Richard Thomas Derryberry

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Current as of July 23, 2021

A.K.A. Richard Thomas Hughes

RESEARCH INTERESTS Algebraically integrable systems, geometric representation theory, moduli of Higgs bundles, quantum field theory.

EDUCATION

Ph.D., Mathematics
University of Texas at Austin, May 2018
Thesis: Towards a Self-dual Geometric Langlands Program
Advisors: David Ben-Zvi and Andrew Neitzke

B.Sc., Pure Mathematics and Mathematical Physics
University of Melbourne, 2011

EMPLOYMENT 2018–present
Perimeter Institute and University of Toronto, Coxeter Postdoctoral Fellow

PUBLICATIONS & PREPRINTS

1. Lax formulation for harmonic maps to a moduli of bundles. arXiv:2106.09781
2. Stacky dualities for the moduli of Higgs bundles. *Adv. Math.,* 368 (2020)
3. Introduction to Mirror Symmetry, in Superschool on Derived Categories and D-branes. Edited by M. Ballard, C. Doran, D. Favero and E. Sharpe. *Springer Proceedings in Mathematics & Statistics*, 240 (2018)

SELECTED TALKS

- **Algebraic Geometry Seminar (Cornell)**, May 2021.
  Zero-curvature formulation for novel two-dimensional field theories.
- **Geometry, Topology and Dynamics Seminar (UIC)**, February 2020.
  Fourier Transforms and Physical Dualities.
- **Park City Mathematics Institute (PCMI),** July 2019.
  Learning seminar on "The Self Duality Equations on a Riemann Surface".
- **Geometry and Physics of Gauge Theories at Infinity (Saskatchewan, Canada),** August 2018.
  Self-dual versions of the moduli of Higgs bundles.
- **QMAP Seminar (UC Davis)**, Fall 2017.
  Self-dual Hitchin Systems from Theories of Class S.
- **Superschool on derived categories and D-branes (University of Alberta)**, Summer 2016.
  Introduction to mirror symmetry.
- **QGM PhD Retreat (Aarhus University)**, Summer 2014.
  Chern-Simons Theory with Finite Gauge Groups.

AWARDS & GRANTS

- GEAR Graduate Internship, August 2016
- GEAR Graduate Internship, July-August 2014
- AMSI Vacation Research Scholarship, 2010/2011

TEACHING

Course Instructor
Mathematics Department, University of Toronto

- MAT244 Introduction to Ordinary Differential Equations, Fall Semester 2019
- APM346 Partial Differential Equations, Winter Semester 2019 (Course coordinator)

Teaching Assistant
Mathematics Department, University of Texas at Austin

- M382D Differential Topology (Graduate Course), Spring 2015 & 2018
- M373L Algebraic Structures II, Spring 2017
- M427J Differential Equations with Linear Algebra, Fall 2015
- M362K Probability (Flipped Classroom), Summer 2014
- M373K Algebraic Structures I, Spring 2014
- M367K Topology (Inquiry Based Learning), Spring 2014
- M408D Sequences, Series and Multivariable Calculus, Spring 2013
- M408K Differential Calculus, Fall 2012

Park City Mathematics Institute

- Advanced Topics in Mathematics and Physics of Higgs Bundles (course by Laura Schaposnik), Summer 2019

Preparation of lecture materials
Mathematics Department, University of Melbourne

- MAST30029 Partial Differential Equations, Semester 2 2011

Mentoring (UT Austin Directed Reading Program)
Graduate mentor for the following undergraduate students:

- Wyatt Reeves, *Commutative Algebra,* Spring 2018
- Carl Marth and Wyatt Reeves, *Index of Dirac Operators,* Fall 2017
- Wyatt Reeves, *Mathematics of Quantum Mechanics,* Spring 2017
- Sarafina Nance, *Frobenius Integrability Theorem,* Spring 2014
- Dean Menezes, *Primes in Arithmetic Progressions,* Fall 2013
- Dean Menezes, *Chebyshev's Inequalities for* $\pi(x)$*,* Spring 2013

SERVICE

- Reviewer for *Mathematical Reviews* and *zbMATH*
- Referee for *JHEP* and *SIGMA*
- Postdoctoral Representative at Perimeter Institute, 2018-2020
- Panelist for PCMI Careers Panel, 2019
- Learning seminars at UT Austin and University of Melbourne, Organiser/Co-organiser, 2011-2017
- UT Austin Directed Reading Program, Co-organiser, 2013-2014
- Graduate Student Geometry and Topology Conference, Co-organiser, 2014
- Sophex Seminar, Co-organiser, Spring 2013
- Melbourne University Mathematics & Statistics Society, Ed. Officer, 2010-2011