

# KATHLEEN L. PETERSEN

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## CONTACT INFORMATION

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RESEARCH INTERESTS · Geometric Topology and Number Theory

## APPOINTMENTS

Associate Professor	Florida State University	2015 -
Assistant Professor	Florida State University	2008 - 2015
Fields Postdoctoral Fellow	The Fields Institute	Fall 2008
Coleman Postdoctoral Fellow	Queen's University	2005 - 2008

## EDUCATION

University of Texas at Austin	Mathematics	Ph.D. 2005
Oberlin College	Mathematics	A.B. 1998

## GRANTS AND AWARDS

MSRI Summer Research for Women in Mathematics (SwiM)	2019
Simons Foundation Collaboration Grant	2016-2021
Simons Foundation Collaboration Grant	2011-2016
Committee on Faculty Research Support (COFRS) Award (Florida State Univ. Council on Research & Creativity)	2013
First Year Assistant Professor Award (Florida State)	2008
Scholarly and Professional Development Fund Grant (Queen's)	2006
Rupert Fellowship (Texas)	2004
Frank Gerth III Teaching Excellence Award (Texas)	2001
Departmental Fellowship (Texas)	2000

## SELECTED ACADEMIC VISITS

Tata Institute of Fundamental Research (TIFR)	Spring 2017
Ohio State University (MBI)	Spring 2015
Mathematisches Forschungsinstitut Oberwolfach (MFO) Research In Pairs (with C. Sinclair)	June 2013
Max Planck Institut für Mathematik, Bonn Germany	May-July 2012
University of Texas at Austin	Feb-March 2012

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## RESEARCH

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### MATHEMATICS PUBLICATIONS

19. *Gonality and Genus of Canonical Components of Character Varieties* (with A. Reid)  
submitted arXiv:1408.3665

18. *Equidistribution of Elements of Norm One in Cyclic Extensions* (with C. Sinclair) preprint · arXiv:1404.4648
17. *Missing class groups and class number statistics for imaginary quadratic fields* (with S. Holmin, N. Jones, P. Kurlberg, and C. McLeman) to appear in *Experimental Mathematics* · (published online 2017) · arXiv:1510.04387
16. *Lower Bounds for Heights in Relative Galois Extensions* (with S. Akhtari, K. Aktaş, K. Biggs, A. Hamieh, and L. Thompson) *Women in numbers Europe II: Contributions to Number Theory and Arithmetic Geometry*, 1–18, Assoc. Women Math. Series, 11, Springer, 2018.
15. *Character Varieties of Double Twist Links* (with A. Tran) *Algebraic & Geometric Topology* 15 (2015) 3569–3598
14. *A-Polynomials of a Family of Two-Bridge Knots* · *NY Journal of Math.* Volume 21 (2015) 847-881
13. *Arithmetic Groups and Lehmer’s Conjecture* · Institut Mittag-Leffler preprint series, Workshop on Mahler Measure and Growth in Geometry and Topology (2014).
12. *Character Varieties of Once Punctured Torus Bundles of Tunnel Number One* (with K. Baker) *Internat. J. Math.*, 24 (2013), No. 06. 1350048, 57pp.
11. *A Bombieri-Vinogradov Theorem for Number Fields* (with M.R. Murty) *Trans. Amer. Math. Soc.* 365 (2013), no. 9, 4987-5032.
10. *The Euclidean Algorithm for Number Fields and Primitive Roots* (with M.R. Murty) *Proc. Amer. Math. Soc.* 141 (2013), 181-190
9. *On Well-Rounded Ideal Lattices* (with L. Fukshansky) *Int. J. Number Theory*, vol. 8 no. 1 (2012) pp. 1–18.
8. *Character Varieties of a Family of Two-Bridge Knots* (with M. Macasieb and R. van Luijk) *Proc. London Math. Soc.* (2011) 103(3): 473-507.
7. *Equidistribution of Algebraic Numbers of Norm One in Quadratic Number Fields* (with C. Sinclair) *Int. J. Number Theory*. Vol: 7, Issue: 7(2011) pp. 1841-1861.
6. *On Character Varieties of Certain Families of 3-Manifolds*, *Oberwolfach Reports* Volume 7, Issue 3, 2010.
5. *The Generalized Artin Conjecture and Arithmetic Orbifolds* (with M.R. Murty) *Groups and symmetries*, 259265, CRM Proc. Lecture Notes, 47, Amer. Math. Soc., Providence, RI, 2009.
4. *Counting Cusps of Subgroups of  $\mathrm{PSL}_2(\mathcal{O}_K)$* , *Proc. Amer. Math. Soc.* 136 (2008), no. 7, 2387-2393.
3. *Conjugate Reciprocal Polynomials with all Roots on the Unit Circle* (with C. Sinclair) *Canad. J. Math.* 60 (2008), no. 5, 1149-1167.
2. *One-Cusped Congruence Groups of Bianchi Groups*, *Mathematische Annalen* 338 (2007), no 2, 249 - 282.
1. *One-Cusped Congruence Subgroups of  $\mathrm{PSL}_2(\mathcal{O}_K)$*  · PhD dissertation · University of Texas, May 2005

## OTHER PUBLICATIONS

*Non-Profit Alternatives to Commercial Academic Journals: Success Stories from Mathematics, Political Geography.* Volume 31, Issue 5, June 2012, Pages 263-265

(solicited unrefereed editorial response)

*Vibrational and Quantum Chemical Studies of 1,2-Difluoroethylenes: Spectra of 1,2-<sup>13</sup>C<sub>2</sub>H<sub>2</sub>F<sub>2</sub> Species, Scaled Force Fields, and Dipole Derivatives* (N.C. Craig, K.L. Petersen and D.C. McKean) *The Journal of Physical Chemistry A*, 2002, Vol. 106, No. 26, pp. 6358-6369.

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 CONFERENCES AND TALKS
 

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## INVITED CONFERENCE AND MEETING TALKS (NON-AMS)

- 2018 *Characters, Representations and the A-polynomial* · Mini-Course (3 lectures) · Workshop on Volume Conjecture and related topics in Knot Theory · IISER Pune · Pune, India
- 2017 *Gonality and the Character Variety* · Geometric Topology in Cortona · Tuscany, Italy
- 2015 *Geometric Representations of Knot Groups* · Invariants in Low Dimensional Geometry Gazi University · Ankara, Turkey
- Introduction to Character Varieties* · Mini-Course (4 lectures) · Workshop on Invariants of Knots, Surfaces and 3-manifolds · Gazi University · Ankara, Turkey
- Invariants of A-polynomials* · Conference on Knot Theory and Its Applications to Physics and Quantum Computing; 60th birthday of Jozef H. Przytycki · University of Texas at Dallas
- 2013 *Gonality and Genus of Character Varieties* · Geometric Topology in New York · Columbia University
- Trace Fields and Hyperbolic 3-manifolds* · Growth and Mahler measures in Geometry and Topology · Institut Mittag-Leffler · Djursholm, Sweden
- Character Varieties and Dehn Filling* · Geometric Groups on the Gulf Coast Conference South Padre Island, TX
- Character Varieties and Dehn Filling* · Low Dimensional Topology and Number Theory V · Fukuoka Japan
- 2011 *The Geometry of Character Varieties* · Tech Topology Conference · Georgia Tech
- Character Varieties of Some Families of 3-Manifolds* · Low Dimensional Topology and Number Theory III · Fukuoka Japan
- 2010 *Character Varieties of Certain Families of Knots* · Low-Dimensional Topology and Number Theory · Mathematisches Forschungsinstitut Oberwolfach
- 2009 *Character Varieties of a Family of Two-Bridge Knots* · Spring Topology and Dynamics Conference · Gainesville FL
- 2008 *Cusps, Congruence Subgroups and Artin's Primitive Root Conjecture* · Thematic Program on Arithmetic Geometry, Hyperbolic Geometry and Related Topics · The Fields Institute Toronto

2007 *Cusps and Congruence Subgroups* · Low-Dimensional Topology and Number Theory · Banff International Research Station

INVITED AMS MEETING TALKS

2017 *Representations of Knot Groups* · AMS Special Session on Invariants of Links and 3-Manifolds · University of North Texas · Denton, TX

$SL(2, \mathbb{C})$  representations of knot groups · AMS Special Session on Invariants in low-dimensional topology · Hunter College, CUNY · New York, NY

2015  $(P)SL_2(\mathbb{C})$  *Representations of Knot Groups* · AMS Special Session on Knots and 3-manifolds · Las Vegas NV

*Knots and their A-polynomials* · AMS Special Session on Interactions Between Geometry, Group Theory and Number Theory · East Lansing MI

*Character Varieties of Double Twist Links* · AMS Special Session on Geometry and 3-Manifold Invariants · East Lansing MI

2014 *Invariants of Character Varieties* · AMS/AMM Joint Meeting Special Session on Deformations of Geometric Structures on Low-Dimensional Manifolds · Baltimore MD

2013 *Gonality and the Character Variety* · AMS Special Session on Geometric Topology of Knots and 3-Manifolds · Philadelphia PA

*Well-Rounded Ideal Lattices* · AMS Special Session on Arithmetic Theory of Quadratic Forms and Lattices · San Diego CA

2012 *Character Varieties of Families of One-Cusped Hyperbolic 3-Manifolds* · AMS Special Session on Combinatorial Methods in Knot Theory · New Orleans LA

2011 *Character Varieties of a Family of Once-Punctured Torus Bundles* · AMS Special Session on Geometry and Applications of 3-Manifolds · Worcester MA

*A-Polynomials of a Family of Two-Bridge Knots* · AMS Special Session on Number Theory, Arithmetic Topology, and Arithmetic Dynamics · Worcester MA

2010 *Character Varieties of Two-Bridge Knots* · AMS/AMM Joint Meeting Special Session on Low-Dimensional Topology · Berkeley CA

2007 *The Euclidean Algorithm and Applications to Hyperbolic Geometry* · AMS/MAA Special Session on Arithmetic of Function Fields · New Orleans LA

CONTRIBUTED CONFERENCE TALKS

2011 *Artin's Primitive Root Conjecture and the Euclidean Algorithm* · Palmetto Number Theory Series XVI · Emory University

*Artin's Primitive Root Conjecture and the Euclidean Algorithm* · Journées Arithmétiques Vilnius Lithuania

2009 *The Generalized Riemann Hypothesis on the Average* · Journées Arithmétiques · Saint-Étienne France

- 2008 *Character Varieties of a Family of Two-Bridge Knots* · Knots, Surfaces, the Curve Complex, Foliations, and all that... Institute for Advanced Study Women and Math Program Princeton NJ  
*A Bombieri-Vinogradov Theorem for Number Fields* · Canadian Number Theory Association X Meeting · Waterloo Ontario

## INVITED SEMINAR AND COLLOQUIUM TALKS

- 2019 Temple University (Topology Seminar), Montana State University (Topology Seminar)  
 2018 Oberlin College (Colloquium)  
 2017 Tata Institute of Fundamental Research (TIFR), (Colloquium and Graduate Student Seminar)  
 2015 Tulane University (Colloquium) · Ohio State University (Number Theory Seminar)  
 University of Texas at Dallas (Geometry, Topology, and Dynamical Systems Seminar)  
 2013 Universidad de los Andes, Bogota Colombia (Colloquium)  
 2012 Brigham Young University (Topology Seminar), McMaster University (Colloquium), McMaster University (Joint Geometry & Topology Seminar and Algebra & Number Theory Seminar), Max Planck Institute (Number Theory Seminar), Max Planck Institute (Oberseminar)  
 2011 University of Oregon (Colloquium), University of Mississippi (Algebra and Number Theory Seminar), University of Maryland (Geometry and Topology Seminar)  
 2010 University of Miami (Colloquium)  
 2009 The Claremont Center for the Mathematical Sciences (Algebra/ Number Theory/ Combinatorics Seminar)  
 2008 University of British Columbia (Topology Seminar), University of British Columbia/Simon Fraser University (Number Theory Seminar), Queens College, CUNY (Colloquium), Florida State University (Colloquium), Florida State University (Topology Seminar), Kansas State University (Colloquium)  
 2007 SUNY Buffalo (Topology/Geometry Seminar), University of Toronto (Ganita Seminar)  
 2006 Université du Québec à Montréal (Topology Seminar), British Columbia/Simon Fraser University (Number Theory Seminar), SUNY Buffalo (Topology/Geometry Seminar)

## OTHER RECENT CONFERENCES/WORKSHOPS ATTENDED

- 2018 Height Functions and Lehmer-type Problems · Focused Research Group meeting · Heilbronn Institute, Bristol University  
 2016 Women in Numbers Europe - 2 · Lorentz Center, Leiden Netherlands  
 2014 Low-Dimensional Topology and Number Theory · Mathematisches Forschungsinstitut Oberwolfach (MFO)  
 2012 Low-Dimensional Topology and Number Theory · MFO  
 AMS Joint Mathematics Meeting · Boston, MA

- 2011 Diophantine Methods, Lattices, and Arithmetic Theory of Quadratic Forms · Banff International Research Station (BIRS)  
 Faces of Geometry: Groups, 3-Manifolds and Singularities · Columbia University
- 2010 Geometry, Topology and Dynamics of Character Varieties · Natl. Univ. of Singapore  
 Character Varieties in the Geometry and Topology of Low-Dimensional Manifolds · BIRS
- 2009 Interactions Between Hyperbolic Geometry, Quantum Topology and Number Theory · Columbia University

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## TEACHING

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- Florida State    *Graduate courses* · Complex Analysis, Groups, Rings and Vector Spaces I, III, Number Theory, Representations of 3-manifold Groups, Topology I,II, Hyperbolic Geometry  
*Undergraduate courses* · Intro to Advanced Math, Topology, Theory of Numbers, Intro to Abstract Algebra I, II, Intro to Analysis, Calculus I (honors), II, III
- Queen's        Linear Algebra II, Precalculus, Algebraic Structures with Applications, Differential and Integral Calculus (pure and applied)
- Texas            Emerging Scholars Workshop, Precalculus

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## MENTORING AND ADVISING

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### Thesis Advisor

Lydia Eldredge (current)

Jay Leach · Ph.D. 2018

Thesis: *Symmetric Surfaces and the Character Variety*

Leona Sparaco · Ph.D. 2017

Thesis: *Character Varieties of Knots and Links with Symmetries*

Robert Billet · Ph.D. 2016

Thesis: *Flow Equivalence classes of pseudo-Anosov surface homeomorphisms*  
 (co-advisor with Eriko Hironaka)

Jonathon (Kyle) Armstrong · Ph.D. 2012

Thesis: *Principal Elements of Mixed Sign Coxeter Systems*  
 (co-advisor with Eriko Hironaka)

Research Sponsor · FSU Undergraduate Research Opportunity Program (UROP)

Student: Mitchell Schmidt (2013-2014)

Project: Discovering Wieferich Primes

Thesis Committee Member · Florida State Department of Mathematics

Xia Liao (PhD 2013), Gregory (Ivan) Dungan (PhD 2013),

Vijay Kunwar (PhD 2013), Corey Harris (PhD 2017),

Yaineli Valdes (PhD 2018), Xiping Zhang (PhD 2018),

Michael Neimeier, Christopher Stover, Opal Graham, Thanittha Kowan, Yi Zhou

Guest Speaker in FSU's AWM chapter · 2016

Guest Speaker in FSU GSS (Graduate Student Seminar) about Research Statements · 2013

Teaching Mentor · Florida State Department of Mathematics · 2010-present

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## OUTREACH

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### *FSU Fun Day*

Games Room Helper · Florida State · 2015

Games Room Organizer · Florida State · 2014

Poster Organizer · Florida State · 2013

*FSU Math Contest* · Faculty Participant · Florida State · 2012

*What is Topology?* · Women in Math, Science and Engineering · Florida State · 2010

*Artin's Conjecture and Unique Factorization* · Poster Presentation for Council on  
Research & Creativity FYAP award · Florida State · 2010

Science Fair Judge · University of Texas Elementary School · 2005

Saturday Morning Math Group Coordinator · University of Texas · 2004

Emerging Scholars Program Instructor · University of Texas · 2003

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## ADDITIONAL SERVICE

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Co-organizer of 2019 AMS Southeastern Fall Sectional Meeting Special Session on  
Geometric Structures on Manifolds (with Sam Ballas and Luca Di Cerbo)

Co-organizer of working group *Heights of Algebraic Integers* (with Shabnam Akhtari)  
WIN-E2: Women in Numbers Europe-2 · 2016

Co-organizer of 2014 AMS Southeastern Spring Sectional Meeting Special Session on  
Geometric Topology and Number Theory (with Eriko Hironaka)

Co-organizer of 2013 *Florida Topology Conference* and *Topology Week*  
(with Eriko Hironaka and Washington Mio)

### Organizer

Algebra and Its Applications Seminar · Florida State · Fall 2011, Fall 2013,  
Spring 2014, Fall 2015, Spring 2019

Professional Development Lunches (with Eriko Hironaka) · Florida State · 2011

Topology Seminar · Florida State · Fall 2009, Spring 2011, Spring 2013, Fall 2016

Member of FSU Faculty Senate 2016-present

Chair of Visibility Committee · FSU Mathematics Department · 2018-

Qualifying Examination Committee · FSU Mathematics Department  
Topology · 2011, 2013 (wrote exam)  
Algebra · 2018 (co-wrote exam), Jan 2019 (co-wrote exam)

Graduation Committee · FSU Mathematics Department · 2009

Graduate Committee · FSU Mathematics Department · 2013-2014, 2018-2019

COFRS (Committee on Faculty Research Support) Proposal Reviewer  
Florida State · 2012, 2014, 2015, 2016

Member of the Association for Women in Mathematics (AWM) Committee on Committees  
2017-2020

Referee

*Acta Arithmetica, Algebraic & Geometric Topology, American Mathematical Monthly, Boletín de la Sociedad Matemática Mexicana, Experimental Mathematics, Journal of Knot Theory and Its Ramifications, International Journal of Mathematics, International Journal of Number Theory, Mathematics Research Letters, Proceeding of the AMS, the Ramanujan Journal, Turkish Journal of Mathematics*