## Curriculum Vitae
## Mark Brittenham

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## Education

B.S. in mathematics: January 1983, SUNY at Stony Brook (with highest honors)
M.A. in mathematics: January 1986, Cornell University
Ph.D. in mathematics: May, 1990, Cornell University
    Dissertation: Essential Laminations in Seifert-fibered Spaces
    Advisor: Allen Hatcher

## Professional Positions

Institute for Advanced Study, Princeton, NJ
    Member, 1990 - 1991
University of Texas at Austin
    Instructor, 1991 - 1994
    Postdoctoral Fellow, 1994 - 1995
New Mexico State University
    Visiting Assistant Professor, 1995 - 1996
Mathematical Sciences Research Institute
    Member, August, 1996
Vassar College
    Visiting Assistant Professor, 1996 - 1997
University of North Texas
    Assistant Professor, 1997 - 2000
University of Nebraska - Lincoln
    Visiting Assistant Professor, 1999 - 2000
    Assistant Professor, 2000 - 2002
    Associate Professor, 2002 - present

## Research Interests

Geometric topology; low-dimensional topology; knot theory
Foliations and laminations in 3-manifolds
Geometric group theory

## Fellowships/Awards/Grants Funded

- SUNY at Stony Brook, Stony Brook Foundation Award, May 1983
- Cornell University, Sage Graduate Fellowship, 1983-1984
- Cornell University, Hutchinson Fellowship, Spr. 1985, Spr. 1987, Spr. 1989
- Cornell, University, Alfred P. Sloan Doctoral Dissertation Fellowship, 1987-1988
- National Science Foundation grant DMS-9203435, 'Essential laminations in 3-manifolds', June 1992 - July 1994. Awarded. Amount: $35,500
- National Science Foundation grant DMS-9400651, 'Essential laminations in 3-manifolds', June 1994 - July 1997. Awarded. Amount: $53,752.
- National Science Foundation grant DMS-9704811, 'Essential laminations in 3-manifolds', June 1997- July 2000. Awarded. Amount: $66,123.
- University of North Texas, Junior Faculty Summer Research Fellowship, May - July, 1998. Awarded. Amount: $2,500.
- University of North Texas, Faculty Research Grant, 1998-1999. Awarded. Amount: $3,500.

## Papers and Preprints

*Published:*

1. *Essential laminations in Seifert-fibered spaces*, Topology **32** no.1 (1993), 61-85.
2. *Essential laminations in non-Haken 3-manifolds*, Topology Appl. **53** (1993) 317-324.
3. *Essential laminations and deformations of homotopy equivalences : From essential pullback to homeomorphism*, Topology Appl. **60** (1994) 249-265.
4. *Essential laminations and Haken normal form*, Pacific J. Math **168** (1995), 217-234.
5. *Essential laminations and Haken normal form : Laminations with no holonomy*, Comm. Anal. Geom. **3** (1995) 465-477.
6. *Essential laminations in I-bundles*, Trans. AMS **349** (1997) 1463-1485.
7. *Exceptional Seifert-fibered spaces and Dehn surgery on 2-bridge knots*, Topology **37** (1998) 665-672.
8. (with R. Naimi and R. Roberts) *Graph manifolds and taut foliations*, J. Diff. Geom. **45** (1997) 446-470.
9. *Essential laminations, exceptional Seifert-fibered spaces, and Dehn filling*, J. Knot Thy. Ram. **7** (1998) 425-432.
10. *Essential laminations in Seifert-fibered spaces : Boundary behavior*, Topology Appl. **95** (1999) 47-62.
11. *Persistently laminar tangles*, J. Knot Thy. Ram. **8** (1999) 415-428.
12. (with R. Roberts) *When incompressible tori meet essential laminations*, Pacific J. Math. **190** (1999) 21-40.
13. (with Y.-Q. Wu) *The classification of Dehn surgeries on 2-bridge knots*, Comm. Anal. Geom. **9** (2001) 97-113.
14. *Free genus one knots with large volume*, Pacific J. Math. **201** (2001) 61-82.
15. *Persistent laminations from Seifert surfaces*, J. Knot Thy. Ram. **10** (2001) 1155-1168.

16. *Tautly foliated manifolds without* **R**-*covered foliations*, Proceedings of the Conference on Foliations: Geometry and Dynamics, Warsaw, 2000.
17. *Free Seifert surfaces and disk decompositions*, Math. Zeit. **240** (2002) 197-210.

*Submitted:*

18. (with C. Hayashi, M. Hirasawa, T. Kobayashi, and K. Shimokawa) *Essential laminations and branched surfaces in the exteriors of links*, submitted for publication.
19. *Knots with unique minimal genus Seifert sirface and depth of knots*, submitted for publication.

*In preparation:*

20. (with J. Dean) *A knot with Strong Property P but no persistent lamination*, in preparation.

*Unpublished:*

21. $\pi_1$-*injective, proper maps of open surfaces*, preprint (1989).
22. *Essential laminations and Haken normal form* : *Regular cell decompositions*, preprint (1992).
23. *Essential laminations and deformations of homotopy equivalences* : *The structure of pullbacks*, preprint (1994).
24. *Bounding canonical genus bounds volume*, preprint (1998).

## Courses Taught:

University of Texas at Austin:

| Semester | Course number | Course title (abbr.) | # students |
|---|---|---|---|
| Fall 1991 | Math 408C | Calculus I | 122 |
| | Math 367K | Topology | 15 |
| Spring 1992 | Math 343K | Intro. to Alg. Structures | 29 |
| | Math 365C | Real Analysis 1 | 20 |
| Fall 1992 | Math 408C | Calculus I | 129 |
| | Math 367K | Topology | 14 |
| Spring 1993 | Math 365C | Real Analysis 1 | 20 |
| | Math 392C | Topics in topology | 8 |
| Fall 1993 | Math 408C | Calculus I | 125 |
| | Math 367K | Topology | 10 |
| Spring 1994 | Math 365C | Real Analysis 1 | 26 |
| | Math M340L | Matrices and Matrix Calc. | 123 |

New Mexico State University:

| Semester | Course number | Course title (abbr.) | # students |
|---|---|---|---|
| Fall 1995 | Math 291 | Calculus III | 37 |
| | Math 392 | Differential Equations | 15 |
| Spring 1996 | Math 192 | Calculus II | 34 |
| | Math 332 | Intro. to Modern Analysis | 12 |

Vassar College:

| Semester | Course number | Course title (abbr.) | # students |
|---|---|---|---|
| Fall 1996 | Math 145 | Calc. and Discrete Math. | 38 + 50 (2 sect.) |
| | Math 225 | Multivariable Calculus | 23 |
| Spring 1997 | Math 116 | Topics in Calculus | 17 |
| | Math 117 | Excursions in Math. | 7 |

University of North Texas:

| Semester | Course number | Course title (abbr.) | # students |
|---|---|---|---|
| Fall 1997 | Math 1650 | Precalculus | 29 |
| | Math 1720 | Calculus II | 39 |
| Spring 1998 | Math 1710 | Calculus I | 37 |
| | Math 4500 | Introduction to Topology | 23 |
| Fall 1998 | Math 1650 | Precalculus | 86 |
| | Math 1710 | Calculus I | 49 |

University of Nebraska-Lincoln:

| Semester | Course number | Course title (abbr.) | # students |
|---|---|---|---|
| Spring 1999 | Math 203 | Contemporary Math. | 33 |
| | Math 314 / 814 | Matrix Theory | 29 / 1 |
| Fall 1999 | Math 208 | Calculus III | 37 |
| | Math 971 | Algebraic Topology I | 5 |
| Spring 2000 | Math 221 | Differential Eqns. | 25 |
| | Math 314 / 814 | Matrix Theory | 37 / 2 |
| Fall 2000 | Math 208H | Calculus III | 38 |
| Spring 2001 | Math 203 | Contemporary Math. | 31 |
| | Math 970 | Topology | 12 |
| Fall 2001 | Math 310 / 310H | Intro. to Modern Algebra | 27 / 10 |
| | Math 971 | Algebraic Topology I | 6 |
| Spring 2001 | Math 203 | Contemporary Math. | 34 |
| | Math 970 | Topology | 6 |
| Fall 2001 | Math 310 / 310H | Intro. to Modern Algebra | 27 / 10 |
| | Math 971 | Algebraic Topology I | 6 |
| Spring 2002 | Math 203 | Contemporary Math. | 30 |
| | Math 970 | Topology | 5 |
| Fall 2002 | Math 445 | Intro. Number Thy. | 22 |

## Course manuscript:

*Foliations and the topology of 3-manifolds*, manuscript based on lectures at the University of Texas at Austin, spring 1993.

## Referee and review activities:

- Reviewer: National Science Foundation
- Reviewer: Addison Wesley Longman Publishing, Brooks/Cole Publishing

- ○ Referee: Advances in Mathematics, Algebraic and Geometric Topology, Communications in Analysis and Geometry, Geometriae Dedicata, Geometry and Topology, Journal of the American Mathematical Society, Journal of Pure and Applied Algebra, Journal of Knot Theory and its Ramifications, Pacific Journal of Mathematics, Proceedings of the American Mathematical Society, Rocky Mountain Journal of Mathematics, Topology and its Applications, Transactions of the American Mathematical Society
- ○ Referee: Proceedings of the 1993 Georgia Topology Conference; Proceedings of the Kirbyfest, MSRI, June, 1998
- ○ Reviewer: Mathematical Reviews

## Conference Organization:

- ○ Co-organizer (with C. Delman and R. Roberts), special session on Low-dimensional Topology, AMS meeting, Urbana, IL, March 18-21, 1999.
- ○ Co-organizer (with F. Gonzalez-Acuña and L. Sanchez-Valdez), special session on Low-dimensional Topology, AMS-SMM meeting, Denton, TX, May 19-22, 1999.

## Committee Service:

- ○ Co-organizer, Introduction to Research lecture series, University of Texas, 1993 - 1994
- ○ Co-organizer, Third Annual Regional Workshop in the Mathematical Sciences, University of Nebraska - Lincoln, October 27-28, 2000
- ○ Head of organizing committee, Fourth Annual Regional Workshop in the Mathematical Sciences, University of Nebraska - Lincoln, November 2-3, 2001
- ○ Head of organizing committee, Fifth Annual Regional Workshop in the Mathematical Sciences, University of Nebraska - Lincoln, October 25-26, 2002
- ○ Library liaison, Department of Mathematics, University of Nebraska - Lincoln, 2000 - present
- ○ Member, postdoctoral search committee, University of Nebraska - Lincoln, 2002-2003

## Professional Society Memberships:

American Mathematical Society

## Invited Talks

*Conferences*

1. Upstate New York Topology Seminar, Syracuse, NY, November 10-12, 1989
   Title: Seifert-fibered spaces which contain no essential laminations.
2. Georgia Topology Conference, Athens, GA, August 1-5, 1990
   Title: Essential laminations in Seifert-fibered spaces.
3. Low-dimensional Topology Conference, Knoxville, TN, May 18-23, 1992
   Title: Controlling essential laminations.
4. Texas Geometry/Topology Conference, Houston, TX, April 16-18,1993
   Title: Essential laminations in non-Haken 3-manifolds.
5. Joint AMS - SMM meeting, Merida, Yucatan, Mexico, December 1-4, 1993

Special session on geometric topology in low dimensions
Title: Essential laminations and cylindrical components.

6. New Mexico Topology/Geometry Seminar, Albuquerque, NM, October 27-28, 1995
   Title: Knots, Property P, and essential laminations.

7. Cascade Topology Seminar, Tacoma, WA, November 4-5, 1995
   Title: Persistent laminations from Seifert surfaces, or How to build your very own knot with (strong) Property P.

8. Joint AMS - SMM meeting, Guanajuato, Mexico, Nov. 29 - Dec. 2, 1995
   Special session on low dimensional topology
   Title: (Exceptional) Seifert-fibered spaces and Dehn surgery on hyperbolic knots.

9. AMS Meeting, University of Iowa, Iowa City, IA, March 22-23, 1996
   Special session on Topology of 3-manifolds
   Title: Graph manifolds and taut foliations.

10. Colloquium of Quebec Graduate Students, Univ. de Montreal, March 22-23, 1997
    Plenary lecture
    Title: Foliations from the topological point of view.

11. Catskill-Taconic Topology Day, Vassar College, May 10, 1997
    Title: A laminator's 'most-wanted' list of knots.

12. Georgia Topology Conference, Athens, GA, July 30 - August 3, 1997
    Title: Constructing persistent laminations for fun and profit.

13. Nara Women's University, Nara, Japan, January 5-8, 1998
    Meeting on laminations in 3-manifolds
    Title: When incompressible tori meet essential laminations.

14. AMS meeting, Kansas State University, March 27-28. 1998
    Special session on Pictorial Methods in Low Dimensional Topology
    Title: Canonical genus, free genus, and volume.

15. AMS meeting, Univ. of California at Davis, April 25-26, 1998
    Special session on Recent Results on the Topology of Three-Manifolds
    Title: Canonical genus, free genus, and volume.

16. AMS meeting, Wake Forest Univ., Winston-Salem, NC, October 9-10, 1998
    Special session on Geometry and Topology in dimension 3
    Title: Free Seifert surfaces for knots.

17. AMS meeting, Univ. of Texas at Austin, October 8-10, 1999
    Special session on Dehn surgery and Kleinian groups.
    Title: Free Seifert surfaces and disk decompositions.

18. AMS meeting, Univ. of California at Santa Barbara, March 11-12, 2000
    Special session on Geometric Methods in 3-manifolds
    Title: Seifert surfaces and sutured handlebodies

19. Conference on Foliations: Geometry and Dynamics, Banach Center, Warsaw, Poland, May 29-June 9, 2000
    Title: Sutured handlebodies and depth of knots

20. Spring Topology and Dynamical Systems Conference, Morelia, MX, March 15-17, 2001
    Special session on Geometric Topology

Title: Seifert surfaces that aren't depth one

21. Foliations and Geometry 2001, Rio de Janeiro, Brazil, August 2-11, 2001
    Title: Taut foliations hate toroidal manifolds

22. Geometric Topology, Xi'an, China, August 12-16, 2002
    Title: Knots with unique minimal genus Seifert surface and depth of knots

23. Joint ESI-EDGE Workshop on Geometry and Physics, Vienna, Austria, November 11-22, 2002
    Title: Knots, foliations, and depth

*Seminars*

24. Saint Louis University, St. Louis, MO, colloquium, February 5, 1990
    Title: Essential laminations in Seifert-fibered spaces.

25. Rutgers University, Newark, NJ, topology seminar, February 28, 1991
    Title: Haken normal form for essential laminations.

26. New Mexico State University, Las Cruces, NM, colloquium, December 1, 1994
    Title: Exploring 2-bridge knots.

27. University of Texas at El Paso, El Paso, TX, February 16, 1996
    Undergraduate Mathematics Club, Departmental Colloquium
    Title: Knots and surfaces.
    Title: The care and feeding of essential laminations in 3-manifolds.

28. Cornell University, Ithaca, NY, topology seminar, November 26, 1996
    Title: Essential laminations are everywhere.

29. Univ. de Quebec á Montreal, topology seminar, March 21, 1997
    Title: Essential laminations as hyperbolic 3-manifold detectors.

30. New Mexico State University, Friday seminar, October 3, 1997
    Title: Playing checkers with knots.

31. University of Texas at Austin, topology seminar, November 24, 1997
    Title: When incompressible tori meet essential laminations.

32. Rice University, Houston, TX, colloquium, November 5, 1998
    Title: Knots, Seifert surfaces, and volume.

33. Texas A & M Commerce, Commerce, TX
    student/faculty colloquium, November 17, 1998
    Title: Knots, Seifert surfaces, and volume.

34. University of Nebraska, colloquium, October 14, 1999
    Title: Tying surfaces up in knots.

35. University of Iowa, topology seminar, November 18, 1999
    Title: Seifert surfaces, Seifert's algorithm, and disk decompositions.

36. Texas Christian University, Frank W. Stones Lectureship Series, November 23, 1999
    Title: The best surface(s) for studying a knot.

37. SUNY at Buffalo, colloquium, December 10, 1999
    Title: Tying surfaces up in knots

38. University of South Alabama, colloquium, February 18, 2000
    Title: Tying surfaces up in knots

39. University of Michigan, topology seminar, March 14, 2000
    Title: The search for a hyperbolic, non-laminar, 3-manifold
40. University of Nebraska, colloquium, December 4, 2001
    Title: The strange but true history of the Poincaré Conjecture
41. Washington University, colloquium and topology seminar, April 11-12, 2002
    Title: Hyperbolic knots with depth greater than one
    Title: The strange but true history of the Poincaré Conjecture
42. University of Arkansas, colloquium and topology seminar, September 26-27, 2002
    Title: Knots, Seifert surfaces, and depth
    Title: The strange but true history of the Poincaré Conjecture
43. Kansas State University, colloquium and topology seminar, October 15 , 2002
    Title: Knots, Seifert surfaces, and depth
    Title: A cartoon history of the Poincaré Conjecture

*Outreach:*

44. "It's a Math Thing", University of Nebraska - Lincoln, July 21-22,2000
    Title: Building rectangles out of squares of different sizes (2 talks)
45. Power Math 2001, University of Nebraska - Lincoln, July 15-21, 2001
    Title: Coloring knots
46. Power Math 2002, University of Nebraska - Lincoln, July 14-20, 2002
    Title: Knots and polynomials

*Additional talks at home institution(s)*

Cornell University: topology seminar, 2 talks

Institute for Advanced Study: topology seminar, 2 talks

University of Texas: topology seminar, 9 talks

New Mexico State University: topology seminar, 4 talks

University of North Texas: colloquium, 2 talks

University of Nebraska: group theory seminar, 14 talks; operator algebras seminar, 3 talks; functional analysis seminar, 2 talks; colloquium, 2 talks; Women's Undergraduate Math Network, 1 talk; Annual Regional Workshop, 3 talks.

## Other Conferences Attended

- Georgia International Topology Conference, University of Georgia, August 2-13, 1993
- Texas Geometry/Topology conference, Texas A&M University, October 22-23, 1993
- Texas Geometry/Topology conference, University of Texas, April 15-17, 1994
- Texas Geometry/Topology conference, Texas A&M University, November 11-13, 1994
- Joint Mathematics Meetings, San Francisco, CA, January 4-7, 1995
- Texas Geometry/Topology conference, Rice University, April 7-9, 1995
- Cornell Topology Festival, Cornell University, May 4-6, 1995
- Midwest Geometry conference, Washington University, June 2-4, 1995
- Workshop on 3-dimensional manifolds, Centre de Recherches Mathematiques, Montreal, Quebec, June 12-16, 1995

- Georgia Topology Conference, University of Georgia, August 9-13, 1995
- Texas Geometry/Topology conference, University of Texas, November 10-12, 1995
- New Mexico Geometry and Topology Seminar, New Mexico State University, April 12-13, 1996
- Conference on Geometric Group Theory, Australian National. University, Canberra, Australia, July 14-19, 1996
- Workshop in Combinatorics and Low-dimensional Topology, MSRI, Berkeley, CA, August 12-23, 1996
- Albany Group Theory Conference, Rensselaerville, NY, October 11-13, 1996
- 22nd Holiday Symposium, New Mexico State University, January 3-7, 1997
- Joint Mathematics Meetings, San Diego, Ca, January 8-11, 1997
- Cornell Topology Festival, Cornell, University, May 2-4, 1997
- Texas Geometry/Topology conference, Rice University, November 14-16, 1997
- Conference on laminations and foliations in dynamics, geometry, and topology, SUNY at Stony Brook, May 18-24, 1998
- International conference on non-positive curvature in group theory, topology, and geometry, Vanderbilt University, May 28-31, 1998
- Georgia Topology Conference, University of Georgia, August 12-16, 1998
- Texas Geometry/Topology conference, University of Texas, October 16-18, 1998
- AMS meeting, University of Illinois at Urbana-Champaign, March 18-21, 1999
- Joint AMS-SMM meeting, University of North Texas, May 19-22, 1999
- Workshop on Computation in Group Theory and Geometry, University of Warwick, July 9-17, 1999
- Joint AMS-MAA Mathematics Meetings, Washington, DC, January 19-22, 2000
- Texas Geometry/Topology conference, University of Texas, February 25-27, 2000
- International Conference on Groups and Semigroups, University of Nebraska, May 15-19, 2000
- International Conference on Geometric and Combinatorial Group Theory, Technion, Haifa, Israel, June 13-21, 2000
- AMS meeting, Columbia University, November 4-5, 2000
- Joint AMS-MAA Mathematics Meetings, New Orleans, LA, January 10-13, 2001
- Larry Fest, Washington University, April 7-8, 2001
- Georgia International Topology Conference, University of Georgia, May 20-June2 , 2001
- Workshop on Groups and 3-manifolds, CRM, Montreal, Quebec, June 25-29, 2001
- AMS meeting, Williams College, October 13-14, 2001
- Joint AMS-MAA Mathematics Meetings,, San Diego, CA, January 6-9, 2002
- Spring Topology and Dynamics Conference, University of Texas, March 21-23, 2002