

# William Hardesty

University of Sydney  
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<https://hardes11.github.io/>

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## Education

- **University of Georgia** Athens, Georgia  
*Ph.D. Mathematics* 2011- 2016
- **University of Maryland, Baltimore County** Baltimore, Maryland  
*B.S. Mathematics* 2007 - 2011

## Employment

- **University of Sydney** Sydney, New South Wales  
*Research Fellow* 2019-
- **Louisiana State University** Baton Rouge, Louisiana  
*Postdoctoral Researcher* 2016-2019

## Research Interests

Representation theory, algebraic geometry, derived categories, Springer theory, tensor categories, perverse sheaves, co-t-structures, categorification

## Publications

11. (with P. Achar) Co-t-structures on derived categories of coherent sheaves and the cohomology of tilting modules, in preparation.
10. (with P. Achar, S. Riche) Integral exotic sheaves and the modular Lusztig–Vogan bijection, submitted, arXiv:1810.08897.
9. On the centralizer of a balanced nilpotent section, submitted, arXiv:1810.06157.
8. Explicit calculations in an infinitesimal singular block of  $SL_n$ , submitted, arXiv:1805.04614.
7. (with P. Achar, S. Riche) Conjectures on tilting modules and antispherical  $p$ -cells, to appear in **RIMS Kokyuroku Bessatsu**, arXiv:1812.09960.
6. (with P. Achar, S. Riche) Representation theory of disconnected reductive groups, to appear in **Documenta Mathematica** arXiv:1810.06851.
5. (with P. Achar) Calculations with graded perverse coherent sheaves, to appear in **The Quarterly Journal of Mathematics**, arXiv:1806.07780.

4. (with P. Achar, S. Riche) On the Humphreys conjecture on support varieties, to appear in **Transformation Groups**, arXiv:1707.07740
3. On support varieties and the Humphreys conjecture in type  $A$ , **Adv. Math.** 329 (2018), 392–421.
2. (with D. Nakano, P. Sobaje) On the existence of Mock Injective modules for algebraic groups, **Bull. Lond. Math. Soc.** 49 (2017).
1. Support varieties of line bundle cohomology groups for  $SL_3(k)$ , **J. Algebra** 448 (2016), 127–173.

## Invited Presentations

- Representations of Lie and Jordan Algebras, Their Representations and Applications - Chengdu, China (January 2020)
- International Conference on Representation Theory (ICRT8) - Harbin, China (July 2019)
- AMS special session on Geometric Methods in Representation Theory - Auburn, Alabama (March 2019)
- AMS special session on Representations of Lie algebras, algebraic groups, and quantum groups - Auburn, Alabama (March 2019)
- Oberwolfach Seminar: Character Formulas for Reductive Algebraic Groups - Oberwolfach, Germany (November 2018)
- Thorie des Reprsentations (notamment groupes algbriques et groupes finis, groupes de Kac-Moody et algbres associes) - Besse-et-Saint-Anastaise, France (September 2018)
- University of Louisiana Lafayette Algebra Seminar (April 2018)
- University of South Alabama, Colloquium (November 2017)
- University of South Alabama, Algebra Seminar (November 2017)
- AMS Special Session on Geometric Methods in Representation Theory - Charleston, South Carolina (March 2017)
- AMS Special Session on Lie Theory, Representation Theory and Geometry - Athens, Georgia (March 2016)
- AMS Special Session on Categorical and Geometric Methods in Representation Theory - Seattle, Washington (January 2016)
- 8th Southeastern Lie Theory Workshop on Algebraic and Combinatorial Representation Theory - Raleigh, North Carolina (October 2015)
- Southwest Group Theory Day 2015 - Tucson, Arizona (March 2015)

## Teaching Experience

- Spring 2019: Math 1552 (Calculus II), Louisiana State University
- Spring 2019: Math 2020 (Discrete Mathematics), Louisiana State University
- Spring 2018: Math 2065 (Ordinary Differential Equations), Louisiana State University
- Fall 2016: Math 1551 (Honors Calculus I), Louisiana State University
- Fall 2015: Math 2250 (Calculus I), University of Georgia
- Fall 2014: Math 1113 (Precalculus), University of Georgia
- Spring 2014: Math 2250 (Calculus I), University of Georgia
- Fall 2013: Math 1113 (Precalculus), University of Georgia

## Awards, Grants & Honours

- NSF Algebra and Number Theory Standard Grant 2019-2022 (**Applied**)
- Graduate Student Travel Grant to the Joint Mathematics Meetings 2016
- University of Georgia, Graduate Student Assistantship 2011-2013
- Outstanding Graduating Senior in Mathematics, University of Maryland, Baltimore County 2010

## Service

- Co-organizer for the Southeastern Lie Theory Workshop XI (Baton Rouge, May 2019)
- Service as an anonymous referee

## References

- Daniel Nakano, Distinguished Research Professor (**Advisor**)  
Department of Mathematics, University of Georgia  
Email: nakano@math.uga.edu
- Pramod Achar, Professor (**Postdoc Mentor, Collaborator**)  
Mathematics Department, Louisiana State University  
Email: pramod@math.lsu.edu

- Simon Riche, Professor (**Collaborator**)  
Laboratoire de Mathématiques Blaise Pascal, Université Clermont Auvergne  
Email: Simon.Riche@uca.fr
- Roman Bezrukavnikov, Professor (**Colleague**)  
Mathematics Department, Massachusetts Institute of Technology  
Email: bezrukav@math.mit.edu
- James Oxley, Boyd Professor (**Teaching Reference**)  
Mathematics Department, Louisiana State University  
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