

James Conant

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RESEARCH AREAS Topology, group cohomology, quantum topology, low-dimensional topology, quantum algebra

- EMPLOYMENT
- University of Tennessee,
Full Professor, 2013 – Present
Associate Head and Undergraduate Director, 2012 – 2013
Associate Professor, 2008 – 2013
Assistant Professor, 2003 – 2008
 - Cornell University, VIGRE Assistant Professor, 2000 – 2003
 - UC San Diego, Graduate Teaching Assistant, 1995 – 2000

- EDUCATION
- UC San Diego, Ph.D. 2000, Advisor: Peter Teichner
 - UC San Diego, M.A. 1997
 - Rutgers University, B.A. 1995, Highest Honors

- HONORS AND SUPPORT
- Spring 2014, Visiting Professor, UC San Diego
 - May 2013, Visiting Researcher, Max Planck Institut für Mathematik, Bonn, Germany
 - July 2010-Dec 2010, Visiting Researcher, Max Planck Institut für Mathematik, Bonn, Germany
 - 2009 Chancellor's Research and Creative Achievement/Professional Promise Award
 - 2006–2007 College of Arts and Sciences Research and Creative Achievement Award
 - NSF Grant DMS 0604351, \$108,961 (2006-2009)
 - NSF Grant DMS 0305012, \$64,532 (2003-2006)
 - Summer 2001 visiting researcher, Max Planck Institut für Mathematik, Bonn, Germany
 - ARCS Scholar: awarded by San Diego ARCS chapter for promising graduate research. (1998-2000)
 - John Bogart Prize: awarded by Rutgers Univ. to top undergraduate mathematics major (1995)
 - Henry Rutgers Scholar - Rutgers College senior thesis program
 - $\Phi\eta\Sigma$, Golden Key and ΦBK honor societies

$$H_0(\mathbb{T}_{\bullet, n+2}; \mathbb{Z}) \xrightarrow{\bar{\eta}} H_1(\bar{\mathbb{L}}_{\bullet, n+2}; \mathbb{Z}) \xrightarrow[\cong]{\phi_*^\Delta} H_1(\bar{\mathbb{L}}_{\bullet, n+2}^\Delta; \mathbb{Z})$$

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JOURNAL
PUBLICATIONS

1. J. Conant, M. Kassabov and K. Vogtmann, “Higher hairy graph homology,” *Geometriae Dedicata*, to appear
2. J. Conant, R. Schneiderman and P. Teichner, “Geometric filtrations of string links and homology cylinders,” *Quantum Topology*, to appear
3. J. Conant, “The Johnson Cokernel and the Enomoto-Satoh invariant,” *Algebraic & Geometric Topology*, to appear
4. J. Conant, R. Schneiderman and P. Teichner, “Milnor invariants and twisted Whitney towers,” *J Topology*, (2014) 7 (1): 187-224
5. J. Conant, T. Michaels, “On the number of tilings of a square by rectangles,” *Annals of Combinatorics*, 18 (2014), no. 1, 21–34
6. J. Conant, V. Curnutte, C. Jones, C. Plaut, K. Pueschel, M. Lusby, J. Wilkins, “Discrete homotopy theory and critical values of metric spaces,” *Fundam. Math.* 227, No. 2, 97-128 (2014).
7. J. Conant, J. Costello, V. Turchin, P. Weed, “Two-loop part of the rational homotopy of spaces of long embeddings,” *J. Knot Theory Ramifications* 23 (2014), no. 4, 1450018, 23 pp.
8. J. Conant, M. Kassabov and K. Vogtmann, “Hairy graphs and the homology of $\text{Mod}(g, s)$, $\text{Out}(F_n)$ and $\text{Aut}(F_n)$,” *J Topology* (2013) 6(1): 119–153
9. J. Conant, R. Schneiderman and P. Teichner, “Universal quadratic forms and Whitney tower intersection invariants,” *Proceedings of the Freedmanfest, G&T Monographs*, 18 (2012) 35–60
10. J. Conant, R. Schneiderman and P. Teichner, “Whitney tower concordance of classical links,” *Geometry & Topology* 16 (2012) 1419–1479
11. J. Conant, R. Schneiderman and P. Teichner, “Tree homology and a conjecture of Levine,” *Geometry & Topology* 16 (2012) 555–600
12. J. Conant, R. Schneiderman and P. Teichner, “Higher-order intersections in low-dimensional topology,” *Proceedings of the National Academy of Sciences*, vol. 108, no. 20, (2011) 8131–8138
13. J. Conant and O. Thistlethwaite “Boolean formulae, hypergraphs and combinatorial topology,” *Topology and its Applications*, 157 (2010) pp. 2449-2461
14. J. Conant, J. Mostovoy and T. Stanford, “Finite type invariants based on the band-pass and the doubled-delta move,” *Journal of Knot Theory and its Ramifications*, 19 (2010), no. 3, 355–384.
15. J. Conant, “Homotopy approximations to the space of knots, Feynman diagrams, and a conjecture of Scannell and Sinha,” *American Journal of Mathematics* 130 (2008), no. 2, 341–357
16. J. Conant and K. Vogtmann, “Morita classes in the homology of $\text{Aut}(F_n)$ vanish after one stabilization,” *Groups, Geometry and Dynamics* 2 (2008), no. 1, 121–138
17. J. Conant, “Ornate necklaces and the homology of the genus one mapping class group,” *Bulletin of the London Mathematical Society* 39 (2007), no. 6, 881–891
18. J. Conant, R. Schneiderman and P. Teichner, “Jacobi identities in low dimensional topology,” *Compositio Mathematica* 143 Part 3 (2007) pp.780-810
19. J. Conant “Chirality and the Conway Polynomial,” *Topology Proceedings*, Volume 30, No. 1, 2006, p.153-162
20. R. Budney, J. Conant, K. Scannell, D. Sinha, “New perspectives on self-linking,” *Advances in Mathematics* Vol. 191, Issue 1 (2005), Pages 78-113

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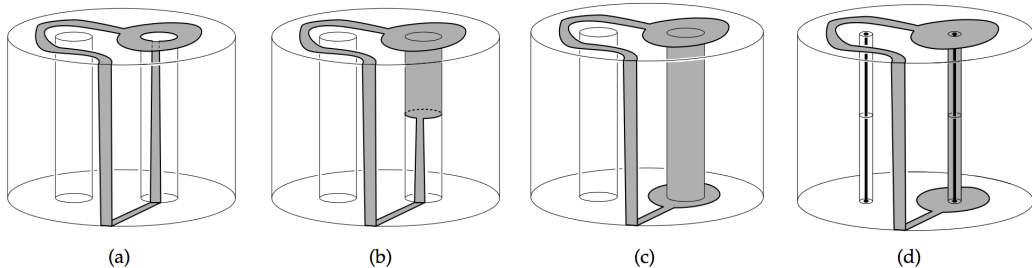
21. J. Conant, F. Gerlits and K. Vogtmann, “Cut vertices in commutative graphs,” *Oxford Quarterly Journal*, Vol. 56, No. 3 (2005)
22. J. Conant and K. Vogtmann, “Morita classes in the homology of automorphism groups of free groups,” *Geom. Topol.*, Vol. 8 (2004) Paper no. 40, pages 1471–1499
23. J. Conant, “Grope and the rational lift of the Kontsevich integral,” *Fundamenta Mathematicae*, Vol. 184 (2004), 73–77
24. J. Conant and P. Teichner, “Grope cobordism and Feynman diagrams,” *Math. Annalen* Vol. 328 (2004), Nos. 1-2, 135-171
25. J. Conant and P. Teichner, “Grope cobordism of classical knots,” *Topology* Vol. 43, Issue 1 (2004); 119-156
26. J. Conant and K. Vogtmann, “On a theorem of Kontsevich” *Algebraic and Geometric Topology*, 3 (2003), paper no. 42, pages 1167-1224
27. J. Conant and K. Vogtmann, “Infinitesimal operations on chain complexes of graphs,” *Math. Annalen*, Vol. 327, No. 3 (2003); 545-573
28. J. Conant, “Fusion and fission in graph complexes,” *Pac J. Math*, Vol. 209, No.2 (2003), 219–230
29. J. Conant, “On a theorem of Goussarov,” *J. Knot Theory Ramifications*, Vol. 12 (No. 1) (2003) 47–52

IN PREPARATION

30. J. Conant, A. Hatcher, M. Kassabov, and K. Vogtmann, “A new perspective on the homology of $\text{Out}(F_n)$.”
31. J. Conant and M. Kassabov, “Hopf algebras and invariants of the Johnson cokernel.”
32. J. Conant, R. Schneiderman and P. Teichner, “Comparing C_n -concordance with Whitney concordance.”
33. R. Budney, J. Conant, R. Koytcheff and D. Sinha, “Embedding calculus knot invariants are of finite type.”

THESES

34. J. Conant, “A knot bounding a grope of class n is $[\frac{n}{2}]$ -trivial,” UC San Diego PhD thesis, 2000
35. J. Conant, “Whitehead torsion and simple homotopy type,” Rutgers University Undergraduate Thesis, 1995 (Advisor: Norman J. Levitt)



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CONFERENCE TALKS

1. "The Johnson homomorphism and its cokernel," Georgia Topology Conference, University of Georgia, June 2014
2. "Abelianizing the target of the Johnson homomorphism," Workshop: Johnson homomorphisms, University of Tokyo, June 2013
3. "Tree homology and Whitney towers," Max-Planck-Institut Semester on 4-manifolds and their combinatorial invariants, Bonn, Germany, May 17 and May 21, 2013
4. "Hairy graphs and the homology of $\text{Out}(F_n)$," Session on geometric group theory, Park City Mathematics Institute, Park City, July 2012
5. "Hairy graphs and the homology of moduli space," Session on Teichmüller space, Park City Mathematics Institute, Park City, July 2011
6. "Grove cobordism and a conjecture of Levine," NRW Topology Meeting, Bonn, Germany, November 2010
7. "Grove cobordism and a conjecture of Levine," Topologie Meeting, Oberwolfach, Germany, September 2010
8. "The cohomology of $\text{Out}(F_n)$ and the Eichler-Shimura isomorphism," *Théorie géométrique des groupes*, Centre International des Rencontres Mathématiques; June 2010
9. "The topology of sets of Boolean formulae," *Wasatch Topology Conference*, University of Utah; August 2007
10. "Chirality and the Conway polynomial," *Quantum Topology — Contemporary issues and perspectives*, Snowbird, Utah; June 2005
11. "Chirality and the Conway polynomial," *Conference on Low Dimensional Topology*, University of Virginia; December 2004
12. "A variation on finite type knot invariants," *Twenty-first Annual Workshop on Geometric Topology*, Milwaukee, WI; June 2004
13. "On the rational homology of the group of automorphisms of the free group," Semi-plenary talk, *Spring Topology and Dynamics Conference*, Birmingham, AL; March 2004
14. "Do Vassiliev invariants distinguish knots?" *Knots in Poland*, Warsaw, Poland; June 2003
15. "Some remarks on grope cobordism," *Workshop in quantum topology*, Warwick, England; March 2002
16. "A Lie bialgebra structure on graphs and graph homology," *Junge Topologen und Neue Topologie*, Münster, Germany; September 2001
17. "Grove cobordism of classical knots," *Knots in Montreal*, Montreal, Canada; April 2001
18. "Gropes, claspers and Vassiliev invariants," *Albany Geometric Group Theory Conference*, Albany, NY; October 2000

AMS SPECIAL SESSIONS

19. *Low dimensional topology*, Tampa, FL; March 2012
20. *Geometric Group Theory*, New Orleans, LA; January 2007
21. *Braids and knots*, Albuquerque, NM; October 2004
22. *Categories and operads in topology, geometry, physics*, Albuquerque, NM; October 2004
23. *Low dimensional topology*, Phoenix, AZ; January 2004
24. *Quantum topology*, Portland, OR; May 2002
25. *Low dimensional topology*, San Diego, CA; January 2002
26. *Topology of links*, Las Vegas, NV; April 2001

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COLLOQUIA AND SEMINAR TALKS

- 2014 Seminar talk: UC San Diego
- 2013 Seminar talks: Cornell University, University of Chicago
- 2012 Seminar talk: University of Virginia
- 2010 Departmental Colloquium: Max Planck Institut für Mathematik (Oberseminar)
Seminar talks: Cornell University, University of Münster, Max Planck Institut für Mathematik
- 2009 Departmental Colloquium: Kansas State University
- 2008 Seminar talk: UC Berkeley
- 2006 Seminar talks: Cornell, University of Oregon, Vanderbilt, Tennessee State University
- 2000-2005 Departmental Colloquia: Rice, University of Oregon, University of Münster, New Mexico State University, SUNY Geneseo, Virginia Tech, University of Tennessee, UC Davis
Seminar talks: Columbia, Cornell, UC Berkeley, UC San Diego, UC Riverside, Monmouth, NYU Courant, Ohio State, Rutgers, SUNY Binghamton, SUNY Buffalo, University of Texas, University of Virginia, Yale.

CONFERENCES CO-ORGANIZED

- Barrett Lectures (May 2006) (with Morwen Thistlethwaite)
- Cornell Topology Festival (May 2001, 2002, 2003) (with all of the Cornell Topologists)
- Special Session in Low dimensional topology (NYU Spring 2003) (with Slava Krushkal and Rob Schneiderman)

OUTREACH

- 2010-2011 Public lecture on “Art and mathematics” for the Seniors for Creative Learning program in Knoxville (April 2011)
two session class on same subject for ORICL (Oak Ridge Institute for Continued Learning) in Oak Ridge (July 2011).
- 2008-2009 Teacher and advisor in U.T. REU program on Discrete Homotopy Theory, summer 2009
public talk on “A history of pi” to Knoxville senior center.
- 2007-2008 Teacher and advisor in U.T. REU on Combinatorial Topology, summer 2008
public talks on “The History of Pi” and “Art and Mathematics” through the Faculty Speakers Bureau
- 2006-2007 Teacher and advisor in U.T. REU on Geometric Group Theory, summer 2007
- 2005-2006 Talk on “Mathematics and Art,” to the Oak Ridge Philosophical Society (Spring 2006)
- 2000-2005 Directed REU project (Summer 2005), Junior Colloquia at Cornell and Tennessee (2001, 2003, 2005), Six week short course for Cornell’s Math Explorer’s club for advanced high school students (April-May 2002)

STUDENTS

- Doctoral: Jon Gray (2010), Vajira Manathunga (current)
- Masters: Jim Borkowski (2004), Oliver Thistlethwaite (2007), Eric Kim (2007), Matt Dawson (2009), Katie Agle (2012), Chelsea McAmis (2012), Nate DeJong (2012), Jimmy Miller (2013)
- Undergraduate Thesis: Ben Cooper (2003, Cornell), Jeffrey Hankins (2007), Tim Michaels (2012)

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- SERVICE
- 2013-2014 UNIVERSITY: Faculty senate, Benefits committee
DEPARTMENT: Undergraduate director, UG Advising, Undergraduate Committee, Algebra Search Committee
PROFESSIONAL: Refereed 3 papers
- 2012-2013 UNIVERSITY: Faculty senate, Research Council
DEPARTMENT: Undergraduate director, Advisory Committee, Department Advising, Honors Day Committee (Undergrad Scholarships and Awards), Lecturer Hiring Committee, Postdoctoral Search Committee – Geometry/Topology, Undergraduate Committee, Lecturer advisory committee
PROFESSIONAL: Refereed 4 papers, wrote 1 MathSciNet review
- 2011-2012 UNIVERSITY: Faculty senate, caucus leader (natural sciences), research council
DEPARTMENT: Advisory committee, graduate student advising committee, honors day committee (undergraduate scholarships and awards), undergraduate mathematics major advising
PROFESSIONAL: Refereed 4 papers, wrote 2 MathSciNet reviews, tutor for “Topology and Groups” summer school in Berlin June 18-22, 2012.
- 2010-2011 UNIVERSITY: Faculty senate, caucus leader (natural sciences), research council
DEPARTMENT: Graduate student advising committee, honors day committee (undergrad scholarships and awards), undergraduate mathematics major advising
PROFESSIONAL: Refereed 6 papers. Wrote 1 MathSciNet review.
- 2009-2010 UNIVERSITY: Arts and Sciences Advising, Faculty Senate, Teaching Council, Committee for the Campus Environment
DEPARTMENT: Honors Day Committee, Tennessee Math Contest Math Bowl Committee
PROFESSIONAL: refereed 4 papers
- 2008-2009 UNIVERSITY: Arts and Sciences Advising, Faculty Senate, Teaching Council, Committee for the Campus Environment
DEPARTMENT: Honors Day Committee, Tennessee Math Bowl Committee
PROFESSIONAL: refereed 3 papers
- 2007-2008 UNIVERSITY: Arts and Sciences Advising, Faculty Senate, Teaching Council, Research Council, Committee for the Campus Environment
DEPARTMENT: Advisory Committee, Graduate Assistantship Committee, Tennessee Math Bowl Committee
PROFESSIONAL: refereed 2 papers, wrote 2 MathSciNet reviews
- 2006-2007 DEPARTMENT: Advisory Committee, Graduate Assistantship Committee, Bylaws Committee, Fermat I Committee
PROFESSIONAL : refereed 4 papers, wrote 4 MathSciNet reviews
- 2005-2006 DEPARTMENT: Graduate Committee, Graduate Assistantship Committee, Fermat I Committee
PROFESSIONAL: refereed 2 papers, wrote 1 MathSciNet review
- 2004-2005 DEPARTMENT: Allen Medal Committee, Undergraduate Committee, Barrett Lectures Committee
PROFESSIONAL: refereed 4 papers, wrote 3 MathSciNet reviews
- 2003-2004 DEPARTMENT: Allen Medal Committee, Undergraduate Committee
PROFESSIONAL: refereed 2 papers, wrote 2 MathSciNet reviews
- 2002-2003 DEPARTMENT: Cornell Topology seminar organizer
PROFESSIONAL: refereed 1 paper.