

# Nico Courts

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Graduate Student  
University of Washington Department of Mathematics  
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## RESEARCH INTERESTS

I am a student of Prof. Julia Pevtsova studying the representation theory of algebraic groups and other objects using tools from geometry and cohomology theory. Looking forward, I am particularly interested in the study of quantum groups and (non-commutative)  $q$ -deformations of objects in algebraic geometry as well as considering problems related to the geometric Langland's program.

## EDUCATION

**Ph.D.**, Mathematics June 2022 (expected)  
University of Washington, Seattle, WA

**Master of Science**, Mathematics June 2020 (expected)  
University of Washington, Seattle, WA  
*Thesis Topic*: Schur Duality and Strict Polynomial Functors

**Bachelor of Science**, Mathematics May 2016  
*Magna Cum Laude*, Phi Beta Kappa, Dean's List, Departmental Honors  
University of Southern California, Los Angeles, CA

**Budapest Semesters in Mathematics** Fall 2015  
Algebraic Topology, Conjecture & Proof, Cryptography, Differential Geometry  
Budapest, Hungary

**Associate of Science**, Mathematics June 2013  
Key of Knowledge, Dean's list, Honors Program  
Citrus College, Glendora, CA

## RESEARCH EXPERIENCE

### Current Focus

In the recent past, my studies have been focusing on understanding the rational representations of  $GL_n$  as established by Schur in his thesis and later work (and later translated and elucidated by Green). More recently, Friedlander, Suslin, Krause, and others have found equivalent categories that more readily afford monoidal structure in the interest of establishing the monoidicity of the Schur-Weyl functor and examining the interactions between different forms of duality.

My current (short-term) goal is to polish my understanding of how the phenomenon of Schur-Weyl duality presents in the broader context (e.g. in the relationship between  $q$ -Schur algebras and Iwahori-Hecke algebras) while continuing to learn about geometric methods used for answering questions in representation theory.

### Graduate Reading Courses

University of Washington, Seattle, WA

- Group Schemes and Algebraic Groups – Prof. Julia Pevtsova – *Autumn 2018*
- Abelian Categories – Prof. James Zhang – *Spring 2018*
- Representation Theory – Prof. Julia Pevtsova – *Winter/Spring 2017*
- (Simplicial) Cohomology – Prof. Steve Mitchell – *Autumn 2016*

## TEACHING EXPERIENCE

**Graduate Teaching Assistant**  
University of Washington, Seattle, WA

Autumn 2016 – Present

- **As an instructor:**

- Math 124 – Calculus I (Summer 2018)
- Math 308 – Matrix Algebra (Spring 2019)

- **As a teaching assistant:**

- Math 120 – Precalculus (Autumn 2017)
- Math 124 – Calculus I (Winter 2017, Winter 2019)
- Math 125 – Calculus II (Autumn 2016, Spring 2017)
- Math 126 – Calculus III (Summer 2017, Winter 2018, Spring 2018)
- Math 327 – Introductory Real Analysis (Summer 2019)
- Math 381 – Discrete Mathematical Modeling (Autumn 2018)
- Math 403 – Group Theory (Winter 2020)

**Lead Teaching Assistant and Instructor**

Summer 2016

SCS Noonan Scholars (previously South Central Scholars), Los Angeles, CA

- Independently developed and delivered approximately 50 hours of instruction and five exams to gifted university-bound students in calculus 2 and 3.
- Total of 100 contact hours, including daily supervised worksheet sessions.
- Took the initiative to deliver weekly lectures in higher mathematics (number theory, knot theory, differential equations, etc.) along with entry-level problems that allowed students to get a sense of the “flavor” of these fields.

**Various Teaching and Mentorship Positions**

Spring 2012 – Summer 2013

Citrus College, Glendora, CA

- **PAGE Program Tutor** Assisted a licensed teacher in the education of a class of middle school children intended to reinforce the previous year’s learning and to prevent “backsliding”. Personally instructed a small group of students who were prepared to learn more advanced topics in intermediate algebra.
- **SIGMA Mentor** Took on a small group of students each semester utilizing a holistic approach to education – supplementing standard tutoring with more in-depth educational guidance and planning.
- **Math Tutor** Instructed students in the fast-paced Math Success Center where I provided homework help in all math classes through linear algebra and differential equations.

## LEADERSHIP & SERVICE

**Graduate Student Representative**

University of Washington, Seattle

Summer 2019 - Spring 2020

- Planned and organized a variety of events and lectures for the graduate students as well as the department at large.
- Served as an advocate for the graduate students in several capacities.
- Worked on promoting better communication between the students and faculty.
- Empowered students to make changes to the department while promoting respect for the wishes of the faculty and administration.

**Washington Directed Reading Program**

*Co-organizer and mentor*

- Ran the program along with other graduate students in the 2019/2020 year, focusing on procuring funds and encouraging participation of under-represented groups.
- Supervised an undergraduate student in a reading course based around Rebecca Weber's book *Computability Theory* (Autumn 2018).

### **Math Hour Olympiad**

Volunteer Judge  
University of Washington, Seattle  
Spring 2018

### **Math Day**

Volunteer  
University of Washington, Seattle  
2017 and 2018

## **EVENTS ATTENDED**

### **Conference on Lie and Jordan Algebras and their Representations**

Sichuan University  
Chengdu, Sichuan Province, P.R. China  
January 2020

### **Triangulated Categories in Representation Theory and Geometry**

University of Sydney  
Sydney, NSW, Australia  
June 2019

### **MSRI Summer School**

*The Mathematics of Machine Learning*  
University of Washington, Seattle  
July 29 - August 9, 2019

### **ABC Workshop**

*Geometric and Cohomological Methods in Algebra*  
University of Washington, Seattle  
November 11, 2018

### **Joint Mathematical Meetings**

Seattle, WA  
January 2016

## **SKILLS & HOBBIES**

### **Languages:**

- *English* – This is my native language.
- *German* – Ich kann ziemlich gut Deutsch sprechen, lesen, und verstehen!
- *Hungarian* – Csak egy kicsit beszélek magyarul.
- *Programming* – **Go**, **Haskell**, Java, **L<sup>A</sup>T<sub>E</sub>X**, PHP, **Python**, Typescript.

**Computer Skills:** Web/Application Development, Server Administration, Sage, Windows, Linux, FreeBSD.

**Life Skills:** Critical Thinking, Abstract Reasoning, Communication, Objectivity, Empathy.

**Hobbies:** Hiking, Jogging, Rollerskating, Appreciating the Wonders of the PNW.