

Employment

- **University of Melbourne:** Research Fellow, 2010–present
- **University of Texas at Austin:** Lecturer, 2007–2010
- **Stanford University:** Graduate student, 2001–2007

Research Interests

- 3-Manifolds and Triangulations
- Deformation and Character Varieties
- Hyperbolic Geometry
- Mathematical Art

Education

- **Stanford University,** Ph.D. in Mathematics under Steven Kerckhoff. Thesis (2007): *Incompressible Surfaces in Hyperbolic Punctured Torus Bundles are Strongly Detected*
- **University of Oxford,** Master of Mathematics (MS), 2001

Fellowships & Awards

- **Research Fellowship** under Australian Research Council grant DP1095760, University of Melbourne and University of Queensland, 2010–present.
- **RTG Postdoctoral Fellowship:** University of Texas at Austin, 2007–2010
- **Research Assistant:** Stanford, 2002–2006
- **Stanford University Centennial Teaching Assistant award,** June 2007

Publications & Preprints

- **Geometry and Topology**
 - *Veering triangulations admit strict angle structures*, with Craig D. Hodgson, J. Hyam Rubinstein and Stephan Tillmann, 2010, arXiv:1011.3695, 15 pages, 9 figures.
 - *Pseudo-developing maps for ideal triangulations I: Essential edges and generalised hyperbolic gluing equations*, with Stephan Tillmann, 2010, preprint, 18 pages, 8 figures.
 - *A generalisation of the deformation variety*, 2011, arXiv:0904.1893, 41 pages, 26 figures.
 - *Incompressible surfaces in handlebodies and boundary compressible 3-manifolds*, with J. Nogueira, 2009, *Topology and its Applications*, in press, arXiv:0911.0207, 33 pages, 14 figures.
 - *Detection of incompressible surfaces in hyperbolic punctured torus bundles*, in *Geometriae Dedicata* **150** (2011), no. 1, pp. 181–232, 52 pages, 25 figures.
 - *On spun-normal and twisted squares surfaces*, 15 pages, 13 figures, in *Proc. Amer. Math. Soc.* **137** (2009), pp. 4259–4273.
- **Mathematical Art and Recreational Mathematics**
 - *Fractal graphs by iterated substitution*, 2010, *Journal of Mathematics and the Arts*, in press, 24 pages, 20 figures.
 - *The Sunflower Spiral and the Fibonacci Metric*, 2010, *Proceedings of the Bridges conference 2010*, 4 pages, 4 figures.
 - *Autologlyphs*, with P.-O. Dehaye, in *Math. Intell.* **26** (2004), no. 2, [cover art](#) and pp. 37–39.
 - *100 prisoners and a lightbulb*, with P.-O. Dehaye and D. Ford, in *Math. Intell.* **25** (2003), no. 4, pp. 53–61.

Seminars & Talks

- *Veering triangulations admit strict angle structures*, University of Texas Topology Seminar, Dec 2010

- *A generalisation of the deformation variety*, University of Texas Topology Seminar, May 2009; Oklahoma State University Topology Seminar, September 2009; Georgia Tech Topology Seminar, October 2009; AMS 2010 Spring Western Section Meeting, Albuquerque, NM, April 2010; AMS-SMM Eighth International Meeting, Berkeley, CA, June 2010; University of Melbourne Topology Seminar, Australia, October 2010; University of Queensland Topology Seminar, Australia, October 2010
- *The Sunflower Spiral and the Fibonacci Metric*, Bridges Pécs, Pécs, Hungary, July 2010
- *Autoglyphs: Self Referential Mathematical Typography*, Gathering 4 Gardner 9, Atlanta, March 2010
- *When is a Knot Not a Knot?*, Oberlin College, January 2010; Davidson College, February 2010; University of Queensland, November 2010
- *The Mathfest 2009 Poster Image, Mathematical Art, Design and Education in Second Life*, Mathfest 2009, Portland, August 2009
- *Drawing knots using computers*, Unknot Conference, Denison University, July 2009
- *Extending the deformation variety*, University of Texas Topology Seminar, November 2008
- *Ideal Triangulations and Components of the Character Variety*, Rice University Topology Seminar, November 2007; University of Texas Topology Seminar, November 2007
- *Incompressible Surfaces in Punctured Torus Bundles, and the Ideal Points They Come From*, UC Davis Geometry/Topology Seminar, April 2006; Southern California Topology Conference, Caltech, January 2007; University of Texas Topology Seminar, March 2007; thesis defence, Stanford, April 2007
- *When is a Knot Not a Knot?*, Educational Program for Gifted Youth, Stanford, July 2006
- *Geometric Structures and Dehn Surgery on the Figure 8 Knot Complement*, area exam talk, Stanford, November 2004
- *Foliation of the Figure 8 Knot Complement in S^3 (with lots of pictures)*, graduate students seminar, October 2003
- *The Mathematics of Juggling*, graduate students seminar, March 2003; Stanford University Math Camp July 2004 and July 2006; Saturday Morning Math Group (at Texas), February 2008; Melbourne University Mathematics and Statistics Society, September 2010, various other venues

Conferences

- **Bridges Pécs**, Pécs, Hungary, July 2010
- **Topology and Geometry in Dimension Three: Triangulations, Invariants, and Geometric Structures**, Stillwater, OK, June 2010
- **AMS-SMM Eighth International Meeting**, Berkeley, CA, June 2010
- **2010 MAA PREP Workshop: Inquiry Based Learning**, University of Texas at Austin, TX, May 2010
- **Banff International Research Station Workshop on Character Varieties in the Geometry and Topology of Low-dimensional Manifolds**, Banff, Canada, April 2010
- **AMS 2010 Spring Western Section Meeting**, Albuquerque, NM, April 2010
- **Gathering 4 Gardner 9**, Atlanta, GA, March 2010
- **Joint Mathematics Meetings 2010**, San Francisco, CA, January 2010
- **Mathfest 2009**, Portland, OR, August 2009
- **Bridges Banff**, Banff, Alberta, Canada, July 2009

- **Unknot Conference**, Denison University, OH, July 2009
- **Geometric Topology in 3 and 4 Dimensions**, UC Davis, CA, June 2009
- **2009 Georgia International Topology Conference**, University of Georgia, GA, May 2009
- **40th Texas Geometry and Topology Conference**, University of Texas at Austin, TX, October 2008
- **Conference on Algebraic and Geometric Topology**, University of Gdańsk, Poland, June 2008
- **Inquiry Based Learning with a Focus on Number Theory, a Transitions-to-Proof Course**, University of Texas at Austin, TX, June 2008
- **Triangulations, Heegaard splittings and hyperbolic geometry**, AIM, Palo Alto, CA, December 2007
- **Warwick Symposium on Low Dimensional Geometry and Topology**, Warwick, UK, July 2007
- **Geometry and the Imagination**, Princeton, NJ, June 2007
- **Joint Mathematics Meetings**, New Orleans, LA, January 2007
- **Future Directions in 3-manifolds**, Ann Arbor, MI, October 2005
- **3-Manifolds and Knot Theory**, The University of Texas at Austin, TX, May 2005
- **AMS 2005 Spring Western Section Meeting**, Santa Barbara, CA, April 2005
- **Spaces of Kleinian Groups and Hyperbolic 3-Manifolds**, The Newton Institute, Cambridge, UK, August 2003

Teaching

- **University of Texas at Austin**
 - Lecturer (each course approx. 36 hours of classtime)
 - *Hyperbolic Geometry and Triangulations of 3-Manifolds*, Spring 2010
 - *Differential Calculus*, Fall 2009
 - *Real Analysis I*, Spring 2009
 - *Multivariable Calculus*, Fall 2008
 - *Introduction to Number Theory*, Spring 2008
 - *Discrete Mathematics*, Fall 2007
- **Stanford University**
 - Teaching Assistant (each course approx. 33 hours of classtime)
 - *Linear Algebra and Calculus of Several Variables* (Accelerated Calculus for Engineers TA), Spring 2007 and Spring 2006
 - *Calculus II*, (Accelerated Calculus for Engineers TA), Winter 2007
 - *Calculus I*, (Accelerated Calculus for Engineers TA), Fall 2006
 - *Calculus II* (Accelerated Calculus for Engineers TA), Winter 2006
 - *Linear Algebra and Calculus of Several Variables* (Administrative TA), Fall 2005
 - *Linear Algebra and Calculus of Several Variables*, Winter 2005 and Fall 2003
 - *Calculus I*, Fall 2002
 - Course Assistant (office hours only)
 - *Algebraic Topology*, Spring 2005
 - *Differential Topology*, Spring 2004
 - *Matrix Theory and Applications*, Spring 2003
 - *Modern Algebra I*, Fall 2001

- **New Orleans Center for Creative Arts¹**
 - Served on the “NOCCA Advisory Council”, a group convened to help guide the transition of NOCCA from a half-day arts school to a full-day diploma-granting institution covering all subjects, whilst preserving the creativity and spirit of this highly successful school, April 2009.
 - I am currently working with NOCCA on the curriculum framework for their mathematics program. In addition, I will act as a consultant on connections between mathematics and the arts, for both students and teachers at NOCCA.
- **Other**
 - Stanford University Math Camp TA/Live-In Counsellor, July 2004
 - Putnam Competition Seminar, Fall 2004
 - Work on creating mathematical learning experiences based around mathematical sculptures in the virtual world Second Life, funded by the New Media Consortium², September 2006.

Other Activities

- Various graphic design/art/math crossover projects. Of particular interest: *Escher's Printgallery at Stanford*, *Colloquium Posters*, *Book Covers*, *3d printed sculpture*, *T-shirts* and “*Autoglyphs*.”
- **University of Texas at Austin**
 - UT Math Club, 2007–2010.
 - *Texas Juggling Society*, 2007–2010.
- **Stanford University**
 - *Stanford Gaming Society* Board Games VP, 2003-2007.
 - *Stanford Court Jugglers*, 2001-2007.
- **University of Oxford**
 - *Oxford University Go Society* President, 1999-2000.

¹NOCCA, the New Orleans Center for Creative Arts, is a pre-professional arts training center that offers secondary school-age children intensive instruction in dance, media arts, music, theatre arts, visual arts and creative writing.

²The [New Media Consortium](#) is an international 501(c)3 not-for-profit consortium of nearly 200 leading colleges, universities, museums, corporations, and other learning-focused organizations dedicated to the exploration and use of new media and new technologies.

Personal

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References

Research

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Teaching

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