

Date of Birth: 18 November 1985
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Department of Mathematics
Massachusetts Institute of Technology
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Education

- 2013—present Massachusetts Institute of Technology, NSF postdoctoral fellow and instructor in pure mathematics. Sponsoring Scientist: Professor Roman Bezrukavnikov.
- 2008—2013 Louisiana State University, Ph.D. Advisor: Professor Pramod Achar;
Awarded Distinguished Dissertation for the College of Science with monetary prize of \$500, May 2014;
Received Pasquale Porcelli Award for Graduate Research Excellence, December 2012;
GAANN fellow 2010 to 2013.
- 2004—2008 Nicholls State University, B.S. earned May 2007, *Magna cum Laude*.
Awarded Larry S. Haw Memorial Scholarship for Outstanding Mathematics Major, 2007.

Research Area

I work in the area of geometric representation theory—studying representation theory related to algebraic groups using geometric methods. In particular, I am interested in perverse sheaves on the nilpotent cone, the Springer correspondence, and character sheaves. More recently, I have been thinking about modular perverse sheaves on the affine Grassmannian and applications to the representation theory of reductive groups over a field of positive characteristic.

Papers

- L. Rider and A. Russell, *Formality and Lusztig’s generalized Springer correspondence*, in progress.
- L. Rider and A. Russell, *Perverse sheaves on the nilpotent cone and Lusztig’s generalized Springer correspondence*, Proceedings of Southeastern Lie Theory Workshop Series, to appear, arXiv:1409.7132.
- P. Achar and L. Rider, *The affine Grassmannian and the Springer resolution in positive characteristic*, with an appendix written jointly with Simon Riche, submitted, arXiv:1408.7050.
- P. Achar and L. Rider, *Parity sheaves on the affine Grassmannian and the Mirković–Vilonen conjecture*, Acta Math., to appear, arXiv:1305.1684.
- L. Rider, *Formality for the nilpotent cone and a derived Springer correspondence*, Adv. Math. **235** (2013), 208–236, arXiv:1206.4343.

Invited Talks

Lusztig’s generalized Springer correspondence and formality for the nilpotent cone: Workshop on Springer Theory and Related Topics, UMass Amherst, 10/2015.

Parity Sheaves on the affine Grassmannian and the Langlands dual Springer resolution in positive characteristic: Workshop on Enveloping Algebras and Geometric Representation Theory, Mathematisches Forschungsinstitut Oberwolfach, 05/2015.

Parity Sheaves on the affine Grassmannian and the Mirković–Vilonen conjecture: • Workshop on Moduli Spaces, Derived Geometry, and Geometric Representation Theory, University of North Carolina at Chapel Hill, 11/2014. • Geometric Representation Theory Conference, Institut d’Etudes Scientifiques de Cargèse, Corsica, France, 06/2014. • Representation Theory of Lie Algebras and Lie Superalgebras, SE Lie Theory Conference, University of Georgia, 05/2014.

Seminars • UT Austin Geometry Seminar 11/2015. • MIT Lie Groups Seminar 10/2013 and 02/2015. • Integrability and Representation Theory Seminar, University of Illinois at Urbana-Champaign 03/2014. • Representation Theory Seminar, UMass, Amherst, 10/2013. • Algebraic Geometry Seminar, Tufts, 10/2013. • Algebraic Geometry and Number Theory Seminar, Boston College, 10/2013. • Algebra Seminar, University of Georgia, 09/2012. • LSU’s Algebra and Number Theory Seminar, 03/2012.

AMS Special Sessions • Lie Theory, Representation Theory and Geometry, University of Georgia, 03/2016. • Geometric and categorical methods in representation theory at the Joint Mathematics Meetings in Seattle, Washington, 01/2016. • Representations of reductive groups, Rutgers University, 11/2015. • Geometric Methods in the Representation Theory of Reductive Groups, University of Colorado Boulder, 04/2013. • Geometric representation theory, University of Kansas, 04/2012.

Expository Talks

University of Georgia: **Introduction to perverse sheaves and the Springer correspondence**, VIGRE graduate student seminar, 09/2012.

University of Oregon: **Introduction to Character sheaves**, workshop entitled *Categorical Representation Theory*, 08/2012.

LSU 2012: **Geometric Langlands for GL_n** , Geometric Langlands Seminar • **Langlands Correspondence for GL_n** , Geometric Langlands Seminar. • **Introduction to Double Affine Hecke Algebras**, VIR Seminar on Assorted Topics in Geometric Representation Theory.

LSU 2011: **Affine Springer Fibers**, VIR Seminar on Affine Springer Fibers. • **Recall the Fundamental Lemma**, VIR Seminar on the Fundamental Lemma II. • **What is the Deligne–Fourier Transform?**, Etale cohomology seminar. • **Etale Morphisms**, Etale cohomology seminar. • **Stable Conjugacy**, VIR Seminar on Fundamental Lemma I.

Teaching Experience

Representation Theory (18.757), graduate level introduction to a variety of topics in representation theory which will likely include representations of finite groups with a focus on the symmetric group, representations of algebraic groups, Lie groups, Lie algebras, highest weight categories, Schur–Weyl duality, quiver representations, etc. MIT, Spring 2016.

Freshman Advising Seminar: A brief sweep of seven millennium problems, weekly meetings with seven freshmen and an associate advisor to discuss the seven millennium problems as well as on-going issues of adjusting to life at MIT, Fall 2015.

Recitation Leader for Multivariable Calculus (18.02), 3 sections, MIT, Fall 2014.

Teacher of record for Calculus II (Math 1552), a four hour Calculus course, in charge of all aspects of course, LSU, Fall 2010.

Teacher of record for Calculus I (Math 1550), a five hour Calculus course, in charge of all aspects of course, LSU, Spring 2010.

Teacher of record for R2R College Algebra (Math 1021), in charge of multiple sections of College Algebra courses as part of LSU R2R Program using Pearson MyMathLab software and tutor in the LSU Pleasant Hall Math Lab, Fall 2009 and Fall 2012.

Calculus and Business Calculus recitations, LSU, Fall 2008 and Fall 2011.

Teaching Assistant for Discrete Math (Math 2020), LSU, Spring 2009.

Teacher of record for Developmental Mathematics (Math 003), a three hour course designed for incoming students with low ACT and SAT mathematics scores, in charge of all aspects of course, Nicholls State University, Fall 2007 and Spring 2008.

Training and Service

Undergraduate Academic Advisor, MIT, Fall 2014 to present. Advised two upperclassmen and seven freshmen. Responsibilities included meeting with and checking in on students throughout each semester to talk about class choices, work load, time management, summer plans, and sometimes personal matters.

Kaufman Teaching Certificate Program, MIT, 7 meetings, each two hours, May and June 2015, <http://t11.mit.edu/help/kaufman-teaching-certificate-program-ktcp>.

MIT Teaching Mentor, Fall 2014. Served as teaching mentor to three MIT mathematics graduate students.

Association for Women in Mathematics, LSU Student Chapter, 2009 - Present; Vice-President 2012-2013; President 2011-2012; Webmaster 2010-2011. Helped plan and organize Welcome Events, Breakfasts with successful women in mathematics, mentor program, and Career Day 2013 (joint with SIAM). Spoke at Career Day (2013) and webpage development seminar (2011) for mathematics graduate students and faculty.

G.E.A.U.X, LSU's orientation program for incoming mathematics graduate students. Algebra talk co-organizer, 2013; Gave lecture, *Reviewing Vector Spaces and Linear Transformations*, LSU, August 18, 2011; organized algebra talks and gave lecture *Introduction to Rings*, August 2010.

SMILE at LSU, 5 week LSU summer program for undergraduates. Served as a research mentor for mathematics undergraduates: helped a group of four students prepare a short paper and beamer presentation about their research topic, *Geometric Constructions with Neusis*, Summer 2011.

REU at LSU, Research Experience for Undergraduates, an 8 week LSU summer program. Was regularly available to students for chats and helped plan social events and REU *Dessins D'enfants* t-shirts, Summer 2009.

References

Pramod Achar, Louisiana State University, pramod@math.lsu.edu.

Roman Bezrukavnikov, Massachusetts Institute of Technology, bezrukav@math.mit.edu.

Dennis Gaitsgory, Harvard University, gaitsgde@math.harvard.edu.

Wolfgang Soergel, University of Freiburg, wolfgang.soergel@math.uni-freiburg.de.

Geordie Williamson, Max Planck Institute for Mathematics, geordie@mpim-bonn.mpg.de.

Teaching: John Bush, Massachusetts Institute of Technology, bush@math.mit.edu.