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Curriculum Vitae

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ACADEMIC EMPLOYMENT

- Assistant Professor, Texas A&M University: 2006-present
- NSF funded Postdoctoral Fellow FRG 0354772, Indiana University: 2006
- VIGRE Postdoctoral Fellow, Indiana University: 2003-2005
- Graduate Teaching Assistant, University of California, San Diego: 1997-2003
- Research Assistant, University of California, San Diego:
with Hans Wenzl 2000-2002
with J. William Helton 1996-1999

EDUCATION

- **Ph.D. Mathematics** University of California, San Diego: June 2003
Advisor: Hans Wenzl
Thesis Title: *Tensor categories arising from quantum groups and BMW-algebras at odd roots of unity.*
- **B.A. Mathematics** University of California, San Diego: June 1997
summa cum laude (GPA 4.0)
Phi Beta Kappa

RESEARCH INTERESTS

- Representation theory: quantum groups, Hopf algebras and braid groups.
- Topological quantum computation: algorithms, models for topological phases of matter, universality.
- Categories with structure: fusion, braided and modular categories, particularly classification questions and applications to physics.
- Low-dimensional topology: link invariants and their computational complexity.

TEACHING EXPERIENCE (Texas A&M University)

- Spring 2011: Seminar in Algebra: Representations of Finite Groups (M662)
- Fall 2009, Spring 2010: Graduate Algebra (M653-M654)
- Fall 2006, 2008, Spring 2009: Topics in Applied Mathematics (M311)
- Spring 2008, Fall 2009: Differential Equations (M308)
- Fall 2007: Engineering Calculus (M151)
- Spring 2007, Fall 2010, Fall 2011: Foundations of Discrete Mathematics (M220)

PUBLICATIONS

- (1) C. Galindo; E. C. R., S.-M. Hong, Generalized and quasi-localization of braid group representations, *Int. Math. Res. Not.* (2012).
- (2) P. Bruillard; E. C. R., Modular categories, integrality and Egyptian fractions, *Proc. Amer. Math. Soc.* **140** (2012), 1141–1150.
- (3) E. C. R.; Z. Wang, Localization of unitary braid representations, *Comm. Math. Phys.* **311** (2012) no. 3, 595–615.
- (4) D. Naidu; E. C. R., A finiteness property for braided fusion categories, *Algebr. Represent. Theory.* **15** (2011) no. 5, 837–855.
- (5) E. C. R., A quaternionic braid representation (after Goldschmidt and Jones), *Quantum Topol.* **2** (2011), 173–182.
- (6) E. C. R., Braid representations from quantum groups of exceptional Lie type, *Rev. Un. Mat. Argentina* **51** (2010) no. 1, 165–175.
- (7) S.-M. Hong; E. C. R., On the classification of the Grothendieck rings of non-self-dual modular categories, *J. Algebra* **324** (2010) no. 5, 1000–1015.
- (8) I. Tuba; E. C. R., Finite linear quotients of \mathcal{B}_3 of low dimension, *J. Knot Theory Ramifications* **19** (2010) no. 5, 587–600.
- (9) E. C. R.; Y. Zhang; Y.-S. Wu; M.-L. Ge, Extraspecial two-groups, generalized Yang-Baxter equations and braiding quantum gates, *Quantum Inf. Comput.* **10** (2010) no. 7-8, 0685–0702.
- (10) E. C. R.; R. Stong; Z. Wang, On classification of modular tensor categories, *Comm. Math. Phys.* **292** (2009) no. 2, 343–389.
- (11) E. C. R., Two paradigms for topological quantum computation, in *Advances in Quantum Computation*, *Contemp. Math.* **482**, 165–178, Amer. Math. Soc. Providence, RI 2009.
- (12) M. J. Larsen; E. C. R., Unitary braid group representations with finite image, *Algebr. Geom. Topol.* **8** (2008), no. 4, 2063–2079.
- (13) S.-M. Hong; E. C. R.; Z. Wang, On exotic modular tensor categories, *Commun. Contemp. Math.* **10** (2008), no. Suppl. 1, 1049–1074.
- (14) E. C. R., Unitarizability of pre-modular categories, *J. Pure Appl. Algebra* **212** (2008) no. 8, 1878–1887.
- (15) M. J. Larsen; E. C. R., An algebra-level version of a link-polynomial identity of Lickorish, *Math. Proc. Cambridge Philos. Soc.* **144** (2008) no. 3, 623–638.
- (16) P. Etingof; E. C. R.; S. Witherspoon, Braid group representations from quantum doubles of finite groups, *Pacific J. Math.* **234** (2008) no. 1, 33–41.
- (17) E. C. R., From quantum groups to unitary modular tensor categories, in *Representations of Algebraic Groups, Quantum Groups and Lie Algebras* (Snowbird, UT, 2004). *Contemp. Math.* **413**, 215–230, Amer. Math. Soc. Providence, RI 2006.
- (18) J. Franko; E. C. R.; Z. Wang, Extraspecial 2-groups and images of braid group representations, *J. Knot Theory Ramifications* **15** (2006) no. 4, 1–15.
- (19) M. J. Larsen; E. C. R.; Z. Wang, The N -eigenvalue problem and two applications, *Int. Math. Res. Not.* **2005** no. 64, 3987–4018.
- (20) E. C. R., On a family of non-unitarizable ribbon categories, *Math. Z.* **250** (2005) no. 4, 745–774.
- (21) E. C. R., A note on tensor categories of Lie type E_9 , *J. Algebra* **284** (2005) no. 1, 296–309.

GRANTS

- NSA grant H98230-08-1-0020: 3/2008-3/2010 \$30,000
- NSA grant H98230-10-1-0215: 3/2010-3/2012 \$30,000
- NSF grant DMS-1108725 (Collaborative, with Zhenghan Wang): 9/2011-8/2014 \$193,326
- NSA grant: 3/2012-3/2014 \$58,726 (declined)

CONFERENCE TALKS

- AMS Special Session of Fusion Categories and Representation Theory, Boston, MA, January 2012.
- Algebraic Aspects of Quantum Computation, SIAM mini-symposium, Raleigh, NC, October 2011.
- Topological Quantum Computing, Simons Center for Geometry & Physics, Stony Brook, NY, September 2011.
- Hopf Algebras and Tensor Categories, U. Almeria, Almeria, Spain, July 2011.
- Southern Regional Algebra Conference, LSU-Lafayette, LA, October 2010.
- Topological Phases and Emergent Phenomena in Physics, Fudan U., Shanghai, China, July 2010.
- Subfactors and Fusion Categories, Vanderbilt U., February 2010.
- Representation Theory, Quantum Field Theory, etc., UT Tyler, October 2009.
- Colloquium on Hopf Algebras, Quantum Groups and Tensor Categories, La Falda, Argentina, September 2009.
- NSF-CBMS: Knots and Topological Quantum Computing, Edmond, OK, July 2008.
- Classical and Quantum Information Theory, Santa Fe, NM, March 2008.
- Topics in von Neumann Algebras, Banff Research Center, Canada, March 2008.
- Knot Theory and Quantum Computing, UT Dallas, December 2007.
- Representation Theory, Quantum Field Theory, etc., UT Tyler, September 2007.
- XVII Coloquio Latinoamericano de Álgebra, Medellín, Colombia, July 2007.
- AMS Special Session on Combinatorial Representation Theory, Fayetteville, AR, November 2006.
- Topics on von Neumann Algebras, Banff Research Center, Canada, October 2006.
- AMS Special Session on Representations of Groups and Algebras, U. of Oregon, November 2005.
- XVI Coloquio Latinoamericano de Álgebra, Colonia, Uruguay, August 2005.
- AMS-IMS-SIAM, Quantum Topology—Contemporary Issues and Perspectives, Snowbird, UT, June 2005.
- Lie Algebras, VOAs and their Applications, North Carolina State U., May 2005.
- AMS Special Session on Knots and Braids, U. of New Mexico, October 2004.
- Representations of Algebraic Groups, Quantum Groups, and Lie Algebras, Snowbird, UT, July 2004.
- Wabash Extramural Modern Analysis Seminar, Wabash College, February 2004.
- AMS Special Session on Lie Algebras, Conformal Field Theory and Related Topics, SUNY Binghamton, October 2003.

COLLOQUIA, INVITED TALKS AND A&M SEMINAR TALKS

- Colloquia: U. of South Alabama, November 2009; Texas A&M U., March 2006; U. of Houston, March 2006; U. of South Florida, February 2006; Virginia Tech, March 2004; Eastern Washington U., May 2003; U. of Maine, March 2003.
- Invited Talks: Ohio State U. January 2011; Iowa State U., December 2010; UT Austin, January 2008 and October 2008; UC San Diego, July 2005.
- A&M Seminar Talks: Algebra & Combinatorics (5 talks), Working Seminar in Algebra (3), Groups & Dynamics (2), Math. Physics (1), Quantum Computation, CS Dept. (3), Linear Analysis (1).

SERVICE/PROFESSIONAL ACTIVITIES

- Conference/Seminar Co-Organization:
 - Modular Categories and Applications, Indiana University, March 2009 (with Z. Wang and M. Larsen).
 - Fusion Categories and Applications, AMS Special Session, Waco TX, October 2009 (with D. Naidu).
 - Quantum Invariants of 3-Manifolds and Modular Categories, AMS Special Session, St. Paul MN, April 2010 (with T. Le and V. Turaev).
 - Algebraic Aspects of Quantum Computation (minisymposium), SIAM Conference on Applied Algebraic Geometry, Raleigh, NC, October 2011 (with Z. Wang).
 - Classifying Fusion Categories, American Institute of Mathematics workshop, Palo Alto CA, March 2012 (with S. Morrison and N. Snyder).
 - Algebra & Combinatorics Seminar, 2011.
- Algebra Qualifying Exam Committee (2009-2011).
- Thesis committee (Chair)
 - P. Bruillard, Mathematics Ph.D., Texas A&M, (current)
 - J. Kessler, Mathematics Ph.D., Texas A&M, (2010-2011, no degree)
 - (Co-Chair) P. Bruillard, Physics Masters, Texas A&M, (2010)
- Thesis committee (Member)
 - Jean Yeh, Mathematics Ph.D., Texas A&M (current)
 - Mitch Phillipson, Mathematics Ph.D., Texas A&M (current)
 - Jeanette Shakalli, Mathematics Ph.D., Texas A&M (current)
 - Piyush Shroff, Mathematics Ph.D., Texas A&M (current)
 - M. Valentina Vega, Mathematics Ph.D., Texas A&M (2009) (substitute)
 - Tobias Hagge, Mathematics Ph.D., Indiana University (2008)
 - Angad Kamat, Computer Science Masters, Texas A&M (2008) (substitute)
- Postdocs mentored: D. Naidu, 2008-2011 (see publication list).
- Other Mentoring: Supervised high school student research project by Rebecca S. Chen, Park Tudor High School, Indianapolis, IN: “Generalized Yang-Baxter Equations and Braiding Quantum Gates” (2010-2011).
- Member in Residence, Kappa of Texas Chapter, Phi Beta Kappa
- Participant, Texas A&M Faculty Abroad Seminar, 2007.