James Tener **Curriculum Vitae**

Contact information

Dr James E. Tener
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Research interests

My research is motivated by the mathematics of conformal field theory, which includes operator algebras, subfactors, functorial field theories, vertex operator algebras, quantum algebra and tensor categories, vector-valued modular forms, and complex function theory.

Employment

Australian National University
Mathematical Sciences Institute Research Fellow (July 2018 - present)

University of California, Santa Barbara
Visiting Assistant Professor (September 2015 - April 2016, September 2017 - June 2018)

Max Planck Institute for Mathematics, Bonn
Postdoctoral Researcher (August 2014 - August 2015, June 2016 - August 2016)

Education

University of California, Berkeley
PhD, Mathematics (September 2008 - May 2014)
Advisor: Vaughan F. R. Jones

Pomona College
BA, Mathematics (September 2004 - May 2008)
Magna cum laude, Phi Beta Kappa, math department award, and thesis award

External funding

1. AMSI Scientific Workshop Funding 2019
2. AMS-Simons Travel Grant 2017-2019
3. NSF Graduate Research Fellowship 2009-2011

Published articles and preprints

1. *Positivity and fusion of unitary modules for unitary vertex operator algebras*
   RIMS Kôkyûroku, to appear.
2. *Singular values of weighted composition operators and second quantization*
   Int. Math. Res. Not., to appear. arXiv:1612.03970 (with Mihai Putinar)
3. *On classification of extremal non-holomorphic conformal field theories*
   J. Phys. A: Math. Theor., 50 (2017), 115204. arXiv:1611.04071 (with Zhenghan Wang)
4. *Geometric realization of algebraic conformal field theories*
   submitted. arXiv:1611.01176
5. *Construction of the unitary free fermion Segal CFT*
   Commun. Math. Phys. 355 (2017), no. 2, 463-518. arXiv:1608.02095
6. *Planar algebras in braided tensor categories*
   submitted. arXiv:1607.06041 (with André Henriques and David Penneys)

7. *Internal trace for module tensor categories over braided tensor categories*
   Documenta Math., 21 (2016) 1089-1149. arXiv:1509.02937 (with André Henriques and David Penneys)
8. *Subfactors of index less than 5, part 4: vines*
   Int. J. Math., 23 (2012), no. 3, 1250017. arXiv:1010.3797 (with David Penneys)
9. *Unitary equivalence to a complex symmetric matrix: low dimensions*
   Lin. Alg. Appl., 437 (2012), no. 1, 271-284. arXiv:1104.4960 (with Stephan R. Garcia and Daniel Poore)
10. *Unitary equivalence of a matrix to its transpose*
    J. Operator Theory, 68:1 (2012), 179-203. arXiv:0908.2107 (with Stephan R. Garcia)
11. *Projections and idempotents with fixed diagonal and the homotopy problem for unit tight frames*
    Oper. Matrices, 5 (2011) 139-155. arXiv:0906.0139 (with J. Giol, L.V. Kovalev, D. Larson and N. Nguyen)
12. *Unitary equivalence to a complex symmetric matrix: an algorithm*
    J. Math. Anal. Appl., 341 (2008) 640-648. arXiv:0908.2201

Recent invited talks at international events (since June 2016)

1. Algebraic Methods in Mathematical Physics, CRM Montreal, July 2018
2. (Sub)Factors in Maui, May 2018
3. Workshop on algebraic combinatorics and representation theory of finite groups and vertex operator algebras, Kyoto RIMS, December 2017
4. Shanks workshop on subfactors and applications, Vanderbilt University, October 2017
5. Quantum Symmetries: Subfactors and Planar Algebras, Maui, July 2017
6. Workshop on Subfactors, higher geometry, higher twists and almost Calabi-Yau algebras, Isaac Newton Institute for Mathematical Sciences, Cambridge, March 2017
7. Southeasern Analysis Meeting 2017, UT Knoxville, March 2017
8. Berkeley-Tokyo Autumn School on Quantum Field Theory and Subfactors, UC Berkeley, November 2016
9. Modular Categories–Their Representations, Classification, and Applications, Casa Matemática Oaxaca, August 2016
10. Von Neumann Algebras workshop, Hausdorff Institute for Mathematics, Bonn, July 2016
11. Mathematics and Physics at the Crossroads trimester seminar, INFN Frascati, June 2016

Recent invited seminar and colloquium talks (since April 2017)

1. Perimeter Institute Seminar talk, April 2018
2. University of Arizona Mathematics Colloquium, February 2018
3. UC Davis Seminar on Algebra & Discrete Mathematics, November 2017
4. Ohio State University Seminar on Quantum Algebra & Quantum Topology, September 2017
5. Ohio State University Seminar on Non-commutative Geometry & Operator Algebras, September 2017
6. Claremont Colleges Mathematics Colloquium, April 2017

Recent Invited talks in special sessions at AMS meetings

Since November 2017, I have given 5 talks at AMS meetings, in special sessions on "Advances in Operator Algebras," "Quantum Symmetries," and "Tensor Categories: Bridging Algebra, Topology, and Physics."

Advising

- I supervised the undergraduate honors thesis of J. Connor Grady at UCSB (title: *The Classification of Extremal Vertex Operator Algebras of Rank 2*)

Service

- Co-organized seven conferences and workshops over the past six years, on the subjects of subfactors, conformal field theory, and quantum field theory.
- Started the UC Santa Barbara seminar on quantum topology and quantum algebra, a research and learning seminar with significant interdisciplinary participation by graduate students from the mathematics, physics, and computer science departments.
- Served as a referee for many journals, including Duke Mathematical Journal, Advances in Mathematics, Proceedings of the National Academy of Sciences, Proceedings of the AMS, Annals of Functional Analysis, Reports on Mathematical Physics, AMS Contemporary Mathematics series, Journal of Differential Equations, Vietnam Journal of Mathematics, Operators and Matrices, and the American Mathematical Monthly.

Teaching experience

- At ANU, I am teaching Advanced Complex Analysis
- At UC Santa Barbara, I was the instructor of record for 11 ten-week courses, including Calculus II (5 times), Transition to Higher Mathematics (4 times), and upper division Linear Algebra (2 times). Course sizes range from 150-350 for calculus and 35-60 for proof based courses. On a scale of 1=excellent to 5=poor, my average course rating by students is 1.2.
- As a graduate student at UC Berkeley, I was the instructor of record for Matrix Theory and Differential Equations, and a teaching assistant for Calculus II, Precalculus, Matrix Theory, and Linear Algebra. I received an Outstanding Graduate Student Instructor award.