WILL HOFFER

WEBSITE: https://willhoffer.com ◇ EMAIL: email@willhoffer.com

EDUCATION

University of California, Riverside *September 2019 - Present*
Masters of Mathematics, June 2021
PhD Doctoral Candidate (Mathematics) Overall GPA: 3.98/4.00
Advisor: Dr. Michel L. Lapidus

The Ohio State University *August 2015 - May 2019*
Bachelors of Science in Mathematics and Physics (*cum laude; with Honors in the Arts & Sciences*)

PROFESSIONAL APPOINTMENTS

Associate Instructor Winter 2022
Mathematics Department *University of California, Riverside*

· I have been the primary instructor for a university mathematics course. See the teaching experience section for more information.

Teaching Fellow Fall 2021
Mathematics Department *University of California, Riverside*

· I help mentor and train new graduate students, in particular those who are new to teaching.

UCR Graduate Division: Graduate Student Mentor Fall 2021 - Present
https://gradmentors.ucr.edu/ *University of California, Riverside*

· I mentor a group of first year graduate students, helping them to adjust and succeed at UCR.

Microtutorials in Mathematics Video Program Spring 2020
https://microtutorials.ucr.edu/ *University of California, Riverside*

· Content creator for UCR's mathematics supplementary instructional videos project

Teaching Assistant September 2019 - Present
Mathematics Department *University of California, Riverside*

· I have been the teaching assistant, additional lecturer, and/or grader for a variety of different courses, and have taught both online and in-person. See the teaching experience section for more information.

Student Instructional Associate August 2016 - Spring 2019
Mathematics Department *The Ohio State University*

· I was a teaching assistant and grader for lower division courses, and I was a tutor for the Mathematics and Statistics Learning Center. See the teaching experience section for more information.

RESEARCH & PUBLICATIONS

Research Interests

· My research interests include resurgence, asymptotic analysis, fractal geometry and the associated theory of complex dimensions, analytic number theory and explicit formulae therein, spectral geometry and inverse spectral problems, functional analysis, and mathematical physics, especially in its overlap with these other topics.

Publications

· W. Hoffer, A. Vengal, and V. Winstein, "The Structure of Biquandle Brackets," *Journal of Knot Theory and its Ramifications*, Vol. 29, Is. 6 (May 2020.) https://doi.org/10.1142/S021821652050042X

AWARDS & HONORS

Research Accolades

· First Place in the Research Poster Competition at James Madison's Shenandoah Undergraduate Mathematics and Statistics Conference (SUMS) Conference (2018), in collaboration with my co-authors Adu Vengal and Vilas Winstein

Academic Accolades

· Phi Beta Kappa Honorary Society Member

GRANTS & FELLOWSHIPS

University of California, Riverside: Department of Mathematics Teaching Fellow (Fall 2021)

INVITED TALKS

American Mathematical Society, Western Sectional Meeting Fall 2021
http://www.ams.org/amsmtgs/2283_abstracts/1172-30-203.pdf

· *On Stokes Phenomena and Geometric Zeta Functions* 10/23/2021

American Mathematical Society, Western Sectional Meeting May 2021
https://www.ams.org/amsmtgs/2282_abstracts/1167-51-151.pdf

· *On resurgent analysis of explicit formulae in fractal geometry* 05/01/2021

Functional Analysis and Mathematical Phyiscs Seminar Decemeber 2020
https://www.fresnostate.edu/csm/math/colloquia-seminars/famp.html *CSU Fresno*

· *From Rainbows to Resurgence: Asymptotics of the Airy Function* 12/11/20

CONFERENCES, WORKSHOPS, & RESEARCH PROGRAMS

American Mathematical Society, Western Sectional Meeting October 2021
http://www.ams.org/amsmtgs/2283_abstracts/1172-30-203.pdf

· I was an invited speaker for the Special Session on Research in Mathematics by Early Career Graduate Students.

Summer Graduate School on Random Conformal Geometry July 2021
Program– The Analysis and Geometry of Random Spaces
https://www.msri.org/summer_schools/922 *Mathematical Sciences Research Institute (MSRI)*

· I was an active participant in a series of lectures and associated problem sessions.
· We covered topics such as Schramm-Loewner evolution (SLE), conformal and quasi-conformal geometry, conformal quantum field theories, etc.

American Mathematical Society, Western Sectional Meeting May 2021
https://www.ams.org/amsmtgs/2282_abstracts/1167-51-151.pdf

· I was an invited speaker for the Special Session on Research in Mathematics by Early Career Graduate Students.

Spring school on asymptotic methods and applications March 2021
Program– Applicable resurgent asymptotics: towards a universal theory
https://www.newton.ac.uk/event/araw01/ *Isaac Newton Institute (INI)*

· I was an active participant in a series of lectures and associated problem sessions.
· We covered resurgence as it appears in many forms, including topics such as saddle-point analysis, WKB semiclassical asymptotics, partial differential equations, and Jean Écalle's general theory.

Southern California Analysis and
Partial Differential Equations Conference November 2019
(SCAPDE) *University of California, San Diego*

· I attended the conference, with talks described here: `https://mathweb.ucsd.edu/~scapde/2019/SCAPDE_2019_TA.pdf`.

American Mathematical Society, Western Sectional Meetings Fall 2019 - Present

· I have been an attendee at many western sectional meetings, held twice a year in the fall and spring (with the exception of the year 2020.) I have listed those in which I was an active speaker separately.

Shenandoah Undergraduate Mathematics and Statistics Conference 10/13/18
http://www.jmu.edu/mathstat/sums/index.shtml *James Madison University*

· My collaborators and I presented our research poster on our work entitled: *Combining Biquandle Knot Invariants*

Young Mathematicians Conference August 2018
https://ymc.math.osu.edu/2018/program.php *Ohio State/National Science Foundation*

· My collaborators and I presented our research in a talk entitled: *Combining Quandle Cohomological and State-Sum Polynomial Knot Invariants*

Denman Research Forum March 2018
https://ugresearch.osu.edu/Pages/Initiatives-%20Denman-%20Accepted%20Abstracts.aspx *Ohio State*

· I presented a research posted entitled: *Invariants for tricolorable knots & links*

Knots & Graphs Program Summer 2017 & Summer 2018
https://people.math.osu.edu/chmutov.1/wor-gr-su18/wor-gr.htm *The Ohio State University*

· I participated in a research program focused on the mathematical theory of knots. As part of the program, I gave a series of talks with my collaborators and produced research that went on to be published in an academic journal.

HOME CAMPUS/DEPARTMENT TALKS

Fractal Research Group and the
Mathematical Physics and Dynamical Systems Seminars 2020-Present
http://www.math.ucr.edu/~frgmpds/seminars.html *University of California, Riverside*

· *A First Introduction to Resurgence, Part I* 4/16/20
· *A First Introduction to Resurgence, Part II* 5/27/20
· *Rainbows Quantum Billiards, and the Birth of Reflections: Stokes Phenomena Exemplified* 10/22/20
· *Rainbows Quantum Billiards, and the Birth of Reflections: Segue into Resurgence* 11/12/20
· *On Zeta Functions and the Stokes Phenomenon* 04/15/21
· *On Heat Content Asymptotics of some Planar Fractals* 11/04/2021
· *On the Stirling Series for the Gamma Function* 02/10/22

· *Borel Summation and Series with Complex Powers* 02/17/22

Analysis Seminar Spring 2022 - Present
https://sites.google.com/ucr.edu/ucranalysisseminar/home *University of California, Riverside*

· *On the Stirling Series for the Gamma Function* 02/10/22

Graduate Student Seminar Winter 2020 - Present
https://ams-at-ucr.github.io/gradsem/ *University of California, Riverside*

· *Keeping up with the Bernoulli's* 01/31/2020
· *Resurgence & Fractals* 01/15/2021
· *On Resurgent Analysis of Explicit Formulae in Fractal Geometry* 04/30/2021
· *This is not the title of this talk* 10/08/21
· *Melting Snowflake Fractals* 11/12/21
· *Sites & Bytes: Website Workshop* 11/19/21
· *Divergence is only the Beginning* 01/14/22

Analytic Number Theory Fall 2021
Mathematics Course Presentation (Math 245) *University of California, Riverside*

· *Explicit Formulae in Number Theory* 12/07/21

Fractal Geometry, Complex Dimensions, & Zeta Functions Fall 2020
Mathematics Course Presentation (Math 260) *University of California, Riverside*

· *Proof of the Pointwise Explicit Formula* 12/17/20

Mathematics of Quantum Mechanics Winter 2020
Mathematics Course Presentation (Math 242) *University of California, Riverside*

· *Deriving the Schrodinger Equation from Feynmann's Path Integral* 03/13/20

Wave Equations and General Relativity Seminar Fall 2021-Spring 2020
Mathematics Seminar *University of California, Riverside*

· *Calculus on Manifolds, Part I* 12/03/2019
· *Calculus on Manifolds, Part II* 1/07/2020
· *Introduction to the Physics of Relativity* 4/13/20
· *The Einstein Equation Cauchy Problem* 05/11/20

Knots & Graphs Program Summer 2017 & Summer 2018
https://people.math.osu.edu/chmutov.1/wor-gr-su18/wor-gr.htm *The Ohio State University*

· *Enhanced Kauffman bracket* 7/7/17
· *Tricoloring number of links* 7/21/17
· *Tricolorings, Keis, and Quandles* 6/25/18
· *Two cocycles of quandles and the state sum invariants* 7/9/18
· *Cohomology, biquandles, and bracket invariants* 7/23/18

Reading Classics Seminar Spring 2017 - Autumn 2018
https://people.math.osu.edu/sinnott.1/ReadingClassics/ *The Ohio State University*

· *Origami & Geometry - Paper Folding and Greek Geometry* 3/28/18
· *Kepler's Laws in Newton's 'Philosophiæ Naturalis Principia Mathematica'* 9/11/18
· *Euler's 'Principia pro motu de sanguinis per arterias determinando'* 10/31/18

What Is...? Seminar 6/14/18
https://math.osu.edu/whatis *The Ohio State University*

· *What is the Yang-Baxter Equation?*

Abstract Algebra, Math 5590H 11/29/18
https://people.math.osu.edu/gautam.42/A18/calendar.html *The Ohio State University*

· *The Stone-von Neumann-Mackey Theorem: Equivalence of Heisenberg Group Representations*

TEACHING EXPERIENCE

Associate Instructor Winter 2022
Mathematics Department *University of California, Riverside*

· I am the primary instructor for a course taught at the university.
· Courses Taught as the Primary Instructor:

- Calculus for Life Sciences *(Size: 100 Students; Format: Hybrid (Online & In-Person))*

Teaching Fellow Fall 2021
Mathematics Department *University of California, Riverside*

· I help mentor and train new graduate students, in particular those who are new to teaching.
· I observed graduate student teaching and provided feedback to the students. At the end of the quarter, I wrote reports on their progress to the department.

Microtutorials in Mathematics Video Program Spring 2020
https://microtutorials.ucr.edu/ *University of California, Riverside*

· I was a content creator for UCR's mathematics supplementary instructional videos project. These instructional videos and materials are used as assignments in mathematics courses.

Teaching Assistant September 2019 - Present
Mathematics Department *University of California, Riverside*

· I have been the teaching assistant, additional lecturer, and/or grader for a variety of different courses, and have taught both online and in-person.
· Upper Division Courses:

- Ordinary and Partial Differential Equations
- Introduction to Chaotic and Complex Dynamical Systems

· Lower Division Courses:

- Introduction to College Mathematics for Business and the Social Sciences
- Precalculus (Study of Elementary Functions, Roots of Polynomials, etc.)
- First Year Calculus
- Calculus for Life Sciences
- Applied Linear Algebra
- Calculus of Several Variables

Student Instructional Associate August 2016 - Spring 2019
Mathematics Department *The Ohio State University*

· I was a teaching assistant and grader for lower division courses, and I was a tutor for the Mathematics and Statistics Learning Center.

· Courses Taught:

- College Algebra
- Trigonometry
- Precalculus

LEADERSHIP, PROFESSIONAL SERVICE, & OUTREACH

Professional Memberships

· American Mathematical Society (AMS) Member — September 2019 - Present
· Spectra: The Association for LGBTQ+ Mathematicians Member — November 2020 - Present

President of UCR's AMS Graduate Student Chapter — September 2021-Present

· I am the lead officer, and I am in charge of running UCR's Graduate Student Seminar.

Mentorship Positions (Volunteer & Employment)

· University of California, Riverside Graduate Student Mentor (Fall 2021 - Present)
· University of California, Riverside Teaching Fellow (Fall 2021)
· Ohio State University Honors & Scholars Program Peer Mentor (August 2016-May 2019)

SOFTWARE PROFICIENCY

Programming Languages

· Proficient: Java/Javascript, Python, C/C++, HTML/CSS/SCSS
· Familiar: Ruby, R, Liquid, Julia

Software Programs/Tools

· Proficient: Mathematica, LaTeX, Git/GitHub, RStudio, VSCode
· Familiar: MatLab