AARON HEAP

Department of Mathematics
SUNY Geneseo
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www.geneseo.edu/math/heap/

EDUCATION:

Ph.D.	Mathematics	Rice University	2004	
B.S.	Mathematics	Texas Christian University	1998	(Phi Beta Kappa)

PROFESSIONAL EMPLOYMENT:

2025-Present	SUNY Geneseo	Professor of Mathematics
2023-Present	SUNY Geneseo	Chair, Department of Mathematics
2019-Present	SUNY Geneseo	Dr. Spencer J. Roemer Supported Professor
2013-2025	SUNY Geneseo	Associate Professor of Mathematics
2007-2013	SUNY Geneseo	Assistant Professor of Mathematics
2004-2007	University of Rochester	Visiting Assistant Professor of Mathematics
1998-2004	Rice University	Teaching and Research Assistant of Mathematics

TEACHING:

SUNY Geneseo

Calculus I, Calculus II, Calculus III, Differential Equations, Linear Algebra I, Linear Algebra II, Honors Linear Algebra, Introduction to Mathematical Proofs, Abstract Algebra, Topology, Low-Dimensional Topology, Algebraic Topology, Tied up in Knots, Introduction to 3D Modeling and Printing, Oral Presentation and Research Seminar

Curriculum/Course/Degree Development: Bachelor of Science in Mathematics, Shift to Early Transcendental Calculus, ProofSpace, 3D Modeling and Printing*, Tied up in Knots*, Algebraic Topology*, Low-Dimensional Topology*, Honors Mathematics I*, Honors Mathematics II*, and Honors Mathematics III* *(* indicates new course)*

University of Rochester

Calculus I, Calculus II, Honors Calculus I, Honors Calculus II, Honors Calculus III (Linear Algebra and Differential Equations), Honors Calculus IV (Multivariable Calculus), Linear Algebra with Differential Equations, Linear Algebra.

Rice University

Instructor: Calculus I, Differential Equations with Linear Algebra

RESEARCH:

Interests

Low-dimensional topology, mapping class groups, group theory, classical 3-manifold topology, knot theory, mosaic knots, 3D printing, WeBWorK and online educational tools.

Current Activities

Knot Mosaics
Logistic Cellular Automata
Adapting WeBWorK for Secondary Mathematics Education
Bordism invariants of homology cylinders
Cohomology and homology of the Johnson filtration
Textbook on Differential Equations and Linear Algebra

AWARDS AND HONORS:

2023	Student Athlete Faculty Appreciation Award, SUNY Geneseo (Volleyball)
2023	Student Athlete Faculty Appreciation Award, SUNY Geneseo (Field Hockey)
2023	Student Athlete Faculty Appreciation Award, SUNY Geneseo (Basketball)
2023	Student Athlete Faculty Appreciation Award, SUNY Geneseo (Swimming/Diving)
2022	Student Athlete Faculty Appreciation Award, SUNY Geneseo (Field Hockey)
2022	Golden Key Honorary Faculty Member
2021	Curriculum Development Award, SUNY Geneseo
2021	Student Athlete Faculty Appreciation Award, SUNY Geneseo (Field Hockey)
2019-22	Dr. Spencer J. Roemer Supported Professorship, SUNY Geneseo
2017	Student Athlete Faculty Appreciation Award, SUNY Geneseo (Swimming/Diving)
2013	Phi Eta Sigma Honorary Faculty Inductee, SUNY Geneseo
2013	Student Athlete Faculty Appreciation Award, SUNY Geneseo (Softball)
2013	Student Athlete Faculty Appreciation Award, SUNY Geneseo (Basketball)
2012	Student Athlete Faculty Appreciation Award, SUNY Geneseo (Soccer)
2011	SUNY Chancellor's Award for Excellence in Teaching
2011	Student Athlete Faculty Appreciation Award, SUNY Geneseo (Tennis)
2005	Undergraduate Professor of the Year, University of Rochester
2004	Clay Mathematics Institute Liftoff Fellowship

PUBLICATIONS, EXHIBITS, AND REVIEWS:

Journal Articles

Tabulating Knot Mosaics: Crossing Number 10 or Less (with D. Baldwin, J. Canning, and G. Vinal), Involve – A Journal of Mathematics, Volume 18, Issue 1 (2025).

Knot Mosaics with Corner Connection Tiles (with U. Donovan, R. Grossman, N. Laine, C. McDermott, M. Paone, and D. Southcott), Pi Mu Epsilon Journal, Volume 15, No. 9, Fall 2023.

Space-Efficient Prime Knot 7-Mosaics (with N. LaCourt), Symmetry, Volume 12, Issue 4 (2020).

Space-Efficient Knot Mosaics for Prime Knots with Mosaic Number 6 (with D. Knowles), Involve – A Journal of Mathematics, Volume 12, Issue 5 (2019).

Tile Number and Space-Efficient Knot Mosaics (with D. Knowles), Journal of Knot Theory and Its Ramifications, Volume 27, Issue 6 (2018).

On the Andreadakis-Johnson filtration of the automorphism group of a free group (with F. Cohen and A. Pettet), Journal of Algebra, Volume 329, Issue 1 (2011).

Bordism invariants of the mapping class group, Topology 45, Issue 5 (2006).

Web-Based OER Publications

ProofSpace: *A Digital Introduction to Mathematical Proofs* (with S. Uttamchandani), http://www.geneseo.edu/proofspace (2015).

Websites and Art Exhibits

Knot Mosaic Websites, Geneseo Authors Celebration – Kinetic Gallery (2022)

Knot Mosaic Space – https://www.geneseo.edu/knotmosaics (2022)

Knot Mosaic Maker – https://knotmosaics.azurewebsites.net (2022)

ProofSpace – https://www.geneseo.edu/proofspace (2015)

Textbook Reviews

Differential Equations and Linear Algebra, Third Edition, Goode and Annin	2013
Calculus, Jeff Holt	2006
Calculus, Taalman, Brazfield, and Kohn	2005

Journal Referee and Reviewer

Algebraic & Geometric Topology, Eurasian Mathematical Journal, Indian Journal of Mathematics, Involve – A Journal of Mathematics, Journal of Knot Theory and Its Ramifications, Journal of Topology and Analysis, Mathematical Reviews of the American Mathematical Society (MathSciNet), Punjab University Journal of Mathematics

CONFERENCES, WORKSHOPS, SEMINARS, and INVITED LECTURES:

Conferences or Workshops Organized:

2016 MAA Seaway Section Spring Meeting, SUNY Geneseo (Co-Coordinator), April.
2012 *Introduction to WeBWorK*, Workshop, MAA Seaway Section Fall Meeting, October.
2011 *Introduction to WeBWorK*, Workshop, AMTNYS Annual Fall Conference, October.

Presentations:

2024 *Knot Mosaics, New and Old*, Invited Paper Session, MAA MathFest, Indianapolis, IN, August.
2024 *Tied up in Knots – An Adventure in Undergraduate Math Research*, Gehman Invited Lecture, MAA Seaway Section, April.
2024 *Tied up in Knots – An Adventure in Undergraduate Math Research*, Houghton University, Math and Science Colloquium, February.
2022 *Knot Mosaics*, Master Teacher Workshop, SUNY Geneseo, October.
2022 *Tied up in Knots – An Adventure in Undergraduate Math Research*, SUNY Geneseo, Roemer Lecture, April.
2021 *Space-Efficient Knot Mosaics*, BUGCAT, November.
2021 *Space-Efficient Knot Mosaics*, HRUMC, April.
2019 *Space-Efficient Knot Mosaics*, MAA Seaway Section, April.
2018 *The Mathematics of an Infinite God: A Journey through Flatland*, Rochester Institute of Technology, October.
2018 *Knot Mosaics*, Master Teacher Workshop, SUNY Geneseo, October.
2018 *Tile Number and Space-Efficient Knot Mosaics*, SUNY Geneseo, Faculty Seminar
2018 *Knot Mosaic Tabulation*, SUNY Geneseo, Faculty Seminar
2018 *The Lomonaco-Kauffman Conjecture*, SUNY Geneseo, Faculty Seminar
2017 *Introduction to Knot Mosaics*, SUNY Geneseo, Faculty Seminar
2017 *Introduction to Knot Theory*, SUNY Geneseo, Faculty Seminar
2017 *The Mathematics of an Infinite God: A Journey through Flatland*, Ratio Christi, SUNY Geneseo, April.
2015 *Knots and Soap Films*, Master Teacher Workshop, SUNY Geneseo, September.
2015 *A Digital "ProofSpace": Facilitating a Blended Classroom for Mathematical Proofs*, SUNY Conference on Instruction and Technology, May.
2015 *The Mathematics of an Infinite God: A Journey through Flatland*, Ratio Christi, SUNY Geneseo, March
2013 *Knot, Knot. Who's There?*, Houghton College, December.

2013   *Understanding the Johnson Filtration of the Mapping Class Group via Geometric Topology*, MAA MathFest, Hartford, CT, August.

2011   *The Mathematics of an Infinite God: A Journey through Flatland*, Rochester Institute of Technology, September.

2010   *The Mathematics of an Infinite God: A Journey through Flatland*, St. John Fisher College, September.

2010   *Online Homework Systems and Media Resources for Mathematics and Statistics, Focus Group, WH Freeman & Company,* MAA MathFest 2010, Pittsburgh, PA, August.

2010   MAA WeBWorK Consultant Workshop*,* MAA MathFest 2010, Pittsburgh, PA, August.

2009   *Introduction to WeBWorK*, SUNY Geneseo, December.

2006   *The Fascinating World of Knots*, SUNY Geneseo, December.

2006   *Bordism Invariants of the Mapping Class Group*, Torelli Workshop Chicago, August.

2005   *Bordism Invariants of the Mapping Class Group*, University of Chicago, May.

2005   *Bordism Invariants of the Mapping Class Group*, University of Buffalo, April.

2004   *Bordism Invariants of the Mapping Class Group*, Cornell University, November.

2004   *Bordism Invariants of the Mapping Class Group*, University of Rochester, October.

2004   *The Fascinating World of Knots*, Trinity University, June.

2004   *Bordism Invariants of the Mapping Class Group*, BIRS Workshop, Knots and Their Manifold Stories, Banff, Canada, May.

2004   *Bordism Invariants of the Mapping Class Group*, AMS/MAA Joint Mathematics Meeting, Phoenix, AZ, January.

2003   *Bordism Invariants of the Mapping Class Group*, George Washington University, Knots in Washington XV Conference, January.

2003   *Bordism Invariants of the Mapping Class Group*, AMS/MAA Joint Mathematics Meeting, Baltimore, MD, January.

Conference/Workshop Attendance:

2025   First International On-line Knot Theory Congress, February.

2024   MAA MathFest, Indianapolis, IN, August.

2024   MAA Seaway Section Spring Meeting, SUNY Fredonia, April.

2021   BUGCAT Conference, Binghamton University, November.

2021   Undergraduate Research at Scale: What if the treatment is a CURE?, October.

2021   E-Assessment in Mathematical Sciences (EAMS) International Conference, June.

2021   Hudson River Undergraduate Mathematics Conference, April.

2020   MAA Seaway Summer Workshops, MAA Seaway Section, Summer.

2019   MAA Seaway Section Spring Meeting, St. John Fisher College, April.

2018   MAA Seaway Section Spring Meeting, SUNY Brockport, April.

2016   MAA Seaway Section Spring Meeting, SUNY Geneseo, April.

2016   Topology in Dimension 3.5, Rice University, Houston, TX, June.

2015   SUNY Conference on Instruction and Technology, SUNY Geneseo, May.

2013   MAA MathFest, Hartford, CT, August.

2012   MAA Seaway Section Fall Meeting, Elmira College, October.

2012   WeBWorK Code Camp, University of Rochester, Rochester, NY, June.

2011   MAA Seaway Section Spring Meeting, April.

2011   AMTNYS Annual Fall Conference, October.

2010   MAA MathFest 2010, Pittsburgh, PA, August.

2006   Advances in Number Theory and Random Matrix Theory, University of Rochester, June.

2006   Texas Geometry and Topology Conference, Rice University, Houston, TX, October.

2006   Torelli Workshop in Chicago, August.
2005   3–Manifolds and Knot Theory Conference, University of Texas, Austin, May.
2005   Braids, links, and mapping class groups, Columbia University, March.
2005   Submanifolds, Singular Varieties and Stratified Spaces, Courant Institute, NYU, March.
2004   BIRS Workshop, Knots and Their Manifold Stories, Banff, Canada, May.
2004   Texas Geometry and Topology Conference, Texas Christian University, February.
2004   AMS/MAA Joint Mathematics Meeting, Phoenix, AZ, January.
2003   Texas Geometry and Topology Conference, Rice University, October.
2003   Topology of Manifolds of Dimension 3 and 4, University of Texas, Austin, June.
2003   George Washington University, Knots in Washington XV Conference, January.
2003   AMS/MAA Joint Mathematics Meeting, Baltimore, MD, January.
2002   Spring Topology and Dynamics Conference, University of Texas, Austin, April.
2001   Georgia Topology Conference, University of Georgia, June.
2001   AMS/MAA Joint Mathematics Meeting, New Orleans, LA, January.
2000   Texas Geometry and Topology Conference, Rice University, October.

GRANTS AND SUPPORT:

2024   Geneseo Foundation Faculty Travel Grant, SUNY Geneseo
2021-22 Curriculum Development Award, SUNY Geneseo
2009-21 Pi Mu Epsilon Prize Grant, Pi Mu Epsilon.
2019-22 Roemer Supported Professorship Grant, SUNY Geneseo.
2020   Geneseo Foundation Publication Grant, SUNY Geneseo
2019   Geneseo Foundation Research Assistantship (J. Canning), SUNY Geneseo
2018   Geneseo Foundation Undergraduate Summer Fellowship (G. Vinal), SUNY Geneseo
2017   Geneseo Foundation Faculty Travel Grant, SUNY Geneseo
2015   Computing & Information Technology Faculty Scholarship, SUNY Geneseo
2014-15 Innovative Instruction Technology Grant (IITG), Open SUNY funded.
2014   Dean Johnston Student Research Assistantship (J. Ford), SUNY Geneseo
2013   Submitted grant proposal, *Adapting WeBWorK for Secondary Mathematics Education*, Institute of Education Sciences (IES) of the U.S. Department of Education
2013   Geneseo Foundation Proposal Writing Support Award, SUNY Geneseo
2013   Geneseo Foundation Faculty Incentive Grant, SUNY Geneseo
2013   Geneseo Foundation Faculty Travel Grant, SUNY Geneseo
2010-13 MAA WeBWorK Consultant Stipend, National Science Foundation funded
2012   Geneseo Foundation Faculty Travel Grant, SUNY Geneseo
2004   Clay Mathematics Institute Liftoff Fellowship, University of Rochester
2002-04 Research Assistant, *Noncommutative Algebraic Phenomena in the Topology of Three- and Four-Dimensional Spaces*, National Science Foundation DMS 0104275, Rice University

STUDENT DIRECTED STUDIES/RESEARCH/PRESENTATIONS:

2025   *Knot Theory*, J. Bunster (Supervised Edgar Fellows Honors thesis)
– presented at GREAT Day 2025.

2025   *The Mathematics Behind Improving Stop Loss Pricing and High-Cost Claimant Forecasting*, M. Cavanagh (Supervised GREAT Day 2025 presentation)

2024   *Topology and Game of Life*, D. Connolly (Directed Study)

2024   *Cornucopia of Mathematics*, C. Henry (Directed Study)

2024   *Modelling and Categorizing Snow Crystal Growth with Cellular Automata*, M. Taylor (Supervised GREAT Day 2024 presentation)

2024   *Identifying Normal Polynomials over Finite Fields*, D. Connolly (Supervised GREAT Day 2024 presentation)

2022-23 *Exploration of Knot Mosaics*, N. Laine (Supervised Edgar Fellows Honors thesis)
– presented at GREAT Day 2023.

2022   *Braid Mosaics*, M. Paone (Directed Research)

2022   *Exploration of Knot Mosaics*, N. Laine (Directed Research)

2022   *Knot Mosaic Programming*, M. Paone (Directed Research)

2020   *Quantum Knots*, C. McDermott (Directed Study)

2020   *Common Ground*, D. Sorrentino and J. Blasioli (Directed Study)

2019-20 *Space Efficient Knot Mosaics for Prime Knots with Crossing Number 10 and Less*, by J. Canning (Supervised Honors in Math thesis and Edgar Fellows thesis)
– published in Proceedings of GREAT Day: Vol. 2020, Article 10.

2019-20 *Knot Mosaic Programming*, J. Canning (Directed Research, two semesters)
– presented at GREAT Day 2020.

2018-19 *Space-Efficient Knot Mosaics of Size 7*, by G. Vinal (Supervised Honors in Math thesis)
– published in Proceedings of GREAT Day: Vol. 2019, Article 13.

2018-19 *Knot Mosaic Algorithms and Interface*, J. Canning and G. Vinal (Directed Research, two semesters)
– presented at MAA Seaway Section Meeting, St. John Fisher College, April 2019.
– presented at GREAT Day 2019.

2017-18 *Knot Mosaics*, N. LaCourt (Directed Research, two semesters)

2016   *Human-Computer Interaction*, A. Golfo (Supervised project)
– presented at GREAT Day 2016.

2016   *Adding Another Dimension: Applications and Future of 3D Printing*, A. Liang (Supervised project)
– presented at GREAT Day 2016.

2014-15 *ProofSpace: A Flipped Classroom Experience*, J. Hines and C. Menarchem (Supervised project, two semesters)
– presented at AMS/MAA Joint Math Meetings, San Antonio, TX, January 2015.

2015   *3D Printing Curriculum*, J. Zomback (Directed Study)

2015   *Mosaic Knots*, D. Knowles (Directed Research)
– presented at GREAT Day 2015.

2015   *3D Printing Curriculum*, J. Zomback and A. Tantillo (Directed Study)

2014-15 *A Digital "ProofSpace," Facilitating a Flipped Classroom for Mathematical Proofs*, S. Uttamchandani (IITG funded curriculum development project, summer and two semesters)
– presented at SUNY Conference on Instruction and Technology, May 2015.

2014	*Mathematical Manipulatives with 3D Printing*, J. Ford (Directed Study)
	– presented at MAA Mathfest, Portland, OR, August 2014.
2014	*Mosaic Knots*, D. Knowles (Directed Study)
	– presented at Undergrad Math Research Symposium, Macaulay Honors College, Nov 2014.
2014	*Class of 2014 Statistical Survey*, S. Dorney and A. Sharpe (Supervised project)
	– presented GREAT Day 2014.
2013	*Introduction to Mathematical Cryptography*, S. Uttamchandani, S. Clark, J. Ford (Directed Study)
2013	*Adapting WeBWorK for Secondary Mathematics Education*, T. Fisher (Directed Study)
2012	*Algebraic Topology and Geometric Algebra*, M. Vaiana (Directed Study)
	– presented at GREAT Day 2012.
2012	*Teaching Proofs* (Directed Study, two students)
2012	*Where Topology Meets Chemistry*, S. Schaefer (Directed Study)
2012	*Mathematics Education Projects*, E. Novak (Directed Study)
2011	*Teaching Proofs* (Directed Study)
2011	*Knot Theory and Fundamental Group*, H. Miller (Directed Study)
2010	*Game Theory*, G. Henderson (Directed Study)
2010	*Modeling with Differential Equations*, M. Kotok (Directed Study)
	– presented at GREAT Day 2010
	– published in Proceedings of GREAT Day: Vol. 2010, Article 29.
2009	*Graph and Tree Analysis*, G. Henderson (Directed Study)
2009	*Harmonic Motion Java Simulations*, M. Kotok (Directed Study)
	– presented at GREAT Day 2009.
2008-09	*Exploring the Jones Polynomial*, N. Devin (supervised Honors in Mathematics thesis)
	– presented at GREAT Day 2009.
2007	*Advanced Linear Algebra*, C. Rogers.

SERVICE:

Service to the Profession
Math and Science Program Advisory Board, Corning Community College (2025-present)
Mathematics Program Advisory Board, Monroe Community College (2021-present)
Mathematical Association of America, WeBWorK Consultant (2010-present)
Mathematical Reviews of the AMS, Reviewer (2018-2023)
External Review Committee, Monroe Community College, Math Program Evaluation (2019)
MAA Seaway Section Extended Executive Committee (2011-2016)
MAA Gehman Lecture Committee (2010-2016, Committee Chair 2011-2016)
Journal Referee for Algebraic & Geometric Topology, Eurasian Mathematical Journal, Indian Journal of Mathematics, Involve – A Journal of Mathematics, Journal of Knot Theory and Its Ramifications, Journal of Topology and Analysis, Mathematical Reviews of the American Mathematical Society (MathSciNet), Punjab University Journal of Mathematics

Department Service
Department Chair (2023-present)
WeBWorK Coordinator (2007-present)

Bylaws Revision Committee (2023-2025)
Departmental Committee (2010-2011, 2013-2015, 2017-2022)
Staffing Committee (2011-12, 2013-14, 2015-16, 2017, 2018-2020, 2021-2022)
Pi Mu Epsilon Committee (2010-2023)
Website Coordinator (2008-2017, 2021-2023)
Scholarship Committee (2016-2021)
Honors Committee (2012-2013, 2016-2021)
Early Transcendental Calculus Committee (2018)
Graduate Advisement Committee (2009-2011, 2016-2017)
Associate Chair (2015-2016)
Five-Year Review Committee (2013-2015)
Computer Committee (2008-2014)
PRISM – Faculty Advisor (2008-2013)
Curriculum Committee (2008-2010)

University Service
Academic Advising
Accepted Students Days, Accepted Knights Days, Academic Fairs
Center for Digital Learning, Faculty Affiliate (2020-present)
Eastern Christian Fellowship – Faculty Advisor (2025-present)
Search Committee for Director of Institutional Research and Effectiveness (2024)
Supporting Transfer Students Working Group (2024)
Faculty Equity Training (2023)
Digital Learning Working Group (2022-2023)
New Organization Review Committee (2018-2023)
Grow STEM Faculty Resource List (2019-2022)
STEM CURE Working Group (2021)
Open Weeks for Students Exploring Majors (2021)
Post-Election Geneseo Allies (2020-2021)
3D Printing Consultation for Geology Department (2020)
College Senate (2009-2013, 2017-2019)
Student Affairs Committee (2017-2019)
Ratio Christi Geneseo – Faculty Advisor (2013-2019)
New York State Master Teacher Interviewer/Evaluator (2014, 2016, 2017, 2019, 2021)
Master Teacher Professional Development Workshop (2015, 2018, 2022)
TLC New Faculty Mentor (2014-2015, 2017-2018)
Committee on Nominations and Elections (2014-2016)
Personal Safety Committee (2012-2016)
Phi Beta Kappa Historian (2012-2015)
Cornerstone Campus Ministries (Geneseo Cru) – Faculty Advisor (2009-2014)
Graduate Affairs Committee (2009-2013)
PRISM "Pi in the Face for Autism" Fundraiser (2010-2013)
Steering Committee "Beyond SOFIs: Supporting and evaluating teaching" (2012)
Presidential Scholars Committee (2010-2011, Chair 2011)
Livingston Cares "Jailbreak" Fundraiser (2010)