HAYS WHITLATCH

Teacher, Mentor, Ally, Mathematician.

@ whitlatch@gonzaga.edu   📞 (509) 313-3902   ✉ 213 Bollier Center

📍 Gonzaga University, Spokane, WA   🌐 tinyurl.com/whitlatch

EXPERIENCE

Assistant Professor of Mathematics

Gonzaga University

📅 Month 2019 – Ongoing   📍 Spokane, WA

- Teacher of students (but I also learn from them). All of my classes are taught using interactive methods.
- Undergraduate research mentor. Over the past six semesters I have run a weekly research groups spanning six projects and including 14 students.
- Active faculty member. I strive to be actively engaged in groups and committees that promote the well-being of the extended Gonzaga community.

CURRENT RESEARCH PROJECTS

Matrices over Finite Fields

- Involved in several projects related to finite-field matrices including positive-definite matrices, Cholesky decompositions, characterizations and enumerations. Undergraduate projects is funded by McDonald Work Award.
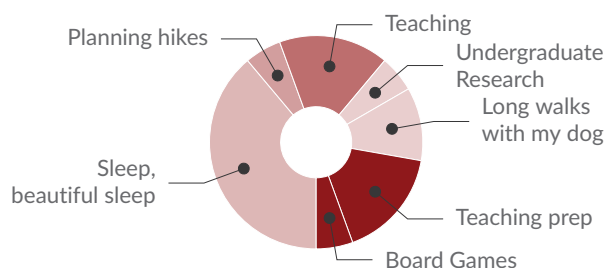
Discrete Phylogenetics

- We use graph theory and linear algebra to study the evolutionary history and relationships among or within groups of organisms. In particular, we use graph pressing sequences to determine characteristics of the most-parsimonious evolutionary paths.

Network Power Domination

- We use graph theory to determine optimal placements of phase measurement units (PMUs) in a power grid. PMUs monitor the grid ensuring that a power disruption is immediately detected and corrected. Undergraduate projects is funded by McDonald Work Award.

A DAY OF MY LIFE

Planning hikes · Teaching · Undergraduate Research · Long walks with my dog · Sleep, beautiful sleep · Teaching prep · Board Games

MY LIFE PHILOSOPHY

"Asking for help is a sign of strength, not weakness."

MOST PROUD OF

❤ **My Students**
for they will change the world

🏆 **Myself**
for making it this far through many road bumps

LANGUAGES

English ●●●●●

Spanish ●●●●●

Python ●◐○○○

Italian ◐○○○○

EDUCATION

Ph.D. Mathematics

University of South Carolina

📅 May 2019

Dissertation title: Successful Pressing Sequences in Simple Pseudo-Graphs
Advisor: Joshua N. Cooper, Ph.D.

M.Sc. Mathematics

Middle Tennessee State University

📅 Math 2014

Thesis title: Isoperimetric Constants in Graphs with Hyperbolic Properties
Advisor: Xiaoya Zha, Ph.D.

B.Sc. Mathematics

University of Iowa

📅 May 2008

Concentration: Actuarial Science

TEACHING EXPERIENCE (*Honors designated)	**Gonzaga University**	Fall 2019 - present

Math 121: Introductory Statistics (Fall 2021*)
Math 157: Calculus I (Fall 2019×2, Fall 2020×2, Spring 2021, Summer 2021)
Math 231: Discrete Structures (Spring 2020)
Math 258: Calculus II (Spring 2020, Summer 2021)
Math 260: Ordinary Differential Equations (Spring 2021)
Math 321: Statistics for Experimentalists (Summer 2020)
Math 339: Linear Algebra (Fall 2021*×2, Spring 2022*×2)
Math 351: Combinatorics and Graph Theory (Fall 2019)
Math 361: Mathematics of Game Shows (Spring 2022*)
Math 457: Number Theory and Cryptography (Fall 2020)
Math 490: Chemical Graph Theory (Fall 2021)
Math 490: Discrete Methods in Genetics (Spring 2020)
Math 490: Graph Theory Applications Research (Fall 2021)
Math 490: Monitoring Power Networks (Spring 2021)
Math 490: Linear Algebra and Sequences (Spring 2022)

University of South Carolina   Fall 2014 - Spring 2019

Math 111: College Mathematics (Spring 2018)
Math 115: Precalculus (Fall 2015, Spring 2016)
Math 122: Applied Calculus (Fall 2016)
Math 141: Calculus I (Summer 2015)
Math 142: Calculus II (Summer 2016)
Math 170: Finite Mathematics (Fall 2018)
Math 374: Discrete Structures (Summer 2017)

Duke Talent Identification Program   Summer 2014

Mathematical Problem Solving

Vanderbilt University Outreach Center   Fall 2013 - Spring 2014

Math Fellow for Nashville Metro Schools

Middle Tennessee State University   Fall 2013, Spring 2014

Math 1010: Math for General Studies

MENTOR EXPERIENCE	**Gonzaga University**

Undergraduate Research Mentor   Spring 2022

Mentored eight undergraduate students in two research projects: Adding combinatorial interpretations to the OEIS, and Counting Cholesky Roots over Finite Fields. Project is supported by McDonald Grant (Gonzaga University)

Gonzaga University

Undergraduate Research Mentor   Fall 2021

Co-mentored (with Dr. Katharine Shultis) four undergraduate students in a research project concerning STEM application to graph theory. Project is supported by McDonald Grant (Gonzaga University)

Undergraduate Research Mentor   Fall 2020 - Summer 2021

Co-mentored (with Dr. Katharine Shultis) four undergraduate students in a research project concerning total Roman domination in Kneser graphs. Project is supported by McDonald Grant (Gonzaga University)

Undergraduate Research Mentor   Spring 2020 - Summer 2020

Mentored one undergraduate students in an investigation project on probabilistic models that can be used to assign haplotypes to DNA windows.

Undergraduate Research Mentor   Fall 2020 - Summer 2021

Co-mentored (with Dr. Katharine Shultis) three undergraduate students in a research project related to solving the Total Roman Domination number of Kneser graphs. Project is supported by McDonald Grant (Gonzaga University)

Undergraduate Research Mentor   Fall 2019 - Summer 2020

Co-mentored (with Dr. Katharine Shultis) three undergraduate students in a research project concerning the probability of successfully monitoring an electric grid of size n by uniformly at random placing m monitors on the grid. Project is supported by McDonald Grant (Gonzaga University)

University of South Carolina

Graduate Teaching Mentor   Fall 2016 - Spring 2018

Mentored four novice instructors each semester (16 total over four semesters) as they transitioned from graduate teaching assistants to graduate student instructors. Conducted monthly observations of the novice instructors and held individual post-observation meetings. Facilitated biweekly group meetings with group of novice instructors. NSF Award Id #1544346 and #1725295

Graduate Research Mentor   Fall 2017 - Spring 2019

Mentored two Master's degree students in their thesis research under the supervision of Dr. Joshua Cooper. Met weekly with students to discuss research progress, brainstorm new strategies, organize findings, create presentations, etc.

PUBLICATIONS

In Print

5. J. Cooper, E. Hanna, H. Whitlatch. "Positive-Definite Matrices over Finite Fields." *Rocky Mountain Journal of Mathematics.* To appear.

4. G. Dorpalen-Barry, C. Hettle, D. Livingston, J. Martin, G. Nasr, J. Vega H. Whitlatch. "A positivity phenomenon in Elser's Gaussian-cluster percolation model" *Journal of Combinatorial Theory - Series A.* **179** (2019), 105364.

3. J. Cooper, P. Gartland, H. Whitlatch. "A New Characterization of $\mathcal{V}$-posets." *Order.* (2019), 1–17.

2. J. Cooper, H. Whitlatch. "Uniquely Pressable Graphs: Characterization, Enumeration, and Recognition," *Advances in Applied Mathematics.* **103** (2019), 13–42.

1. Anderson, Bai, Barrera-Cruz, Czabarka, Da Lozzo, Hobson, Lin, Mohr, Smith, Szekely, Whitlatch. "Analogies between the Crossing Number and the Tangle Crossing Number," *The Electronic Journal of Combinatorics.* **25** (2018), 4.24.

Submitted

2. S. Kniahnitskaya, M. Ortiz, O. Ramirez. K. Shultis, H. Whitlatch. "Counting Power Domination Sets in Complete m-ary Trees." https://arxiv.org/abs/2201.09111

1. H. Whitlatch. "On the Number of Cholesky Roots of the Zero Matrix over F2." https://arxiv.org/abs/2109.06130

In Preparation

1. J. Cooper, E. Hanna, H. Whitlatch. "Uniform Sampling of Symmetric Matrices over Finite Fields by Size and Rank."

SCHOLARLY PRESENTATIONS

Invited Talks

A Positivity Phenomenon in Elser's Gaussian-Cluster Percolation Model Coast Combinatorics Conference University of Victoria, BC, Canada	March 2020
How to Steal All the Hearts and Get Away With It Guest Lecture for Math 360 Gonzaga University, Spokane, WA	February 2020
From Genetics to Graph Theory: Exploring the Origin of Pressing Sequences in Graphs Math Seminar Lafayette College, Easton, PA	October 2018
Pressing Sequences for Mitochondrial Genome Graphs AMS Spring Southeastern Sectional Meeting Vanderbilt University, Nashville, TN	April 2018
Graph Pressing Sequences on Mitochondrial Genomes Carolina Math Seminar The Citadel, Charleston, SC	March 2018
Using Technology in the Classroom University of South Carolina Teaching Seminar Columbia, SC	April 2017
Graduate Student Instructor Mentorship Model AMS Special Session on Teaching Assistant Development Programs: Why and How? Joint Math Meetings, Atlanta, GA	Jan 2017
Isoperimetric Constants in Infinite Planar Graphs Combinatorics and Graph Theory Seminar Vanderbilt University, Nashville, TN	March 2014

Contributed Talks

The Tangle-Crossing Number	November 2017

University of South Carolina Discrete Math Seminar
Columbia, SC

The Mathematics of Gene Editing   September 2017
University of South Carolina Graduate Seminar
Columbia, SC

Uniquely Pressable Graphs   April 2017
University of South Carolina Discrete Math Seminar
Columbia, SC

Mentor Professional Development for
Mathematics Graduate Student Instructors   Feb 2017
SIGMAA on Research in Undergraduate Mathematics Education
San Diego, CA

Isoperimetric Constants in Graphs with Hyperbolic Properties March 2015
Graduate Student Combinatorics Conference
Lexington, KY

<table>
<tr><td>INSTITUTIONAL
SERVICE</td><td colspan="2"><h2>Gonzaga University</h2></td></tr>
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Advisory Board Member, *Honors Advisory Board*	2021 - present
Committee Chair, *Student Research Committee*	2021 - present
Committee Chair, *Online Summer Course Development Committee*	2021 - present
Committee Member, *CAS Curriculum Committee*	2021 - present
Committee Member, *Major Assessment*	2020 - present
Committee Member, *STEM - IDEAS*	2021 - present
Committee Member, *University Benefits committee*	2019 - present
Task Force Section Coordinator, *Equity in Registration*	2021 - present
Tutor, *Math Resource Center*	2019 - present
Volunteer Chair, *Spokane Math Group/Math Colloquium*	2021 - present
Volunteer Member, *Actuarial Club*	2020 - present
Volunteer Member, *Gonzaga Society for Women In Mathematics*	2021 - present
Committee Member, *Applied Mathematics Committee*	2019 - 2020
Committee Member, *Calculus Committee*	2020 - 2021
Committee Member, *Courses for High-School Students*	2020 - 2021
Department Liaison, *Mathematics Association of America*	2019 - 2020
Committee Member, *Mathematics Tenure-Track Hiring Committee*	2019
Organizer, *Mathematics Graduate School Panel*	2019

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<tr><td>GRANTS, AWARDS
AND OTHER HONORS</td><td colspan="2"><h2>Grants Received</h2></td></tr>
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McDonald Work Award, *Gonzaga University* - $4,368$ award	2021-2022
McDonald Work Award, *Gonzaga University* - $4,212$ award	2020-2021
McDonald Work Award, *Gonzaga University* - $1,913$ award	2019-2020

Grants Received

	SPARC Graduate Research Grant,	2018-2019
	University of South Carolina - $5,000 award	
	Teaching Resource Development Grant,	2018-2019
	Center for Teaching Excellence, University of South Carolina - $500 award	

Travel and Workshop Awards

Travel grant for 4-days research visit,	May 2018
University of Minnesota (Minneapolis, MN)	
$450 in addition to housing	
Graduate Research Workshop in Combinatorics,	May 2018
Iowa State University (Ames, IA)	
$400 in addition to meals and housing	
AMS Math Research Community,	July 2017
Beyond Planarity: Crossing Numbers of Graphs (Snowbird, UT)	
$650 in addition to meals and housing	
Peer Excellence Award - Mathematics	2015-2016
University of South Carolina (Columbia, SC)	
Excellence in Teaching Award - Mathematics	2015-2016
University of South Carolina (Columbia, SC)	

CONFERENCE PARTICIPATION (*with full support)	*Nebraska Conference for Undergraduate Women in Mathematics*	2022
	Queer and Trans Mathematicians	2021
	Coast Combinatorics Conference	2021
	Nebraska Conference for Undergraduate Women in Mathematics	2021
	MathFest	2020
	Mastery Grading Conference	2020
	Coast Combinatorics Conference	2020
	*Southeast Center for Math and Biology Annual Symposium**	2019
	*Mini-Conference on Discrete Mathematics and Algorithms - Clemson**	2018
	*AMS Spring Southeastern Sectional Meeting - Vanderbilt**	2018
	Carolina Math Seminar - The Citadel	2018
	*Joint Math Meetings - San Diego, CA**	2018
	*Joint Math Meetings - Atlanta, GA**	2017
	*Atlanta Lecture Series - Georgia Tech**	2017
	*Triangle Lecture Series - UNC Greensboro**	2016
	*Atlanta Lecture Series - Georgia State**	2016
	*Atlanta Lecture Series - Emory**	2016
	*Atlanta Lecture Series - Georgia State**	2015
	*Graduate Student Combinatorics Conference - Kentucky**	2015
	Atlanta Lecture Series - Georgia State	2014

ACADEMIC SERVICE	**Journal Referee,** *Missouri Journal of Mathematical Sciences*	2022 - present
	Journal Referee, *Theory and Applications of Graphs*	2018 - present
	Reviewer, *Cambridge University Press*	2018
	Co-organizer, *High School Math Contest (U of SC)*	2017, 2018
	Coordinator, *U of SC Discrete Math Seminar*	2017-2018
	President, *SIAM Student Chapter (U of SC)*	2017-2018
	Student Representative, *Math Graduate Council (U of SC)*	2017-2018
	Judge, *MAA Undergraduate Student Poster Session (JMM)*	Jan 2018

Volunteer, *Math Research Communities Info Booth (JMM)*	Jan 2018
Presentation Reviewer, *Discover USC (U of SC)*	Apr 2017
Volunteer, *U of SC Recruitment Booth (JMM)*	Jan 2017
Proctor, *High School Math Contest (U of SC)*	Feb 2016

SKILLS AND MEMBERSHIPS

Gonzaga Society for Women in Mathematics, faculty member.
Mathematics Association of America, member.
Foreign Languages: Spanish (native proficiency).
Programming Languages: Maple, SageMath, python.
Sexuality and Gender Equity (SAGE) 1, certification.
Erdös Number $= 2$.