Eric Allen Swartz

Curriculum Vitæ

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Nationality

US Citizen.

Education

June 2009 **Ph.D., Mathematics**, The Ohio State University.
Columbus, OH

June 2004 **Bachelor of Arts, Mathematics**, *Cum Laude*, Harvard University.
Cambridge, MA

Ph.D. Thesis

Title *2-arc transitive polygonal graphs of large girth and valency*

Advisor Ákos Seress

Appointments

Aug. 2015 – present **Assistant Professor**, *College of William and Mary*.

Jan. 2013 – July 2015 **Research Associate**, *Centre for the Mathematics of Symmetry and Computation at The University of Western Australia*.

Sept. 2010 – Dec. 2012 **Riley Visiting Assistant Professor**, *Binghamton University*.

Sept. 2009 – June 2010 **Lecturer**, *The Ohio State University*.

Publications and Preprints

1. E. Swartz, *A construction of an infinite family of 2-arc transitive polygonal graphs of arbitrary odd girth*, J. Combin. Theory Ser. A 117 (6), 2010, 783–789.
2. E. Swartz, *A construction of an infinite family of 2-arc transitive polygonal graphs of arbitrary even girth*, J. Alg. Combin. 33 (1), 2011, 95–109.
3. Á. Seress and E. Swartz, *A note on the girth-doubling construction for polygonal graphs*, J. Graph Theory 68, 2011, 246–254.

4. E. Swartz, *The locally 2-arc transitive graphs admitting an almost simple group of Suzuki type*, J. Combin. Theory Ser. A 119, 2012, 949–976.
5. Á. Seress and E. Swartz, *A family of near-polygonal graphs of valency 10*, Ann. Comb. 16, 891–903, 2012.
6. J. Bamberg, S. Glasby, and E. Swartz, *AS-configurations and skew-translation generalised quadrangles*, J. Algebra 421, 311–330, 2015, 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*, Des. Codes Cryptogr. 75, 237–242, 2015, http://dx.doi.org/10.1007/s10623-013-9903-7.
8. L. Morgan, E. Swartz, and G. Verret, *On 2-arc-transitive graphs of order kp^n*, J. Combin Theory Ser. B, 117, 77–87, 2016, http://dx.doi.org/10.1016/j.jctb.2015.11.001.
9. J. Bamberg, M. Lee, and E. Swartz, *A note on relative hemisystems of Hermitian generalised quadrangles*, Des. Codes Cryptogr., 81 (1), 131–144, 2016, http://dx.doi.org/10.1007/s10623-015-0135-x.
10. E. Swartz, *Locally 3-arc transitive regular covers of complete bipartite graphs*, Electron. J. Combin., 23 (2), Paper 2.18, 20 pp., 2016, 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*, Disc. Math. 339 (11), 2593–2604, 2016, https://doi.org/10.1016/j.disc.2016.05.004.
12. L.C. Kappe, D. Nikolova-Popova, and E. Swartz, *On the covering number of small symmetric groups and some sporadic simple groups*, Groups Complex. Cryptol. 8 (2), 135–154, 2016, 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*, Trans. Amer. Math. Soc., to appear. Available at https://doi.org/10.1090/tran/6984.
14. O. Gnilke, M. Greferath, C. Hollanti, G. Nuñez Ponasso, P. Ó Catháin, *Improved User-Private Information Retrieval via Finite Geometry*, accepted to The Tenth International Workshop on Coding and Cryptography 2017. Available at https://arxiv.org/abs/1707.01551.
15. J. Bamberg, B. Corr, A. Devillers, D. Hawtin, I. Pivotto, and E. Swartz, *The circular altitude of a graph*, submitted. Available at https://arxiv.org/abs/1608.06127.
16. A. Schaefer and E. Swartz, *Graphs that contain multiply transitive matchings*, submitted. Available at https://arxiv.org/abs/1706.08964.
17. R. Oppenheim and E. Swartz, *On the covering number of S_{14}*, submitted. Available at http://www.math.wm.edu/~eswartz/S14_2017_06_20.pdf.
18. E. Swartz and N. Werner, *Zero pattern matrix rings, reachable pairs in digraphs, and Sharp's topological invariant τ*, submitted. Available at https://arxiv.org/abs/1709.05390.

19. E. Swartz, *On generalized quadrangles with a point regular group of automorphisms*, submitted. Available at `https://arxiv.org/abs/1710.09019`.

In Preparation

20. M. Giudici and E. Swartz, *Locally s-arc transitive graphs arising from the product action*.
21. T. Olson and E. Swartz, *Transitive PSL(2,11)-invariant arcs in PG(4,q)*.
22. M. Garonzi, L.-C. Kappe, and E. Swartz, *On integers that are covering numbers of groups*.
23. J. Bamberg, C.H. Li, and E. Swartz, *Locally 2-arc-transitive generalized polygons*.

Grants

2012 AMS-Simons Travel Grant, $4000.

2013 UWA ECM Research Development Grant (with Irene Pivotto), $10000.

2015 UWA Research Collaboration Award (with Padraig Ó Catháin), $9100.

Awards

2006–2007 Phil Huneke Excellence in Teaching Award, $750.

2005–2006 Distinguished First-Year Graduate Student Teaching Associate Award.

Invited Presentations

Sept. 2016 **AMS Sectional Meeting (University of North Texas), Special Session on Generalizations of Graph Theory**, *Graphs that contain multiply transitive matchings*.

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

Jan. 2016 **Aalto University Algebra, Number Theory, and Applications Seminar**, *Highly symmetric Hadamard matrices*.

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

June 2015 **Monash University Discrete Math Seminar**, *Highly symmetric Hadamard matrices*.

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

Jan. 2015 **Joint Meetings of the AMS and MAA, Special Session on What's New in Group Theory?**, *Highly symmetric generalized quadrangles*.

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

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

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

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

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

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

Other Conference Presentations

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

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

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

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

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

Dec. 2014 **ANZMC8 (Melbourne, Australia)**, *Covering symmetric groups with proper subgroups*.

Dec. 2014 **38ACCMCC (Wellington, New Zealand)**, *Antiflag-transitive generalized quadrangles*.

Sept. 2014 **Finite Geometries 2014 (Irsee, Germany)**, *Antiflag-transitive generalized quadrangles*.

July 2014 **Algebra, Geometry, and Computation (Eindhoven, Netherlands)**, *Antiflag-transitive generalized quadrangles*.

Jan. 2014 **Joint Meetings of the AMS and MAA, Special Session on Trends in Graph Theory**, *New examples of strongly regular Cayley graphs*.

Dec. 2013 **37ACCMCC (Perth, Australia)**, *New examples of strongly regular Cayley graphs*.

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

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

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

June 2011 **7th Slovenian International Conference of Graph Theory, Group Actions Minisymposium (Bled, Slovenia)**, *The locally 2-arc transitive graphs admitting an almost simple group of Suzuki type*.

May 2009 **The 22nd Cumberland Conference on Graph Theory/Combinatorics/Computing – Western Kentucky University**, *2-arc transitive polygonal graphs of large girth and degree*.

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

Apr. 2009 **CombinaTexas '09 – University of Houston**, *2-arc transitive polygonal graphs of large girth and valency*.

Mar. 2009 **AMS Sectional Meeting – University of Illinois, Urbana-Champaign**, *A construction of an infinite family of 2-arc transitive polygonal graphs of arbitrary odd girth*.

Teaching Experience

2015–present **Assistant Professor**, *Department of Mathematics*, College of William and Mary.
- Symmetry (COLL 100 course)
- Calculus II (integral calculus, sequences/series)
- Intro Multivariable Calculus
- Foundations of Mathematics
- Abstract Algebra

2010–2012 **Riley Visiting Assistant Professor**, *Department of Mathematical Sciences*, 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)

2009–2010 **Lecturer**, *Department of Mathematics*, The Ohio State University.
- Elementary Functions (precalculus)
- Calculus and Analytic Geometry I (differential 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)

Summer 2009 **Peer Mentor/Master Teacher**, *Department of Mathematics*, The Ohio State University.
- Seminar in Teaching College Mathematics (The Master Teacher is an advanced graduate student with a successful teaching background who assists the faculty and staff in the eight-week teaching practicum for new graduate students.)

2005–2009 **Graduate Teaching Associate**, *Department of Mathematics*, The Ohio State University.
- Survey of Calculus (differential and integral calculus for architecture students)
- Mathematical Analysis for Business II (differential calculus for business students)
- Elementary Functions (precalculus)
- Calculus and Analytic Geometry I (differential calculus for engineers)
- Calculus and Analytic Geometry II (integral calculus for engineers)
- Accelerated Calculus with Analytic Geometry I (honors differential calculus)

2001–2003 **Course Assistant**, *Department of Mathematics*, Harvard University.
- Introduction to Calculus (differential calculus)

Mentoring

2014 **Honours project co-supervisor with John Bamberg for Melissa Lee**, *Relative Hemisystems on the Hermitian Surface*.

Summer 2016 **Monroe Scholars project supervisor for Ryan Oppenheim**, *On the covering number of* S_{14}.

Summer 2017 **EXTREEMS-QED summer project supervisor for Torger Olson**, *Transitive PSL(2,11)-invariant arcs in PG(4,q)*.

2017–2018 **Honors supervisor for Yoongbok Lee (recipient of Honors Fellowship)**.

2017–2018 **Honors supervisor for Corey "Santana" Afton**.

Service

2017–present **Editor**, *Communications in Mathematics*.

2013 **Co-organizer**, *37th Australasian Conference on Combinatorial Mathematics and Combinatorial Computing*, December 2013.

2010–2012 **Co-organizer**, *Binghamton University Combinatorics Seminar*.

2014 **Co-organizer**, *Algebra/Combinatorics session at ANZMC8*, December 2014.

2013–2014 **Volunteer**, *Western Australia Junior Mathematics Olympiad*.

2013 **Volunteer**, *UWA Academy for Young Mathematicians*.

Referee, *Journal of Combinatorial Theory, Series A; Journal of Graph Theory; Discrete Mathematics; The Australasian Journal of Combinatorics; Discrete Applied Mathematics; Expositiones Mathematicae; European Journal of Combinatorics; Electronic Journal of Combinatorics; AKCE International Journal of Graphs and Combinatorics; Ars Mathematica Contemporanea*.

Reviewer, *Math Reviews on MathSciNet*.

Computer Skills

GAP, *Groups, Algorithms, Programming*.

Gurobi.

MINION.

Mathematica.