

Ciprian Manolescu

Curriculum Vitae

University of California
Department of Mathematics
520 Portola Plaza
Los Angeles, CA 90095-1555

Phone: (310) 825-3687
Fax: (310) 206-6673
Email: cm@math.ucla.edu
Homepage: <http://www.math.ucla.edu/~cm>

Research Interests

Low-dimensional topology, symplectic geometry, gauge theory. Particular interests: Floer homology and its applications to knots, 3-manifolds, and 4-manifolds; the Seiberg-Witten equations; Khovanov homology and categorification

Education

Ph.D. in Mathematics, Harvard University, June 2004
Thesis: *A spectrum valued TQFT from the Seiberg-Witten equations*
Advisor: Peter B. Kronheimer

B.A. *summa cum laude* in Mathematics, Harvard University, June 2001

Employment

Professor, UCLA, 2012-Present

Associate Professor, UCLA, 2008-2012

Assistant Professor, Columbia University, 2005-2008

Research Fellow, Clay Mathematics Institute, 2004-2008

Veblen Research Instructor, Princeton University and IAS, 2004-2005

Visiting Positions

Visiting Researcher, Simons Center for Geometry and Physics, April-May 2013

C.N.R.S. Visiting Researcher, University of Paris 7, June-August 2012

Visiting Research Professor, MSRI, March-April 2010

Royal Society University Research Fellow, University of Cambridge, Spring 2009

Selected Awards, Grants, and Honors

Invited speaker at the International Congress of Mathematicians, Rio de Janeiro, 2018

Honorary Doctorate, Babeş-Bolyai University, Cluj-Napoca, Romania, 2018

Fellow of the American Mathematical Society, 2017

European Mathematical Society Prize, 2012

National Science Foundation: Principal Investigator, research grants DMS-0803465, “Applications and Refinements of Floer Homology” (2008-2011); DMS-1104406, “Invariants in Low-Dimensional Topology” (2011-2014); DMS-1402914, “Topological Applications of Floer Theory” (2014-2017); DMS-1708320, “Floer Theories for 3-Manifolds” (2017-2020); and DMS-1563615, “FRG: Collaborative Research: Floer Homotopy Theory” (2016-2019)

Robert Sorgenfrey Distinguished Teaching Award at UCLA, 2011

Royal Society University Research Fellowship (UK), 2008

Clay Research Fellowship, 2004-2008

AMS/MAA/SIAM Frank and Brennie Morgan Prize for Outstanding Research in Mathematics by an Undergraduate Student, 2001

Cue Certificate for Distinction in Teaching, Harvard: 1998, 1999, 2002

William Lowell Putnam Mathematical Competition, top five (Putnam Fellow): 1997, 1998, and 2000

Three Gold Medals with perfect scores (42 points) at the International Mathematical Olympiad: Toronto, Canada (1995); Bombay, India (1996); Mar del Plata, Argentina (1997)

Publications and Preprints

1. The Knight Move Conjecture is false (with M. Marengon), preprint (2018), arXiv:1809.09769
2. Homology cobordism and triangulations, to appear in *Proceedings of the International Congress of Mathematicians 2018*
3. A sheaf-theoretic model for $SL(2, \mathbb{C})$ Floer homology (with M. Abouzaid), preprint (2017), arXiv:1708.00289
4. Involutive Heegaard Floer homology and plumbed three-manifolds (with I. Dai), to appear in *Journal of the Institute of Mathematics of Jussieu*
5. A connected sum formula for involutive Heegaard Floer homology (with K. Hendricks and I. Zemke), *Selecta Mathematica* **24** (2018), 1183–1245
6. Floer homology and covering spaces (with T. Lidman), *Geometry & Topology*, **22** (2018), 2817–2838
7. The equivalence of two Seiberg-Witten Floer homologies (with T. Lidman), *Astérisque*, **399** (2018)
8. Lectures on the triangulation conjecture, in *Proceedings of the Gökova Geometry / Topology Conference 2015*, Gökova (2016), 1–38
9. Involutive Heegaard Floer homology (with K. Hendricks), *Duke Mathematical Journal*, **166** (2017), 1211–1299

10. Floer theory and its topological applications, *Japanese Journal of Mathematics*, **10** (2015), 105–133
11. Triangulations of manifolds, *Notices of the International Congress of Chinese Mathematicians*, **2** (2014), no.2, 21–23
12. An introduction to knot Floer homology, in *Physics and mathematics of link homology*, Contemp. Math. **680**, AMS (2016), 99–135
13. Cornered Heegaard Floer homology (with C. Douglas and R. Lipshitz), to appear in *Memoirs of the American Mathematical Society*
14. The Conley index, gauge theory, and triangulations, *Journal of Fixed Point Theory and Applications* **13** (2013), 431–457
15. On the intersection forms of spin four-manifolds with boundary, *Mathematische Annalen* **359** (2014), 695–728
16. A generalized asynchronous computability theorem (with E. Gafni and P. Kuznetsov), in *Proceedings of the 2014 ACM Symposium on Principles of Distributed Computing (PODC '14)*, ACM, New York (2014), 222–231
17. Pin(2)-equivariant Seiberg-Witten Floer homology and the Triangulation Conjecture, *Journal of the American Mathematical Society* **29** (2016), 147–176
18. Grid diagrams in Heegaard Floer theory, in *European Congress of Mathematics, Kraków, 2-7 July, 2012*, European Mathematical Society (2013), 643–657
19. An untwisted cube of resolutions for knot Floer homology, *Quantum Topology* **5** (2014), 185–223
20. On the algebra of cornered Floer homology (with C. Douglas), *Journal of Topology* **7** (2014), 1–68
21. Heegaard Floer homology and integer surgeries on links (with P. Ozsváth), preprint (2010), arXiv:1011.1317
22. Grid diagrams and Heegaard Floer invariants (with P. Ozsváth and D. Thurston), preprint (2009), arXiv:0910.1317
23. Floer homology on the extended moduli space (with C. Woodward), in *Perspectives in Analysis, Geometry and Topology: On the Occasion of the 60th Birthday of Oleg Viro*, Progress in Mathematics **296**, Birkhäuser / Springer (2012), 283–329
24. A combinatorial description of knot Floer homology (with P. Ozsváth and S. Sarkar), *Annals of Mathematics* **169** (2009), 633–660
25. Combinatorial cobordism maps in Heegaard Floer theory (with R. Lipshitz and J. Wang), *Duke Mathematical Journal* **145** (2008), 207–247
26. On the Khovanov and knot Floer homologies of quasi-alternating links (with P. Ozsváth), in *Proceedings of the Gökova Geometry / Topology Conference 2007*, Gökova (2008), 60–81
27. On combinatorial link Floer homology (with P. Ozsváth, D. Thurston and Z. Szabó), *Geometry and Topology* **11** (2007), 2339–2412
28. An unoriented skein exact triangle for knot Floer homology, *Mathematical Research Letters* **14** (2007), 839–852
29. Link homology theories from symplectic geometry, *Advances in Mathematics* **211** (2007), 363–416
30. A concordance invariant from the Floer homology of double branched covers (with B. Owens), *International Mathematics Research Notices* **2007**, doi:10.1093/imrn/rnm077

31. A gluing theorem for the relative Bauer-Furuta invariants, *Journal of Differential Geometry* **76** (2007), 117–153
32. Nilpotent slices, Hilbert schemes, and the Jones polynomial, *Duke Mathematical Journal* **132** (2006), 311–369
33. Periodic Floer pro-spectra from the Seiberg-Witten equations (with P.B. Kronheimer), eprint (2002), [arXiv:math/0203243](https://arxiv.org/abs/math/0203243)
34. Seiberg-Witten-Floer stable homotopy type of 3-manifolds with $b_1 = 0$, *Geometry and Topology* **7** (2003), 889–932

Invited Talks

Lecture Series and Mini-courses

- Topologie, workshop in Oberwolfach, Germany, July 2018
- PIMS Symposium on the Geometry and Topology of Manifolds, Vancouver, Canada, July 2015
- Gökova Geometry / Topology Conference, Gökova, Turkey, May 2015
- Myhill Lectures, University at Buffalo, April 2015
- Takagi Lectures, University of Tokyo, November 2014
- Perspectives in Geometry lecture series, University of Texas at Austin, December 2013
- Seminar series at Microsoft Station Q, Santa Barbara, September 2013
- Workshop on the Topology and Invariants of Smooth 4-Manifolds, University of Minnesota, August 2013
- Summer school on Homology theories of knots and links, University of Montreal, July 2013
- Seminar series at the Jussieu Mathematics Institute, June 2012
- Link homology and categorification, conference at Kyoto University, May 2007

Conference Talks

- Midwest Topology Seminar, University of Kentucky, September 2018
- International Congress of Mathematicians, geometry and topology sections, Rio de Janeiro, Brazil, August 2018
- Geometry Day, IMPA, Rio de Janeiro, Brazil, July 2018
- Quantum Knot Homology and Supersymmetric Gauge Theories, Aspen Center for Physics, March 2018
- Tech Topology Conference, Georgia Institute of Technology, December 2017
- Thirty Years of Floer Theory for 3-Manifolds, BIRS Oaxaca, Mexico, August 2017
- JDG Conference on Geometry and Topology, Harvard University, April 2017
- 3-Manifold Workshop, Newton Institute, Cambridge, UK, February 2017

- Perspectives in Topology and Geometry of 4-Manifolds, Inter University Center, Dubrovnik, Croatia, June 2016
- Cornell Topology Festival, May 2016
- Workshop on Flavours of Gauge Theory (on the occasion of Daniel Ruberman's 61st birthday), The Fields Institute, Toronto, May 2016
- AMS Special Session on Moduli Spaces in Symplectic Geometry, Joint Mathematics Meetings, Seattle, January 2016
- Workshop on Flows, Foliations and Contact Structures, IAS, Princeton, December 2015
- Categorification in Algebra, Geometry and Physics (a conference in honor of the 60th Birthday of Christian Blanchet), Cargèse, Corsica, May 2015
- Yamabe Memorial Symposium, University of Minnesota, October 2014
- 38th Congress of the American Romanian Academy of Arts and Sciences, TED-styled lecture, Pasadena, July 2014
- Fourth Conference of Tsinghua Sanya International Mathematics Forum, China, December 2013
- A Day of Triangulations, UCLA, November 2013
- Conference on the Topology and Invariants of Smooth 4-Manifolds, University of Minnesota, August 2013
- Conference on Low-dimensional Topology after Floer, CRM, Montreal, July 2013
- Workshop on the Geometry and Topology of Smooth 4-Manifolds, Max Planck Institute, Bonn, June 2013
- Workshop on Low Dimensional Topology, Simons Center at Stony Brook, May 2013
- Southern California Topology Colloquium, California Institute of Technology, March 2013
- AMS Special Session on Knots, Links, and Three-Manifolds, Joint Mathematics Meetings, San Diego, January 2013
- Conference on Holomorphic Curves and Low Dimensional Topology, Stanford University, August 2012
- Conference on Geometry, Topology and Group Theory, in honor of the 80th birthday of Valentin Poenaru, Autrans, France, July 2012
- 6th European Congress of Mathematics, Krakow, Poland, July 2012
- Solstice International Colloquium on Topology, Groups and Algebra, Jussieu, Paris, June 2012
- Gökova Geometry / Topology Conference, Gökova, Turkey, May 2012
- Simons Symposium on Knot Homologies and BPS States, Caneel Bay, U.S. Virgin Islands, April 2012
- Conference on Contact and Symplectic Geometry, University of Nantes, June 2011
- Workshop on Interactions between contact symplectic topology and gauge theory in dimensions 3 and 4, Banff, Canada, March 2011
- ICM Satellite Conference on Geometric Topology and Riemannian Geometry, Bangalore, August 2010

Workshop on Homology Theories of Knots and Links, MSRI, March 2010
Southern California Topology Colloquium, Claremont Colleges, February 2010
Categorification and Geometrisation from Representation Theory, University of Glasgow, April 2009
AMS Central Meeting, Western Michigan University, October 2008
Fifty Years since Fox and Milnor, conference at Brandeis University, June 2008
Workshop on Mirror Symmetry and Symplectic Geometry, MIT, May 2008
Knots in Washington XXVI, George Washington University, April 2008
Great Lakes Geometry Conference, University of Minnesota, September 2007
Conference on Symplectic Geometry and Physics, ETH Zürich, Switzerland, September 2007
Gökova Geometry / Topology Conference, Gökova, Turkey, May 2007
Midwest Topology Conference, Indiana University, October 2006
Categorification in Algebra and Topology, Uppsala University, Sweden, September 2006
IAS/PCMI Program in Low Dimensional Topology, Park City, July 2006
Conference in Honor of the 60th Birthday of John Morgan, Columbia University, April 2006
AMS Spring Southeastern Meeting, Florida International University, April 2006
Around Khovanov Homology, workshop in Montréal, Canada, October 2005
Differentialgeometrie im Großen, workshop in Oberwolfach, Germany, August 2005
SYMAT'05 Workshop on symplectic topology in Lisbon, Portugal, July 2005
IAS Holomorphic Curves Workshop, Princeton, May-June 2005
Georgia Topology Conference, University of Georgia at Athens, August 2004
Conference on 3-dimensional topology at Ohio State University, December 2003
MSRI Workshop on Floer homology for 3-manifolds in Banff, Canada, November 2003
Conference on invariants in low-dimensional topology at the Renyi Institute, Budapest, June 2003
MAA MathFest in Burlington, Vermont, August 2002
JAMI Workshop on low-dimensional topology at Johns Hopkins University, March 2002

Colloquia

- 2018: UC Davis
- 2017: Stanford University, University of Chicago, Chinese University of Hong Kong
- 2016: University of Oregon, SUNY Stony Brook
- 2015: Michigan State University
- 2014: Princeton University, Vanderbilt University, UC Irvine
- 2013: University of Texas at Austin
- 2012: IMAR Bucharest, Istanbul Center for Mathematical Sciences
- 2011: CSU Fullerton, Rice University
- 2010: University of Southern California
- 2007: UCLA, Bryn Mawr College, University of Bonn, Northwestern University, Rutgers University
- 2006: Rice University
- 2004: California Institute of Technology

Seminar Talks

- 2018: Stanford University, UC Santa Cruz, UC Berkeley (2), Princeton University, Columbia University, Massachusetts Institute of Technology, University of Regensburg, UC Davis
- 2015: Stanford University (2), University of Oxford, University of Cambridge, Imperial College, University of Edinburgh, University of Glasgow, University of Warsaw (2), IMAR Bucharest
- 2014: UC Davis
- 2013: University of North Carolina, Massachusetts Institute of Technology, University of Cambridge
- 2012: Columbia University, University of Cologne, University of Nantes
- 2011: University of Southern California, Massachusetts Institute of Technology, Michigan State University (2), Stanford University, UC Berkeley, Simons Center, Princeton University
- 2010: MSRI, Harvard University, SUNY Stony Brook (Simons Center Seminar), Princeton University
- 2009: University of Warwick, UC Berkeley
- 2008: University of Cambridge, Imperial College, California Institute of Technology, University of Southern California (Joint LA Topology Seminar)
- 2007: Massachusetts Institute of Technology, New York University, Bryn Mawr (Philadelphia Area Contact / Topology Seminar), Columbia University, Northwestern University, University of Michigan
- 2006: Columbia University, Stanford University, University of Aarhus, University of Marseille, Columbia University, Harvard University, New York University, Stanford University (Bay Area Topology Seminar)
- 2005: Stanford University (2), UC Berkeley, Harvard University, Georgia Institute of Technology, University of Cambridge

2004: University of Notre Dame, California Institute of Technology, Princeton University, Columbia University

2003: University of Porto, Ludwig Maximilian University of Munich, Michigan State University, McMaster University

2001: Harvard University, University of Notre Dame, Université du Québec à Montréal

Teaching Experience

Graduate Level

UCLA: The Atiyah-Singer Index Theorem (Winter 2016), Gauge Theory (Winter 2015), Combinatorial Heegaard Floer Homology (Fall 2011), Symplectic Geometry (Winter 2011), Riemannian Geometry (Fall 2010, Fall 2013, Fall 2015), Characteristic Classes and K-theory (Winter 2010, Winter 2012, Winter 2018), Differential Topology (Fall 2009, Fall 2012), Heegaard Floer Homology (Fall 2008, Spring 2017)

Princeton University: Four-Manifolds (Spring 2005)

Undergraduate Level

UCLA: Advanced Problem Solving Seminar (Fall 2014-2017), Honors Analysis (Winter 2014), Integration and Infinite Series (Winter 2013, Spring 2014), Introduction to Discrete Structures (Winter 2012, Spring 2018), Problem Solving (Fall 2011-2016), Honors Linear Algebra and Applications (Lower Division, Winter 2011), Honors Linear Algebra (Upper Division, Fall 2009)

Columbia University: Topology (Fall 2005 and Fall 2007), Multivariable Calculus (Fall 2007)

Harvard University: Tutorial on Morse theory (Fall 2003), Tutorial on Symplectic and Contact Geometry (Summer 2003), Multivariable Calculus (Spring 2003), Tutorial on Knots and 3-Manifolds (Summer 2002), Course Assistant for various classes (1998-2004)

Supervision

Postdoctoral researchers

Sherry Gong (UCLA, 2018-), Marco Marengon (UCLA, 2017-), Andy Manion (NSF Fellow, UCLA, 2015-2018), Kristen Hendricks (UCLA, 2013-2016), Tova Brown (NSF Fellow, UCLA, 2011-2014), Allison Gilmore (NSF Fellow, UCLA, 2012-2014), Daniel Krasner (UCLA, 2010), Liam Watson (UCLA, 2009-2013)

Ph.D. students

Ikshu Neithalath (UCLA), David Boozer (UCLA), Mike Miller (UCLA), Haofei Fan (UCLA), Siqu He (Caltech, Ph.D. 2018), Matthew Stoffregen (UCLA, Ph.D. 2017), Ian Zemke (UCLA, Ph.D. 2017), Jianfeng Lin (UCLA, Ph.D. 2016), Christopher Scaduto (UCLA, Ph.D. 2015), Yajing Liu (UCLA, Ph.D. 2015), Tye Lidman (UCLA, Ph.D. 2012), Eamonn Tweedy (UCLA, Ph.D. 2011)

Undergraduate students

Cole Hugelmeyer (UCLA, Winter 2016), Yilong Wang (UCLA, Summer 2010; visiting from Zhejiang University through the CSST program), Michael Lock (Columbia, Spring 2008), Dmytro Karabash (Columbia, Spring 2008 and Spring 2006), Sanjay Arora (Columbia, Spring 2007), Mikhail Shklyar (Columbia, Spring 2006), Geillan Aly (Columbia, Fall 2006), Mio Alter (Columbia, Fall 2006)

Service and Miscellaneous

Member of the Editorial Boards of *Journal of the American Mathematical Society*, *Compositio Mathematica*, *Geometry & Topology*, *Selecta Mathematica*, *Geometry & Topology Monographs*

Member of the Advisory Board of *Journal of Fixed Point Theory and Applications*

Reviewer for *Mathematical Reviews*

Grant Reviewer for the National Science Foundation, the American Mathematical Society, the European Research Council, the Research Grant Council of Hong Kong, the National Science Center of Poland, and the Netherlands Organisation for Scientific Research

Referee for *Advances in Mathematics*, *Algebraic and Geometric Topology*, *Communications in Analysis and Geometry*, *Duke Mathematical Journal*, *Geometric and Functional Analysis*, *Geometry and Topology*, *International Mathematics Research Notices*, *Journal of the American Mathematical Society*, *Journal of Differential Geometry*, *Journal of the European Mathematical Society*, *Journal of Knot Theory and its Ramifications*, *Journal of Topology*, *Mathematical Research Letters*, *Mathematische Annalen*, *Memoirs of the American Mathematical Society*, *Proceedings of the National Academy of Sciences*, *Publications Mathématiques de l’IHES*, *Selecta Mathematica*, *Topology and its Applications*, and several conference proceedings

Co-organizer of the PCMI program on QFT and Manifold Invariants in Park City, Utah, July 1-20, 2019

Co-organizer of the workshop on Symplectic Geometry and Homotopy Theory at UCLA, December 12-14, 2018

Co-organizer of the UCLA Topology workshop, January 3-5, 2018

Co-organizer of the summer school and conference “Floer Homology and Homotopy Theory,” UCLA, July 10-21, 2017

Co-organizer of the IPAM workshop “Gauge Theory and Categorification,” UCLA, March 6-10, 2017

Co-organizer of “A Day of Triangulations,” workshop at UCLA, November 16, 2013

Co-organizer of the special session “Topology and Symplectic Geometry,” AMS Western Section Meeting, UCLA, October 9-10, 2010

Seminars (co-)organized: Joint LA Topology Seminar (2008-Present), UCLA Topology Seminar (2008-Present), UCLA Geometry Seminar (2009-2010), Columbia Gauge Theory and Symplectic Geometry Seminar (2005-2008)

Guest lecturer at the Romanian Master of Mathematics competition for high school students, Bucharest (2012)

Guest lecturer at the Fullerton Math Circle for high school students (2013)

Guest lecturer at the Los Angeles Math Circle for high school students (2008-2013)

Guest lecturer at the Oxford Invariants—maths society for undergraduate students (2015)

Guest lecturer at the Archimedians, the Cambridge University Mathematical Society (2017)

Guest lecturer at the Undergraduate Math Colloquium, UCLA (2018)

Guest lecturer at the International Mathematical Olympiad, Cluj-Napoca, Romania (2018)

Coach of the Columbia team for the Putnam Mathematical Competition (2005-2007)

Coach of the UCLA team for the Putnam Mathematical Competition (2009-Present)

Personal

Born on December 24, 1978 in Alexandria, Romania

Dual citizen: Romania and USA