

# Anna Macquarie Romanov

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School of Mathematics and Statistics F07  
University of Sydney, NSW 2006  
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**EMPLOYMENT** NSF Mathematical Sciences Postdoctoral Research Fellow 2018-2020  
**The University of Sydney**, Sydney, Australia

**CITIZENSHIPS** USA, United Kingdom

**EDUCATION** **University of Utah**, Salt Lake City, UT  
*PhD*, Mathematics, May 2018  
Concentration: Representation Theory  
Advisor: Dragan Miličić  
Dissertation title: *A Kazhdan-Lusztig algorithm for Whittaker modules*

**Colorado State University**, Fort Collins, CO  
*Bachelor of Science*, Honors Mathematics, May 2011  
*Bachelor of Arts*, Languages, Literatures, and Cultures - Spanish, May 2011  
Thesis title: *An exploration of non-orientable topological surfaces*  
Summa Cum Laude  
Mathematics Honors Scholar

**PUBLICATIONS AND PREPRINTS** H. Friedlander, W. Grodzicki, W. Johnson, G. Ratcliff, **A. Romanov**, B. Strasser, B. Wessel, *An orbit model for the spectra of nilpotent Gelfand pairs*. To appear in Transformation Groups. arXiv:1803.09787 [math.RT]

**A. Romanov**, *A Kazhdan-Lusztig algorithm for Whittaker modules*. arXiv:1809.03622 [math.RT]. Full dissertation available at <http://www.maths.usyd.edu.au/u/romanova>

**A. Romanov**, S. Taylor, *A lightning introduction to category  $\mathcal{O}$* . Book chapter. RSME Springer Series textbook on proceedings of the 2017 MSRI graduate school on Soergel bimodules.

**INVITED CONFERENCE TALKS** *A Kazhdan-Lusztig algorithm for Whittaker modules* June 2019  
Representation Theory XVI  
Inter University Center Dubrovnik; Dubrovnik, Croatia

*Filtrations of Whittaker modules* Mar 2019  
Lie Theory in the Representations of Groups and Related Structures  
AMS Sectional Meeting; University of Hawaii at Manoa, USA

*Twisted Harish-Chandra sheaves and Whittaker modules* Dec 2018  
Geometric and Categorical Representation Theory  
MATRIX Research Institute; Creswick, Australia

*An orbit model for the spectra of nilpotent Gelfand pairs* Dec 2018  
Special Section in Representation Theory  
Australian Mathematical Society Annual Meeting; Adelaide, Australia

**INVITED  
SEMINAR  
TALKS**

*A Kazhdan–Lusztig algorithm for Whittaker modules*  
University of Melbourne Pure Math Seminar, Australia May 2019  
University of New South Wales Pure Math Seminar, Australia April 2019  
The Perimeter Institute for Theoretical Physics, Waterloo, Canada April 2018  
University of Toronto Geometric Representation Theory Seminar, Canada Mar 2018  
University of Wisconsin–Madison Algebraic Combinatorics Seminar, USA Jan 2018  
University of California Los Angeles Algebra Seminar, USA Jan 2018  
University of Southern California Algebra Seminar, USA Jan 2018  
University of Sydney Algebra Seminar, Australia Dec 2017  
University of Georgia Algebra Seminar, USA Nov 2017  
Louisiana State University Algebra and Number Theory Seminar, USA Nov 2017  
University of Utah Representation Theory Seminar, USA Sept 2017

*An orbit model for nilpotent Gelfand pairs*  
University of Sydney Algebra Seminar, Australia Nov 2018

**CONTRIBUTED  
CONFERENCE  
TALKS**

*Whittaker modules and parabolic Kazhdan–Lusztig polynomials* Aug 2019  
Flags, Galleries and Reflection Groups  
University of Sydney, NSW, Australia

*Formative assessment as a mechanism to improve calculus persistence* Jan 2018  
Contributed paper session on assessment  
Joint Mathematics Meetings, San Diego, CA, USA

**FELLOWSHIPS  
AND  
AWARDS**

NSF Mathematical Sciences Postdoctoral Research Fellowship, \$150,000 2018–2020  
*National Science Foundation proposal funded to work with Professor Geordie Williamson  
at the University of Sydney*

Most Outstanding Graduate Student Research Poster 2018  
*Association for Women in Mathematics research symposium, Joint Mathematics Meet-  
ings 2018*

University of Utah Teaching Fellowship, \$17,000 2017–2018  
*University wide grant awarded to a limited number of graduate students who propose  
creative new projects to enhance undergraduate teaching*

Mathematics Department Summer Research Fellowship, \$4,500 2017  
*Proposal funded to support independent summer research*

Mathematics Department Nominee, Thomas G. Stockham Medal for Conspicuously Ef-  
fective Teaching 2017  
*University wide teaching award, one graduate student is nominated from the Mathemat-  
ics Department annually*

2016 Outstanding Professor Award, Sigma Chi Fraternity 2016  
*University wide teaching award*

NSF Research Training Grant RTG-1246989 Fellowship, \$10,200 2015  
*Mathematics Department research fellowship*

#### Travel Awards

- Mathematics Department Travel Award, \$500 per award 2015, 2016, 2017
- NSF Research Training Grant RTG-1246989 Travel Award, \$700 2015
- University of Utah ASUU Graduate Student Travel Award, \$800 2015

Outstanding Graduate Student Award, \$500 2014-2015

*Two awards are given by the math department each academic year.*

#### TEACHING

*Learning Seminar Organizer* ongoing  
Organizing a weekly learning/research seminar (the “Informal Friday Seminar”) for the algebra research group at the University of Sydney.

*Undergraduate Research Mentor* 2018  
Funded by the University of Utah to design and lead an undergraduate research project on finite Gelfand pairs.  
Mentees: *Faith Pearson, Dylan Soller*

*Course Designer and Instructor* 2017-2018  
Received fellowship to design and implement a new interdisciplinary undergraduate course at the University of Utah in Spring 2018.  
Course title: *Representation Theory Techniques in Quantum Physics*

*Co-Principal Investigator, Research Project on Calculus Persistence* 2016-2018  
Education research project testing the impact of new formative assessment techniques on student persistence in the University of Utah engineering calculus sequence. Project included gathering and analysis of data on student confidence surveys before and after interventions. (*Joint with Heather Z. Brooks.*)

*Instructor* 2012-2017  
Taught undergraduate courses with full responsibility for lectures, assessment, and grades.  
Courses taught:

- Spring 2017: Linear Algebra, Math 2270
- Summer 2016: Discrete Mathematics, Math 2200
- Spring 2016: Linear Algebra, Math 2270
- Fall 2014: Precalculus, Math 1080
- Summer 2014: College Algebra, Math 1050
- Spring 2014: Precalculus, Math 1080
- Spring 2013: Intermediate Algebra, Math 1010
- Fall 2012: Intermediate Algebra, Math 1010

*Teacher Training Workshop Facilitator* 2015, 2016  
Facilitated and organized annual workshop for new teaching assistants in the University of Utah mathematics department.

*Algebra Qualifying Exam Problem Session Leader* 2016  
Employed by the Utah math department to lead weekly problem sessions to help first year graduate students study for the algebra qualifying exam.

*Undergraduate Summer School Teaching Assistant* 2015  
Engaged undergraduates at the Park City Mathematics Institute with problems focusing on moduli spaces and geometric representation theory.

*Teaching Assistant* 2013  
Taught weekly discussion sessions for engineering calculus courses with responsibility for writing labs, grading labs, and grading exams.

**PROFESSIONAL SERVICE** *Organizational Committee, New Connections in Representation Theory* 2019-2020  
Organizing international representation theory conference to take place in Queensland, Australia in February 2020. Organization includes obtaining conference grants (AustMS, AMSI, University of Sydney, NSF), inviting speakers, arranging travel and local accommodation.

*Bernhard Neumann Prize selection committee* 2018  
Evaluated student talks at the Australian Mathematical Society annual meeting in Adelaide and helped to select the 2018 BH Neumann Prize recipients.

*President, Association for Women in Mathematics Utah Student Chapter* 2017-2018  
Chapter activities included: AWM speaker series, negotiation skills workshop, monthly lunch discussions on gender and academia, professor panel to help early graduate students find advisors, and establishment of a new mentorship network for undergraduate women.

*Vice President, Association for Women in Mathematics Student Chapter* 2016-2017  
Chapter activities included: initiation and funding of new speaker series, monthly lunch discussions on gender and academia, outreach event at a local science museum, workshops on scientific communication, implicit bias, and gendered language.

*Mathematics Category Judge, Sterling Scholar Award* 2017  
Evaluated and interviewed Utah high school students who were nominated by school administrators for this state scholarship.

*Chair, Graduate Student Colloquium* 2015-2016  
Organized, advertised, and found speakers for weekly graduate student colloquium.

*Chair, Graduate Student Advisory Committee* 2014-2015  
Represented graduate students on university committees and served as a liaison between graduate students and department administration.

*Chair, Graduate Student Recruitment Committee* 2014-2015  
Coordinated prospective graduate student visiting weekend by scheduling transportation, faculty talks, student interviews, and social activities.

**CONFERENCE PARTICIPATION** Flag, Galleries, and Reflection Groups August 2019  
University of Sydney, Australia

Representation Theory VI June 2019  
Inter University Centre Dubrovnik, Croatia

Lie Theory in the Representations of Groups and Related Structures Mar 2019  
AMS Sectional Meeting, University of Hawaii at Manoa, USA

Geometric and Categorical Representation Theory Dec 2018  
MATRIX Research Institute, Creswick, Australia

Australian Mathematical Society Annual Meeting Dec 2018  
The University of Adelaide, Australia

Mentoring and Guidance in Careers (MAGIC) Workshop The Australian National University, Canberra, Australia	Oct 2018
Program on Geometric Representation Theory and Symplectic Varieties University of Notre Dame, South Bend, USA	June 2018
Geometric, Combinatorial and Categorical Methods in Lie Theory University of Georgia, Athens, USA	June 2018
Representation Theory, Geometry, and Quantizations Massachusetts Institute of Technology, Cambridge, USA	May 2018
Connections for Women: Group Representation Theory and Applications Mathematical Sciences Research Institute, Berkeley, USA	Feb 2018
Joint Mathematics Meeting San Diego, USA	Jan 2018
Future Directions in Representation Theory University of Sydney, Australia	Dec 2017
Interactions between Representation Theory and Algebraic Geometry University of Chicago, USA	Aug 2017
Workshop on the Atlas of Lie Groups and Representations University of Utah, Salt Lake City, USA	July 2017
MSRI Summer Graduate School on Soergel Bimodules Berkeley, USA	June 2017
Joint Mathematics Meeting Atlanta, USA	Jan 2017
Mathematics Research Community Workshop on Lie Group Representations, Discretization, and Gelfand Pairs, Snowbird, USA	June 2016
International Conference on Geometric and Categorical Representation Theory, Mooloolaba, Australia	Dec 2015
Universitat Paderborn Summer School on Reductive Groups Frankenakademie, Schloss Schney, Germany	Aug 2015
Park City Math Institute, Geometry of Moduli Spaces and Representation Theory, Midway, USA	July 2015
<b>EXPOSITORY TALKS</b>	
Informal Friday Seminar (University of Sydney)	
• <i>The local Langlands correspondence for <math>SL(2, \mathbb{R})</math></i>	Mar 2019
• <i>Representation theory of <math>SL(2, \mathbb{R})</math></i>	Mar 2019
• <i>The Hitchin fibration and the Springer resolution</i>	Dec 2018
• <i>Unitary representations of real reductive groups (two week mini-series)</i>	Nov 2018

Representation Theory Student Seminar (University of Utah)		
• <i>A Kazhdan-Lusztig algorithm for Whittaker modules</i>		March 2017
• <i>Twisted sheaves on flag varieties - <math>\mathfrak{sl}(2, \mathbb{C})</math> calculations</i>		Nov 2016
• <i>Character theory of Whittaker modules</i>		April 2016
• <i>Cosets in the Weyl group</i>		Feb 2016
• <i>Deriving the Weyl character formula from a basis of Verma modules</i>		Dec 2015
• <i>Composition factors, multiplicity and Grothendieck groups</i>		Sept 2015
• <i>Deriving the Weyl character formula from Kostant's theorem</i>		March 2015
• <i>A proof of the Borel–Weil theorem</i>		Nov 2014
Algebraic Geometry Student Seminar (University of Utah)		
• <i>Algebraic D-modules: A first example</i>		Dec 2016
• <i>Introduction to D-modules</i>		Nov 2015
Hodge Theory and D-Modules Seminar (University of Utah)		
• <i>Holonomic D-Modules: A first detailed example</i>		Oct 2015
<b>OUTREACH TALKS</b>	ACCESS Program for Undergraduate Women in Science	June 2018
	• <i>Four dimensional polytopes</i>	
	Utah Summer Mathematics Program for High School Students	
	• <i>An exploration of the fourth dimension</i>	June 2018
	• <i>Benton's law, Graham's number, and the Euler characteristic of a soccer ball</i>	July 2014
	University of Utah Undergraduate Colloquium	
	• <i>Representation theory and the hydrogen atom</i>	Nov 2017
	• <i>Exploring higher dimensional polytopes</i>	Oct 2016, Oct 2015
	• <i>Platonic solids and the ADE correspondence</i>	Nov 2014
	University of Utah Graduate Colloquium	
• <i>Geometric representation theory: A tale of two islands</i>	April 2017	
• <i>Representation theory and the hydrogen atom</i>	Aug 2016, Oct 2014	
• <i>The ADE classification</i>	Jan 2015	
Utah Teachers' Math Circle		
• <i>Keeping it platonic</i>	Feb 2016	
Science Day at the University of Utah		
• <i>Visualizing four dimensions: Life inside a hypercube</i>	Oct 2015	
What is Math? Day		
• <i>What is symmetry?</i>	Mar 2015	
Association for Women in Mathematics Workshop		
• <i>Symmetry groups and beading</i>	Feb 2015	