

Anna Macquarie Romanov

School of Mathematics and Statistics
University of New South Wales Sydney, NSW 2052
a.romanov@unsw.edu.au
<https://web.maths.unsw.edu.au/~aromanov>

EMPLOYMENT Lecturer current
University of New South Wales, Sydney, Australia

Postdoctoral Research Associate Nov 2020 - Sept 2021
The University of Sydney, Sydney, Australia

National Science Foundation Postdoctoral Research Fellow Oct 2018 - Oct 2020
The University of Sydney, Sydney, Australia

EDUCATION **University of Utah**, Salt Lake City, UT
PhD, Mathematics, May 2018
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 J. Eberhardt, **A. Romanov**, *Two proofs of a Jantzen conjecture for Whittaker modules*. arXiv:2407.16330 [math.RT]

S. Larson, **A. Romanov**, *A categorification of the Lusztig-Vogan module*. arXiv:2203.09007 [math.RT]

S. Bohun, **A. Romanov**, *An example of the Jantzen filtration of a \mathcal{D} -module*. Journal of the Australian Mathematical Society (to appear). arXiv:2405.06158 [math.RT]

A. Brown, **A. Romanov**, *Contravariant pairings between standard Whittaker modules and Verma modules*. Journal of Algebra, 609:145–179, 2022

A. Romanov, *Four examples of Beilinson–Bernstein localization*. Lie Groups, Number Theory, and Vertex Algebras, Contemporary Mathematics, vol. 768, Amer. Math. Soc., Providence, RI, 2021, 65–85.

A. Romanov, *A Kazhdan-Lusztig algorithm for Whittaker modules*. Algebras and Representation Theory, 24(1), 81–133, 2021.

F. Pearson, **A. Romanov**, D. Soller, *Finite Gelfand pairs and cracking points of the symmetric groups*. Rocky Mountain Journal of Mathematics, 50(5), 1807–1812, 2020.

A. Brown, **A. Romanov**, *Contravariant forms on Whittaker modules*. Proceedings of the American Mathematical Society, 149(1), 37–52, 2020.

A. Romanov, S. Taylor, *A lightning introduction to category \mathcal{O}* . Book chapter, *Introduction to Soergel bimodules*. RSME Springer Series, vol. 5, 2020.

H. Friedlander, W. Grodzicki, W. Johnson, G. Ratcliff, **A. Romanov**, B. Strasser, B. Wessel, *An orbit model for the spectra of nilpotent Gelfand pairs*. Transformation Groups, 25(3), 859-886, 2019.

EXPOSITORY NOTES

A. Romanov, G. Williamson, *Langlands correspondence and Bezrukavnikov's equivalence*. arXiv:2103.02329 [math.RT]

GRANTS

UNSW Faculty of Science Research Grant (AU\$7,500) 2024

Sydney Mathematical Research Institute International Visitor (AU\$19,000) 2023
To support a five month visit by Prof. Dragan Milicic, University of Utah

UNSW Start-up Grant (AU\$20,000) 2021

Australian Mathematical Sciences Institute conference grant (AU\$8,000) 2020

Australian Mathematical Society conference grant (AU\$3500) 2020

Sydney School of Mathematics and Statistics workshop funding (AU\$7,000) 2020

NSF Mathematical Sciences Postdoctoral Research Fellowship (US\$150,000) 2018

FELLOWSHIPS AND AWARDS

UNSW Momentum Award (AU\$5,000) 2024

UNSW Career Advancement Award (AU\$10,000) 2024

Most Outstanding Research Poster, Association for Women in Mathematics research symposium 2018

University of Utah Teaching Fellowship (US\$17,000) 2017-2018

Mathematics Summer Research Fellowship (US\$4,500) 2017

Mathematics Nominee, Thomas G. Stockham Medal for Conspicuously Effective Teaching 2017

2016 Outstanding Professor Award, Sigma Chi Fraternity 2016

NSF Research Training Grant Fellowship (US\$10,200) 2015

Travel Awards

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

Outstanding Graduate Student Award (US\$500) 2014-2015

STUDENT SUPERVISION	Daniel Dunmore, PhD (Primary supervisor) University of New South Wales	June 2024 - Dec 2027
	Thomas Dunmore, PhD (Secondary supervisor) University of New South Wales	June 2024 - Dec 2027
	Victor Zhang, PhD (Primary supervisor) University of New South Wales	Feb 2024 - June 2027
	Tasman Fell, Research Masters (Primary supervisor) University of New South Wales	Feb 2023 - Feb 2025
	Zach Leong, Honours University of New South Wales	Feb 2024 - Dec 2024
	Victor Zhang, Honours University of New South Wales	June 2022 - May 2023
	Simon Bohun, Honours University of New South Wales	June 2022 - May 2023
	Amy Bradford, Undergraduate Research University of Utah/University of Texas at Austin	Aug 2020 - July 2021
	Faith Pearson, Undergraduate Research University of Utah	May 2018 - March 2020
	Dylan Soller, Undergraduate Research University of Utah	May 2018 - March 2020
TEACHING	<i>University Lecturer</i>	2022-present
	Coordinated, designed, and lectured undergraduate and honours courses at UNSW Sydney. Courses taught:	
	<ul style="list-style-type: none"> • T1 2024: Modules and Representation Theory, Math 5735 • T2 2022: Mathematics 1B (linear algebra + probability), Math 1231 • T1 2022: Modules and Representation Theory, Math 5735 	
	<i>Course Designer and Instructor</i>	2017-2018
	Received fellowship to design and implement a new interdisciplinary undergraduate course at the University of Utah in Spring 2018. Course title: <i>Representation Theory Techniques in Quantum Physics</i>	
<i>Co-Principal Investigator, Research Project on Calculus Persistence</i>	2016-2018	
Education research project investigating effects of varied assessment techniques on student persistence in a calculus sequence. (<i>Joint with Heather Zinn Brooks.</i>)		
<i>Instructor of Record</i>	2012-2017	
Taught undergraduate courses at the University of Utah with full responsibility for lectures, assessment, and grades. Courses taught:		
<ul style="list-style-type: none"> • 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
- Fall 2013: Engineering Calculus I, Math 1310 (TA)
- 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.

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

CONFERENCE ORGANIZATION *Diagrammatic Categorification* Oct 2025
 Institute for Computational and Experimental Research in Mathematics (ICERM)
 Rhode Island, USA

Computational Algebra and Magma Dec 2023
 University of Sydney

Special Session in Representation Theory Dec 2022, Dec 2023
 AustMS Annual Meeting, UNSW Sydney

New Connections in Representation Theory Feb 2020
 Mooloolaba, Queensland, Australia

SEMINAR ORGANIZATION *Pure Mathematics Seminar* ongoing
 University of New South Wales

Tensor Categories and their Modules Feb-June 2024
 University of New South Wales/University of Sydney

Mahler Lecture Nov 2022
 University of New South Wales

Informal Friday Seminar 2018-2021
 University of Sydney

Representation Theory Student Seminar 2014-2018
 University of Utah

OUTREACH AND PROFESSIONAL SERVICE *Do the Maths: Women, Empowerment, Opportunity* 2024
 Organised a carnival booth on four dimensional polytopes for UNSW's flagship mathematics outreach event, aimed at young women in their final years of high school.

Frontiers of Science Forum, public lecture 2023
 Presented a public lecture for this annual event run by the Australian Institute of Physics, the Teachers Guild of NSW, the Royal Australian Chemical Society, and the Royal Society of NSW.

Referee work 2019-2023

- Girls do the Maths organizing committee* 2022
Helped with organisation of annual workshop for female students in their final years of high school studies. The aim of the workshop series is to encourage female students to consider mathematics as a career.
- Live from the Lab, interdisciplinary collaboration* 2021
“A celebration of science, music, arts, and culture.” Worked with R&B soul artist Mi-Kaisha to create an original piece of music inspired by my mathematics research.
- IAS Women and Mathematics program organizing committee* 2021
Evaluated applications and selected participants for the annual Women and Mathematics program at the Institute for Advanced Study, Princeton, USA.
- Infinite Pathways Speaker, outreach lecture* 2021
Presented on careers in mathematics in a University of Sydney outreach event aimed at year 9 and 10 students.
- Raising the Bar speaker, public lecture* 2019
Presented a sold-out public lecture (and podcast) as part of a yearly event aimed at bringing science into the broader Sydney community.
- Public radio appearance, ABC Radio Evenings with Chris Bath* 2019
Appeared as a special guest on a public radio show about women in mathematics.
- Bernhard Neumann Prize selection committee* 2018, 2019
Evaluated student talks at the Australian Mathematical Society annual meetings and helped to select the 2018 BH Neumann Prize recipients.
- “Meet and Greet a Scientist” high school outreach event* 2019
Presented to high school students at the University of Sydney’s 2019 International Science School event about research and academic life.
- 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 issues in academia, professor panel, and establishment of a mentorship network.
- 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 issues in 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.

**INVITED
TALKS**

<i>Chair, Graduate Student Recruitment Committee</i>	2014-2015
Coordinated prospective graduate student visiting weekend by scheduling transportation, faculty talks, student interviews, and social activities.	
<i>The generalised Harish-Chandra homomorphism and ghost distributions</i>	
One Tree Island Representation Theory Workshop (Australia)	July 2023
<i>Higher representations of Soergel bimodules arising from real Lie groups</i>	
Categorification in Representation Theory, USyd (Australia)	Feb 2023
<i>A Jantzen filtration of Whittaker modules</i>	
University of Sydney Algebra Seminar (Australia)	Oct 2022
<i>A Soergel bimodule approach to the character theory of real groups</i>	
National University of Singapore (Singapore)	Oct 2022
Representation Theory XVII (Croatia)	Oct 2022
Peking Online International Number Theory (POINT) Seminar (online)	May 2022
The Hendoff, Conference in honour of Anthony Henderson (Australia)	April 2022
Beijing Institute of Technology (online)	April 2022
Chinese University of Hong Kong RANT seminar (online)	Nov 2021
University of Utah Representation Theory Seminar (online)	Oct 2021
<i>What is the Sato-Tate conjecture?</i>	
UNSW Canberra Number Theory Seminar (Australia)	Aug 2022
<i>Bridging two worlds: A tour via examples of Beilinson-Bernstein localization</i>	
University of Adelaide Colloquium (Australia)	May 2022
University of New South Wales Pure Math Seminar (online)	April 2021
University of North Carolina Chapel Hill AWM Lecture Series (online)	Nov 2020
Categorification Seminar (online)	Sept 2020
Macquarie University Department Colloquium (online)	April 2020
<i>Twisted D-modules on the affine flag variety and Whittaker modules</i>	
University of Adelaide Differential Geometry Seminar (Australia)	May 2022
The Mathematics of Conformal Field Theory, ANU (online)	July 2021
American Mathematical Society Spring Western Sectional Meeting (online)	May 2021
<i>Costandard Whittaker modules and contravariant pairings</i>	
University of Oregon Algebra Seminar (online)	Feb 2022
University of Utah Representation Theory Seminar (USA)	Jan 2022
<i>Highest weight structures on Whittaker categories</i>	
Mathematical Congress of the Americas (online)	July 2021
University of Bonn Oberseminar (online)	June 2021
University of Queensland Pure Math Seminar (Australia)	June 2021
<i>Contravariant duality for Whittaker modules</i>	
American Mathematical Society Spring Western Sectional Meeting (online)	May 2021
<i>Kac-Moody groups, affine flag varieties and D-modules (3 part lecture series)</i>	
University of Melbourne Representation Theory Seminar (online)	April-May 2021
<i>A categorification of the Lusztig-Vogan module</i>	
University of Georgia Algebra Seminar (online)	April 2021

Categorification Seminar (online)	Oct 2020
Max Planck/Perimeter Geometric Representation Theory conference (online)	June 2020
<i>What is a Hecke algebra?</i>	
What is ...? Seminar, University of Queensland (online)	April 2021
<i>Jordan-Holder multiplicities of Verma modules with rational highest weight</i>	
University of Melbourne Representation Theory Seminar (online)	Dec 2020
<i>What is the local Langlands correspondence for $GL(2, \mathbb{R})$?</i>	
What is ...? Seminar, University of Queensland (online)	Aug 2020
<i>Representations of representations of $\mathfrak{sl}(2, \mathbb{C})$</i>	
Australian Categories Seminar, Macquarie University (online)	May 2020
<i>Contravariant forms on Whittaker modules</i>	
Australian Mathematical Society Annual Meeting; Melbourne (Australia)	Dec 2019
<i>Whittaker modules and parabolic Kazhdan–Lusztig polynomials</i>	
Sydney Flags, Galleries and Reflection Groups conference (Australia)	Aug 2019
<i>A Kazhdan–Lusztig algorithm for Whittaker modules</i>	
Plenary talk, Representation Theory XVI conference (Croatia)	June 2019
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 (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
<i>Filtrations of Whittaker modules</i>	
AMS Sectional Meeting; University of Hawaii at Manoa (USA)	Mar 2019
<i>Jantzen filtrations</i>	
Workshop on Quantum Symmetries, Australian National University (Australia)	Feb 2019
<i>Twisted Harish-Chandra sheaves and Whittaker modules</i>	
Geometric Representation Theory conference, MATRIX Institute (Australia)	Dec 2018
<i>An orbit model for the spectra of nilpotent Gelfand pairs</i>	
Australian Mathematical Society Annual Meeting; Adelaide (Australia)	Dec 2018
University of Sydney Algebra Seminar (Australia)	Nov 2018
<i>Formative assessment as a mechanism to improve calculus persistence</i>	
Joint Mathematics Meetings; San Diego, CA (USA)	Jan 2018
OUTREACH TALKS	
Girls Do The Maths, UNSW Outreach event	
<i>Searching for Symmetry</i>	June 2022, June 2023

University of New South Wales architecture students <i>4-dimensional polytopes</i>	April 2021
Infinite Pathways, Program for year 9 students <i>Life as a research mathematician</i>	March 2021
Sydney University Mathematics Society <i>The ADE correspondence</i> <i>A glimpse of the fourth dimension</i>	Oct 2020 Aug 2019
ACCESS Program for Undergraduate Women in Science <i>Four dimensional polytopes</i>	June 2018
Utah Summer Mathematics Program for High School Students <i>An exploration of the fourth dimension</i> <i>Benton's law, Graham's number, and the Euler characteristic of a soccer ball</i>	June 2018 July 2014
University of Utah Undergraduate Colloquium <i>Representation theory and the hydrogen atom</i> <i>Exploring higher dimensional polytopes</i> <i>Platonic solids and the ADE correspondence</i>	Nov 2017 Oct 2015 Nov 2014
University of Utah Graduate Colloquium <i>Geometric representation theory: A tale of two islands</i> <i>Representation theory and the hydrogen atom</i> <i>The ADE classification</i>	April 2017 Aug 2016, Oct 2014 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
INTERNAL TALKS	
Tensor Categories and their modules (UNSW Sydney) <i>Basics of monoidal categories</i> <i>Basics of tensor categories</i>	Feb 2024 Feb 2024
Informal Friday Seminar (University of Sydney) <i>Affine Whittaker modules</i> <i>Vogan duality (two-week mini-series)</i> <i>The Lusztig–Vogan module of the Hecke algebra (two week mini-series)</i> <i>The Kazhdan–Lusztig conjectures: history, statement, “proof”</i> <i>Introduction to equivariant cohomology (two week mini-series)</i> <i>Representation theory of $SL(2, \mathbb{R})$ (two week mini-series)</i> <i>The Hitchin fibration and the Springer resolution</i> <i>Unitary representations of real reductive groups (two week mini-series)</i>	March 2021 July/August 2020 Nov 2019 Aug 2019 June 2019 Mar 2019 Dec 2018 Nov 2018

Student Algebra Seminar (University of Sydney)	
<i>The antispherical module of the Hecke algebra and Whittaker modules</i>	April 2020
Representation Theory Student Seminar (University of Utah)	
<i>A Kazhdan-Lusztig algorithm for Whittaker modules</i>	March 2017
<i>Twisted sheaves on flag varieties - $\mathfrak{sl}(2, \mathbb{C})$ 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