

# Robert J. Won

Department of Mathematics · University of Washington

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## Research Interests

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I am interested in noncommutative algebra, particularly noncommutative ring theory, noncommutative projective algebraic geometry, and noncommutative invariant theory.

## Employment

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### University of Washington

Acting Assistant Professor

Seattle, WA

September 2018-present

### Wake Forest University

Teacher-Scholar Postdoctoral Fellow

Winston-Salem, NC

July 2016-June 2018

## Education

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### University of California, San Diego

Ph.D. Mathematics

Advisor: Daniel Rogalski

La Jolla, CA

June 2016

M.A. Pure mathematics

June 2013

### Duke University

B.S. Mathematics, *magna cum laude*

Durham, NC

May 2011

## Publications & Preprints

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10. **Simple  $\mathbb{Z}$ -graded domains of Gelfand-Kirillov dimension two**  
with Luigi Ferraro and Jason Gaddis.  
[arXiv:1905.04327](#).
9. **Three infinite families of reflection Hopf algebras**  
with Luigi Ferraro, Ellen Kirkman, and W. Frank Moore.  
[arXiv:1810.12935](#).
8. **Sidon sets and 2-caps in  $\mathbb{F}_3^n$**   
with Yixuan (Alice) Huang and Michael Tait.  
*Involve, a Journal of Mathematics*. (Accepted).
7. **Fixed rings of group actions on generalized Weyl algebras**  
with Jason Gaddis.  
[arXiv:1808.01207](#).
6. **Auslander's Theorem for permutation actions on noncommutative algebras**  
with Jason Gaddis, Ellen Kirkman, and W. Frank Moore.  
*Proceedings of the American Mathematical Society* 147, no. 5, 1881--1896. (2019).
5. **Discriminants of Taft algebra smash products and applications**  
with Jason Gaddis and Daniel Yee.  
*Algebras and Representation Theory*. (To appear).
4. **The noncommutative schemes of generalized Weyl algebras**  
*Journal of Algebra* 506, 322--349. (2018).

3. **A structure theorem for product sets in extra special groups**  
with Thang Pham, Michael Tait, and Le Anh Vinh.  
*Journal of Number Theory* 184, 461--472. (2018).
2. **The Picard group of the graded module category of a generalized Weyl algebra**  
*Journal of Algebra* 493, 89--134. (2018).
1. **Partitions of  $AG(4,3)$  into maximal caps**  
with Michael Follett, Kyle Kalail, Elizabeth McMahon, and Catherine Pelland.  
*Discrete Mathematics* 337, 1--8. (2014).
0. **The graded module category of a generalized Weyl algebra**  
Ph.D. Thesis, University of California, San Diego. (2016).

## Teaching Experience

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### University of Washington

#### Acting Assistant Professor

- Summer 2019 Introduction to Modern Algebra for Teachers (MATH 412)
- Spring 2019 Matrix Algebra with Applications (MATH 308)
- Winter 2019 Matrix Algebra with Applications (MATH 308, two sections)
- Autumn 2018 Matrix Algebra with Applications (MATH 308)

### Wake Forest University

#### Teacher-Scholar Postdoctoral Fellow

- Spring 2018 Discrete Mathematics (MST 117), Graduate Algebra (MST 722)
- Fall 2017 Linear Algebra (MST 121), Graduate Algebra (MST 721)
- Spring 2017 Elementary Probability and Statistics (MTH 109, two sections)
- Fall 2016 Calculus with Analytic Geometry I (MTH 111, two sections)

### University of California, San Diego

#### Associate Instructor

- Summer 2015 Precalculus (Math 3C)

#### Graduate Teaching Assistant

- 2015-2016 Foundations of Real Analysis I (Math 140A)
- 2014-2015 Graduate Algebra I, II, and III (Math 200A, 200B, and 200C)
- 2013-2014 Mathematical Reasoning (Math 109), Introduction to Analysis I and II (Math 142A and 142B), Multivariable Calculus (Math 20C)
- 2012-2013 Honors Linear Algebra (Math 31AH), Differential Equations (Math 20D), Linear Algebra (Math 20F)
- 2011-2012 Differential Calculus (Math 10A), Integral Calculus (Math 20B)

## Student Mentoring

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### Wake Forest University

- Summer 2018 I advised undergraduate student Yixuan (Alice) Huang, who was awarded a \$4000 Wake Forest Research Fellowship to work with me for the summer. Our paper with Michael Tait, "Sidon sets and 2-caps in  $\mathbf{F}_3^n$ ", will be published in *Involve*.

Fall 2016 I held an informal reading course with four graduate students (Mike Annunziata, Katie Greene, Rebecca Kotsonis, and Rob McConkey) in which we read "On large subsets of  $\mathbf{F}_q^n$  with no three-term arithmetic progression" by Ellenberg and Gijswijt. Rob gave a talk in the Wake Forest Combinatorics Seminar.

## University of California, San Diego

Winter 2015 I co-advised (with Michael Tait) three undergraduate students (Yuhui Jin, Kyle Lee, and Esther Wang) on a project on finite affine geometries and their connections to the card game SET. This was organized through UCSD AWM's Graduate-Undergraduate Learning Program. The students gave a presentation at the end of the quarter.

## Service

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### Departmental

#### Wake Forest University

2017-2018 Graduate committee, Math club/PME committee

2016-2017 Graduate committee, Math club/PME committee

2016, 2017 GRE Math Subject Test review

#### University of California, San Diego

2014-2016 WebWork TA

2012-2016 Graduate Student Association department representative

### Conferences/Seminars Organized

March 2018 AMS Central Sectional Meeting, The Ohio State University

Special Session on Noncommutative Algebra and Noncommutative Algebraic Geometry

2015-2016 Food For Thought Seminar, University of California, San Diego

Spring 2016 GradSWANTAG III, University of California, San Diego

Winter 2016 GradSWANTAG II, University of California, San Diego

Fall 2015 GradSWANTAG I, University of California, San Diego

### Referee Work

Reviewer for *Mathematical Reviews*, *Communications in Algebra*.

## Invited Talks

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1. Colloquium, Portland State University Portland, OR  
**The card game SET, finite affine geometry, and combinatorial number theory** May 2019
2. AMS Central/Western Sectional Meeting, University of Hawaii Honolulu, HI  
**A translation principle for generalized Weyl algebras** March 2019
3. Algebra and Algebraic Geometry Seminar, University of Washington Seattle, WA  
 **$\mathbb{Z}$ -graded noncommutative algebraic geometry** February 2018
4. AMS-MAA Joint Mathematics Meetings San Diego, CA  
**Simple  $\mathbb{Z}$ -graded domains of Gelfand-Kirillov dimension 2** January 2018
5. Colloquium, Miami University Oxford, OH  
 **$\mathbb{Z}$ -graded noncommutative algebraic geometry** November 2017
6. AMS Central Sectional Meeting, University of North Texas Denton, TX  
**Discriminants of Taft algebra smash products and applications** September 2017
7. AMS Western Sectional Meeting, Washington State University Pullman, WA  
**Auslander's Theorem for permutation actions on noncommutative algebras** April 2017

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| 8. AMS Western Sectional Meeting, University of Denver<br><b>The noncommutative schemes of generalized Weyl algebras</b>            | Denver, CO<br>October 2016      |
| 9. AMS Eastern Sectional Meeting, Bowdoin College<br><b>The noncommutative schemes of generalized Weyl algebras</b>                 | Brunswick, ME<br>September 2016 |
| 10. AMS Central Sectional Meeting, Michigan State University<br><b>The category of graded modules of a generalized Weyl algebra</b> | East Lansing, MI<br>March 2015  |

## Other Talks

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|---|-----------------------------------|
| 1. Combinatorics Seminar, Wake Forest University<br><b>SET and <math>AG(4,3)</math></b>   | Winston-Salem, NC<br>October 2016 |
| 2. GradSWANTAG III, University of California, San Diego<br><b>Categories of graded modules: What they are and what you can do with them</b> | La Jolla, CA<br>May 2016          |
| 3. AMS-MAA Joint Mathematics Meetings<br><b>The category of graded modules of a generalized Weyl algebra</b>                                | Seattle, WA<br>January 2016       |
| 4. Algebra Seminar, University of California, San Diego<br><b><math>\mathbb{Z}</math>-graded noncommutative geometry</b>                    | La Jolla, CA<br>November 2015     |
| 5. Graduate Algebraic Geometry Seminar, University of California, San Diego<br><b>What is noncommutative algebraic geometry?</b>            | La Jolla, CA<br>August 2015       |
| 6. Informal Noncommutative Algebra Seminar, University of California, San Diego<br><b>An introduction to Hopf algebras</b>                  | La Jolla, CA<br>June 2015         |
| 7. Food For Thought Seminar, University of California, San Diego<br><b>SET and <math>AG(4,3)</math></b>                                     | La Jolla, CA<br>February 2015     |
| 8. AMS-MAA Joint Mathematics Meetings<br><b>SET and disjoint complete caps in <math>AG(4,3)</math></b>                                      | New Orleans, LA<br>January 2011   |

## Other Publications

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1. **The dynamics of proactive and reactive cognitive control processes in the human brain**  
Appelbaum, L.G., Boehler, C.N., Davis, L.A., **Won, R.J.**, Woldorff, M.G.  
*Journal of Cognitive Neuroscience*. 26(5), 1021-1038. (2014).
2. **Strategic allocation of attention reduces temporally predictable stimulus conflict**  
Appelbaum, L.G., Boehler, C.N., **Won, R.J.**, Davis, L.A., Woldorff, M.G.  
*Journal of Cognitive Neuroscience*. 24(9), 1834-1848. (2012).