

## CURRICULUM VITAE

**Name:** Efstratia (Effie) Kalfagianni

**Address:**

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Michigan State University  
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**Education:**

Ph.D, Mathematics, Columbia University, New York, 1995  
M.A., Mathematics, Columbia University, New York, 1991  
M.S., Mathematics, Fordham University, New York, 1990  
B.S., Aristotelian University of Thessaloniki, Greece, 1988

**Graduate Advisor:** Joan S. Birman

**Thesis title:** Finite type invariants for knots in 3-manifolds

**Research Interests:** Low dimensional topology; knot theory, 3-manifolds, quantum topology, hyperbolic geometry, braid groups, combinatorics.

**Faculty Appointments:**

2008-present , Professor, Michigan State University  
2003-2008, Associate Professor, Michigan State University  
1998-2003, Assistant Professor, Michigan State University  
1995-1998, Hill Assistant Professor, Rutgers University

**Visiting Appointments:**

June-July 2007, Visiting Member, MPI, Bonn, Germany  
2004-2005, Member, Institute for Advanced Study, Princeton  
1994-1995, Member, Institute for Advanced Study, Princeton  
July-August 1999, Visiting Member, MPI, Bonn, Germany

## **Grants/Awards:**

2008-2011, sole PI for NSF Grant, DMS-0805942  
2008-2011, Co-PI for NSF/RTG Grant, DMS-0739208,  
(joint with R. Fintushel, T. Parker and J. Wolfson)  
June-July 2007, Research Scholarship, MPI-Bonn, Germany  
2005-2008, PI for NSF Focused Research Grant, DMS-0456155,  
(collaborative with A. Champanerkar, O. Dasbach, I Kofman,  
X.-S. Lin, W. Neumann and N. Stoltzfus)  
2004-2009, Co-PI for NSF/RTG Grant, DMS-0353717,  
(joint with Fintushel, Parker and Wolfson)  
2004-2005, Research Scholarship, Institute of Advanced Study  
2003-2007, sole PI for NSF grant DMS-0306995  
2001-2004, sole PI for NSF grant DMS-010400  
1999-2001, sole PI for NSF grant DMS-9996227  
July-August 1999, Research Scholarship, MPI, Bonn, Germany  
1996-1999, sole PI for NSF grant DMS-9626140  
1996-1997, MSRI Postdoctoral Fellowship (declined)  
1995, Sigma Xi, Columbia University Chapter  
1990-1994, Columbia University Fellowship  
1993, NSF student summer research salary (PI, J. Birman)  
1992, US-Israel BSF grant support (PI, J. Birman)  
1989-1990, Graduate Fellowship, Fordham University  
1983-1988, Greek National Science Foundation undergraduate fellowship

## **Professional and Honors Societies:**

1995-present , Sigma Xi, Columbia University Chapter  
Member of the American Mathematical Society (AMS)  
Member of the Association for Women in Mathematics (AWM)  
Member of the Mentor Network of the AWM

## Bibliography:

Published/Accepted:

- [1]. *On the  $G_2$  Link invariant*,  
J. of Knot Theory and its Ramifications, Vol. 2 no. 4 (1993), 431-451.
- [2]. *Addendum to: On the  $G_2$  link invariant*,  
J. of Knot Theory Ramifications, Vol 3 No. 3 (1994), 431–432.
- [3]. *Finite type invariants for knots in 3-manifolds*,  
Ph.D Thesis (1995), Columbia University, NY.
- [4]. *Homology spheres with the same finite type invariants of bounded orders*,  
Mathematical Research Letters 4 (1997), 341-347.
- [5]. *Finite type invariants for knots in 3-manifolds*,  
Topology 37 (1998) no. 3, 673-707.
- [6]. *Milnor and finite type invariants of plat-closures*,  
with X.-S. Lin, Mathematical Research Letters, 5 (1998), 293-304.
- [7]. *Vassiliev invariants and orientation of pretzel knots*,  
J. of Knot Theory and its Ramifications, Vol. 7 no. 2 (1998), 173-185.
- [8]. *The HOMFLY polynomial for links in rational homology 3-spheres*,  
with X.-S. Lin, Topology 38 (1999) no. 1, 95-115.
- [9]. *Power series link invariants and the Thurston norm*,  
Topology and Its Applications, Vol. 101 (2000), no. 2, 107–119.
- [10]. *On knot adjacency*, with N. Askitas,  
Topology and Its Applications, Vol. 126 (2002), no. 1-2, 63–81.
- [11]. *Surgery  $n$ -triviality and companion tori*,  
J. of Knot Theory and its Ramifications, Vol. 13 (2004), 441-456.
- [12]. *Knot adjacency and satellites*, with X.-S. Lin,  
Topology and its Applications, Vol. 138 (2004), 207-217.
- [13]. *Alexander polynomial, finite type invariants and volume of hyperbolic knots*, Algebraic and Geometric Topology, Vol. 4 (2004), 1111-1123.
- [14]. *Knot adjacency, genus and essential tori*, with X.-S. Lin,  
Pacific J. of Mathematics, Vol. 228, No. 2 (2006), 251-276.

- [15]. *Seifert surfaces, Commutators and Vassiliev knot invariants*,  
with X.-S. Lin, J. of Knot Theory and its Ramifications, Vol. 16 No  
10 ( 2007),1295-1329. Special Volume in honor of L. Kauffman’s 60th  
birthday ( Eds. J. Przytycki, S. Lampropoulou).
- [16]. *Knot adjacency and fibering*, with X.-S. Lin,  
Transactions of the American Math. Soc., Vol. 360(2008), 3249-3261.
- [17]. *The Jones polynomial and graphs on surfaces*,  
with D. Futer, O. Dasbach, X.-S. Lin and N. Stoltzfus,  
J. of Combinatorial Theory, Series B 98, Issue 2 (2008), 384-399 .
- [18]. *Dehn Filling, volume and the Jones polynomial*,  
with D. Futer and J. Purcell, J. of Differential Geometry, Vol 78, no 3  
(2008), 429-464.
- [19]. *Quantum 3-manifold invariants and hyperbolic volume*,  
J. of Knot Theory and its Ramifications, Vol. 18 No 1 ( 2009), 1-7.
- [20]. *Symmetric Links and Conway sums: Volume and Jones polynomial*,  
with D. Futer and J. Purcell, Mathematical Research Letters, 16(2009),  
no 2, 233-253.
- [21]. *Alternating sum formulae for the determinant and other link invari-  
ants*, with D. Futer, O. Dasbach, X.-S. Lin and N. Stoltzfus, “Knots  
and Quantum Computing” (December 18-20, 2007 UT Dallas, TX),  
J. of Knot Theory and its Ramifications, June 2010, to appear. (Vol-  
ume Eds. M.Dabkowski, V.Harizanov, L.Kauffman, J.Przytycki and  
V.Ramakrishna)
- [22]. *On diagrammatic bounds of knot volumes and spectral invariants*,  
with D. Futer and J. Purcell, Geometricae Dedicata, to appear.

Manuscripts under review by a journal:

- [23]. *Cusp areas of Farey manifolds and applications to knot theory*,  
with D. Futer and J. Purcell, ArXiv:math.GT/0808.2716 (40 pages).
- [24]. *Cosmetic Crossing Changes in Fibered Knots*, 20 pages.

In preparation/progress:

- [25]. *Guts of state surfaces and the Jones polynomial*,  
with D. Futer and J. Purcell in preparation.
- [26]. *An intrinsic approach to polynomial invariants for knots in 3-manifolds*,  
in preparation.

Unpublished/Drafts:

- [26]. *Knot and 3-manifold invariants and exceptional Dehn surgeries*, available at <http://www.math.msu.edu/~kalfagia>.
- [27]. *A draft of notes on knot polynomials and hyperbolic volume*, available at <http://www.math.msu.edu/~kalfagia>.
- [28]. *Regular Seifert surfaces and Vassiliev knot invariants*, ArXiv: math.GT/9804032.

### **Book Editing:**

“Interactions between Hyperbolic Geometry, Quantum Topology and Number Theory”, (June 3-13, Columbia University, New York), *Contemporary Mathematics*, to be published by the AMS. (co-editors: A. Champanerkar, O. Dasbach, I Kofman, W. Neumann and N. Stoltzfus.)

### **Teaching Experience:**

#### **Michigan State University**

Spring 2010: Math 961: Algebraic Topology II;  
Fall 2009: Math 960 Algebraic Topology I; Math132, Calculus I  
Spring 2009: Math 869, Geometry/Topology  
Fall 2008: Math 132, Calculus I (2 sections)  
Spring 2008: Math 996, Topics in 3-dimensional Topology  
Fall 2007: Math 132, Calculus I (2 sections)  
Spring 2007: Math 961, Algebraic Topology, II  
Fall 2006: Math 960 Algebraic Topology I; Math 133-AP, Advanced Placement Calculus II  
Spring 2006: Math 869, Geometry/Topology  
Fall 2005: Math 496, “An elementary Introduction to Knot Theory” ; Math 133-AP, Advanced Placement Calculus II  
2004-2005: On leave at the Institute for Advanced Study  
Spring 2004: Math 496, “An elementary Introduction to Knot Theory”  
Fall 2003: Math 153H, Honors Calculus II; Math 235, Differential Equations

Spring 2003: Math 153H, Honors Calculus II  
Fall 2002: Math 235, Differential Equations; Math 132  
Spring 2002: Math 235, Differential Equations  
Fall 2001: Math 132, Calculus I (2 sections)  
Spring 2001: Math 996, “Topics in Knot theory”  
Fall 2000: Math 461, Geometric Topology; Math 132  
Spring 2000: Math 132, Calculus I  
Fall 1999: Math 314, Linear Algebra; Math 132  
Spring 1999: Math 132, Calculus I  
Fall 1998: Math 132, Calculus I

#### **Rutgers University, New Brunswick, NJ**

I have taught Calculus I for non-science majors (Fall 95, 96, Spring 1997), Calculus I for science majors (Fall 96, Spring 97), Calculus II for Biology majors (Spring 96) and Linear Algebra (Fall 95, Spring 96, Spring 1997).

#### **Columbia University, New York, NY**

I taught the undergraduate seminar for Mathematics majors during the academic years 91-92 and 92-93. The topics taught at the seminar during these years were: Linear representations of finite groups, Differential topology, Probability theory. I have also taught Calculus I during the summer of 92 and 93.

#### **Postdoctoral associates/collaborators:**

- 1999-2001, Hessam Hamidi-Tehrani (Ph.D., Columbia University).  
Post- placement: Assistant Professor (tenure-track) at BCC of CUNY  
Currently in Finance.
- 2005-2008, David Futer (Ph.D., Stanford University).  
Fall 2007, Member at MSRI, Berkeley.  
Post- placement: Assistant Professor (tenure-track), Temple University.
- 2006-2009, Lawrence Roberts (Ph.D., UC-Berkeley)– Co-mentoring with R. Fintushel.  
Post- placement: Assistant Professor (tenure-track), University of Alabama.
- 2007-2008, Teaching Mentor for Manish Kumar.

–2009–2011, Eric Shoenfield (Ph.D. Stanford University).

**Long term visitors hosted:**

December 2009- February 2010, Sang Young Lee (Pursan National University, Korea)

**Graduate student Advising:**

*Ph.D. students:*

Chris Cromwell (degree expected 2011)

Research work:

– *A polynomial invariant for links in Lens spaces*, in preparation.

– *Bennequin type inequalities in Lens spaces*, in preparation.

Thomas Jaeger (degree expected 2011)

Research work:

– *On the structure of Khovanov Homology*, in progress.

*1st year advisees:*

2008-2009, Nikolaos Pattakos

2008-2009, Manoussos Maridakis

2005-2006, Matthew Jonhson

*Supervised Graduate reading:*

2006-2009, Chris Cornwell

2007-2008, Thomas Jaeger

Summer 2009, Cheryl Balm

Fall 2009, Cheryl Balm and Dan Smith

*Dissertation Defense Committees:*

2002, Elmas Irmak (Advisor, J. McCarthy)

2007, Inanc Baykur (Advisor, R. Fintushel)

2008, Adam Knapp (Advisor, R. Fintushel)

*Comprehensive Exam Committees:*

2007, Arda Bugra Ozer

2008, Nathan Sunukjian

**Professional Service:**

2010, Program committee of “Knots in Poland III”, Beldewo, Poland, July 25-August 4.

2010, co-organizer of Special Session “Geometric Aspects of Link and 3-Manifold Invariants”, Joint AMS Meeting, San Francisco, January 11-16

2009, Reviewer of Bowling Green State University Grant Proposals

2009, co-organizer of a workshop and conference on “Interactions between Hyperbolic Geometry, Quantum Topology and Number Theory”, June 3-19, Columbia University, New York

2008, Member of NSF proposal evaluation panel

2008, Chair of NSF site visit committee at MSRI (April 16-18)

2007, Member of NSF proposal evaluation panel

2007, co-organizer of the conference “A second time around the Volume Conjecture”, May 28-June 3, LSU, Baton Rouge

2006, co-organizer of the conference “Around the Volume Conjecture”, March 13-19, Columbia University, New York

2005, Member of NSF proposal evaluation panel

2005-present, co-organizing the RTG lectures

2006-present, co-organizer the “3, 4-manifolds seminar”

2007, organizer of a learning seminar in Khovanov Homology

1996-present, mail reviewer for NSF Grant proposals

*Referee for:*

Topology

Journal of Differential Geometry

Pacific Journal of Mathematics

Topology and its Applications

Journal of Knot Theory and its Ramifications  
Proceedings of the AMS  
Transactions of the AMS  
Bulletin of the London Mathematics Society  
Algebraic and Geometric Topology  
Journal of the Australian Mathematics Society  
Experimental Mathematics  
Israel Journal of Mathematics  
Communications in Contemporary Mathematics  
International Journal of Mathematics  
SIGMA

**Selected Conference Invitations/Talks:**

2010, MSRI Workshop Connections for Women: Homology Theories of Knots and Links January 21-22  
2010, Special Session on Quantum Invariants of 3-manifolds and Modular Categories, Spring Central Section Meeting St. Paul, MN, April 10-11  
2009, Moab topology conference, Utah, May 13-15.  
2009, Conference on the Geometry and Topology of Knots, Oklahoma State University, March 20-21  
2008, Special Session AMS Meeting, Baton Rouge, LA  
2007, Geometric Topology seminar, Columbia University  
2007, International Conference on Quantum Topology , Hochiminh City, Vietnam (*not able to attend*)  
2007, “International Conference on Topology and Physics”, Nankai University, Tianjin, China ( *not able to attend*)  
2007, Mathematics colloquium, University of South Alabama  
2007, Topology seminar, University of South Alabama  
2007, Special Session, AMS National meeting, New Orleans  
2005, AIM Workshop on “Moduli spaces of Knots”  
2005, Bryn-Mawr-Haverford bi-college Mathematics colloquium

2005, Topology Seminar, Princeton University  
 2005, Quantum Topology Conference, Snowbird Resort, Utah  
 2004, Cascade Topology Conference, Boise State University  
 2004, Geometric Topology seminar, Columbia University  
 2003, Topology seminar, University of Michigan  
 2003, Workshop on Quantum Topology, Oberwolfach, Germany  
 2002, ICM Satellite “Geometric Topology”, Xian, China (*not able to attend*).  
 2002, Special Session in Topology, AMS meeting, Ann-Arbor  
 2001, Low dimensional Topology Seminar, MSU (3 talks)  
 2001, Special Session, AMS meeting , Las Vegas  
 2000, “Knots 2000”, KAIST, Korea  
 1999, Poincare Seminar, Rutgers at Newark  
 1999, Oberseminar, Max-Plank-Institut für Mathematik  
 1998, Math Department Colloquium, University of Crete, Greece  
 1998, “Knots in Hellas ’98”, Delphi-Greece  
 1998, Special Session at AMS meeting, Philadelphia  
 1998, Mathematics colloquium, Oklahoma State University  
 1997, Special session at AMS Meeting, Baltimore  
 1997, Geometry/Topology seminar, Rutgers University  
 1996, Topology seminar, Rutgers University  
 1996 and 1997, Topology Seminar, Columbia University  
 1996, Special session at AMS Meeting, Lawrenceville NJ  
 1995, Workshop in Knot Theory, Oberwolfach, Germany  
 1995, Gauge theory seminar, Harvard University  
 1995, Mathematics colloquium, Indiana University  
 1994, Geometry Festival, Bethlehem, PA  
 1994, Topology seminar, Princeton University  
 1994, Conference in low dimensional topology, Luminy, France  
 1994, Topology-Geometry seminar, University of Pennsylvania  
 1994, Special session at AMS Meeting, Brooklyn, NY

**Departmental Service:**

2009-2010, Hiring Committee  
2009, RTG Graduate Student Recruitment Committee  
2009, RTG Postdoctoral Fellow Recruitment Committee  
2/2009, LBC Interview Exit Committee (for T. Gerhardt)  
Fall 2008, 132 Final Exam referee  
2008-2009, Graduate Studies Committee  
2007-2008, Advisory Committee  
2006-2007, Hiring Committee  
Fall 2006, Math 132 final exam writing committee.  
2005-present, RTG program co-coordinator  
2006-present, Incoming graduate student advisor  
Fall 2006, 133 Final Exam referee  
2006– , Mathematics department member for Lyman Briggs College “2-PC” Committee for Assistant Professor R. Bell.  
2005-2006, Graduate Studies Committee  
2004-present, Undergraduate student department advisor  
2003-2004, Undergraduate studies committee  
2003-2004, Calculus 132 coordinating committee  
2003- 2004, Math 132 final exam writing committee

**University Service:**

2007–present, Honors College advisor

**Birth Place:** Lesvos, Greece

**Citizenship:** US and Greek

**Family:** Married; one son.