

RUTH VANDERPOOL

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EDUCATION

University of Oregon, Eugene, OR.

- Ph.D. in Mathematics, June 2009.
Thesis: Non-existence of a stable homotopy category for p-complete abelian groups.
Advisor: Hal Sadofsky.
- M.S. in Mathematics, June 2005.

Pacific Lutheran University, Tacoma, WA.

- B.S. in Mathematics, May 2002.
- B.A. in Computer Science, May 2002.
Cum Laude.

ACADEMIC POSITIONS

Associate Teaching Professor, University of Washington, Tacoma.

- September 2020-present.

Senior Lecturer, University of Washington, Tacoma.

- September 2016-September 2020.

Lecturer, University of Washington, Tacoma.

- September 2009-2016.

Instructor, University of Oregon.

- June 2009 - September 2009.

Graduate Teaching Fellow, University of Oregon.

- September 2003 - June 2009.

TEACHING INTERESTS

- Standard undergraduate curriculum: Precalculus, Calculus, Discrete, Geometry, Topology, Linear & Abstract Algebra.
- Special topics: Math Education, Interdisciplinary Arts & Math.

PEDAGOGICAL
INTERESTS &
HIGHLIGHTS

- Developed UWT's Bachelor's in Science Degree in Mathematics.
- High impact practices in math classes:
 - Utilize inclusive teaching techniques.
 - Emphasize applications from the sciences, business, computer engineering, and computer science in all math courses.
 - Develop writing and research projects for upper division courses.
- Technology use in math education:
 - Incorporate appropriate online math applications into most classes.
 - Develop programming labs for Discrete 1.
- Quantitative literacy across the curriculum:
 - Develop liberal arts math course for freshman orientation program.

PAPERS
&GRANTS

Becker B., Cline E., Kmail Z., Sesko A., Than D., Vanderpool R. Contextualized Math Pathways to Increase Equity of Access to STEM Majors at UW Tacoma. 1st revision submitted Jan. 2021 to NSF Improving Undergraduate STEM Education: Education and Human Resources.

Chambers D., Flapan E., Heath D., Lawrence E., Thatcher C., Vanderpool R. (2017). Topological Symmetry Groups of the Petersen Graph. Accepted by Journal of Knot Theory and Its Ramifications. arXiv:1710.02168.

Vanderpool R. (2012). Categorical Properties of p -complete Abelian Groups. *Communications in Algebra* 40, 2949-2961.

UNDERGRADUATE
PROJECTS

Miller S. & Riddle P. Elliptical Curves Implemented in Cryptography.

- Presented at UWT SIAS Science and Math Undergraduate Research Symposium, Summer 2020 & UWT Math Enthusiast Series, Winter 2021.

Price H. & Wilson R. Hilbert's 3rd Problem.

- Presented at UWT SIAS Science and Math Undergraduate Research Symposium, Autumn 2020 & UWT Math Enthusiast Series, Winter 2021.

Jacobsen A. Gerrymandering.

- Presented at PNW MAA Sectional 2018, Math Fest 2018, & UWT Math Enthusiast Series, Winter 2018.
- Submitted "Tracing the Math and the 'Mander'" paper to Pi Mu Epsilon.

Windels R. The Fundamental Group.

- Presented at UWT Math Enthusiast Series, Winter 2017.

SELECTED
PRESENTATIONS

- “A Concrete Example of Incompleteness”, invited speaker to Seattle University Math Department Seminar Nov. 2019, University of Puget Sound Math Department Seminar Sept. 2016 & to Pacific Lutheran University Math Department Seminar, March 2011.
- “Transitions to the University of Washington Tacoma”, PNW MAA Seattle University, April 2018.
- “ $\int 0 \cup \mathbb{N} \partial$ of Music”, Joint speaker at UWT Math Enthusiast Series Oct. 2018, & IAS Seminar with Dr. Card, March 2016.
- “Motivating & Exploring Topological Spaces”, UWT Math (Enthusiast) Series, April 2017.
- “Topological Symmetry Groups meet the Petersen Graph”, invited speaker to Pacific Lutheran University Math Department Seminar, April 2016.
- “Programming Activities that Apply & Motivate Discrete Math”, contributed paper session on Addressing the Needs of Mathematics and Computer Science Majors in Discrete Mathematics Courses at Joint Mathematical Meetings, Seattle, January 2016.
- “Proposed Math Major at UWT”, Special Session at PNW MAA & NUMS, UW Tacoma April 2015.
- “Quantum Bomb Detection”, Invitation to SMPosium, Carleton College July 2014 and to Pacific Lutheran University Seminar, March 2012.
- “Paper Folding $\sqrt[3]{2}$ ”, SMPosium, Carleton College, July 2011.
- “The Answer to Life, the Universe, and Everything (in Math)”, Joint IAS departmental talk at UWT with Dr. Card, June 2011.
- “Visualizing the p -adics”, SMPosium, Carleton College, July 2009.
- Various topics in Topology and Mathematics Education, University of Oregon Math Seminars, 3-4 talks per year, Fall 2003-Summer 2009.
- “Bending & Stretching Space”, California Lutheran University, March 2009
- “Homology functors of chain complexes of p -complete abelian groups”, Joint Mathematical Meeting, Washington D.C. January 2009.
- “The non-existence of a stable homotopy category for p -complete abelian groups.” University of Oregon Topology Seminar, October 2008.
- “Yoga Geometry.” Invited speaker to Pacific Lutheran University Math Department Seminar, September 12, 2007.
- “Deceptively Good Teacher Meets Deceptively Bad Teacher.” Invited speaker to University of Oregon’s Teaching Seminar for first year Math Graduate Teaching Fellows, October 2004.

RELATED
ACADEMIC
EXPERIENCE
& TRAINING

Research Experience for Undergraduate University of Puget Sound 2019-2022. Senior faculty for NSF funded “Spacial Models and Electoral Districting” joint REU with University of Puget Sound. Co PI’s: Dr. Courtney Thatcher & Dr. Jim Thatcher.

Teaching Squares, University of Washington, Tacoma 2018 & 2020. Small groups of faculty visit & observe each others’ classes & then gather to share pedagogical ideas. Organizers: Dr. Heller & Mr. Martens.

Research Experience Undergraduate Faculty, American Institute of Mathematics, San Jose 2018 & Providence 2019. Intensive workshops focused on building math questions and providing practical training for faculty leading undergraduate research projects. Group Lead: Dr. Flapan.

Data Fellows University of Washington, Tacoma 2018. Institutional data access and training during summer. Directed by: Ms. Few.

Strengthening Educational Excellence through Diversity, University of Washington, Tacoma 2017. One week workshop focused on building courses using best practices for an inclusive classroom. Steering Committee: Dr. Aguirre, Dr. Ishem, Dr. McKinley, Dr. Camacho, & Dr. Oswald.

Technology Fellows Institute, University of Washington, Tacoma 2012. Three month workshop developing an online mathematics course using research-based best practices. Program directed by Dr. Colleen Carmean.

Sage: Open-Source MathSoftware with Undergraduates, Mathematical Association of America, online 2012. One month program directed by Dr. Karl-Dieter Crisman & Dr. Dan Drake. Developed programs to support in-class lectures and student driven labs.

CORE Training, University of Washington, Tacoma 2010. Year long process developing a course and updating the Student Learning Objectives and structure of required freshmen courses. Directed by Dr. Ingrid Walker.

Writing Fellows Institute, University of Washington, Tacoma 2010. Reevaluated & restructured writing assignments throughout the year in a guided curriculum development program directed by Dr. Anne Beaufort.

Undergraduate Research, Indiana University Summer 2001. Investigated braid groups and knots under the direction of Dr. Zhenghan Wang with funding from the National Science Foundation.

Summer Mathematics Program, Carlton College Summer 2000. Participated in month long intensive courses on Fuzzy Logic and Homotopy Theory in an all-women environment. Funded by the National Science Foundation.

ACADEMIC
SOFTWARE
EXPERIENCE

Mathematical Software.

- TinkerCad. Supported Geometry 3D printing project: Spring 2019.
- Desmos. Online graphing incorporated in lectures: Winter 2018-present.
- Desmos Test Mode. Free graphing application for student use on exams: Winter 2019-present.
- OverLeaf. Used to teach & assign L^AT_EX materials: Winter 2018-present.
- Sage. Open source mathematics software used during inquiry-based learning activities & for upper-division L^AT_EX lessons: Fall 2012-Fall 2017.
- Geometer's Sketchpad. Used for the Mathematics for Elementary School Teachers class in a weekly lab: Summer 2004.
- Microsoft Excel. Assisted in editing and implementing labs on regression, limits, and derivatives: Winter 2007.

Educational Platforms.

- Canvas. Housed course calendar, content, and communication software, such as discussion boards, Adobe Connect, and Tegrity, for online office hours: Fall 2012-present.
- Catalyst. Used to post grades, run a discussion board, and gather feedback from students: Fall 2009-Spring 2012.
- Blackboard. Used to post grades and gather feedback from students: Fall 2003-Summer 2009.

Online Homework Systems.

- MyMathLab. Used to supplement written homework, to post grades, and to run a discussion board: Fall 2013-present.
- WebAssign. Used to supplement written homework, to post grades, and to run a discussion board: Spring 2008, Fall 2008, Fall 2010-present.
- WebWork. Used to supplement written homework: Fall 2009, Winter 2010, Spring 2010, Summer 2010.

ACADEMIC &
COMMUNITY
SERVICE

**University of Washington Tacoma,
Interdisciplinary Arts & Sciences (IAS).**

- School of IAS representative to Academic Policy and Curriculum Committee: 2018-2019.
- Chair of search of multiple lecturer positions in math: 2018-2019.
- Member of non-mandatory promotion committee: 2019.
- Awarded funding to increase calculator availability: Summer 2016.
- UWT Teaching Forum co-coordinator: Fall 2016-Fall 2017.
- Chair of math major assessment: Spring 2017.
- Calculus coordinator: Fall 2016-Fall 2017.
- Math coordinator: Fall 2014-July 2016.
- Custom math placement & transfer credit: Fall 2013-July 2016, & Summer 2019.
- Analyzed and restructured math placement system: Spring 2015 & Summer 2018.
- Cochair in faculty search committee: Winter 2015.
- Served in faculty search committee: Winter 2016, Winter 2017.
- Analyzed online precalc. & math placement, Spring 2012-Spring 2014.
- Orient new hires & provide peer reviews for select lecturers, ongoing.
- Precalculus course coordinator: Fall 2009-Summer 2014.
- Serve as graduate faculty on Ed. D candidate: Spring 2015.
- Direct independent readings: Fall 2011, Spring 2015, Summer 2015, Spring 2018, Summer 2020, Autumn 2020.
- Mentor in the Student Success Mentoring Program: 2012-2013.
- Member of campus-wide Technology Fellows: Fall 2013-Spring 2013.

Professional Services

- Mathematical Association of America:
-textbook series editorial board Jan 1 2017-Present.
- committee for PNW Sectional joint with Northwest Undergraduate Mathematics Symposium April 2015.
- American Mathematical Monthly Journal: Reviewed articles 2010-2012.

Community Outreach

- Managed the Math (Enthusiast) Series at UWT which was open to and attracted the public: Fall 2016, Winter 2017, Winter 2018.
- Seattle Expanding your Horizons, Seattle University. Ran workshop for middle school girls, 2016.
- Tutor at Peace Community Center, Tacoma, 2016.
- STEM night at Totem Middle School, Kent. Designed and ran an interactive booth, 2014, 2015, 2017.
- Creative Educational Experiences (CEE), Tacoma. Developed and presented courses as academic outreach to high schools, 2010, 2012, 2014.

University of Oregon, Mathematics Department.

- Graduate student interviewer for hiring committee: Spring 2008.
- Course coordinator: Fall 2004, Spring 2005, Fall 2006, Fall 2007.

CONFERENCES
ATTENDED

Unknot IV conference.

- Bothell, WA 2019.

MAA Pacific Northwest Sectional Meeting.

- Seattle, WA 2018, Tacoma, WA 2015 & Portland, OR 2012.

MAA & AMS Joint Meeting.

- Seattle, WA 2016, San Diego, CA 2013, San Francisco, CA 2010, & Washington D.C., 2009.

Next Gen. WA STEM Teacher Prep

- Seattle Pacific University, WA 2018.

Northwest Undergraduate Mathematics Symposium.

- Tacoma, WA 2015 & Tacoma, WA 2013.

Math Fest.

- Portland, OR 2014.

Cascade Topology Seminar.

- Seattle, WA 2006.

AMS Western Sectional Meeting.

- Vancouver, Canada, 2008 & Eugene, OR 2005.

CURRICULUM
DEVELOPMENT

Primary Author:

- Comprehensive Review of Math Placement at UWT, Summer 2018.
- Bachelor of Science in Mathematics, approved 2015.
- Math Major Assessment Plan, Summer 2015.

Proposed and Fully Developed:

- Applied Topology. Differential, knot, or algebraic topology presented with an emphasis on applications in chemistry, physics, or engineering.
- Mathematics Capstone. Introduces career minded themes with speakers & workshops while providing finishing support for the Capstone Project.
- Mathematics Research Seminar. Seminar introducing diverse mathematical topics while developing reading, \LaTeX , and presentation skills.
- Spatial & Geometric Reasoning: Course on geometry & topology with no mathematics prerequisites.
- Origami Math: Interdisciplinary freshmen course on geometry, origami, & scientific thinking.
- Pre-calculus I: Functions: Course to prepare students for calculus.
- Introduction to Abstract Algebra 1. Introductory group theory course with a brief introduction to rings and fields. Offered as Inquiry Based Learning & remote.
- Distance Learning Calculus 1. Online course teaching differential calculus and application.

New Courses Proposed:

- | | |
|---------------------------------|--------------------------|
| • Pre-calculus II: Trigonometry | • History of Mathematics |
| • Abstract Algebra 2 | • Mathematics Internship |
| • Undergraduate Research | |

Significant Course Changes Submitted:

- Matrix Algebra

TEACHING
EXPERIENCE

Additional courses beyond those in the curriculum development section are listed below. Courses that have also been taught in a remote setting are indicated with an asterisk(*).

Geometry. Axiomatic treatment of Euclidean & non-Euclidean geometry.

Discrete Structures. Discrete algebra for computer professionals.

Linear Algebra*. Proof-based course on vector & matrix algebra.

Collaborative Learning Seminar for Precalculus, Calculus 1& 2. Instruct & support student facilitators who run enhanced problem solving sessions.

Calculus 1*, 2, & 3.

- Differential calculus and applications for math and science majors.
- Integral calculus and applications for math and science majors.
- Sequences, series, and multivariable calculus for science majors.

Calculus for Life Sciences 2. Integral calculus with an emphasis on applications to mathematical models used in the life sciences.

Calculus and Its Practical Applications. Differential calculus with an emphasis on applications and models used in business & economics.

Introduction to Statistics. Survey of discrete probability, data analysis, sampling distributions, confidence intervals, and hypothesis testing.

Mathematics for Elementary School Teachers 1, 2, & 3.

- Logical systems and reasoning for future K-8 teachers.
- Number systems structure designed for future K-8 teachers.
- Topics in geometry designed for future K-8 teachers.

Precalculus*. Calculus preparatory course.

Elementary Functions. Exponential, logarithmic, and trigonometric functions.

College Algebra. Primarily focused on function formalism and notation.