

Curriculum Vita of Sean Allen Broughton

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Personal Data, Education and Professional Experience

Personal Data

Date of Birth: November 12, 1951, Windsor, Ontario, Canada.
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Education

B.Sc. (1975) University of Windsor, Ontario, Canada, 1971-73 & 1974-1975
Major in mathematics, minor in physics
M.Sc. (1978) Queen's University, Kingston, Ontario, 1975-78
Supervisor: O. A. Nielsen
Thesis Title: *The fundamental groups and centres of Lie groups*
Ph.D. (1982) Queen's University, 1978-82
Supervisor: A. J. Coleman
Thesis Title: *On the topology of polynomial hypersurfaces*
Languages Fluency in spoken and written French
Reading knowledge of German

Work Experience (reverse chronological order)

1994-present Professor and Head of Mathematics, Rose-Hulman Institute of Technology
1989-94 Associate Professor, Mathematics, Cleveland State University,
1986-89 Assistant Professor, Mathematics, Cleveland State University
1983-86 Van Vleck Visiting Assistant Professor, Mathematics,
University of Wisconsin-Madison, (half-time, 9-83 to 9-85
while NSERC Postdoctoral Fellowship (Canada) concurrently held)
1981-83 Assistant Professor, Mathematics, Memorial University of
Newfoundland
1975-80 Grader, Teaching Assistant, and Lecturer while a graduate student
at Queen's University
1974-75 Sublieutenant, Canadian Armed Forces
1971-73, 74-75 Grader and Teaching Assistant, Mathematics, University of Windsor

Scholarships and Fellowships

1977-78 and 1979-80 Ontario Graduate Scholarship,
1980-81 Queen's University Scholarship,
1983-85 Natural Sciences and Engineering Research Council Postdoctoral
Fellowship (Canada)

Other Professional Activities

Summer 1983 NSERC Research Experiences for Undergraduates, Memorial U. of Newfoundland
1990-1994 reviewer, Mathematical Reviews
Summer 1992 participant, Regional Geometry Institute, Amherst, Massachusetts
Summer 1993 participant, ATLAST Linear Algebra Curriculum Workshop, U. of Michigan
March 1994 visiting scholar, Universidad Nacional de Educacion a Distancia, Madrid Spain
Summer 1996 SIAM Workshop: Mathematics of Finance
Summer 1996 consultant, Rose-Hulman NSF-REU
1996-present Member, Imaging Systems Faculty, RHIT
1997-2004 program director, Rose-Hulman NSF-REU
Sept. 1999 participant, Working Conference on Undergraduate Mathematics Research,
Washington, D.C.
Winter 2000-01 TED Program Rose-Hulman
Spring 2001-02 Sabbatical, Mount Holyoke College
Spring 2007 Session on Automorphisms of Surfaces, U. of Arizona, Tucson, co-organizer
Spring 2007-08 Sabbatical, Indiana University
Spring 2007-08 visiting scholar, Universidad Nacional de Educacion a Distancia, Madrid Spain
Fall 2010 Session on Automorphisms of Surfaces, Penn State, co-organizer

Professional Societies

1986-present member, AMS, American Mathematical Society
1986-present member, MAA, Mathematical Association of America
1994-present member, SIAM, Society for the Industrial Applications of Mathematics

Public Service

1993 member, Technology Task Force, South Euclid - Lyndhurst School District
1992-94 member, Adrian School PTA and Advisory Council
1997-02 den leader and Assistant Scout Master, Boy Scouts of America

Teaching Experience

Undergraduate Courses Taught

- College Algebra, Liberal Arts Mathematics, Mathematics for Teachers
- Basic and Pascal Programming
- all levels of Calculus

- Linear Algebra, Differential Equations, Statistics
- Discrete Mathematics, Probability
- Mathematical Modeling
- Euclidean, Non-Euclidean, and Differential Geometry
- Mathematics of Image Processing.
- Introduction to Parallel Computing
- Fractals and Chaotic Systems

Graduate Courses Taught

- Applied Linear Algebra
- Stochastic Methods of Operations Research
- Euclidean and Non - Euclidean Geometry
- Fractals and Chaotic Systems
- Lie Groups and Lie Algebras
- Algebraic Geometry

Graduate Student Committees

Dave Boyles	University of Wisconsin
Steve Katz	University of Wisconsin
Kay Tasuoka	University of Wisconsin
Jack Chen	Cleveland State
Todd Holthaus	Rose-Hulman
Madhulika Khare	Rose-Hulman
Siva Subramanian	Rose-Hulman
Sundershan Tirumala	Rose-Hulman
Christopher Doyle	Rose-Hulman

Undergraduate Theses

Robert Parada Gauge Theory

Research Interests and Computing Activities

Research Interests

- Riemann surfaces, non-Euclidean geometry, automorphisms, tilings, group actions, moduli and Teichmüller spaces, (MR 1990 class: 14H,30F,20H)
- Lie theory, geometry and topology of manifolds and homogeneous spaces, (MR 1990 class: 22, 51M, 57)

- singularity theory, algebraic geometry (MR 1990 class: 14,32)
- mathematics of image and signal processing, wavelets

Computing Software

- *Computer Algebra Systems*: MAPLE, MATLAB, MAGMA, MACAULAY, GAP, MATHEMATICA
- *Programming Languages*: PASCAL, FORTRAN, BASIC, C
- *Other*: TeX, standard productivity tools, HTML, PHP

Computing Experience and Activities

- Extensive classroom use at Cleveland State and Rose-Hulman
- Extensive research use at Cleveland State and Rose-Hulman
- Support and leadership for computer use at Cleveland State and Rose-Hulman
- Chair, Academic Software Committee, Rose-Hulman
- Equipment grant writing at Cleveland State and Rose-Hulman
- Webmaster and web page developer, RHIT Mathematics Department, <http://www.rose-hulman.edu/math/>
- Chair of Parallel Computing Steering Committee/Users Group

Grants Awarded

1986-87	Research Challenge Grant, Ohio Board of Regents, \$5000
1993	Mathematical Sciences Computing Laboratory, Internal House Bill 904, Cleveland State University, \$100,000, drafted proposal
1997	Computational Group Theory and Hyperbolic Geometry, NSF-REU, DMS-9619714, \$30,000, P.I.
1997	Foundation Coalition Upper Division Curriculum Proposal, \$8,000, co-P.I.
1998-2001	Computational Group Theory and Hyperbolic Geometry, NSF-REU, DMS-9619714 (extension), \$120,000, P.I.
2001-2003	Computational Group Theory, Hyperbolic Geometry, Number Theory, and Inverse problems NSF-REU, DMS-0097804, \$144,000, P.I.
2003-2004	Sophomore Course and Ancillaries in Nanoscience DMR-0304487 \$100,000 senior investigator
2003-2004	MAA Conference Grant supported by NSF DMS-0241090, \$2,000
2006-2007	MAA Conference Grant supported by NSF DMS-0536991, \$2,000

Publications, Works in Progress, Presentations

Theses

- T1. *The fundamental groups and centres of Lie groups*, Queen's University, M.Sc. Thesis, 1978.

T2. *On the topology of polynomial hypersurfaces*, Queen's University, Ph.D. Thesis, 1982.

Books and book chapters

- B1. *The Science of Nanotechnology: An Introductory Text*, with L. Tilstra, R. Tanke, D. Jelski, V. French, G. Zhang, A. Popov, T. George, A. Western, Nova Science Publishers, Hauppauge NY (2007).
- B2. *Discrete Fourier Analysis and Wavelets: Applications to Signal and Image Processing*, with Kurt Bryan, Wiley Interscience 2009.

Published / Accepted Papers

- P1. *A comment on unions of sigma-fields*, (with B. W. Huff), Amer. Math. Monthly, **84** (7), (1977), 553-554.
- P2. *On the topology of polynomial hypersurfaces*, Proc. Symposia Pure Math., **40**, Amer. Math. Soc. (1983), 167-178.
- P3. *The height of two-dimensional cohomology classes of complex flag manifolds*, (with M. Hoffman and W. Homer), Canadian Bull. Math. **26** (4) (1983), 498-502.
- P4. *A note on characters of algebraic groups*, Proc. of the AMS **89** (1) (1983), 39-40.
- P5. *The homology and higher representations of the automorphism group of a Riemann surface*, Transactions AMS **300**(1) (1987), 153-158.
- P6. *Volumes of subgroups of compact Lie groups*, Algebras, Groups and Geometries, **4**(1987), 325-364.
- P7. *Milnor numbers and the topology of polynomial hypersurfaces*, Invent. Math., **92** (1988), 217-241.
- P8. *The equisymmetric stratification of the moduli space and the Krull dimension of the mapping class group*, Topology and its Applications, **37** (1990), 101-113.
- P9. *Classifying finite group actions on surfaces of low genus*, J. of Pure & Appl. Algebra **69** (1990), 233-270.
- P10. *The Gottlieb group of finite linear quotients of odd-dimensional spheres*, Proc. of the A.M.S., **111** (4), (1991), 1195-1197.
- P11. *Normalizers and centralizers of elementary Abelian subgroups of the mapping class group*, Topology '90, Walter de Gruyter, New York (1992), 77-89.
- P12. *Simple group actions on hyperbolic surfaces of least area*, Pacific J. of Math., **158** (1), (1993), 23-48.
- P13. *Symmetries of Riemann surfaces on which $PSL(2, q)$ acts as a Hurwitz automorphism group*, (with E. Bujalance, A.F. Costa, J.M. Gamboa, G. Gromadski), J. of Pure and Appl. Algebra. **106** (1996) 113-126.
- P14. *Symmetries of Accola - Maclachlan and Kulkarni surfaces*, (with E. Bujalance, A.F. Costa, J.M. Gamboa, G. Gromadski), Proc. of the AMS. **127**, #3 (1999).
- P15. *Constructing Kaleidoscopic Tiling Polygons in the Hyperbolic Plane*, American Mathematical Monthly, **107** #8 (2000), 689-710.

- P16. *Divisible tilings of the hyperbolic plane*, (with D.M. Haney, L. McKeough and B. Smith) New York Journal of Mathematics, **6** (2000), 237-283. <http://nyjm.albany.edu:8000/j/2000/6-12.pdf>
- P17. *Anharmonic Vibrational Motions in C60 : A Potential Energy Surface Derived from Vibrational Self Consistent Field Calculations*, D.Jelski, Laszlo Nemes, S.Allen Broughton, Journal of Cluster Science, Vol 16, No 1, March 2005.
- P18. *Finite Abelian Subgroups of the Mapping Class Group*, with Aaron Wootton, Algebraic & Geometric Topology **7** (2007) 1651–1697. <http://msp.warwick.ac.uk/agt/2007/07/p066.xhtml>
- P19. *Topologically Unique Maximal Elementary Abelian Group Actions on Compact Oriented Surfaces*, Journal of Pure and Applied Algebra, **213** (2009) 557-572.
- P20. *Cyclic n -gonal surfaces and their automorphism groups: two talks in the UNED Geometry Seminar*, with Aaron Wootton, Disertaciones del Seminario de Matematicas Fundamentales, no. 44, UNED

Submitted papers/preprints

- SP1. Subconics in Translation Surfaces, with Chris Judge, submitted to Geometriae Dedicata.

Technical Reports

- TR1. *Counting ovals on a symmetric Riemann surface*, RHIT MSTR 97-04, Rose-Hulman Math. Sci.Tech. Report Series.
- TR2. *Splitting tiled surfaces with abelian conformal tiling group*, RHIT MSTR 99-03 ,Rose-Hulman Math. Sci.Tech. Report Series.
- TR3. *Triangular Surface Tiling Groups for Low Genus*: S. Allen Broughton, Robert M. Dirks, Maria T. Slougher, C. Ryan Vinroot RHIT MSTR 01-01.
- TR4. *The Birational Isomorphism Types of Smooth Real Elliptic Curves*, RHIT MSTR 04-05, Rose-Hulman Math. Sci.Tech. Report Series.
- TR5. *Flattening a Cone*, RHIT MSTR 09-01, Rose-Hulman Math. Sci.Tech. Report Series.

Conference Proceedings (not refereed)

- C1. *Mean and standard deviation for the facilities design problem* (with V. Charumongkol), Computers in Industrial Engineering, **19**, Nos. 1-4 (1990) 313-317.
- C2. *The role of technology in enhancing learning in various disciplines*, with Sam Hulbert, Julia Williams, Ed Doering, IHETS Purdue Conference on Technology Enhancement and Teaching and Learning, webpage summary, 1997, <http://www.rose-hulman.edu/~brought/Purdue.html>.
- C3. *The Rose-Hulman NSF-REU Program*, in Working Conference on Summer Undergraduate Mathematics Research, Washington, D.C. 1999, AMS (2000) 139-145.

Unpublished Manuscripts and Notes

- U1. *Maximal finite groups of homeomorphisms of Riemann surfaces.*
- U2. *Calculation of the Killing form of a simple Lie algebra.*
- U3. *Algebraic geometry, elimination theory and factorization in exterior algebra:* notes for the Cleveland Topology Seminar.
- U4. *Symmetries of Riemann surfaces and kaleidoscopic tilings:* notes for presentation at RHIT.
- U5. *Kaleidoscopic tilings of Riemann surfaces:* problems for the RHIT - REU.
<http://www.tilings.org/publications.html#background>

Work in Progress

- W1. *Short Geodesics on Klein's Quartic Curve*, with Ryan Derby Talbot, Kevin Woods, manuscript.
- W2. *Triangular Surface Tiling Groups for Genus 2 to 13*, with Robert M. Dirks, Maria T. Slougher, C. Ryan Vinroot, submitted, under revision.
- W3. *The Barycenter of the Numerical Range of a Matrix*, with R. Lautzenheiser, T. Werne, completed manuscript, submitted.
- W4. *Analytical Solution of the Symmetric Circulant Tridiagonal Linear System*, with Jeffery Leader, in preparation.
- W5. *Full Automorphism Groups of Cyclic n -gonal Surfaces*, with Aaron Wootton, in preparation.
- W6. *Fuchsian Group Pairs I*, in preparation.
- W7. *Fuchsian Group Pairs II*, in preparation.

Presentations

1. *The topology of polynomial hypersurfaces*, AMS Summer School on Singularity Theory, Arcata, California, August 1981, contributed lecture.
2. *Milnor numbers and the topology of polynomial hypersurfaces*, Topology Seminar, Ohio State University, May 1984, invited lecture.
3. *The homology representation of the automorphism group of a Riemann surface*, Case-Carroll Seminar, John Carroll University, November 1986, invited lecture.
4. *The interplay between topology and singularity theory in algebraic geometry*, Case-Carroll Seminar, John Carroll University, November 1987, invited lecture.
5. *Simple groups of automorphisms of Riemann surfaces*, Mathematics Department Colloquium, Kent State University, February 1988, invited lecture; Valley Geometry Seminar, Five Colleges Inc., February 1988, invited lecture.
6. *The equisymmetric stratification of the moduli space*, AMS special session on knot theory and algebraic geometry in the large, Amer. Math. Soc. meeting, College of the Holy Cross, April 1989, invited lecture.
7. *Fractal geometry: geometry, probability and computers yield pretty pictures*, Second Annual Sonya Kovalevsky High School Mathematics Day, Cleveland State University, November 1990, invited lecture.

8. *Group symmetries and partial differential equations*, Cleveland Topology Seminar, Winter-Spring 1990, 6 contributed lectures.
9. *Stratification of families of affine curves by the link at infinity*, AMS special session on affine hypersurfaces, and related number theory, Amer. Math. Soc. meeting, Dayton, Ohio, October 1992, invited lecture.
10. *Algebraic geometry, elimination theory and factorization in exterior algebras*, Cleveland Topology Seminar, Fall -Winter 1992-93, 4 contributed lectures.
11. *The equisymmetric stratification of the moduli space of Riemann surfaces*, Universidad Nacional de Educacion a Distancia, Madrid, March 1994, invited lecture.
12. *Computing the finite group actions on Riemann surfaces in low genus*, Universidad Nacional de Educacion a Distancia, Madrid, March 1994, invited lecture.
13. *Symmetries of Riemann surfaces and kaleidoscopic tilings*, Rose-Hulman, January 1994, interview presentation.
14. *Lectures on wavelets*, RHIT Applied Math Seminar, Winter 1995, 4-5 contributed lectures.
15. *Tilings, finite groups, and hyperbolic geometry at the Rose-Hulman REU*, MAA Fall meeting, Wabash College, October 1997, contributed lecture.
<http://www.rose-hulman.edu/~brought/Epubs/REU/Wabash.html>
16. *The role of technology in enhancing learning in various disciplines*, with Sam Hulbert, Julia Williams, Ed Doering, IHETS Purdue Conference on Technology Enhancement and Teaching and Learning, October 1997,
<http://www.rose-hulman.edu/~brought/Epubs/Purdue/Purdue.html>
17. *Undergraduate research at the Rose-Hulman REU - what works for us*, AMS Annual meeting, Baltimore, January 1998,
<http://www.rose-hulman.edu/~brought/Epubs/REU/Baltimore.html>
18. *Wavelet based methods of image processing*, Applied Math Seminar, Winter 1998, 7 contributed lectures,
<http://www.rose-hulman.edu/~brought/Epubs/Imaging/waveimage.html>
19. *Tilings, finite groups, and hyperbolic geometry at the Rose-Hulman REU*, Cleveland Topology Seminar, April 1998, invited lecture.
20. *Mathematical Methods of Image Processing, A Progress Report on Course Development*, with Ed Doering, AMS Annual Meeting, San Antonio, January 1999, contributed lecture,
<http://www.rose-hulman.edu/~brought/Epubs/REU/SanAntonio.html>
21. *How do I Teach with this Laptop Anyway?*, with Patsy Brackin, Julia Williams and Ed Doering, Rose-Hulman Showcase, October 1999.
22. *Laptop Program at Rose-Hulman*, with Dan Hatten, Aaron Klebanoff, Julia Williams, Stevens Institute of Technology, invited presentation.
http://www.rose-hulman.edu/~brought/_private/stevens/
23. *Tilings, finite groups, and hyperbolic geometry at the Rose-Hulman REU*, Kanazawa Institute of Technology, July 1999.
24. *Higher genus Soccer Balls and Kaleidoscopic Tilings in the Hyperbolic Plane*, Rose Mathematics Seminar, April 2000,
<http://www.rose-hulman.edu/~brought/Epubs/soccer/soccer.html>

25. *The Unreasonable Effectiveness of Mathematics*, Rose-Hulman Symposium to open 126th school year, August 2000.
26. *Transform Methods in Image Processing*, Mathematics Faculty Seminar, Mount Holyoke College, Spring 2001.
<http://www.rose-hulman.edu/~brought/Epubs/mhc/mhctransimage.html>
27. *Higher Genus Soccer Balls*, Mount Holyoke Math Club, Spring 2001.
<http://www.rose-hulman.edu/~brought/Epubs/soccer/soccer.html>
28. *Signals, Images, ..., What's Next in Scientific Visualization*, Sigma Xi, Mount Holyoke College, Spring 2001.
<http://www.rose-hulman.edu/~brought/Epubs/sigma/sigviz.html>
29. *The Rose-Hulman Laptop Program*, (with Ed Doering), Ohio Northern University, September 2001.
30. *Automorphisms of Riemann Surfaces, Galois Groups, and Hecke Algebras*, Rose Math Seminar, March 2002.
31. *Vanishing Cycles and Kaleidoscopic Quadrilateral Tilings*, Rose Math Seminar, December 2002.
<http://www.rose-hulman.edu/~brought/Epubs/quads/quads.html>
32. *Kaleidoscopic Tilings on Surfaces, This Time with the Groups*, Rose Math Seminar, Spring 2003,
<http://www.rose-hulman.edu/~brought/Epubs/withgroups/withgroups.html>
33. *Are the Students Competent Users of Mathematics?*, AMS Meeting, Phoenix, January, 2004,
<http://www.rose-hulman.edu/~brought/Epubs/laptop/Phoenix.html>
34. *Equivalence of Real Elliptic Curves*, Rose Math Seminar, October 2004.
<http://www.rose-hulman.edu/~brought/Epubs/reaelliptic/reaelliptic.html>
35. *Fostering Undergraduate Research in Mathematics, Showcase - Best Assessment Practices VII*, Rose-Hulman, April 2005.
<http://www.rose-hulman.edu/~brought/Epubs/showcase/foster.html>
36. *Enumeration of the Equisymmetric Strata of the Moduli Space of Surfaces of Low Genus*, AMS Regional Conference, Santa Barbara, April 2005.
<http://www.rose-hulman.edu/~brought/Epubs/SantaBarbara/santabarbara.html>
37. *Higher Genus Soccer Balls*, ISU Math Seminar, Fall 2006.
38. *Geometry from Chemistry*, Rose Math Seminar, Fall 2006.
39. *Geometry from Chemistry*, INMAA Spring Meeting, 2007.
40. *Classifying Pairs of Fuchsian Groups of Finite Type*, AMS Regional Conference, Tucson, April 2007.
41. *Elementary Abelian Group Actions on Surfaces and the Geometry of Moduli Space*, IU Geometry Seminar, November, 2007.
42. *The Barycenter of the Numerical Range of an Operator*, ISU Math and CS Research Seminar, November 28, 2007.
43. *Billiards and Flat Surfaces, Voronoi Tessellations, Delaunay Tessellations and Flat Surfaces*, Rose Math Seminar, Fall 2008.

44. *Full Automorphism Groups of Cyclic n -gonal Surfaces*, First of two talks in the UNED Geometry Seminar, February 2009.
45. *Classification of Pairs of Fuchsian Groups*, Second of two talks in the UNED Geometry Seminar, March 2009.
46. *Cyclic n -gonal surfaces - weakly malnormal actions and computational methods*, joint with Aaron Wootton, 25th Nordic and 1st British-Nordic Congress of Mathematicians, June 2009.
47. *Roll-ups and Differential Geometry*, Rose Math Seminar, Fall 2009.
48. *Roll-ups and Differential Geometry*, INMAA section meeting, Fall 2009.
49. *Flat Surfaces, Teichmueller Discs, Veech Groups, and the Veech Tessellation*, AMS Regional Conference, Pennsylvania State University, University Park, PA - October 2009.
50. *Galois actions on regular dessins and Fuchsian group covers*, Conference on Riemann Surfaces and Dessins d'Enfants On the Occasion of Jürgen Wolfart's 65'th Birthday - May 2010

Undergraduate Student Research Work

I have spent considerable effort at undergraduate student research, especially since coming to Rose-Hulman. The following section lists the relevant entries from my vita as well as grants, works in progress, and student research mentored by myself.

Programs and Activities

summer 1983	NSERC Research Experiences for Undergraduates, Memorial U. of Newfoundland
summer 1996	RHIT NSF-REU, faculty consultant
1996-2000	RHIT NSF-REU, Computational Group Theory and Hyperbolic Geometry, P.I. and faculty mentor 6-8 students per year
1997-present	developer and webmaster for RHIT NSF-REU web page, http://www.rose-hulman.edu/Class/ma/HTML/REU/NSF-REU.html

Grants

1996-97	RHIT NSF-REU, Computational Group Theory and Hyperbolic Geometry, \$30,000
1997-2000	RHIT NSF-REU, Computational Group Theory and Hyperbolic Geometry, \$120,000
2001-2003	RHIT NSF-REU, Hyperbolic Geometry, Number Theory and Inverse Problems \$144,000
2003-04	MAA Undergraduate Mathematics Conference Grant \$2,000

Published (joint with students)

- *Divisible tilings of the hyperbolic plane*, (with D.M. Haney, L. McKeough and B. Smith) New York Journal of Mathematics, **6** (2000), 237?-283.
<http://nyjm.albany.edu:8000/j/2000/6-12.pdf>

Works in Progress (joint with students)

- *Triangular Surface Tiling Groups for Genus 2 to 13*, with Robert M. Dirks, Maria T. Slougher, C. Ryan Vinroot.
- *Lengths of geodesics on Klein's quartic curve*, with Ryan Derby-Talbot and Kevin Woods

Presentations and Conferences attended

- *Tilings, finite groups, and hyperbolic geometry at the Rose-Hulman REU*, MAA Fall meeting, Wabash College, October 1997, contributed lecture,
<http://www.rose-hulman.edu/~brought/Epubs/REU/Wabash.html>
- *Undergraduate research at the Rose-Hulman REU - what works for us*, AMS Annual Meeting, Baltimore, January 1998,
<http://www.rose-hulman.edu/~brought/Epubs/REU/Baltimore.html>
- *Tilings, finite groups, and hyperbolic geometry at the Rose-Hulman REU*, Cleveland Topology Seminar, April 98, invited presentation

- *Tilings, finite groups, and hyperbolic geometry at the Rose-Hulman REU*, Kanazawa Institute of Technology, July 99, invited presentation
- *The Rose-Hulman NSF-REU Program*, Working Conference on Undergraduate Mathematics Research, Washington D.C., Sept 1999, conference proceedings submission, participant at conference.

Student Research Projects Directed

- *Oval intersections on Riemann surfaces*, Dennis Schmidt, RHIT Mathematical Sciences Technical Report 97-03.
- *Quadrilaterals subdivided by triangles in the hyperbolic plane* Lori McKeough and Dawn Haney, RHIT Mathematical Sciences Technical Report 98-04.
- *Symmetry and tiling groups in genus 4 and 5*, Ryan Vinroot, RHIT Mathematical Sciences Technical Report 98-02.
- *Tilings and cwatsets*, Patrick Swickard and Reva Schweitzer.
- *Symmetries which split at a mirror*, Jim Belk, RHIT Mathematical Sciences Technical Report 99-01
- *Quest for tilings on Riemann surfaces of genus six and seven*, Robert Dirks and Maria Slougher, RHIT Mathematical Sciences Technical Report 00-08.
- *Lengths of geodesics on Klein's quartic curve*, Ryan Derby-Talbot, RHIT Mathematical Sciences Technical Report 00-03.
- *Triangle tilings of quadrilaterals on the hyperbolic plane*, Brandy Smith.
- *Separability of Tilings*, Nick Baeth, Jason Deblois, Lisa Powell, RHIT Mathematical Sciences Technical Report 00-10.
- *Lengths of Systoles on Tileable Hyperbolic Surfaces*, Kevin Woods, RHIT Mathematical Sciences Technical Report 00-09.
- *Oval Lengths in Tilings on Surfaces*, Shaun McCance and Sarah Weissman.
- *Hyperbolic Billiard Paths*, Rebecca Lehman and Chad White, RHIT Mathematical Sciences Technical Report 02-02
- *Applications of Graph Theory to Separability*, Stephen Young.
- *Pigeon-Holing Monodromy Groups*, Niles Johnson, work in progress 02-07.
- *Finding the Fundamental Domain of a Tiling of an n -genus Surface*, Yvonne Lai.
- *Hecke Algebras of Low Genus Surfaces*, Matt Ong, RHIT Mathematical Sciences Technical Report 02-08
- *Tilings of Low-Genus Surfaces by Quadrilaterals*, John Gregoire and Isabel Averill, RHIT Mathematical Sciences Technical Report 02-13.
- *Description of the Limiting Surfaces of Hyperbolic Surfaces Tiled by Quadrilaterals*, Michael A. Burr and Kathryn M. Zuhr.
- *Constructing the Moduli Space of Riemann Surfaces with a G $-(k,l,m,n)$ Action*: Kathryn M. Zuhr.

- *When Abelian Groups Split*: Robert C. Rhoades and Rachel L. Thomas RHIT Mathematical Sciences Technical Report 03-1.
- *Divisible Tilings of Surfaces*: Aimee Kalas and Jason Saccomano.