ROBERT W. BELL

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Holmes Hall, Room W-32	Wells Hall, Room C-305
Lyman Briggs College	Department of Mathematics
Michigan State University	Michigan State University
W-32 Holmes Hall	A-305 Wells Hall
East Lansing, MI 48825	East Lansing, MI 48824

EMPLOYMENT HISTORY

Associate Professor, Lyman Briggs College and Department of Mathematics, Michigan State University, July 2012–present.

Visiting Scholar, University of Michigan, Department of Mathematics, August 2017–August 2018.

Assistant Professor, Lyman Briggs College and Department of Mathematics, Michigan State University, Aug. 2006–June 2012.

Assistant Professor (Lecturer), Department of Mathematics, University of Utah, Aug. 2003–May 2006.

EDUCATION

The Ohio State University, Ph.D. Mathematics, May 2003, Dissertation advisor: Ruth M. Charney.

Syracuse University, M.S. Mathematics, December 1996.

Boston College, A.B. Mathematics with honors, May 1995, Magna Cum Laude, Phi Beta Kappa.

AWARDS

NSF VIGRE Postdoctoral Fellow, University of Utah, Aug. 2003–May 2006.

All-University Graduate Fellow, Syracuse University, August 1995–May 1998.

PUBLICATIONS

Robert W. Bell and Rita Gitik. *Quasi-positivity and recognition of products of conjugacy classes in free groups.* Submitted. Available at arXiv:1808.03291.

Taylor Ball, Robert W. Bell, Jonathan Guzman, Madeleine Hanson-Colvin, and Nikolas Schonsheck. *The cop number of generalized*

Petersen graphs. Discrete Mathematics. Online: available November 2016. Print: Volume 340, Issue 6, June 2017, pp. 1381–1388.

Robert W. Bell and Matt Clay. "Right-angled Artin groups," book chapter in *Office Hours with a Geometric Group Theorist*, M. Clay and D. Margalit, editors, Princeton University Press, 2017.

Bell, Robert W. & Zeleke, Aklilu. *Starting and Sustaining an Undergraduate Research Program: The SURIEM Experience at Michigan State University*, PRIMUS, DOI: 10.1080/10511970.2016.1240730. Published online: 10 October 2016.

Robert W. Bell. *Combinatorial Methods for Detecting Surface Subgroups in Right-Angled Artin Groups*. ISRN Algebra, vol. 2011, Article ID 102029, 6 pages, 2011. doi:10.5402/2011/102029.

Robert W. Bell and Dan Margalit. *Injections of Artin groups*. Commentarii Mathematici Helvetici, 82 (2007), no. 4, 725-751.

Robert W. Bell and Dan Margalit. *Braid groups and the co-Hopfian property*. Journal of Algebra, 303 (2006), no. 1, 275-294.

Robert W. Bell. *Three dimensional FC Artin groups are CAT(0)*. Geometriae Dedicata, 113 (2005), 21-53.

GRANTS

PI, "REU Site: REU in Discrete and Applied Mathematics", NSF Division of Mathematical Sciences, NSF Award No. 1852066, 5/1/2019–4/30/2022, amount awarded: $261,739.

PI, "Summer Undergraduate Research Institute in Experimental Mathematics (SURIEM)", National Security Agency, NSA Award No. H98230-19-1-0014, 5/1/2019–4/30/2020, amount awarded: $94,917.

PI, "Summer Undergraduate Research Institute in Experimental Mathematics (SURIEM)", National Security Agency, NSA Award No. H98230-18-1-0042, 4/18/2018–4/17/2019, amount awarded: $101,554.

PI, "REU Site: REU in Discrete and Applied Mathematics", NSF Division of Mathematical Sciences, NSF Award No. 1559776, 4/1/2016–3/31/2019, amount awarded: $287,199.

PI, "Summer Undergraduate Research Institute in Experimental Mathematics (SURIEM)", National Security Agency, NSA Award No. H98230-16-1-0031, 5/16/2016–5/15/2017, amount awarded: $85,109.

co-PI, "Summer Undergraduate Research Institute in Experimental Mathematics (SURIEM)", National Security Agency, PI: Aklilu Zeleke,

NSA Award No. H98230-15-1-0047, 5/16/2015–5/15/2016, amount awarded: $84,194.

Senior Personnel, "LEVERS: Leveraging Engagement and Vision to Encourage Retention in STEM", Howard Hughes Medical Institute, New Awards for Science Education to Research Universities, PI: R. Sekhar Chivukula, 5/16/2014–5/16/2019, amount awarded: $1,500,000. Bell and Zeleke will develop an inquiry based calculus course for life sciences.

co-PI, "Summer Undergraduate Research Institute in Experimental Mathematics (SURIEM)", National Security Agency, PI: Aklilu Zeleke, 2013-present, amount awarded: $94,045 in 2013; $76,868 awarded in 2014.

Senior Personnel, "Science Scholarship Program at Lyman Briggs College Phase 2", NSF award no. 1153778, NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM), PI: Ryan Sweeder, 5/1/2012–4/30/2016, amount awarded: $599,834.

co-PI, "REU Site in Applied & Discrete Mathematics", NSF award no. 1062817, NSF Division of Mathematical Sciences, PI: Aklilu Zeleke, 9/1/2011–8/31/2014, amount awarded: $275,406.

co-PI, "Summer Undergraduate Research Institute in Experimental Mathematics", NSA grant no. H98230-11-1-0222, National Security Agency, PI: Aklilu Zeleke, amount awarded: $83,706 2011-12 in 2011 REU and $83K in 2012.

co-PI, "REU Site in Probability and Discrete Mathematics", NSA award no. H98230-10-1-0222, National Security Agency, PI: Aklilu Zeleke, amount awarded: $87,199 in 2010.

Senior Personnel, EMSW21-RTG: "Research Training in Geometry and Topology at Michigan State University", NSF award no. 0739208, NSF Division of Mathematical Sciences, PI: Ronald Fintushel, 2008-2012, amount awarded: $640,000.

MATHEMATICAL REVIEWS

MR3723556 Amram, Meirav; Shwartz, Robert; Teicher, Mina Covers of D-type Artin groups. Electron. J. Combin. 24 (2017), no. 4, Paper 4.17, 26 pp. (Reviewer: Robert W. Bell)

MR3639631 Reviewed Calvez, Matthieu; Wiest, Bert Curve graphs and Garside groups. Geom. Dedicata 188 (2017), 195-213. (Reviewer: Robert W. Bell)

MR3513110 Terragni, Tommaso. On the growth of a Coxeter group.

Groups Geom. Dyn. 10 (2016), no. 2, 601618. (Reviewer: Robert W. Bell)

MR3434544 Fedoseev, Denis A.; Manturov, Vassily O.; Cheng, Zhiyun. On marked braid groups. J. Knot Theory Ramifications 24 (2015), no. 13, 1541005, 12 pp. (Reviewer: Robert W. Bell)

MR3314944 Kar, Aditi; Nikolov, Nikolay Rank gradient and cost of Artin groups and their relatives. Groups Geom. Dyn. 8 (2014), no. 4, 11951205. (Reviewer: Robert W. Bell)

MR3252966 Guilbault, Craig R.; Mooney, Christopher P. Boundaries of CrokeKleiner-admissible groups and equivariant cell-like equivalence. J. Topol. 7 (2014), no. 3, 849868. (Reviewer: Robert W. Bell)

MR3114776 Polk, Jason K. C.; Wise, Daniel T. Polygonal VH complexes. Publ. Mat. 57 (2013), no. 2, 421428. (Reviewer: Robert W. Bell)

MR2914860 Clay, Matt T.; Leininger, Christopher J.; Mangahas, Johanna. The geometry of right-angled Artin subgroups of mapping class groups. Groups Geom. Dyn. 6 (2012), no. 2, 249278. (Reviewer: Robert W. Bell)

MR2918313 Hosaka, Tetsuya. On boundaries of Coxeter groups and topological fractal structures. Tsukuba J. Math. 35 (2011), no. 2, 153-160. (Reviewer: Robert W. Bell)

MR2846406 Digne, Franois; Marin, Ivan; Michel, Jean. The center of pure complex braid groups. J. Algebra 347 (2011), 206213. (Reviewer: Robert W. Bell)

MR2802164 Peyerimhoff, Norbert; Vdovina, Alina. Cayley graph expanders and groups of finite width. J. Pure Appl. Algebra 215 (2011), no. 11, 27802788. (Reviewer: Robert W. Bell)

MR2776985 McCammond, Jon; Wise, Daniel. Windmills and extreme 2-cells. Illinois J. Math. 54 (2010), no. 1, 69-87. (Reviewer: Robert W. Bell)

MR2734148 An, Byung Hee; Ko, Ki Hyoung. *A family of representations of braid groups on surfaces.* Pacific J. Math. 247 (2010), no. 2, 257282. (Reviewer: Robert W. Bell)

MR2669638 Gordon, Cameron; Wilton, Henry. *On surface subgroups of doubles of free groups.* J. Lond. Math. Soc. (2) 82 (2010), no. 1, 1731. (Reviewer: Robert W. Bell)

MR2644310 Lee, Eon-Kyung; Lee, Sang-Jin. *Uniqueness of roots up to conjugacy for some affine and finite type Artin groups.* Math. Z. 265 (2010), no. 3, 571-587. (Reviewer: Robert W. Bell)

MR2552249 Bestvina, Mladen; Bux, Kai-Uwe; Margalit, Dan. *The dimension of the Torelli group.* J. Amer. Math. Soc. 23 (2010), no. 1, 61-105. (Reviewer: Robert W. Bell)

MR2599567 Mj, Mahan. *Mapping class groups and interpolating complexes: rank.* J. Ramanujan Math. Soc. 24 (2009), no. 4, 341-357. (Reviewer: Robert W. Bell)

MR2556030 Andersen, Jrgen Ellegaard; Bene, Alex James; Penner, R. C. *Groupoid extensions of mapping class representations for bordered surfaces.* Topology Appl. 156 (2009), no. 17, 27132725. (Reviewer: Robert W. Bell)

MR2497785 Fujiwara, Koji. *Quasi-homomorphisms on mapping class groups.* Handbook of Teichmüller theory. Vol. II, 241269, IRMA Lect. Math. Theor. Phys., 13, Eur. Math. Soc., Zürich, 2009. (Reviewer: Robert W. Bell)

MR2493376 Vershinin, V. V. *On the inverse braid monoid.* Topology Appl. 156 (2009), no. 6, 1153–1166. (Reviewer: Robert W. Bell)

MR2457429 Hosaka, Tetsuya. *Minimality of the boundary of a right-angled Coxeter system.* Proc. Amer. Math. Soc. 137 (2009), no. 3, 899–910. (Reviewer: Robert W. Bell)

MR2422070 Crisp, John; Sageev, Michah; Sapir, Mark. *Surface subgroups of right-angled Artin groups.* Internat. J. Algebra Comput. 18 (2008), no. 3, 443–491. (Reviewer: Robert W. Bell)

MR2392822 Tillmann, Ulrike. *Artin's map in stable homology.* Bull. Lond. Math. Soc. 39 (2007), no. 6, 989–992. (Reviewer: Robert W. Bell)

MR2386796 Funar, Louis. *Braided Houghton groups as mapping class groups.* An. tiin. Univ. Al. I. Cuza Iai. Mat. (N.S.) 53 (2007), no. 2, 229–240. (Reviewer: Robert W. Bell)

MR2336251 Wang, Stephen Representations of surface groups and right-angled Artin groups in higher rank. Algebr. Geom. Topol. 7 (2007), 1099–1117. (Reviewer: Robert W. Bell)

MR2313068 Geoghegan, Ross; Ontaneda, Pedro. *Boundaries of cocompact proper* CAT(0) *spaces.* Topology 46 (2007), no. 2, 129–137. (Reviewer: Robert W. Bell)

MR2263057 Caprace, Pierre-Emmanuel. *Conjugacy of 2-spherical subgroups of Coxeter groups and parallel walls.* Algebr. Geom. Topol. 6 (2006), 1987–2029. (Reviewer: Robert W. Bell)

MR2252676 Antony, Noelle. *The natural embedding of positive singular*

Artin monoids. Comm. Algebra 34 (2006), no. 9, 3329–3346. (Reviewer: Robert W. Bell)

MR2241974 Lafont, Jean-Francois. *Strong Jordan separation and applications to rigidity.* J. London Math. Soc. (2) 73 (2006), no. 3, 681–700. (Reviewer: Robert W. Bell)

MR2197811 Chatterji, Indira; Niblo, Graham. *From wall spaces to* CAT(0) *cube complexes.* Internat. J. Algebra Comput. 15 (2005), no. 5-6, 875–885. (Reviewer: Robert W. Bell)

MR2183979 Antony, Noelle. *On singular Artin monoids and contributions to Birman's conjecture.* Comm. Algebra 33 (2005), no. 11, 4043–4056. (Reviewer: Robert W. Bell)

PROFESSIONAL ACTIVITIES

Co-organizer (with Zeleke) of the Summer Research Institute in Experimental Mathematics (SURIEM), a summer REU program in mathematics at MSU (Summer 2010-present)

Organizer of the Summer Undergraduate Michigan Mathematics Research (SUMMR) Conference (2018).

Co-organizer (with Zeleke) of the Summer Undergraduate Michigan Mathematics Research (SUMMR) Conference (2012, 2015).

Developer and consultant for Expacon - a mathematical game based on group theory by Gilbert Baumslag

Advisor for MSU's COMAP Mathematics Contest in Modeling team (2008, 2009, 2013, 2014)

Co-organizer of an MSU undergraduate trip to MathFest, Madison, WI (Summer 2008)

Co-organizer (with Zeleke) of the Michigan Undergraduate Math Conference (2007)

Co-organizer (with Charney) of an NSF VIGRE working group on geometric group theory at Ohio State (2002)

Referee for *Geometry & Topology*, *Journal of Pure & Applied Algebra*, *Michigan Math Journal*, *Astérisque*, *The American Mathematical Monthly*, *The Electronic Journal of Combinatorics*, *Journal of Algebra*, and various conference proceedings.

PROFESSIONAL MEMBERSHIPS

American Mathematical Society

Mathematical Association of America

PROGRAMMING EXPERIENCE

C, CSS, HTML, Mathematica, Python, R, SageMath, WeBWork, Matlab

TEACHING

Michigan State University:

MTH 103 College Algebra (FS12–14, FS18)
LB 118 Calculus I (FS06–08, FS11, FS14–15, SS07)
LB 118 Calculus I, Special Section for Life Science Majors (SS16, SS17)
LB 119 Calculus II (FS09–10, FS12)
UGS 200H Honors Research Seminar: Experimental Mathematics (FS07–SS08)
LB 220 Calculus III (FS13, FS15, SS08, SS11–13, SS17) MTH 254H Honors Multi-variable Calculus (SS12)
MTH 291 Mathematical Snapshots (SS15)
MTH 299 Transitions (SS14)
MTH 309 Linear Algebra (FS06)
MTH 310 Abstract Algebra & Number Theory I (SS11)
MTH 419H Honors Algebra II (SS15–16)
LB 492 Senior Seminar: Modern Mathematical Discoveries (FS11)
LB 492 Senior Seminar: The Mathematics of Politics (SS09)
LB 492 Senior Seminar: Artificial Intelligence, Big Data, and Machine Learning (SS19)
MTH 496 Capstone in Mathematics: Geometric Group Theory (SS19)
MTH 996 Geometric Group Theory (SS09, SS13)

University of Utah:

Introduction to Analysis II (SS06)
Intermediate Algebra (FS05)
Algebraic Topology (SS05)
Point Set Topology (FS04)
Introduction to Algebraic Topology (SS04)
Introduction to Analysis (FS03)

The Ohio State University:

Various calculus and pre-calculus courses (FS98–SS03)

Syracuse University:

Calculus, pre-calculus, and business calculus courses (SU96–SS98)

ADDITIONAL TEACHING

Reading course: Mapping class groups (SS17)
Reading course: Symmetry & Permutation Groups (FS16)
Reading course: Networks and Graph Theory (SU15)
Reading course: Mathematical Biology (SS15)
Reading course: Combinatorics of Coxeter Grousp (SU14)
Reading course: Mapping class groups (SS14)
Reading course: Thompson's group and the Lamplighter group (SU13)
Reading course: Pursuit and evasion games on graphs (SS13)
Reading course: Geometric group theory (SU12)
Reading course: Simplicial complexes and algebraic topology (SU12)
Reading course: Knot theory (SU09)
Reading course: Calculus on manifolds (SS09)
Putnam team: (FS08)
Reading course: Abstract algebra II (Utah, SS05)
Reading course: Calculus on manifolds (Utah, SU04)
High School Math Circles lecturer (Utah, FS03–SS05)

COURSE DEVELOPMENT

Senior Seminar: Artificial Intelligence, Big Data, and Machine Learning (SS19). This is a course for seniors (typically non-mathematics majors) in LBC. The course introduces some mathematical ideas, e.g. fundamental algorithms, neural networks. But the focus is on ethical and societal questions. Readings include media articles on advances in AI, e.g. the AlphaZero program which learns how to play Go and beats the best human players, and also books written by experts in diverse fields (Cathy O'Neil, data scientist; Nick Bostrom, philosopher; Safiya Noble, sociologist ; Viginia Eubanks, sociologist). Students work on term projects and give final presentations.

Captstone in Mathematics: Geometric Group Theory (SS19). This is a course for senior mathematics majors, many of whom have not yet studied groups. The course emphasizes groups as transformations. Many examples of infinite groups are introduced (free groups, SL$(2, \mathbb{Z}$, reflection groups, Lamplighter group, Thompson's group, Baumslag-Solitar groups). Finitely generated groups are studied as metric spaces (via their Cayley graph or via isometric actions on other metric spaces). Ideas from linear algebra, analysis, and topology are used, introduced just in time as needed. Students work on term projects and give final presentations.

Precalculus to Calculus (SU17): Joint work with Abe Edwards on developing curriculum and learning objectives for LB 117, a precalculus

course with a tighter focus on themes and topics necessary for success in LB 118 Calculus I. We pitch this as the first part of Calculus I.

Calculus for Life Science Majors (FS15–SS18): This is work in progress, joint with Zeleke, and is part of a larger effort to transform undergraduate STEM education. The effort is funded by a grant from the HHMI. The course will use real data, modeling, and inquiry methods.

Senior Seminar: Modern Mathematical Discoveries (SS11): The aim of this course was for non-mathematics majors in Lyman Briggs College, especially those who might go into science policy, to learn about some of the great mathematical achievements of the 20th century in much the same way that one with a limited scientific background could learn about 20th century physics. Students were expected to present mathematical topics in written, oral, and audio-visual formats to their peers.

Senior Seminar: The Mathematics of Politics (SS09): This was a course for senior non-math majors in Lyman Briggs College. This course emphasized problem solving, mathematical reasoning, and scientific writing. Topics included game theory, models of escalation, fair division, and voting theory.

Honors Seminar: Experimental Mathematics (FS07–SS08): This was a course for first year students in the MSU Honors College developed jointly with Aklilu Zeleke. The course emphasized computer programming, designing computer simulations, and undergraduate research. Topics included probability, dynamical systems, and discrete mathematics.

UNDERGRADUATE RESEARCH MENTORING

Tao Fei, Jonathan Fleck (MSU), Spencer Lee (MSU), Chris Wilcox (MSU). Undergraduate research students. Research topics: pursuit and evasion games on graphs. SS17.

Julie Bowman (Southwestern Baptist University), Arhtur Diep-Nguyen (Boston College), Rashmika Goswami (University of Michigan), Dylan King (University of Nebraska at Omaha), Nicholas Lindell (University of Georgia). Summer REU students. Research topics: weak cop numbers of planar tilings, the game of seepage. Summer 2016.

Levi Crews (Duke University), Garrette Divens (Morehouse College), Jordan DuBeau (Middlebury College), Beth Matys (Gettysburg College), Gregory Rodriguez (NYU), Will Vosjepka (USAF Academy). Summer REU students. Research topics: Weak cop numbers of infinite graphs, cop numbers of amalgams of graphs. Summer 2015.

Taylor Ball (Indiana University), Jonathan Guzman (California State

College, Long Beach), Madeleine Hanson-Colvin (Bryn Mawr College), and Nikolas Schonsheck (Vassar College). Summer REU students. Research topic: Bounds on the cop number of generalized Petersen graphs and the cop number of grids on surfaces. Summer 2014.

Adam Scarchili and David Wegscheid, reading course. Research topic: Generalizations of active and passive cop numbers of finite graphs. SS13.

Alex Ethridge (MSU). Research topic: Connolly surfaces and computer modeling of molecules. SS13.

Thomas Bolden (MS), LB 119 and LB220 student. Research topic: Knot theory. FS12–SS13.

Kirstyn Baker (Alma College), Caitlin Graff (Idaho State), Aashish Srinivas (Swarthmore), Anthony Graves-McCleary (Vassar), and Phil Thomas (Indiana). Summer REU students. Research Topics: pursuit and evasion games on graphs. Summer 2012.

John Hopfensberger (MSU), Professorial Assistant. Research topic: group theory FS10–SS11.

Adam Scarchilli (MSU), Professorial Assistant. Research topic: combinatorial games. FS10–SS11.

Erica Dominic (Kalamazoo College), Rebecca Meyer (Whitworth College), Ramond Perkins (Morehouse College), Garrett Rodriguez (Alma College), and Joshua Ritter (MSU). Summer REU students. Research Topics: pursuit and evasion games on graphs. Summer 2010.

Rachel Klavon (MSU), Professorial Assistant. Research topic: combinatorial games and computer programming. FS07–SS09.

Kathleen Bonnen (MSU), Professorial Assistant. Research topic: combinatorial games and group theory. FS07–FS08.

Jeremy Pecharich (Utah), NSF VIGRE REU student. Research topic: hyperbolic geometry and non-positive curvature. Summer 2004–Summer 2005.

HONORS OPTION PROJECTS SUPERVISED

Sydney Miller. Topic: The mathematics of Tchoukaillon, a solitaire variant of Mancala, FS14.

Jonathan Boss. Topic: Schwartz's example of a sequence of polygonal surfaces which geometrically approximate a finite cylinder, but whose areas diverge, FS13.

Michael Cross. Topic: Deriving Snell's Law and the AM/GM inequality using Lagrange Multipliers, FS13.

Michael Sterner. Topic: A mathematical derivation of Kepler's Laws, SS13.

Scott O'Connor. Topic: Regular tournaments, SS11.

Craig Pearson. Topic: Cesàro sums, SS11.

Sara Dykowski & Robert McGowan. Topic: RSA cryptography, FS10.

Santosh Gunturu. Topic: programming and card counting, FS10.

Andrew Johnson. Topic: least squares approximations, FS10,

Eric Lee. Topic: programming and the game of nim, FS10.

Craig Pearson. Topic: Fourier series, FS10.

Paul Ryan. Topic: programming and games, FS10.

Kevin Steelman. Topic: mathematics of a tennis serve, FS10.

Megan Climans. Topic: programing and numerical methods, FS08.

Nelson Winkler. Topic: the fifteen puzzle, FS07.

Valerie Rygiel. Topic: chessboard problems, FS07.

Michael Moran. Topic: programing and games, FS07.

Teresa Deluca. Topic : logic and proof, FS06.

GRADUATE STUDENT MENTORING

Michael Shultz, SS17. Reading course on mapping class groups.

Emad Zahedi, Summer 2015. Reading course on networks and graph theory.

Emily Olson, Summer 2014. Reading course on combinatorics of Coxeter groups.

Stephen Burton and Deborah Franks, Spring 2014. Reading course on mapping class groups.

Deborah Franks, Summer 2013. Reading course in geometric group theory.

Joshua Hallam, Summer 2012. Reading course in algebraic topology.

Christine Lee, Summer 2012. Reading course in hyperbolic geometry and geometric group theory.

Jeremy Walthers, Summer 2010. Reading course in geometric group theory.

GRADUATE COMPREHENSIVE EXAM COMMITTEE

Michael Shultz, MSU 2017

Duff Baker-Jarvis, MSU 2016
Eylem Yildiz, MSU 2016
Metin Ozsarfat, MSU 2016
Emad Zahedi, MSU, 2015
Emily Olson, MSU, 2015
Stephan Burton, MSU, 2014
Samantha Dalhberg, MSU, 2013
Joshua Hallam, MSU, 2013
Christine Lee, MSU, 2012
Kenny Barrese, MSU 2012
Joshua Thompson, Utah, 2006
Scott Crofts, Utah, 2006

DISSERTATION COMMITTEE

Duff Baker-Jarvis, MSU 2019
Samuel Lin, MSU 2017
Stephan Burton, MSU 2017
Emily Olson, MSU 2017
Samantha Dalhberg, MSU 2016
Joshua Hallam, MSU 2015
Kenny Barrese, MSU 2015
Christine Lee, MSU 2015
Luke Williams, MSU 2015
Faramarz Vafaee, MSU, 2014
Adam Giambrone, MSU, 2014
Christopher Hays, MSU, 2013
Cheryl Balm, MSU, 2013

PROFESSIONAL DEVELOPMENT WORKSHOPS ATTENDED

STEM Teaching Essentials Workshop: Exams as Learning Opportunities: Using Assessment Corrections to Enhance Meaningful Learning and Reflection, October 9, 2018.

STEM Gateway Conference, workshop and conference related to work on the HHMI LEVERS grant, each May (2015–2018).

Inclusion in Math and Advising Learning Community workshop sponsored by the Department of Mathematics and the Office for Inclusion and Intracultural Initiatives, MSU, May 3, 2018.

Panelist for the Professional Development Workshop on Undergradute Research on April 24, 2018, sponsored by the Department of Mathematics

at MSU.

Facilitating Entering Research Workshop, sponsored by the National Mentoring Research Network at the University of Wisconin at Madison, March 22–23, 2018.

STEM Teaching Essentials Workshop: How Undergraduate Research Impact Facutly, MSU Spring 2017

MSRI Workshop on Geometry of mapping class groups and Out(F_n), October 2016

AIM Workshop on Boundaries of Groups, October 2016

MSRI Workshop on Groups acting on CAT(0) spaces, September 2016

HHMI LEVERS Gateway Summit, MSU 2015–17

STEM Teaching Essentials Workshop: The Role of Faculty in Increasing Student Success, Spring 2016

STEM Alliance Meetings, MSU, 2013–present

Probelm Based Learning Brown Bag, Jon Sticklen and Claudia Vergara, MSU, Spring 2013

MSRI Hot Topics Workshop on Surface subgroups and cube complexes, March 2013

CREATE Calculus at MSU: Improving student outcomes, David Bressoud MSU, Summer 2012

Lily Seminar Series: Moving from Effective Teaching to the Scholarship of Teaching and Learning, Karl Smith, MSU, Fall 2009

Lily Seminar Series: Design and Implementation of Active and Cooperative Learning, Karl Smith, MSU, Fall 2009

Lily Seminar Series: Opening the Classroom Door: Focus on Teaching Large Classes, Mary Bremigan, Diane Ebert-May, Carl Liedholm, and Kami Silk, MSU, Spring 2008

Spring Institute on College Teaching and Learning: Design and Implementation of Active and Cooperative Learning in Large Classes, Karl Smith, MSU, Spring 2008

Workshop Participant, AIM Workshop on Braid Groups, Clusters, and Free Probability, January 2005.

COMMITTEE WORK

Briggs Advisory Council, Lyman Briggs College, Fall 2018–present.

University Committee on Libraries, CNS representative, Fall 2018–present.

Lyman Briggs College Speaker Series, Spring 2011– Summer 2018.

MSU IDEA Coordinator, Spring 2008–2017. This university level committee advises the Office of the Provost on issues of diversity and inclusion.

Math and Physics Academic Specialist Search Committee, 2015.

HPS of Computer Science Tenure Stream Search Committee, 2015.

Undergraduate Studies Committee, Mathematics Department, Fall 2013–Spring 2015.

Lyman Briggs College Awards Committee, Fall 2011–2013, chair 12-13.

SALG (Student Assessment of Learning Gains) committee, 2008–2010. The charge of this ad-hoc LBC committee is to reform and study the use of student evaluations.

LBC Bylaws committee, 2009–2010. This ad-hoc LBC committee was charged with revising the bylaws of the college.

LBC metrics committee, 2008. This ad-hoc LBC committee was charged with determining metrics by which the college would like to be measured over the next 5-10 years.

UGLA committee, 2008. This ad-hoc LBC committee was charged with studying ways to better utilize our undergraduate learning assistants.

OUTREACH

Grandparents' University. Course offering: The mathematics of counting, puzzles, and shapes. I recruited some of the students in the SURIEM Summer REU Program to co-present and assist. Summer 2012, 2014–17.

Girl's Math / Science Day discovery presenter (with Cheryl Balm (2010), Kathleen Bonnen (2008, 2009), Rachel Klavon (2008), and Victoria McCoy (2007)), East Lansing High School.

Reviewer of grade 3-5 math / science assessment tests for the MST Education Department at MSU, Fall 2007.

OTHER SERVICE

MSU chapter Phi Beta Kappa, Vice President (2009-2013), President (2013-present).
Reviewer for the MLK Advancing Inclusion Through Research Award, 2012–2016, 2019
Author of mathematics problems for the Alumni Distinguished Scholarship

Exam for prospective MSU students, 2015.
Organizer, MSU Math Student Conference team problem solving contest, 2012–2015.
Dealer, Casino Night in Holmes Hall, 2012–2015.
Binder Park Zoo S-STEM scholarship student field trip participant and driver, Fall 2012.
Panelist, High School Honors Science Program, Summer 2011.
Co-organizer, MLK Day LBC events, 2010–2012.
Panelist, Lyman Briggs Book Debate, SS08, SS09, FS09.

INVITED TALKS, SEMINAR TALKS, COLLOQUIA

Quasi-positivity and recognition of products of conjugacy classes in free groups, Session for Contributed Papers, Fall Southeastern Setional Meeting of the AMS, Fall 2018.

Weak cop number of infinite graphs, Kalamazoo College Mathematics Colloquium, Fall 2018.

Finding play in your work (and work in your play), presentation to the first year students in the INQUIRE program in LBC, Fall 2018.

Weak cop number of infinite graphs, AMS Contributed Paper Session on Graphs and Their Applications, Joint Mathematics Meetings, San Diego, CA, Spring 2018.

Weak cop number of infinite graphs, Alma College Mathematics Colloquium, Fall 2017.

Mathematics courses in Lyman Briggs College and reform efforts (joint with Abe Edwards), Conversations Among Colleagues seminar, MSU, Spring 2017.

An exploration of right-angled Artin groups, MAA Special Session on Office Hours with a Geometric Group Theorist, Joint Mathematics Meetings, Atlanta, GA, Spring 2017.

Divergence of CAT(0) groups, Topology Seminar, MSU, Fall 2016.

Hyperbolic geometry, groups, and tilings, TOP-SUM (Topical Seminar in Undergraduate Mathematics) colloquium, MSU, Fall 2016.

Calculus Reform in LB 118, STEM Alliance Meeting presentation, MSU, Spring 2016.

Order polynomials and reciprocity (2 lectures), Combinatorics and Graph Theory Seminar, MSU, Spring 2016.

Rank gradient and expanders (2 lectures), Group Theory Seminar, MSU,

Fall 2015.

The weak cop number of an infinite graph, Colloquium, Albion College, Fall 2015.

The weak cop number of an infinite graph (2 lectures), Combinatorics and Graph Theory Seminar, MSU, Fall 2015.

The cop number of generalized Petersen graphs, AMS Sectional Meeting at Dalhousie University, Halifax, NS, Canada (October 2014); co-presenter: Madeleine Hanson-Colvin.

The cop number of generalized Petersen graphs (2 lectures), Combinatorics and Graph Theory Seminar, MSU, Fall 2014.

Roots of the characteristic polynomial of a hyperplane arrangement. Combinatorics and Graph Theory Seminar, MSU, Spring 2012.

Surface subgroups and embeddings between graph groups (4 lectures). Group Theory Seminar, MSU, Fall 2011.

On hyperbolic surface subgroups in right-angled Artin groups. AMS Sectional Meeting at the University of Utah, Fall 2011.

Pursuit and evasion games on graphs. Undergraduate Mathematics Colloquium, Central Michigan University, Spring 2011.

Combinatorial methods for detecting surface subgroups in right-angled Artin groups. AMS Sectional Meeting at Georgia Southern University, Spring 2011.

Pursuit and evasion games on graphs. Mathematics Colloquium, Albion College, Spring 2011.

Subgroups of graph groups (4 lectures). Group Theory Seminar, MSU, Fall 2010.

Surface Subgroups of right-anged Artin groups. Topology Seminar, Ohio State University, Spring 2010.

Surface subgroups of right-angled Artin groups. NY Group Theory Seminar, CUNY Graduate Center, Spring 2010.

Hamming codes. Mathematics Colloquium, Kalamazoo College, Spring 2010.

Surface subgroups (2 lectures). Topology Seminar, MSU, Spring 2010.

Logarithmic scales. Guest lecture, LB 155 Intro to Quantitative Science & Research, MSU, Fall 2009.

What is geometric group theory? Pi Mu Epsilon Math Club, MSU, Spring

2009.

Davis manifolds and boundaries of CAT(0) groups. 3 & 4 Manifolds Seminar, MSU, Fall 2008.

Hamming codes, MSU summer program for under represented students, 2008.

The geometry of the word and conjugacy problems for finitely presented groups (3 lectures). Group Theory Seminar, MSU, Fall 2007.

What is the Poincaré conjecture? Pi Mu Epsilon Math Club, MSU, Spring 2007.

Groups, geometry, and algorithms. Freshman Math Seminar, MSU, Spring 2007.

Automorphisms of the pure braid group. AMS Sectional Meeting, Miami University, Spring 2007.

A combinatorial Gauss-Bonnet theorem. Mathematics Colloquium, Albion College, Spring 2007.

Spaces with non-positive immersions. Joint AMS-MAA Meetings, New Orleans, Spring 2007.

Spaces with non-positive immersions. AMS Sectional Meeting, University of Utah, Fall 2006.

Injective endomorphisms of Artin groups. Topology Seminar, MSU, Fall 2006.

Recent advances in the study of Artin groups. Mathematics Colloquium, MSU, Spring 2006.

Recent advances in the study of Artin groups. Mathematics Colloquium, Canisius College, Spring 2006.

Quasi-isometries, Alice's diary, and the Morse-Thue sequence. Max Dehn Seminar, University of Utah, Fall 2005.

Topological classification of regular closed curves in the Plane. Undergraduate Colloquium, University of Utah, Fall 2005.

Injections of Artin groups. AMS Sectional Meeting, UC Santa Barbara, Spring 2005.

Injections of Artin groups. Spring Topology and Dynamics Conference, Berry College, Spring 2005.

Injections of Artin groups. Max Dehn Seminar, University of Utah, Fall 2004.

Combinatorial Gauss-Bonnet theorems. Undergraduate Colloquium, University of Utah, Fall 2004.

Geometric injections of braid groups. Albany Group Theory Conference, Fall 2004,

Algorithms and undecidability. Graduate Student Seminar, University of Utah, Fall 2004.

Hyperbolic groups and CAT(0) spaces. VIGRE mini-course on "The synthetic geometry of the Weil-Petersson metric", University of Utah, Spring 2004.

Braid groups are almost co-Hopfian I. Max Dehn Seminar, University of Utah, Spring 2004.

Curvature testing in Artin groups. Albany Group Theory Conference, Fall 2003.

The geometry of Coxeter groups. Graduate Student Seminar, University of Utah, Fall 2003.

Three dimensional FC Artin Groups are CAT(0). Max Dehn Seminar, University of Utah, Fall 2003.

Three dimensional FC Artin Groups are CAT(0). AMS Sectional Meeting, Northeastern University, Fall 2002.