



*College of William and Mary*  
*Curriculum Vita Standard Format*

PERSONAL INFORMATION

Name: **Eric A. Swartz**

Date: March 5<sup>th</sup> 2024

Office Address: 133 Jones Hall

Phone: (757) 221-7974

Email: easwartz@wm.edu

Current Position: Associate Professor, Department of Mathematics

EDUCATION

**Ph.D., The Ohio State University**, Department of Mathematics, 2009

**B.A., Harvard University**, Mathematics, 2004

ACADEMIC POSITIONS

**Associate Professor**, Department of Mathematics, William & Mary, 2021-present

**Assistant Professor**, Department of Mathematics, William & Mary, 2015-2021

**Research Associate**, Centre for the Mathematics of Symmetry and Computation, University of Western Australia, 2013-2015

**Riley Visiting Assistant Professor**, Department of Mathematical Sciences, Binghamton University (State University of New York), 2010-2012

**Lecturer**, Department of Mathematics, The Ohio State University, 2009-2010

HONORS, PRIZES, AND AWARDS

Simon Prize for Excellence in the Teaching of Mathematics, (Department of Mathematics, William & Mary), 2021.

Phil Huneke Excellence in Teaching Award (Department of Mathematics, The Ohio State University), 2007.

Distinguished First-Year Graduate Student Teaching Associate Award (Department of Mathematics, The Ohio State University), 2006.

COURSES TAUGHT AT THE COLLEGE LEVEL

*At William & Mary*

Spring 2024	MATH 307H – Honors Abstract Algebra MATH 430 – Abstract Algebra 2 MATH 300 – Mathematical Sciences Writing
Fall 2023	MATH 214 – Foundations of Mathematics MATH 307 – Abstract Algebra
Spring 2023	MATH 214 – Foundations of Mathematics MATH 307 – Abstract Algebra MATH 496 – Honors MATH 300 – Mathematical Sciences Writing
Fall 2022	(on leave) MATH 495 – Honors
Spring 2022	(on leave) MATH 496 – Honors
Fall 2021	MATH 307 – Abstract Algebra MATH 410 – Permutation Groups MATH 495 – Honors
Spring 2021	MATH 214 – Foundations of Mathematics MATH 410 – Reading in Algebraic Graph Theory MATH 430 – Abstract Algebra II MATH 496 – Honors
Fall 2020	MATH 214 – Foundations of Mathematics MATH 311 – Elementary Analysis MATH 410 – Reading in Abstract Algebra MATH 495 – Honors
Spring 2020	MATH 214 – Foundations of Mathematics MATH 307 – Abstract Algebra MATH 400 – Mathematical Connections (converted to this from MATH 496)
Fall 2019	MATH 100 – Symmetry MATH 311 – Elementary Analysis MATH 410 – Research in Combinatorics (converted to this from MATH 495)
Spring 2019	MATH 100 – Symmetry MATH 214 – Foundations of Mathematics MATH 214 – Foundations of Mathematics MATH 496 – Honors
Fall 2018	(on leave)

MATH 495 – Honors  
Spring 2018 MATH 307 – Abstract Algebra  
MATH 309 – Intermediate Linear Algebra  
MATH 496 – Honors  
Fall 2017 MATH 100 – Symmetry  
MATH 307 – Abstract Algebra  
MATH 495 – Honors  
Spring 2017 MATH 100 – Symmetry  
MATH 307 – Abstract Algebra  
Fall 2016 MATH 214 – Foundations of Mathematics  
MATH 307 – Abstract Algebra  
Spring 2016 MATH 212 – Introduction to Multivariable Calculus  
MATH 307 – Abstract Algebra  
Fall 2015 MATH 112 – Calculus II  
MATH 212 – Introduction to Multivariable Calculus

*At Binghamton University*

Calculus I (differential calculus)

Linear Algebra

Calculus III (multivariable calculus)

Number Systems (an introduction to proofs for math majors)

Graph Theory (undergraduate course)

Introduction to Graph Theory (graduate course)

*At Ohio State*

Elementary Functions (precalculus)

Calculus and Analytic Geometry I (differential calculus for engineers)

Calculus and Analytic Geometry II (integral calculus for engineers)

Mathematical Analysis for Business II (differential calculus for business students)

Mathematical Analysis for Business III (integral calculus for business students)

Discrete Mathematical Structures I (introduction to discrete mathematics)

Peer Mentor/Master Teacher for Seminar in Teaching College Mathematics

## FELLOWSHIPS AND RESEARCH GRANTS

2019–2021 **US-Slovenia Bilateral Grant:** 3030€

BI-US/19-21-106, co-PI: Luke Morgan (University of Primorska)

2018 **William & Mary Summer Faculty Research Award:** \$4000

2017 **William & Mary Reves Faculty Conference Travel Grant:** \$500

2017-2018 Senior personnel of **EXTREEMS-QED: Computational and Statistical theory and techniques in the study of large data sets**, DMS-1331021, National Science Foundation, 2013-2019, \$879,498. (PI: J. Shi, co-PI: S. Day, C. Li and G. Yu)

2016 **William & Mary Summer Faculty Research Award:** \$4000

2015 **University of Western Australia Research Collaboration Award:** AU\$9,100  
“Combinatorial Designs and Finite Geometries”, co-PI: Pádraig Ó Catháin (then at Monash University, now at Worcester Polytechnic Institute)

2013 **University of Western Australia ECM Research Development Grant:** AU\$10,000  
co-PI: Irene Pivotto (University of Western Australia)

2012 **American Mathematical Society-Simons Travel Grant:** \$4,000

## RESEARCH

Refereed Peer-Reviewed Publications in Journals (in all cases, was involved in all aspects of the publication; \* indicates undergraduate student author):

1. E. Swartz, A construction of an infinite family of 2-arc transitive polygonal graphs of arbitrary odd girth, *Journal of Combinatorial Theory Series A* 117 (6), 2010, 783-789. Available at <http://dx.doi.org/10.1016/j.jcta.2009.07.001>
2. E. Swartz, A construction of an infinite family of 2-arc transitive polygonal graphs of arbitrary even girth, *Journal of Algebraic Combinatorics* 33 (1), 2011, 95-109. Available at <http://dx.doi.org/10.1007/s10801-010-0235-7>
3. Á. Seress and E. Swartz, A note on the girth-doubling construction for polygonal graphs, *Journal of Graph Theory* 68, 2011, 246-254. Available at <http://dx.doi.org/10.1002/jgt.20555>

4. E. Swartz, The locally 2-arc transitive graphs admitting an almost simple group of Suzuki type, *Journal of Combinatorial Theory Series A* 119, 2012, 949-976. Available at <http://dx.doi.org/10.1016/j.jcta.2012.01.005>
5. Á. Seress and E. Swartz, A family of near-polygonal graphs of valency 10, *Annals of Combinatorics* 16, 2012, 891-903. Available at <http://dx.doi.org/10.1007/s00026-012-0166-1>
6. J. Bamberg, S. Glasby, and E. Swartz, AS-Configurations and skew-translation generalised quadrangles, *Journal of Algebra* 421, 2015, 311-330. Available at <http://dx.doi.org/10.1016/j.jalgebra.2014.08.031>
7. E. Swartz, A construction of a partial difference set in the extraspecial groups of order  $p^3$  with exponent  $p^2$ , *Designs, Codes and Cryptography* 75 (2), 2015, 237-242. Available at <http://dx.doi.org/10.1007/s10623-013-9903-7>
8. J. Bamberg, M. Lee\*, and E. Swartz. A note on relative hemisystems of Hermitian generalised quadrangles, *Designs, Codes and Cryptography* 81 (1), 2016, 131--144. Available at <http://dx.doi.org/10.1007/s10623-015-0135-x>
9. L. Morgan, E. Swartz, and G. Verret. On 2-arc-transitive graphs of order  $kp^n$ , *Journal of Combinatorial Theory Series B* 117, 2016, 77–87. Available at <https://doi.org/10.1016/j.jctb.2015.11.001>
10. E. Swartz. Locally 3-arc-transitive regular covers of complete bipartite graphs, *Electronic Journal of Combinatorics* 23 (2), 2016, Paper 2.18, 20 pp. Available at <http://www.combinatorics.org/ojs/index.php/eljc/article/view/v23i2p18/pdf>
11. E. Swartz. On the covering number of symmetric groups having degree divisible by six, *Discrete Mathematics* 339 (11), 2016, 2593–2604. Available at <https://doi.org/10.1016/j.disc.2016.05.004>

12. L.-C. Kappe, D. Nikolova-Popova, E. Swartz. On the covering number of small symmetric groups and some sporadic simple groups, *Groups Complexity Cryptology* 8 (2), 2016, 135–154. Available at <https://doi.org/10.1515/gcc-2016-0010>
13. J. Bamberg, C.-H. Li, and E. Swartz. A classification of finite antiflag-transitive generalized quadrangles, *Transactions of the American Mathematical Society* 370, 2018, 1551–1601. Available at <https://doi.org/10.1090/tran/6984>
14. J. Bamberg, B. Corr, A. Devillers, D. Hawtin, I. Pivotto, and E. Swartz. The circular altitude of a graph, *Australasian Journal of Combinatorics* 72 (2), 2018, 357–368. Available at [https://ajc.maths.uq.edu.au/pdf/72/ajc\\_v72\\_p357.pdf](https://ajc.maths.uq.edu.au/pdf/72/ajc_v72_p357.pdf)
15. R. Oppenheim\* and E. Swartz. On the covering number of  $S_{14}$ , *Involve* 12 (1), 2019, 89–96. Available at <https://doi.org/10.2140/involve.2019.12.89>
16. E. Swartz. On generalized quadrangles with a point regular group of automorphisms, *European Journal of Combinatorics* 79, 2019, 60–74. Available at <https://doi.org/10.1016/j.ejc.2018.12.006>
17. R. Egan, P. Ó Catháin, and E. Swartz. Spectra of Hadamard matrices, *Australasian Journal of Combinatorics* 73 (3), 2019, 501–512. Available at [https://ajc.maths.uq.edu.au/pdf/73/ajc\\_v73\\_p501.pdf](https://ajc.maths.uq.edu.au/pdf/73/ajc_v73_p501.pdf)
18. O. Gnilke, M. Greferath, C. Hollanti, G. Nuñez Ponasso, P. Ó Catháin, and E. Swartz. Improved User-Private Information Retrieval via Finite Geometry, *Designs, Codes and Cryptography* 87 (2-3), 2019, 665--677. Available at <https://doi.org/10.1007/s10623-018-00591-9>

19. T. Olson\* and E. Swartz. Transitive  $\text{PSL}(2,11)$ -invariant arcs in  $\text{PG}(4,q)$ , *Designs, Codes and Cryptography* 87 (8), 2019, 1871–1879. Available at <https://doi.org/10.1007/s10623-018-0588-9>
  
20. P. Ó Catháin and E. Swartz. Homomorphisms of matrix algebras and constructions of Butson-Hadamard matrices, *Discrete Mathematics* 342 (12), 2019. Available at <https://doi.org/10.1016/j.disc.2019.111606>
  
21. S. F. Afton\* and E. Swartz. On prime order automorphisms of generalized quadrangles, *Algebraic Combinatorics* 3 (1), 2020, 143–160. Available at <https://doi.org/10.5802/alco.89>
  
22. E. Swartz and N. Werner. Fuchs’ problem for 2-groups, *Journal of Algebra* 556, 2020, 225–245. Available at <https://doi.org/10.1016/j.jalgebra.2020.02.025>
  
- Corrigendum to “Fuchs’ problem for 2-groups”, *Journal of Algebra* 608 (2022), 25–36.
  
23. E. Swartz and N. Werner. On the number of reachable pairs in a digraph, *Australasian Journal of Combinatorics* 77 (2), 2020, 184–223. Available at [https://ajc.maths.uq.edu.au/pdf/77/ajc\\_v77\\_p184.pdf](https://ajc.maths.uq.edu.au/pdf/77/ajc_v77_p184.pdf)
  
24. J. Bamberg, C.H. Li, and E. Swartz. A classification of finite 2-transitive generalized quadrangles, *Transactions of the American Mathematical Society* 374 (3), 2021, 1535–1578. Available at <https://doi.org/10.1090/tran/8236>
  
25. A. Schaefer and E. Swartz. Graphs that contain multiply transitive matchings, *European Journal of Combinatorics* 92, 2021, 103236, 22 pp. Available at <https://doi.org/10.1016/j.ejc.2020.103236>
  
26. E. Swartz and G. Tauscheck\*. Restrictions on parameters of partial difference sets in nonabelian groups, *Journal of Combinatorial Designs* 29 (1), 2021, 38–51. Available at <https://doi.org/10.1002/jcd.21754>
  
27. E. Swartz and N. Werner. Covering numbers of commutative rings, *Journal of Pure and Applied Algebra* 225 (8), 106622, 17 pp. Available at <https://doi.org/10.1016/j.jpaa.2020.106622>

28. M. Garonzi, L.-C. Kappe, and E. Swartz. On integers that are covering numbers of groups, *Experimental Mathematics* 31 (2022), no. 2, 425--443. Available at <https://doi.org/10.1080/10586458.2019.1636425>
29. M. Giudici and E. Swartz. Locally s-arc transitive graphs arising from product action. *Ars Mathematica Contemporanea* 23 (2023), no. 2, Paper No. 10, 14 pp. Available at <https://doi.org/10.26493/1855-3974.2857.07b>
30. E. Swartz and N. Werner. A new infinite family of  $\sigma$ -elementary rings. *Communications in Algebra* 52 (2024), 172–188. Available at <https://doi.org/10.1080/00927872.2023.2237575>
31. E. Swartz and N. Werner. The covering numbers of rings. *Journal of Algebra* 639 (2024), 249–280. Available at <https://doi.org/10.1016/j.jalgebra.2023.10.016>
32. E. Swartz and N. Werner. Null ideal sets of  $3 \times 3$  similar matrices with irreducible characteristic polynomial. *Linear and Multilinear Algebra*, to appear.

Invited scholarly talks:

Covering numbers of rings with unity, *University of Richmond Mathematics Colloquium*, October 2021.

Fuchs' problem for 2-groups, *University of Western Australia Groups and Combinatorics Seminar (Online)*, June 2020.

Reachable pairs in digraphs and zero pattern matrix rings, *Virginia Commonwealth University Discrete Math Seminar*, September 2018.

Reachable pairs in digraphs and zero pattern matrix rings, *Worcester Polytechnic Institute Discrete Math Seminar*, September 2018.

Graphs that contain multiply transitive matchings, *AMS Sectional Meeting (University of North Texas), Special Session on Generalizations of Graph Theory*, September 2017.

Highly transitive matchings in graphs, *Binghamton University Combinatorics Seminar*, December 2016

Highly symmetric Hadamard matrices, *Aalto University Algebra, Number Theory, and*



*Applications Seminar*, January 2016

Generalized quadrangles with symmetry, *University of Delaware Discrete Mathematics Seminar*, November 2015.

Highly symmetric Hadamard matrices, *Monash Univeristy Discrete Mathematics Seminar*, June 2015.

Generalized quadrangles with symmetry, *Binghamton University Geometry and Topology Seminar (joint with Algebra Seminar and Combinatorics Seminar)*, February 2015.

Highly symmetric generalized quadrangles, *Joint Meeting of the American Mathematical Society and Mathematical Association of America, Special Session on What's New in Group Theory?*, January 2015.

Lifting automorphisms of finite graphs, *Binghamton University Graduate Conference in Algebra and Topology*, November 2012.

Locally 3-arc transitive covers of complete bipartite graphs, *Cornell University Discrete Geometry and Combinatorics Seminar*, October 2012.

Locally  $s$ -arc transitive graphs arising from the product action, *The 31<sup>st</sup> Ohio State-Denison Mathematics Conference*, May 2012.

The locally 2-arc transitive graphs admitting an almost simple group of Suzuki type, *University of Western Australia Groups and Combinatorics Seminar*, January 2012.

Locally 2-arc transitive graphs, *Discrete Math Days – St. Michael's College*, July 2011.

Locally 2-arc transitive graphs, *Cornell University Discrete Geometry and Combinatorics Seminar*, February 2011.

Contributed Scholarly Talks:

The covering numbers of rings I, *Zassenhaus Groups and Friends Conference*, June 3, 2023.

Restrictions on parameters of partial difference sets in nonabelian groups, *Combinatorial Designs and Codes (Online)*, July 2021.

Restrictions on parameters of partial difference sets in nonabelian groups, *2021 Zassenhaus Groups and Friends Conference (Online)*, June 2021.

Covering numbers of rings, *2020 Zassenhaus Groups and Friends Conference (Online)*, May 2020.

Locally 2-transitive generalized quadrangles, *Finite Geometries and Extremal Combinatorics 2019*, August 2019.

Locally 2-transitive generalized quadrangles, *2019 Zassenhaus Groups and Friends Conference*, June 2019.

Covering numbers of finite groups: a computational approach, *Groups St. Andrews 2017*, August 2017.

Highly transitive matchings in graphs, *Symmetry in Finite and Infinite Structures*, July 2017.

Covering numbers of finite groups: a computational approach, *2017 Zassenhaus Group Theory and Friends Conference*, May 2017

2-arc-transitive graphs of order  $kp^n$ , *AMS Sectional Meeting (University of Denver), Special Session on Algebraic Combinatorics*, October 2016

Covering symmetric groups with proper subgroups, *2016 Zassenhaus Group Theory Conference*, June 2016.

Covering symmetric groups with proper subgroups, *8<sup>th</sup> Australia and New Zealand Mathematics Convention*, December 2014.

Antiflag-transitive generalized quadrangles, *38<sup>th</sup> Australasian Conference on Combinatorial Mathematics and Combinatorial Computing*, December 2014.

Antiflag-transitive generalized quadrangles, *Finite Geometries 2014*, September 2014.

Antiflag-transitive generalized quadrangles, *Algebra, Geometry, and Computation*, July 2014.

New examples of strongly regular Cayley graphs, *Joint Meeting of the American Mathematical Society and Mathematical Association of America, Special Session on Trends in Graph Theory*, January 2014.

New examples of strongly regular Cayley graphs, *37<sup>th</sup> Australasian Conference on Combinatorial Mathematics and Combinatorial Computing*, December 2013.

New examples of partial difference sets in finite nonabelian groups, *Groups St. Andrews*, August 2013.

Locally 2-arc transitive covers of complete bipartite graphs, *American Mathematical Society Fall Eastern Sectional Meeting, Special Session on New Advances in Graph Theory*, September 2012.

The locally 2-arc transitive graphs admitting an almost simple group of Suzuki type, *Graphs, Designs, and Algebraic Combinatorics 2011*, July 2011.

The locally 2-arc transitive graphs admitting an almost simple group of Suzuki type, *7<sup>th</sup> Slovenian International Conference on Graph Theory*, June 2011.

2-arc transitive polygonal graphs of large girth and degree, *The 22<sup>nd</sup> Cumberland Conference on Graph Theory/Combinatorics/Computing*, May 2009.

2-arc transitive polygonal graphs of large girth and valency, *MIGHTY (Midwestern Graph Theory) XLVIII*, May 2009.

2-arc transitive polygonal graphs of large girth and valency, *CombinaTexas '09*, April 2009.

A construction of an infinite family of 2-arc transitive polygonal graphs of arbitrary odd girth, *AMS Spring Central Sectional Meeting, Contributed Paper Session*, March 2009.

Student mentoring:

Honors supervisor for Ryan Pesak, 2022–2023

Honors supervisor for Nathaniel Healy, 2021–2022

Supervised reading and research for Alex Gallehr, 2022

Supervised reading and research for Kailai Cui, 2021–2022

Honors supervisor for Samantha Phillips, 2020–2021

Co-supervisor for Honors thesis of Akshara Pisharody (Primary advisor: Pierre Clare), 2020–2021

Supervised reading and research for Thomas Wang, 2021.

Independent research supervisor for Aditya Mohan, 2019–2020.

Monroe Scholars summer research project advisor for Kerry Wang, *Ovoids in generalized quadrangles*, 2019.

Monroe Scholars summer research project advisor for Abigail Van Essendelft, *Mathematics of Art*, 2019.

Honors supervisor for Gabrielle Tauscheck, *Partial Difference Sets in Nonabelian Groups and Strongly Regular Cayley Graphs*, 2018–2019.

EXTREEMS-QED summer research project advisor for Cooper Spinelli, *Relative difference sets in nonabelian groups*, 2018.

Summer reading/research advisor for Aditya Mohan, 2018.

Honors supervisor for Yoongbok Lee (recipient of Honors Fellowship), *Implementation and analysis of the Nonlinear Decomposition Attack on Polycyclic Groups*, 2017–2018.

Honors supervisor for Santana Afton, *On Automorphisms of Generalized Quadrangles with a Prime Parameter*, 2017–2018.

EXTREEMS-QED summer research project advisor for Torger Olson, *Arcs in  $PG(4,q)$* , 2017.

Monroe Scholars summer research project advisor for Ryan Oppenheim, *On the covering number of  $S_{14}$* , 2016.

Honours project co-supervisor (with John Bamberg) for Melissa Lee (University of Western Australia), *Relative Hemisystems on the Hermitian Surface*, 2014.

## PROFESSIONAL SERVICE

### Service for William & Mary:

- Honors and Research Committee (Chair) for Department of Mathematics, Fall 2023 to present.
- Web Presence and Outreach Committee (Chair) for Department of Mathematics, Fall 2023 to present
- PhD Proposal Committee for Department of Mathematics, Spring 2023 to present.
- Undergraduate Curriculum Committee for Department of Mathematics, Fall 2022 to present.
- Pure Mathematics Unit Personnel Committee, Fall 2022 to present.
- Editor for Processes for Institutional Effectiveness (PIEs) for Department of Mathematics, Fall 2020 to Fall 2021.
- Member of Merit Evaluation Committee for Department of Mathematics, Fall 2019.
- PME Math Club Sponsor, Spring 2019 to Fall 2021.
- Member of Merit Evaluation Committee for Department of Mathematics, Fall 2018.
- Library Representative for Department of Mathematics, September 2015 to August 2018.
- Member of Merit Evaluation Committee for Department of Mathematics, Fall 2016.
- Member of Math Competition Committee for Department of Mathematics, September 2016– August 2018.
- Member of panel for undergraduates at William & Mary Majors Information Fair, Spring 2016
- Freshman advisor to 6–8 students per year, 2016–2021, 2023-2024
- Major advisor for Mathematics (numerous students)

### Other Professional Service:

- Division Editor (Algebra), *Communications in Mathematics*, November 2017 to present.
- Co-organizer, *Algebra/Combinatorics Session at the 8<sup>th</sup> Australia and New Zealand Mathematics Convention*, December 2014.

- Co-organizer, *37<sup>th</sup> Australasian Conference on Combinatorial Mathematics and Combinatorial Computing*, December 2013.
- Co-organizer, *Binghamton Combinatorics Seminar*, 2010–2012.
- Volunteer, *Western Australia Junior Mathematics Olympiad*, 2013–2014.
- Volunteer, *University of Western Australia Academy for Young Mathematicians*, 2013.
- Referee, *Journal of Combinatorial Theory, Series A*; *Journal of Graph Theory*; *Discrete Mathematics*; *Australasian Journal of Combinatorics*; *Discrete Applied Mathematics*; *Expositiones Mathematicae*; *European Journal of Combinatorics*; *Ars Mathematica Contemporanea*; *Electronic Journal of Combinatorics*; *AKCE International Journal of Graphs and Combinatorics*; *Journal of Algebra and Its Applications*; *Acta et Commentationes Universitatis Tartuensis de Mathematica*; *Discussiones Mathematicae Graph Theory*; *Involve*; *Journal of Pure and Applied Algebra*; *Applied Mathematical Modeling*; *Combinatorica*; *PME Journal*; *Quasigroups and Related Systems*; *Journal of Group Theory*; *Journal of Algebra, Combinatorics, Discrete Structures, and Applications*; *Journal of Algebra*; *Linear and Multilinear Algebra*; *Advances in Mathematics*
- Reviewer, *Math Reviews on MathSciNet* (25 reviews)