwords in one dimension ..... Spring 2015
4. **Michael Osbourne** - Cycle systems of K_{14n+7} with no subsystems ..... Spring 2015
3. **Christian Myers** - The Five-Color Theorem ..... Spring 2014
2. **Jordan Paris** - Cycle systems of K_{10n+5} with no subsystems ..... Fall 2014
1. **Miranda Ashbury** - Joint-orthogonally realizable graphs ..... Fall 2012

Undergraduate Student Research - Data Science

3. **Zach Jones, Steven Rollins, David Hannan** ..... Spring 2017
   Modeling collection routes for City of Huntington municipal services
2. **Sara Brumbaugh, Kevin McDaniel, Ben Jones, Matthew Haldeman, Elizabeth Hance** ..... Spring 2016
   Redistricting patrol zones for the Huntington Police Department
1. **Tyler Bonnett, Paige Yankey, Donald Bays** ..... Spring 2015
   Modeling left-censored data

Professional Service

- **Webmaster, MAA Ohio Section** ..... Fall 2021 – present
  I maintain the website for the section, which incorporates registration for meetings.
- **Chair, MAA Ohio Section Program Committee** ..... Fall 2018 – Spring 2019
  I was responsible for finding plenary speakers, soliciting contributed talks, devising a schedule, and all other issues associated with developing the program for the MAA Ohio section meetings in Fall 2018 and Spring 2019.
- **Member, RMSC Scientific Committee** ..... Fall 2018
  I was part of the scientific committee for the student Regional Mathematics and Statistics Conference at UNC Greensboro in November 2018.
- **Lead Organizer, Cumberland Conference** ..... Summer 2018
  I invited speakers, organized sessions, and handled local arrangements for the 30th Cumberland Conference in Combinatorics, hosted by Marshall University. I also wrote and received an NSF conference grant (DMS-1822390) to offset travel costs for several participants.
- **Participant, PIC Math Workshop on Data Science** ..... Summer 2017
  I was part of a workshop which further introduced mathematics faculty to the field of data science, statistical learning, and machine learning. We were given an overview of techniques and software used to solve data science problems, and taught how to guide undergraduate students working on real world data science problems (grant DMS-1345499).

- **Co-organizer, Cumberland Conference** . . . . . Summer 2017

  I assisted in the logistical matters in organizing the 29th Cumberland conference at Vanderbilt Univeristy.

- **Member, MAA Ohio Section Program Committee** . . . . . Fall 2016 – Spring 2018

  I assisted the program chair with any needs for developing the program for the four MAA Ohio section meetings which took place in AY 2016-2017 and AY 2017-18.

- **MAA Ohio Project NExT Coordinator** . . . . . Fall 2016 – present

  I am one of three coordinators who organize a workshop for new faculty members in the Ohio section of the MAA to discuss teaching methodologies.

- **MAA Ohio Section Local Arrangements Coordinator** . . . . . Spring 2015

  Marshall University hosted the spring meeting of the Mathematical Association of America, Ohio Section in Spring 2015. I was responsible for coordinating all local arrangements, such as hotel accommodations, room reservations, equipment, catering, etc.

- **Participant, PIC Math Program** . . . . . Fall 2014 – Spring 2016

  I was part of a nation-wide program geared toward engaging undergraduate mathematics majors with research problems from industry. This program is supported by the MAA, SIAM, and the NSF (grant DMS-1345499).

- **Journal Referee** . . . . . Fall 2009 – present

  I have refereed several papers for the following journals:

- Journal of Combinatorial Mathematics and Combinatorial Computing
  - Australasian Journal of Combinatorics
  - Designs, Codes, and Cryptography
  - Discrete Mathematics
  - Discussiones Mathematicae Graph Theory
  - Electronic Journal of Combinatorics
  - Graphs and Combinatorics
  - Mathematiki Vesnik
  - Advances in Mathematics and Communications
  - Journal of Combinatorial Designs
  - Journal of Combinatorial Theory A
  - Journal of Combinatorial Mathematics and Combinatorial Computing
  - Rose-Hulman Undergraduate Mathematics Journal
  - Special Matrices

- **Member, Mathematical Association of America** . . . . . Fall 2005 – present
- **Member, American Mathematical Society** . . . . . Fall 2005 – present

University and College-wide Service (at Marshall unless otherwise noted)

- **Member, Content Specialization Liaison Committee for Initial Teacher Education** . . . . . Fall 2019 – present

  This steering committee is responsible for recommending the necessary coursework that secondary education students should complete in their subject area.

- **Member, NASA Advisory Committee** . . . . . Fall 2019 – present

  This committee is responsible for soliciting requests for funding from a state-wide NASA grant, as well as decide on which proposals will be funded.

- **Member, TECI Advisory Group** . . . . . Fall 2018 – present

  The Technology Enhanced Classroom Initiative (TECI) is tasked to design spaces which provide faculty with the latest technologies and to help improve student learning outcomes through the promotion and support of new, high-tech teaching pedagogies. We meet to discuss the directions taken by this initiative.

- **Director, CORTEX Center** . . . . . Fall 2016 – present

  The CORTEX (COmmunity Research and Teaching EXperiences) Center is an entity (created by myself and Damien Arthur in Political Science) which liaises between faculty, students, and community partners for the purpose of completing community-based research projects. Projects include:

  - Rezoning for Huntington Police Department
  - EMS Centralization / Locations for Wayne County, WV
  - Garbage Collection Optimization for Huntington, WV
  - Recycling Survey / Analysis for the City of Huntington
  - Fitbits for Garbage Trucks
  - Code Enforcement App for City of Huntington
  - Public Works Activity App for City of Huntington
  - Housing Database App for City of Huntington
  - Two apps for business startups
  - Abandoned Homes Study for City of Huntington
  - Green Plans for City of Huntington
  - City Opioid Analysis for Huntington
  - SSI risks from OR door openings for Cabell-Huntington Hospital

- **Faculty Senator** . . . . . Fall 2016 – Spring 2017

  I was elected by my peers to represent our college in Faculty Senate.

- **Member, MU Long-Term Flood Planning Group** . . . . . Fall 2016 – present

  After West Virginia was devastated by flooding in the southern parts of the state in early 2016, the state (in conjunction with the National Guard) solicited each to campus form a group of individuals who can help shape the future response to state-wide flooding in the future. I was included due to my mathematical skills and my involvement in community-based, data-driven projects.

- **Member, Science Olympiad Committee** . . . . . Fall 2015 – Spring 2016

  Assisted in the organization of the Science Olympiad competition at Marshall University in Spring 2016.

- **CFYE Advisory Board member (UW - Madison)** . . . . . Fall 2009 – Spring 2011

  I sat on the advisory board for the Center for the First-Year Experience, whose charter involves the successful integration of incoming students into the UW community, such as student orientation, learning groups, and advising.

- **Consultant for Student Orientation (UW - Madison)** . . . . . Summer 2006 – Spring 2011

  I consulted incoming freshmen and transfer students at orientation regarding their enrollment in math courses, placement scores, and discussed the various opportunities available to students. I was a point of contact for various agencies on campus for issues relating to enrollment and advising, and was involved in the decision process for relevant department policy.

Department Service (at Marshall unless otherwise noted)

- **Advisor, Math Club** . . . . . Fall 2022 – present

  I act as the faculty advisor for the student-run recreational math club.

- **Advisor, Pi Mu Epsilon** . . . . . Fall 2021 – present

  I act as the faculty advisor for the student-run math honor society.

- **WeBWorK Administrator** . . . . . Fall 2021 – present

  I am responsible for maintaining a local server for WeBWorK, an open-source online homework system, used by various faculty in the math department.

- **Member, Planning Committee for ICOSDA 2022** . . . . . Spring 2020 – present

  Marshall University will host the International Conference on Statistical Distributions and Applications in October 2022; I am assisting with registration, technical logistics, and the creation of the physical program.

- **Director of Undergraduate Studies in Mathematics** . . . . . Fall 2019 – present

  I am responsible for most undergraduate advising and represent the department in university affairs as it pertains to the undergraduate major program and any undergraduate classes run by our department. I also liaise with Math Education as it relates to their majors and with Computer Science as it relates to the newly developed undergraduate program in data science.

- **Member, Tenure and Promotion Committee** . . . . . Spring 2018, Spring 2020, Spring 2022

  Committee members are responsible for reviewing applicants' tenure packets and rendering a recommendation.

- **Member, College Algebra and Trigonometry Course Committee** . . . . . Spring 2016 – Fall 2018

  This course committee is responsible for curriculum changes for the four courses at Marshall which include material from college algebra and trigonometry: MTH 122 (Trigonometry), MTH 127 (College Algebra Expanded), MTH 130 (College Algebra), and MTH 132 (Precalculus).

- **Member, Undergraduate Committee** . . . . . Spring 2013 – present

  The UC makes decisions regarding undergraduate course additions, changes, etc. for the Math department.

- **Chair, Active Research Initiative Committee** . . . . . Fall 2012 – Spring 2016

  In an effort to foster interest in mathematics research, The ARI committee invites distinguished mathematics researchers to campus to interact with students, present their work, and illustrate the role that research mathematics plays in the real world.

- **Judge, Math Capstone Presentations** . . . . . Fall 2013 – Spring 2020

  Nearly each semester I participated in the Math Department Capstone Presentation by judging three presentations; the results were aggregated by the Capstone coordinator and used to inform the grade each student received for the semester. I no longer judge as I am now the Capstone coordinator.

- **Member and Chair, Lecture and Colloquium Committee** . . . . . Fall 2011 – present, Chair: Fall 2013 – Spring 2018

  The L&C committee selects and coordinates any lectures presented by the Math department. This now encompasses the responsibility of the ARI Committee.

- **TA Evaluation Committee member (UW - Madison)** . . . . . Fall 2009 - Spring 2011

  I participated in analyzing student-reported and instructor data about our teaching assistants and sat on the committee responsible for assigning ratings based on the information.

- **College Algebra Coordinator (UW - Madison)** . . . . . Fall 2008 - Spring 2011

  I was directly involved with the renovation of Math 112 - College Algebra. Initially, the course was loosely organized with up to a dozen graduate students running separate lectures and administering a coordinated exam. I assisted with standardizing the course by maintaining the on-line homework delivery program, WeBWorK, and compiled a standardized set of classroom materials. I had this published as a workbook, and was adopted by the Math Department at UW Madison for all College Algebra courses (which was still in use after my departure). I was also responsible for assignment of grades for this course.

- **TA Coordinator (UW - Madison)** . . . . . Fall 2006

  I oversaw the progress of four first-year graduate students teaching Math 221 - Calculus. I held training sessions, evaluated their discussions, and acted as a mentor for their first semester.

Teaching Experience (Marshall University)

- **Math 121 - Concepts and Applications (3 cr)** . . . . . Fall 2011 $\times 3$, Spring 2012

  This terminal course introduced non-majors to topics including unit conversion, money, statistics, and basic counting and probability.

- **Math 127 - College Algebra Expanded (5 cr)** . . . . . Fall 2017

  An introductory course to College Algebra with just-in-time review.

- **Math 132 - Precalculus (5 cr)** . . . . . Fall 2012, 2014, and 2015 $\times$2, Spring 2012, 2014, 2015, 2016, 2018, and 2019

  This course serves as a prerequisite to our calculus sequence.

- **Math 220 - Discrete Mathematics (3 cr)** . . . . . Fall 2012, Spring 2013 and 2017

  This course covers the basics of logic, proof writing, and an introduction to counting arguments and algorithms, including some graph theory. Students are primarily computer science majors.

- **Math 229 - Calculus with Analytic Geometry (5 cr)** . . . . . Spring 2013 and 2021, Fall 2013 and 2021

  This is the first course in our calculus sequence.

- **Math 231 - Calculus III with Analytic Geometry (4 cr)** . . . . . Fall 2014

  This is the third course in our calculus sequence, covering multivariable calculus.

- **Math 329 - Elementary Linear Algebra (3 cr)** . . . . . Fall 2019

  In this course we develop concepts of rank-nullity for matrices, null spaces, row/column spaces, eigenvalues, decompositions, and general vector spaces.

- **Math 440 / Math 635 - Graph Theory and Combinatorics (3 cr)** . . . . . Spring 2016 and 2020

  This proof-based course covered an introduction to enumerative combinatorics and graph theory. It was taught with both graduate and undergraduate students in the same classroom. Different assignments and exams were given, graduate students presented problems in class, and were held to a higher standard in their writings.

- **Math 450 / Math 550 - Modern Algebra I (3 cr)** . . . . . Fall 2013, 2016, 2017, and 2019

  This proof-based course covered an introduction to group theory. It was taught with both graduate and undergraduate students in the same classroom. Different assignments and exams were given, graduate students presented problems in class, and were held to a higher standard in their writings.

- **Math 452 / Math 552 - Modern Algebra II (3 cr)** . . . . . Spring 2014, 2017, 2018, and 2020

  This course introduces rings and fields and is the follow-up course to the first semester Modern Algebra course.

- **Math 455 / Math 655 - Number Theory (3 cr)** . . . . . Fall 2020

  This proof-based course covered an introduction to number theory. The first half of the class was spent covering all material from a classical textbook, while the second half was run seminar-style with students making presentations based on a research paper we read as a class.

- **HON 480 - Huntington, a Smart City (3 cr)** . . . . . Fall 2018

  A special topics class in which, with a small group of students, Damien Arthur (Political Science) and I supervised group projects completed by honors students in which they developed data-driven plans for improving different aspects of city and county management, informed by community partners.

- **Math 480 / Math 490 - PIC Math (3 cr)** . . . . . Spring 2015, 2016, and 2017

  This course (which I piloted at Marshall) has students work in groups to tackle real-world problems which come directly from industry.

- **Math 485 - Math Competition Preparatory Course (3 cr)** . . . . . Fall 2015, 2016, 2019

  This course (which I piloted with Elizabeth Niese) has students practicing strategies for math competitions, specifically the Virginia Tech Regional Mathematics Exam and the Putnam Exam.

- **Math 485 - Graph Theory and Combinatorics (3 cr)** . . . . . Spring 2016

  An independent study for a student needing this course while student teaching.

- **Math 485/690 - Design Theory (3 cr)** . . . . . Fall 2018

  A introductory course to combinatorial designs.

- **Math 491 - Senior Seminar (2 cr)** . . . . . Fall 2020 and 2021, Spring 2021 and 2022

  In this course I supervised independent research projects for an average of 6 students each semester, ranging a variety of topics including analysis, matrix theory, combinatorics, numerical analysis, and statistics. Each student had a faculty mentor who helped oversee the progress of the students on the research; in addition to providing assistance in this way, I provided professional development for the students and taught the basics of writing long-prose mathematical documents and giving mathematical presentations.

- **Math 670 - Spectral Graph Theory (3 cr)** . . . . . Spring 2019 and 2022

  An independent study which explored the linear-algebraic properties of matrices which are associated to graphs with particular properties.

Teaching Experience (University of Wisconsin)

- **Math 112 - College Algebra (3 cr)** . . . . . Fall 2007 $\times 2$, 2008–2010, Spring 2009, 2010, Summer 2010

  This course briefly reviewed several algebraic concepts such as functions, equations, graphing, etc. This is a prerequisite course for a multitude of majors at UW Madison, primarily business and nursing. From Fall 2009 through Spring 2011, the course was taught using my published workbook.

- **Math 210 - Finite Mathematics (4 cr)** . . . . . Spring 2007 $\times 4$ discussion sections

  This course covered a variety of topics including logic, basic statistics, counting and probability. Each week, three hours are spent in a large lecture and one with a discussion leader.

- **Math 221 - Calculus (5 cr)** . . . . . Fall 2005 and 2006, $\times 2$ discussion sections

  This course was the first of three courses in the calculus sequence. Each week, students went to a large lecture for three hours and spent two hours each week in discussion sections.

Teaching Experience (University of Florida)

- **MAC 1147 - Precalculus (5 cr)** . . . . . Fall 2001 and 2002, $\times 2$ discussion sections

  This course was the prerequisite course for the calculus sequence. Each week, students went to a large lecture three hours and their discussion sections for two hours.

- **MAC 1147 - Precalculus (5 cr)** . . . . . Spring 2003

  This class met in a small-class setting with only one instructor.

- **MAC 2311 - Calculus w/ Analytic Geometry I (5 cr)** . . . . . Fall 2003 $\times 3$, Fall 2004 $\times 4$ discussion sections

  This course is the first of three courses in the calculus sequence. Each week, three hours were spent in a large lecture and two were spent in a discussion section.

- **MAC 2311 - Calculus w/ Analytic Geometry I (5 cr)** . . . . . Summer 2004

  This class met in a small-class setting with only one instructor.

- **MAC 2312 - Calculus w/ Analytic Geometry II (4 cr)** . . . . . Spring 2004, 2005

  This course was the second semester of the calculus sequence. Students met four hours each week with one instructor.