

Geordie Richards

Engineering Building (ENGR) Suite 419R
Utah State University, Logan, UT, USA 84322-4130
✉ www.geordierichards.com

Employment

- 2016–present **Assistant Professor**,
Department of Mechanical and Aerospace Engineering, Utah State University,
Logan, UT, USA.
- 9/2015–
11/2015 **Research Member**, *Mathematical Sciences Research Institute,*
Berkeley, CA, USA.
- 2013–2016 **Visiting Assistant Professor**,
Department of Mathematics, University of Rochester,
Rochester, NY, USA.
- 2012–2013 **Postdoctoral Research Fellow**, *Institute for Mathematics and its Applications,*
Minneapolis, MN, USA.

Education

- 2007–2012 **Ph. D.**, *University of Toronto*, Toronto, ON, Canada.
Mathematics
- 2006–2007 **M. Sc.**, *University of Toronto*, Toronto, ON, Canada.
Mathematics
- 2001–2005 **Hon. B. Sc.**, *University of Toronto*, Toronto, ON, Canada.
Mathematics specialist - *with high distinction*

Doctoral Thesis

- Title *Maximal-in-time behaviour of deterministic and stochastic dispersive PDEs*
Advisors James Colliander (University of Toronto) and Tadahiro Oh (Edinburgh University)

Research Interests

Nonlinear dispersive PDEs, stochastic PDEs, fluid mechanics, harmonic analysis, probability theory, dynamical systems.

Publications

Published Articles

- [1] J. Földes, N.E. Glatt-Holtz, G. Richards, and J. Whitehead. “Ergodicity in randomly forced Rayleigh-Bénard convection.” *Accepted for publication in Nonlinearity* pp. 1–32 (2016). Available at <http://arxiv.org/abs/1511.01247>.
- [2] T. Oh, G. Richards, and L. Thomann. “On invariant Gibbs measures for the generalized KdV equations.” *Dynamics of Partial Differential Equations* pp. 1–20 (2016). Available at <http://arxiv.org/abs/1509.06873>.
- [3] G. Richards. “Invariance of the Gibbs measure for the periodic quartic gKdV.” *Annales de l’Institut Henri Poincaré (C) Analyse non linéaire* **33**, 699–766 (2016). Available at <http://arxiv.org/abs/1209.4337>.
- [4] J. Földes, N.E. Glatt-Holtz, G. Richards, and E. Thomann. “Ergodic and mixing properties

of the Boussinesq equations with a degenerate random forcing." *Journal of Functional Analysis* **269**, 2427–2504 (2015). Available at <http://arxiv.org/abs/1311.3620>.

- [5] G. Richards. "Well-posedness of the stochastic KdV-Burgers equation." *Stochastic Processes and their Applications* **124**, 1627–1647 (2014). Available at <http://arxiv.org/abs/1109.4926>.
- [6] G. Richards. "Mass Concentration for the Davey-Stewartson System." *Differential and Integral Equations* **24**, 261–280 (2011). Available at <http://arxiv.org/abs/0909.0492>.

Submitted Articles

- [7] J. Földes, S. Friedlander, N.E. Glatt-Holtz, and G. Richards. "Asymptotic analysis for randomly forced MHD." pp. 1–25 (2016). Available at <https://arxiv.org/abs/1604.06352>.
- [8] N.E. Glatt-Holtz, J.C. Mattingly, and G. Richards. "On unique ergodicity in nonlinear stochastic partial differential equations." pp. 1–24 (2015). Available at <http://arxiv.org/abs/1512.04126>.
- [9] J. Földes, N.E. Glatt-Holtz, and G. Richards. "Large Prandtl number asymptotics in randomly forced turbulent convection." pp. 1–30 (2015). Available at <http://arxiv.org/abs/1504.02904>.

Expository Articles

- [10] C. Mueller and G. Richards. "Can solutions of the wave equation with nonlinear multiplicative noise blow-up?" *Open Problems in Mathematics* **2**, 1–4 (2014). Available at <http://opmath.org/index.php/opm/article/view/9>.

Ph.D. Thesis

- [11] G. Richards. "Maximal-in-time behavior of solutions to deterministic and stochastic dispersive PDEs." 2012, University of Toronto, Available at <https://tspace.library.utoronto.ca/handle/1807/32973>.

Research Honours and Awards

- 2016 **Research in Groups grant**, *Banff International Research Station, Canada*, 1 week research visit, with Nathan Glatt-Holtz, Juraj Földes and Jared Whitehead.
- 2015 **MSRI Research Membership**, *Program on New Challenges in PDE: Deterministic Dynamics and Randomness in High and Infinite Dimensional Systems*, September 1, 2015 - November 1, 2015.
- 2015 **Research in Peace grant**, *Mathematical Research Institute of Oberwolfach, Germany*, 3 week research visit, with Nathan Glatt-Holtz, Juraj Földes and Susan Friedlander.
- 2014 **Research in Pairs grant**, *Mittag-Leffler Institute, Sweden*, 3 week research visit, with Nathan Glatt-Holtz, Juraj Földes and Enrique Thomann.
- 2012 **IMA Postdoctoral Fellowship**, *Program on Infinite Dimensional and Stochastic Dynamical Systems*, September 1, 2012 - August 1, 2013.
- 2010 **Ontario Graduate Scholarship**.
- 2009 **Ontario Graduate Scholarship in Science and Technology**.
- 2008 **George F.D. Duff Graduate Scholarship**.
- 2007 **Helen Sawyer Hogg Graduate Admission Award**.

- 2007 **Ontario Graduate Scholarship.**
- 2006 **NSERC PGS-M.**
- 2005 **Innis College Academic Excellence Award.**
- 2005 **Samuel Beatty Scholarship.**
- 2004 **Innis College Academic Excellence Award.**
- 2002, 2003, 2004, 2005 **Dean's List Scholar, *University of Toronto.***

Teaching Awards

- 2015 **Professor of the Year Award nominee, *University of Rochester.***
- 2011 **Engineering faculty TA award finalist, *University of Toronto.***
- 2009 **Daniel B. Delury teaching award, *Used to recognize the best TAs in the University of Toronto Mathematics department..***

Service

- 2016-present MAE undergraduate curriculum committee, Utah State University
- May 2017 Spring Eastern Sectional AMS Meeting, Hunter College
Organizer for special session on "Nonlinear and Stochastic Partial Differential Equations: Theory and Applications in Turbulence and Geophysical Flows"
- October 2016 Fall Western Sectional AMS Meeting, University of Denver
Organizer for special session on "Nonlinear and stochastic partial differential equations"
- October 2014 Fall Western Sectional AMS Meeting, San Francisco State University
Organizer for special session on "Nonlinear PDEs"
- April 2014 Spring Western Sectional AMS Meeting, University of New Mexico
Organizer for special session on "Stochastics and PDEs"

Referee for

- Journal of Mathematical Analysis and Applications
- Proceedings of the Royal Society of Edinburgh, Section A
- Canadian Mathematical Bulletin
- Communications in Pure and Applied Analysis
- Discrete and Continuous Dynamical Systems, Series A
- Journal of Mathematical Physics
- Nonlinear Analysis Series A: Theory, Methods and Applications

Talks

Invited Conference Talks

- April 2016 Spring Central Sectional AMS Meeting, University of Utah,
On invariant Gibbs measures for the generalized KdV equations
- April 2016 Spring Central Sectional AMS Meeting, University of Utah,
On unique ergodicity for nonlinear stochastic PDEs
- December 2015 SIAM Conference on Analysis of Partial Differential Equations, Scottsdale, AZ
On invariant Gibbs measures for the generalized KdV equations

- December 2015 SIAM Conference on Analysis of Partial Differential Equations, Scottsdale, AZ
Ergodicity results for stochastic Boussinesq equations
- August 2015 Conference on “Harmonic Analysis and Partial Differential Equations”, International Center for Mathematical Sciences (ICMS), Edinburgh, UK,
Ergodicity results for stochastic Boussinesq equations
- March 2015 Spring Central Sectional AMS Meeting, Georgetown University,
Ergodicity results for stochastic Boussinesq equations
- January 2015 Informal Analysis Workshop, Texas A&M University,
Statistical mechanics for gKdV
- July 2014 Australian Statistical Conference in conjunction with the Institute for Mathematical Statistics Annual Meeting, Australian Technology Park, Sydney, Australia
Ergodic and mixing properties of the Boussinesq Equations with a degenerate random forcing
- April 2014 Spring Central Sectional AMS Meeting, Texas Tech University
Ergodic and mixing properties of the Boussinesq equations with a degenerate random forcing
- May 2013 Conference on “Probability and PDEs” held at Centro de Giorgi, Pisa, Italy
Statistical mechanics for gKdV
- March 2012 Spring Eastern Sectional AMS Meeting, George Washington University
Invariance of the Gibbs measure for the periodic quartic gKdV
- [Invited Seminar Talks](#)
- August 2016 Analysis Seminar, University of Edinburgh,
Convergence of invariant states in singular parameter limits for systems of stochastic PDEs
- April 2016 Analysis Seminar, University of Toronto,
Ergodicity results for stochastic Boussinesq equations
- November 2015 Analysis Seminar, Cornell University,
On invariant Gibbs measures for the generalized KdV equations
- October 2015 Center for Applied Mathematical Sciences Colloquium, University of Southern California,
Ergodicity results for stochastic Boussinesq equations
- July 2015 MAE Departmental Colloquium, Utah State University,
Invariant measures for nonlinear evolution equations
- April 2015 Applied Math Seminar, Virginia Tech,
Ergodicity Results for stochastic Boussinesq Equations
- April 2015 Probability and Financial Math Seminar, Penn State University,
Ergodicity Results for stochastic Boussinesq Equations
- February 2014 Applied Math Seminar, Virginia Tech
Statistical Mechanics for gKdV
- November 2013 Probability Seminar, University of Rochester
Ergodic and Mixing Properties of the Boussinesq Equations with a Degenerate Random Forcing
- November 2013 Colloquium, Georgia Southern University
Statistical Mechanics for gKdV
- October 2013 Analysis Seminar, University of Rochester
Statistical Mechanics for gKdV

- April 2013 Analysis Seminar, Princeton University
Statistical Mechanics for gKdV
- April 2013 Dynamics Seminar, Boston University
Invariance of the Gibbs measure for the periodic quartic gKdV
- March 2013 Analysis and Applied Math Seminar, Duke University
Invariance of the Gibbs measure for the periodic quartic gKdV
- January 2013 Stochastics Seminar, Georgia Tech
Invariance of the Gibbs measure for the periodic quartic gKdV
- December 2012 IMA Postdoc Seminar, Institute for Mathematics and its Applications
Invariance of the Gibbs measure for the periodic quartic gKdV
- September 2012 PDE Seminar, University of Minnesota
Invariance of the Gibbs measure for the periodic quartic gKdV
- January 2012 Analysis Seminar, University of Rochester
Invariant measures for Hamiltonian PDEs
- [Expository Talks](#)
- April 2016 Graduate PDE Seminar, University of Toronto
On Unique Ergodicity for Stochastic PDEs
- February 2013 Dispersive PDEs Seminar, University of Toronto
Statistical Mechanics for Hamiltonian PDEs
- September 2011 Graduate Student Seminar, University of Toronto
Probabilistic Cauchy theory and invariant measures for Hamiltonian PDEs
- June 2011 Dispersive PDEs seminar, University of Toronto
Function spaces for critical well-posedness theory
- October 2010 Dispersive PDEs seminar, University of Toronto
Invariant Gibbs measures for periodic nonlinear Schrödinger equations (Part II)
- September 2010 Fields Analysis Working Group, Fields Institute, Toronto, Canada
Invariant Gibbs measures for periodic nonlinear Schrödinger equations (Part I)
- June 2010 Dispersive PDEs seminar, University of Toronto
Invariant measures for Hamiltonian PDEs
- April 2010 Fields Analysis Working Group, Fields Institute, Toronto, Canada
Local well-posedness of the stochastic KdV-Burgers equation
- February 2009 Dispersive PDEs seminar, University of Toronto
Critical local well-posedness and perturbation theory
- July 2009 Dispersive PDEs Seminar, University of Toronto
The classical limit of mean field quantum systems
- December 2008 Fields Analysis Working Group, Fields Institute, Toronto, Canada
The Tomas-Stein restriction Theorem
- October 2008 Dispersive PDEs Seminar, University of Toronto
Log-log blowup solutions to L^2 -critical NLS
- November 2006 Fields Analysis Working Group, Fields Institute, Toronto, Canada
Classification of minimal mass blow-up solutions to the L^2 -critical NLS

Teaching Experience

Research Mentor

Summer 2013 **MAXIMA REU project (NSF funded): Recognizing and segmenting barcodes in images**, *Institute for Mathematics and its Applications*, Joint with T. Hoft (University of St. Thomas) guided a research project involving four undergraduate students, Students: Mikaela Cashman (Coe College '14, UNL CompSci Ph.D.), Keenan Hawekotte (Nebraska Wesleyan '15), Elizabeth Newman (Haverford '14, Tufts Ph.D.), Dung Nguyen (Bard '15).

Presentations by students:

1. "Bar code localization in images using neural network and linear discriminant analysis frameworks"
- D. Nguyen, Joint Mathematics Meetings, Baltimore (MD), Jan. 2014.
- M. Cashman, SE Conference for Undergrad Women in Math, Clemson University (SC), Oct. 2013.
2. "Bar code localization using machine learning" (poster)
- M. Cashman, K. Hawekotte, E. Newman, D. Nguyen, JMM, Baltimore (MD), Jan. 2014.
- E. Newman, Undergraduate Science Research Symposium, Haverford College (PA), Sep. 2013

Course Instructor

Spring 2016 **MAE 6490 (Turbulence)**, *Utah State University*, graduate course.
Fall 2016 **MAE 6500 (Potential Flow)**, *Utah State University*, graduate course.
Spring 2016 **MTH 282 (Complex Variables)**, *University of Rochester*.
Spring 2015, 2016 **MTH 201 (Probability Theory)**, *University of Rochester*.
Fall 2014 **MTH 210H (Mathematics of Finance: Honors)**, *University of Rochester*.
Spring 2014, Summer 2015 **MTH 235 (Linear Algebra)**, *University of Rochester*.
Spring 2014, 2015, 2016 **MTH 130 (Excursions in Mathematics)**, *University of Rochester*.
Fall 2013 **MTH 263 (Qualitative Theory of ODEs)**, *University of Rochester*.
Fall 2013, 2014 **MTH 162 (Calculus I)**, *University of Rochester*.
Summer 2012 **MAT 334H (Complex Variables)**, *University of Toronto*.
Summer 2012 **MAT 235Y (Calculus II)**, *University of Toronto*.
Spring 2012 **MAT 336S (Elements of Analysis)**, *University of Toronto*.
Fall 2011 **APM 384F (PDEs for Engineering Science)**, *University of Toronto*.
Fall 2011 **MAT 291F (Calculus III)**, *University of Toronto*.
2010–2011 **MAT 235Y (Calculus II)**, *University of Toronto*.
Summer 2010 **MAT 137Y (Calculus!)**, *University of Toronto*.
Summer 2009 **MAT 137Y (Calculus!)**, *University of Toronto*.

Teaching Assistant

Spring 2012 **APM 462S (Nonlinear Optimization)**, *University of Toronto*.
Summer 2011, Summer 2006 **MAT 235Y (Calculus II)**, *University of Toronto*.
Fall 2006, Fall 2010 **MAT 1060F (Graduate PDEs I)**, *University of Toronto*.

Spring 2010 **MAT 1700S (General Relativity)**, *University of Toronto*.
Fall 2009 **APM 384F (PDEs for Engineering Science)**, *University of Toronto*.
Spring 2009 **MAT 244S (Introduction to ODEs)**, *University of Toronto*.
2008–2009 **MAT 237Y (Multivariable Calculus)**, *University of Toronto*.
Fall 2008 **APM 421F (Quantum Mechanics)**, *University of Toronto*.
Summer 2008, **MAT 137Y (Calculus!)**, *University of Toronto*.
2007–2008, Summer 2007, 2006–2007
Spring 2006 **MAT 223S (Linear Algebra I)**, *University of Toronto*.
2005–2006, **MAT 135Y (Calculus I)**, *University of Toronto*.
2004–2005

Training

Spring 2008 **MAT 1499 (Teaching Large Mathematics Classes)**, *University of Toronto*.

References

Research

- **James Colliander**,
Professor, University of British Columbia,
E-mail: colliand@math.ubc.ca.
- **Tadahiro Oh**,
Associate Professor, University of Edinburgh,
E-mail: hiro.oh@ed.ac.uk.
- **Jeremy Quastel**,
Professor, University of Toronto,
E-mail: quastel@math.toronto.edu, Phone: 416-946-7193.

Teaching

- **Mark Herman**,
Director of Undergraduate Studies, Department of Mathematics, University of Rochester,
E-mail: herman@math.rochester.edu, Phone: 585-275-9414.
- **Catherine Sulem**,
Professor, University of Toronto,
E-mail: sulem@math.toronto.edu, Phone: 416-978-4378.