

# Angela Gibney

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## Curriculum Vitae

### Education

- 2000 **Ph.D.**, *University of Texas*, Austin.
- 1994 **Bachelor of Science, Mathematics**, *The University of California*, Santa Barbara.
- 1993 **Alg Geom Study Abroad**, *Mathematics Research Institute*, Utrecht, Netherlands.
- 1992 **Budapest Semesters in Mathematics**, *Eötvös University*, Budapest, Hungary.

### Ph.D Thesis

Title Fibrations of  $\overline{\mathcal{M}}_{g,n}$  (Advisor: Sean Keel)

### Experience

- 2021–Present **Presidential Professor**, *University of Pennsylvania*, Philadelphia.
- 2017–2021 **Professor**, *Rutgers University*, New Brunswick.
- 2009–2017 **Assistant, Associate, Professor**, *University Of Georgia*, Athens.
- 2004–2008 **Assistant Professor**, *University of Pennsylvania*, Philadelphia.
- 2003–2004 **Gibbs Assistant Professor**, *Yale University*, New Haven.
- 2000–2003 **VIGRE Assistant Professor**, *University of Michigan*, Ann Arbor.

### Research Interests

Algebraic geometry and representation theory: In particular moduli of curves and their generalizations, vector bundles, and representations of vertex operator algebras.

### Funding

- 2022-25 NSF DMS-2200862 (personal award)
- 2019-22 NSF DMS-1902237 (personal award)
- 2016-19 NSF DMS-1601909 (personal award)
- 2012-16 NSF DMS-1201268 (personal award)
- 2005-09 NSF DMS-0509319 (personal award)
- 2014-19 NSF DMS-1344994 (RTG)
- 2019-23 NSF DMS-1937370 (AGNES)
- 2015-18 NSF DMS-1522813 (GAGS)
- 2015 NSF DMS - 1500652 (Bootcamp for Alg Geom Summer Research Institute)
- 2015 NSA - 141006 (Bootcamp for Alg Geom Summer Research Institute)

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## Publications and Preprints

- *Morita equivalences of Zhu's associative algebra and mode transition algebras* (with Damiolini and Krashen)  
on the arxiv <https://arxiv.org/abs/2403.11855>
- *Conformal blocks on smoothings via mode transition algebras* (with Damiolini and Krashen)  
on the arxiv <https://arxiv.org/abs/2307.03767>
- *Oberwolfach Report : Algebraic structures on moduli of curves from vertex operator algebras*  
on my website [bit.ly/3rpTCZh](http://bit.ly/3rpTCZh)
- *Factorization presentations* (with Damiolini and Krashen)  
on the arxiv <https://arxiv.org/pdf/2207.05110.pdf>, to appear in an LMS Lecture Notes volume in honor of V. Shokurov's 70th birthday
- *On global generation of vector bundles on the moduli space of curves from representations of vertex operator algebras* (with Damiolini)  
to appear in Algebraic Geometry, and on the arxiv <https://arxiv.org/abs/2107.06923v2>
- *On an equivalence of divisors on  $\overline{\mathcal{M}}_{0,n}$  from Gromov-Witten theory and conformal blocks* (with Chen, Heller, Kalashnikov, Larson, and W. Xu)  
Transformation Groups <https://doi.org/10.1007/s00031-022-09752-6>
- *Vertex algebras of CohFT-type* (with C. Damiolini, and N. Tarasca),  
Facets of algebraic geometry. Vol. I, 164–189, London Math. Soc. Lecture Note Ser., 472, Cambridge Univ. Press, Cambridge, 2022. <https://arxiv.org/abs/1910.01658>
- *On factorization and vector bundles of conformal blocks from vertex algebras* (with Damiolini and Tarasca), Annales scientifiques de l'École normale supérieure, to appear <https://arxiv.org/pdf/1909.04683.pdf>
- *Conformal blocks from vertex algebras and their connections on  $\overline{\mathcal{M}}_{g,n}$*  (with Damiolini and Tarasca), Geometry & Topology 25 (2021) 2235–2286 <https://arxiv.org/abs/1901.06981>
- *Basepoint free cycles on  $\overline{\mathcal{M}}_{0,n}$  from Gromov-Witten theory* (with Belkale), Int. Math. Res. Not. IMRN (2021), no. 2, 855–884. <https://doi.org/10.1093/imrn/rnz184>
- *On finite generation of the section ring of the determinant of cohomology line bundle* (with Belkale), Trans. Amer. Math. Soc. 371 (2019) <https://www.ams.org/journals/tran/0000-000-00/S0002-9947-2018-07564-X/>
- *Scaling of conformal blocks and generalized theta functions over  $\overline{\mathcal{M}}_{g,n}$*  (with Belkale and Kazanova), Math. Z. 284 (2016), no. 3-4, 961–987.; <http://link.springer.com/article/10.1007/s00209-016-1682-1>

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- *Nonvanishing of conformal blocks divisors on  $\overline{M}_{0,n}$*  (with Belkale and Mukhopadhyay),  
Transformation Groups, Volume 21, Issue 2, 329-353, 2016  
<https://link.springer.com/article/10.1007/s00031-015-9357-2>
- *On higher Chern classes of vector bundles of conformal blocks*  
(with Mukhopadhyay) <https://arxiv.org/abs/1609.04887>
- *Vanishing and identities of conformal blocks divisors on  $\overline{M}_{0,n}$*   
(with Belkale and Mukhopadhyay),  
Algebraic Geometry, Volume 2, Issue 1, 62-90, 2015  
<https://algebraicgeometry.nl/Content/6.html>
- *Higher level conformal blocks divisors on  $\overline{M}_{0,n}$*   
(with Alexeev and Swinarski)  
Proc. Edinb. Math. Soc. (2), Volume 57, Number 1, 7-30, 2014  
<https://doi.org/10.1017/S0013091513000941>
- *Veronese quotient models of  $\overline{M}_{0,n}$  and conformal blocks*  
(with Jensen, Moon, and Swinarski)  
Michigan Math. J. Volume 62, Number 4, 721- 751, 2013  
<https://projecteuclid.org/euclid.mmj/1387226162>
- *Conformal blocks divisors and the birational geometry of  $\overline{M}_{g,n}$*   
Oberwolfach Reports, Moduli Spaces in Algebraic Geometry, 2013  
[https://www.mfo.de/document/1306b/OWR\\_2013\\_06.pdf](https://www.mfo.de/document/1306b/OWR_2013_06.pdf)
- *$sl_n$  level 1 conformal blocks divisors on  $\overline{M}_{0,n}$*  (with Swinarski, Stankewicz and Arap)  
Int. Math. Res. Not., Number 7, 1634-1680, 2012  
<https://academic.oup.com/imrn/article-abstract/2012/7/1634/757371>
- *Lower and upper bounds for nef cones* (with Maclagan)  
Int. Math. Res. Not., Number 14, 3224-3255, 2012  
<https://doi.org/10.1093/imrn/rnr121>
- *The cone of type A, level one conformal blocks divisors*, (with Giansiracusa)  
Adv. Math. Volume 231, Number 2, 798-814, 2012  
<https://doi.org/10.1016/j.aim.2012.05.017>
- *On extensions of the Torelli map*  
Geometry and arithmetic, EMS Ser. Congr. Rep., Eur. Math. Soc., Zürich, 2012  
<https://www.ems-ph.org/qsearch.php>
- *Equations for Chow and Hilbert Quotients* (with Maclagan),  
Algebra and Number Theory, Volume 4, Number 7, 855-885, 2010  
<https://msp.org/ant/2010/4-7/p03.xhtml>

- *Numerical criteria for a divisor in  $\overline{\mathcal{M}}_g$  to be ample*,  
Compos. Math., Volume 145, Number 5, 1227–1248, 2009; <https://doi.org/10.1112/S0010437X09004047>
- *Pointed trees of projective spaces*, (with Chen and Krashen)  
J. Algebraic Geom., Volume 18, Number 3, 477–509, 2008  
<https://doi.org/10.1090/S1056-3911-08-00494-3>
- *Mori cones of moduli spaces of curves of small genus*, (with Farkas)  
Trans Amer Math Soc, Volume 355, Number 3, 1183–1199, 2003 <https://doi.org/10.1090/S0002-9947-02-03165-3>
- *Towards the ample cone of  $\overline{\mathcal{M}}_{g,n}$* , (with Keel and Morrison)  
Journal of the American Mathematical Society, Volume 15, Number 2, 273–294, 2002  
<https://doi.org/10.1090/S0894-0347-01-00384-8>

## Publications and Preprints: Editorial

- *Our Early Career, looking back*  
Notices of the American Math. Soc., Jan 2022  
<https://bit.ly/37gBI0R>
- *The Early Career and the pandemic*  
Notices of the American Math. Soc., Jan 2021  
<https://www.ams.org/journals/notices/202101/rnoti-p56.pdf>
- *In the Early Career*  
Notices of the American Math. Soc., Jan 2020  
<https://www.ams.org/journals/notices/202001/rnoti-p56.pdf>
- *Introducing the Early Career Section*  
Notices of the American Math. Soc., Jan 2018  
<https://www.ams.org/journals/notices/201901/rnoti-p28.pdf>
- *Surveys on Recent Developments in Algebraic Geometry*  
(editor, with I. Coskun, T. de Fernex, and M. Lieblich),  
Proc of Symposia in Pure Mathematics, American Math. Soc., Jul 2017  
<https://bookstore.ams.org/pspum-95/>
- *Proceedings of the 2010 conference at the University of Georgia, Athens*,  
(editor, with V. Alexeev, E. Izadi, E. Looijenga, J. Kollár)  
Contemporary Mathematics, American Math. Soc., Volume: 564, 2011  
<https://www.ams.org/books/conm/564/>

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## Editorial Service

ongoing **Contemporary Mathematics, Manuscripta Mathematica, Moduli, arXiv monitor**

past **AMS Notices**

## Other honors and awards

Teaching awards at University of Pennsylvania (2023, 2006); American Association of University Women, Dissertation Fellowship (offered), (2001); Clay Mathematics Institute, Liftoff Fellow (2000).

## Invited Talks

**2001-05 (15 lectures); 2006-10 (12 lectures); 2011-16 (38 lectures);**

### Select talks since 2018:

- 2024 *A panorama of moduli spaces*, Goethe University, Frankfurt. Feb 26 - Mar 1.  
*Workshop on New Directions in Conformal Field Theory*, Fields Institute, CA Mar 18-22.
- 2023 Algebraic Geometry Seminar, Stony Brook, Wednesday, Mar 22  
*Conference: Recent trends in algebraic geometry*, Oberwolfach, June 19  
Lie group and quantum mathematics seminar, Rutgers, Oct 6,  
Algebraic geometry and moduli seminar ETH, Zurich November 18  
Stanford Algebraic Geometry Seminar, December 8,
- 2022 *Physical Mathematics of Quantum Field Theory*, UMass, Amherst, Aug 1–5, 4 lectures  
*Bundles and Conformal Blocks with a Twist* at the ICMS, June 13-17, Edinburgh, UK (online)  
University of Utah's AWM summer conference, June 7-10, 3 lectures  
Georgia Algebraic Geometry Seminar, Emory University April 1-3  
Kyoto Representation Theory Seminar on Zoom, February 2
- 2021 Algebraic Geometry seminar, UC Davis, November 9th  
Colloquia at UPenn and UT Austin
- 2020 Madison Moduli Weekend (online), (September 26-27th)  
Topics in refined theories and beyond at ETH-ITS, Zurich (online) (April 15)  
JMM 2020, Cohomological Field Theories and Wall Crossing (January 15)
- 2019 Facets in Algebraic Geometry, Ann Arbor, Michigan  
Verlinde Algebras and the Grassmannian, Guangzhou, China  
Texas Algebraic Geometry Symposium, Austin, Texas
- 2018 School on the Geometry of Moduli Spaces of Curves, Trieste, ITALIA  
Algebraic Geometry Seminars at Columbia, Harvard/MIT, and Princeton

## ■ Courses taught

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|----------|--|
| Penn     | (1700) <i>Ideas in Mathematics*</i> , (6240) <i>Algebraic Geometry</i> , (8100) <i>VOA Reading</i> , (7250) <i>Conformal Field Theory</i> ,  |
| Rutgers  | (250) <i>Intro to Linear Algebra</i> , (350) <i>Linear Algebra</i> , (428) <i>Graph Theory</i> , (436) <i>History of Math</i> , (535) <i>Graduate Algebraic Geometry</i> , (552) <i>Graduate Algebra 2</i>   |
| UGA      | (2250, 2260) <i>Calculus I II</i> (3000) <i>Linear Algebra</i> , (4010/6010) <i>Modern Algebra and Geometry</i> , (7005/9005) <i>Mock AMS Conference</i> , (8000) <i>Graduate Algebra</i> , (8310) <i>Geometry of Schemes</i> , (8330) <i>Toric Varieties</i> , (8330) <i>Quantum Cohomology</i> , (8330) <i>Conformal Blocks</i> , (8330) <i>Moduli of Curves</i> |
| Penn     | (103) <i>Calculus</i> , (370, 371) <i>Algebra I and II</i> , (312/402) <i>Linear algebra</i> , (624, 625) <i>Algebraic geometry I and II</i> , (724) <i>Topics: Introduction to moduli spaces, Moduli of stable maps</i> , 240 <i>Linear algebra and differential equations</i>  |
| Yale     | (480b) <i>Introduction to Algebraic Geometry</i> , (115a) <i>Calculus II</i>   |
| Michigan | (115, 116) <i>Calculus II and III</i> , (216) <i>Intro to Diff Equations</i> , (731) <i>Moduli of Curves</i>   |

## ■ Research advising of graduate students and postdocs

- 2023 - Jianci Liu, postdoctoral advisor, University of Pennsylvania
- 2022 - Daebeom Choi, University of Pennsylvania
- 2021 - Avik Chakravarty, University of Pennsylvania  
Xiangrui Liu, University of Pennsylvania
- 2018 - Chiara Damiolini, postdoctoral advisor, Rutgers University
- 2017-19 Nicola Tarasca, postdoctoral advisor, UGA and Rutgers University
- 2016-17 Anand Deopokur, postdoctoral co-advisor with V. Alexeev, UGA  
Michael Schuster, postdoctoral advisor, UGA
- 2012-17 Natalie Hobson, PhD Advisor, UGA
- 2013-16 Anna Kazanova, postdoctoral advisor, UGA
- 2011-13 Gulden Cinar, Masters Advisor, UGA  
Han-Bom Moon, postdoctoral advisor, UGA
- 2008-11 David Swinarski, postdoctoral Co-advisor with V. Alexeev, UGA

## ■ On a thesis committee for

- 2023 Xiangrui Liu, MS, University of Pennsylvania
- 2019 Carl Lian, PhD, Columbia University  
Chengxi Wang, PhD, Rutgers University
- 2017 Luca Schaffler, PhD, UGA
- 2015 Xiayan Hu, PhD, UGA
- 2011 Noah Giansiracusa, PhD, Brown University
- 2010 Paul Larsen, PhD, Humboldt University, Berlin
- 2008 David Swinarski, PhD, Columbia University
- 2005 Damiano Testa, PhD, MIT

## Service as a conference co-organizer

- 2025 Summer Research Institute in Algebraic Geometry  
(with G. Farkas, C. Hacon, K. Smith, B. Poonen, and C. Xu)
- 2024 Algebraic Geometry Northeast Sectional (AGNES) (with R. Donagi, J. Hartmann, and D. Krashen)
- 2023 Abramorama (with K Ascher, D Bejleri, Q Chen, B Hassett, S Marcus, and J Wise)
- 2022 Algebraic Geometry Northeast Sectional (AGNES) (with L. Borisov, A. Buch, and D. Krashen)
- 2017 The Georgia Algebraic Geometry Symposium  
(with V. Alexeev, B. Bakker, D. Krashen, and D. Lorenzini)  
The Georgia Summer Workshop in Algebraic Geometry at UGA  
(with A. Deopurkar, J. Kass, and N. Tarasca);
- 2016 Combinatorial Moduli Spaces and Intersection Theory, The Fields Institute  
(with D. Abramovich, I. Coskun, G. Smith, and M. Stillman)  
The Georgia Summer Workshop in Algebraic Geometry at UGA  
(with A. Deopurkar, J. Kass, and N. Tarasca)
- 2015 The graduate student 'Bootcamp' for the Algebraic Geometry Institute  
Salt Lake City, Utah, (with I. Coskun, T. DeFernex, and M. Lieblich)  
AWM Research Symposium, Special Session in Algebraic Geometry, UM (with L. Chen)
- 2014 The Georgia Algebraic Geometry Symposium  
(with V. Alexeev, N. Giansiracusa, and D. Krashen)
- 2013 The Georgia Algebraic Geometry Symposium  
(with V. Alexeev, E. Izadi, and D. Krashen)
- 2012 VIGRE Summer School and Georgia Algebraic Geometry Symposium  
(with V. Alexeev and E. Izadi, and D. Krashen)
- 2010 Mathematical Research Communities Workshop, Snowbird, Utah  
(with D. Abramovich, I. Coskun, J. McKernan and T. deFernex)  
The Compact Moduli and Vector Bundles Conference at UGA  
(with V. Alexeev and E. Izadi)
- 2009 The Connections for Women Workshop at MSRI  
(with D. Maclagan and J. Sidman)
- 2007 Combinatorial Algebraic Geometry, (AMS meeting, Hoboken, NJ) (with D. Maclagan)
- 2002 Curves and their Moduli, (AMS meeting, Ann Arbor, MI) (with G. Farkas and R. Lazarsfeld)

## Activities promoting graduate education

- 2022 - 4 lectures, school on *Physical Mathematics of Quantum Field Theory*, UMass, Amherst, Aug 1–5  
3 lectures, AWM summer school at University of Utah, June 7–10
- 2021 - Zoom lecture on applying for graduate school, at the UP GRADe Workshop, October 30.
- 2018 - Associate Editor of the Notices, in charge of the Early Career Section
  
- 2017-19 Professional development activities for grad students at Rutgers
  
- 2018 5 Lectures, school on Geometry of Moduli Spaces of Curves, ICTP, Trieste, IT
  
- 2017 4 Lectures, GAeL, Bath University, UK
  
- 2016 RTG Summer Coordinator for the RTG grant  
  
Academic Year Coordinator for the RTG grant
  
- 2015 ‘Bootcamp’ for the Algebraic Geometry Institute, Salt Lake City, Utah  
(Co-Organizer with I. Coskun, T. DeFernex, and M. Lieblich)  
Graduate Student Mock AMS Conference, UGA
  
- 2013 5 lectures, summer school on Conformal Blocks, Universita Sapienza, Rome, IT
  
- 2012 Algebraic Geometry Summer School at UGA (with V. Alexeev and D. Krashen)
  
- 2010 - 14 VIGRE Summer Program Coordinator  
Graduate Student Mock AMS Conference, UGA
  
- 2010-11 M.A.T.H. Students program,
  
- 2010 Organized lunch and talk for students by David Saltman, director IDA  
Topic: Nonacademic Math Jobs in the Defense Industry
  
- 2009 Connections for Women, Co-Organizer, with Diane Maclagan, MSRI
  
- 2007 Institute for Advanced Study, Women’s program, Princeton, NJ
  
- 2005 mentor, ‘Bootcamp’, Summer Institute in Algebraic Geometry
  
- 2004 AMS Presentations By Young Researchers Conference,  
MRC Program, led working group on moduli spaces, Snowbird, Utah
  
- 2002 Learning Stacks and Computational Methods through Problem Solving,  
University of Illinois at Urbana Champagne
  
- 1998-00 Junior Geometry At UT Austin

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## Outreach to under-represented groups in STEM

- 2022 3 lectures mini-course, University of Utah's RTG funded AWM summer conference, June 7-10, 2022 (organized by Christopher Hacon, Peter McDonald, and Carl Schwede)
- 2020-22 Group co-leader (with L. Chen), ICERM Women in Algebraic Geometry workshop (members: Lauren Heller, grad student, Berkeley; Elana Kalashnikov, postdoc, Harvard; Hannah Larson, grad student, Stanford; Weihong Xu, grad student, Rutgers);
- 2019 Speaker, Workshop On Math Advice and Networking at the UPenn  
Panelist, High-school Girls STEM Career Pathways Conference, S. Brunswick, NJ
- 2018 Speaker, Strength In Numbers, workshop, Queen's Univ., CA  
Speaker, Harvard/MIT Graduate workshop in Algebraic Geometry for Women and Mathematicians of Minority Genders
- 2017 Speaker, supported by FEW Grant, University of Pennsylvania  
EDGE (Enhancing Diversity in Graduate Education), Follow Up Mentor
- 2015 Co-organizer (with Linda Chen), AWM Research Symposium  
Algebraic Geometry Special Session, University of Maryland
- 2009 Co-organizer (with Diane Maclagan), Connections for Women Conference, MSRI
- 2007 Speaker, IAS Women In Science Program, Princeton, NJ
- 2005 EDGE (Enhancing Diversity in Graduate Education), Follow Up Mentor  
Co-organizer (with A. Grassi), *Algebraic Geometry, Symplectic Geometry and Theoretical Physics*:
- 2002 Presenter, Expanding Your Horizons in Science and Engineering, University of Texas

## Teaching Advisor to Postdocs

Franco Rota, Julian Rosen, Amber Russell, Jacob Hicks, Joshua Wood

## Undergraduate and preliminary graduate advising to

K. Boe, K. A. Hoyt, E. Quinche, N. Mendrano D. McKenzie, M. Edwards, E. T. LaPaquette, A. McMillan, M. Turbow, G. Cinar, E. T. LaPaquette, G. Mabon, A. McMillan, T. Purvis, D. Harvey, B. Seilre, and E. Wang.

## Activities for elementary, high-school, and undergrad students

- 2014, 16, 17, & 18 co-organized (with Krashen) UGA summer high-school MathCamp
- 2016 Co-organized talk for undergrads on jobs outside of academia
- 2010-11 co-organized (with D. Krashen) Mentoring and Advice for Talented HS Students
- 2009-10 lectured at the UGA Summer Stem Academy  
presented at the Barrow Elementary School Career Day
- 2000-01 King/Chavez/Parks Workshop, activities for 7th graders from inner-city Detroit
- 1999-00 ran Saturday Morning Math Group, activities for high-school students in Austin, TX