

# Anna Macquarie Romanov

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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

**RESEARCH INTERESTS** Geometric representation theory, Lie theory,  $\mathcal{D}$ -modules, Whittaker modules, Kazhdan-Lusztig polynomials, Gelfand pairs, categorification

**PUBLICATIONS AND PREPRINTS** **A. Romanov**, *A Kazhdan-Lusztig algorithm for Whittaker modules*. Dissertation. Available at <http://www.math.utah.edu/~romanova>

H. Friedlander, W. Grodzicki, W. Johnson, G. Ratcliff, **A. Romanov**, B. Strasser, B. Wessel, *An orbit model for the spectra of a class of nilpotent Gelfand pairs*. Submitted. arXiv:1803.09787 [math.RT]

**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. Draft available upon request.

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

Special Section in Representation Theory Dec 2018  
Australian Mathematical Society Annual Meeting, the University of Adelaide

Mathematical Physics Seminar April 2018  
The Perimeter Institute for Theoretical Physics, Waterloo, Canada

University of Toronto Geometric Representation Theory Seminar Mar 2018  
The Fields Institute for Research in Mathematical Sciences: Toronto, Canada

University of Wisconsin-Madison Algebraic Combinatorics Seminar	Jan 2018
University of California Los Angeles Algebra Seminar	Jan 2018
University of Southern California Algebra Seminar	Jan 2018
University of Sydney Algebra Seminar	Dec 2017
University of Georgia Algebra Seminar	Nov 2017
Louisiana State University Algebra and Number Theory Seminar	Nov 2017
University of Utah Representation Theory and Number Theory Seminar	Sept 2017

**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  
*AWM Workshop Poster Competition, Joint Mathematics Meetings 2018*

University of Utah Teaching Fellowship, \$17,000 2017-2018  
*Four graduate students in the math department have received this university fellowship in the past five years.*

Mathematics Department Summer Research Fellowship, \$4,500 2017  
*Four fellowships were awarded in 2017.*

Mathematics Department Nominee, Thomas G. Stockham Medal for Conspicuously Effective Teaching 2017  
*One graduate student from the math department is nominated each academic year.*

2016 Outstanding Professor Award, Sigma Chi Fraternity 2016  
*Approximately five instructors at the University of Utah are awarded each academic year. In 2016 I was the only graduate student recognized.*

NSF Research Training Grant RTG-1246989 Fellowship, \$10,200 2015  
*Approximately four graduate students in the math department receive geometry/topology RTG fellowships each academic year.*

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.*

**CONFERENCES  
AND  
WORKSHOPS**

Lie Theory in the Representations of Groups and Related Structures 2019  
AMS Sectional Meeting, University of Hawaii at Manoa  
*Invited speaker*

Special Section in Representation Theory Australian Mathematical Society Annual Meeting, the University of Adelaide <i>Invited speaker</i>	Dec 2019
Program on Geometric Representation Theory and Symplectic Varieties University of Notre Dame, South Bend, IN <i>Fully funded participant</i>	June 2018
Geometric, Combinatorial and Categorical Methods in Lie Theory University of Georgia, Athens, GA <i>Fully funded participant</i>	June 2018
Representation Theory, Geometry, and Quantizations Massachusetts Institute of Technology, Cambridge, MA <i>Invited fully funded participant</i>	May 2018
Connections for Women: Group Representation Theory and Applications Mathematical Sciences Research Institute, Berkeley, CA <i>Funded participant</i>	Feb 2018
Joint Mathematics Meeting San Diego, CA <i>Poster presenter, funded participant in AWM Workshop, speaker</i>	Jan 2018
Future Directions in Representation Theory University of Sydney <i>Poster presenter, funded participant</i>	Dec 2017
Interactions between Representation Theory and Algebraic Geometry University of Chicago <i>Poster presenter, fully funded participant</i>	Aug 2017
Workshop on the Atlas of Lie Groups and Representations Salt Lake City, Utah <i>Participant</i>	July 2017
MSRI Summer Graduate School on Soergel Bimodules Berkeley, California <i>Fully funded participant</i>	June 2017
Mathematics Research Community Workshop on Lie Group Representations, Discretization, and Gelfand Pairs, Snowbird, Utah <i>Fully funded participant</i>	June 2016
International Conference on Geometric and Categorical Representation Theory, Mooloolaba, Australia <i>Funded participant</i>	Dec 2015
Universitat Paderborn Summer School on Reductive Groups Frankenakademie, Schloss Schney, Germany <i>Funded participant</i>	Aug 2015

Park City Math Institute, Geometry of Moduli Spaces and Representation Theory, Midway, UT July 2015  
*Undergraduate summer school TA, graduate summer school funded participant*

**RESEARCH TALKS**

Representation Theory Student Seminar (University of Utah)

- *A Kazhdan-Lusztig Algorithm for Whittaker Modules* March 2017
- *Twisted Sheaves on Flag Varieties -  $\mathfrak{sl}(2, \mathbb{C})$  calculations* Nov 2016
- *Character Theory of Whittaker Modules* April 2016
- *Cosets in the Weyl Group* Feb 2016
- *Deriving the Weyl Character Formula from a Basis of Verma Modules* Dec 2015
- *Composition Factors, Multiplicity and Grothendieck Groups* Sept 2015
- *Deriving the Weyl Character Formula from Kostant's Theorem* March 2015
- *A Proof of the Borel Weil Theorem* Nov 2014

Algebraic Geometry Student Seminar (University of Utah)

- *Algebraic D-modules: A First Example* Dec 2016
- *Introduction to D-modules* Nov 2015

Hodge Theory and D-Modules Seminar (University of Utah)

- *Holonomic D-Modules: A First Detailed Example* Oct 2015

**TEACHING**

*Undergraduate Research Mentor* 2018  
Funded by the University of Utah Math Department 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 involving implementation of formative assessment interventions intended to increase calculus persistence in the University of Utah engineering calculus sequence. Project includes gathering and analysis of data on student confidence surveys before and after interventions. (*Joint with Heather Z. Brooks.*)

*Graduate Student 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

*TA 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**

*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 Utah Student Chapter* 2016-2017  
Chapter activities included: initiation and funding of a new AWM speaker series, monthly lunch discussions on gender and academia, showing of MSRI film *Navajo Math Circles*, an outreach event at a local science museum, and 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.

**OUTREACH TALKS**

ACCESS Program for Undergraduate Women in Science June 2018  
• *Four Dimensional Polytopes*

Utah Summer Mathematics Program for High School Students  
• *An Exploration of the Fourth Dimension* June 2018  
• *Benton's Law, Graham's Number, and the Euler Characteristic of a Soccer Ball* July 2014

University of Utah Undergraduate Colloquium  
• *Representation Theory and the Hydrogen Atom* Nov 2017  
• *Exploring Higher Dimensional Polytopes* Oct 2016, Oct 2015

- *Platonic Solids and the ADE Correspondence* Nov 2014
- University of Utah Graduate Colloquium
  - *Geometric Representation Theory: A Tale of Two Islands* April 2017
  - *Representation Theory and the Hydrogen Atom* Aug 2016, Oct 2014
  - *The ADE Classification* Jan 2015
- Utah Teachers' Math Circle
  - *Keeping it Platonic* Feb 2016
- Science Day at the University of Utah
  - *Visualizing Four Dimensions: Life Inside a Hypercube* Oct 2015
- What is Math? Day
  - *What is Symmetry?* Mar 2015
- Association for Women in Mathematics Workshop
  - *Symmetry Groups and Beading* Feb 2015