

KRYSTAL TAYLOR

Associate Professor
The Ohio State University
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POSITIONS HELD

Associate Professor <i>Ohio State University</i>	June 2021 -current Columbus, Ohio
Assistant Professor <i>Ohio State University</i>	August 2015 -2021 Columbus, Ohio
Research Fellow <i>Institute Mittag Leffler</i>	November - December, 2017 Stockholm, Sweden
Visiting Scholar <i>ICERM- Brown University</i>	February - March 2016 Providence, Rhode Island
Industrial Postdoc, (host: Fadil Santosa) <i>IMA- University of Minnesota</i>	September 2013 -August 2015 Minneapolis, Minnesota
Research Fellow, (host: Amos Nevo) <i>Technion- Israel Institute of Technology</i>	October 2012 -August 2013 Haifa, Israel

EDUCATION

<i>University of Rochester in New York</i> Ph.D. in Mathematics, (advisor: Alex Iosevich)	Rochester, New York July 2010 - May 2012
<i>University of Missouri at Columbia</i> Studied under direction of Professor Alex Iosevich	Columbia, Missouri August 2007 - May 2010
<i>Saint Louis University</i> Masters in Mathematics	Saint Louis, Missouri May 2007
<i>University of Missouri at Saint Louis</i> Bachelors in Mathematics	Saint Louis, Missouri July 2005

RESEARCH AWARDS & GRANTS

NSF Conference Grant, HAFS2023@OSU, March 2023

AWM-NSF Travel Grant, November 2022

MSRI Sponsored Summer Research Project- PI, July 2019

Simon's Foundation Collaboration Grant , September, 2017- present

NSF Conference Grant, HAFS2017@OSU, February 2017

AWM-NSF Mentoring Travel Grant , Summer 2017

AWM-NSF Travel Grant, June 2012

CONFERENCE & SEMINAR ORGANIZATION

BIRS: 5 day workshop at Banff International Research Station (lead organizer);
On the Interface of Geometric Measure Theory and Harmonic Analysis, (June 2024)

Harmonic Analysis and Fractal sets: HAFS2023@OSU (lead organizer);
Conference website: u.osu.edu/hafs2023/ (March 2023)

AMS Sectional Meeting: Special Session (co-organizer);
On the Interface of Harmonic Analysis and Geometric Measure theory (April, 2023)

Mid-Atlantic Analysis Meeting U Penn October 2021 (co-organizer);

Virtual Mid-Atlantic Analysis Meeting U Penn October 2020 (co-organizer);

Graduate Advising Workshop at OSU 2019 (co-organizer); u.osu.edu/gaw2019/
A workshop dedicated to best practices on advising graduate students

Harmonic Analysis and Fractal sets: HAFS2017@OSU (independent creator and organizer)
Conference website: u.osu.edu/hafs2017/ (February 2017)

Young Mathematicians' Conference at OSU 2019 (co-organizer); ymc.osu.edu/

COMPETITION & PROGRAM ORGANIZATION

OSU Quantathon, a Financial Math Competition (co-organizer);
Workshop website: <https://u.osu.edu/careerprep/osu-quantathon/> (March 2024)

Math to Industry Career-Prep. and Speaker Series at OSU (independent creator and organizer)
u.osu.edu/careerprep/ (September 2017 - present)

Beyond the Classroom: Girls Exploring Math (co-organizer);
Program website: math.osu.edu/beyond-the-classroom-girls-exploring-math (Summer 2018- 2023)

Financial Math Case Competition Sponsored by Deloitte (creator and organizer)
Competition website: u.osu.edu/careerprep/ (October 2018)

ACTIVITIES PROMOTING GRADUATE EDUCATION

Associate Editor of the Notices, in charge of the Early Career Section Editor, 2022- present
 ★ Recruiting authors to write for the column
 ★ Reading and commenting on submissions
 ★ Planning on themes for the year
 ★ Managing deadlines and sending follow-up emails

Professional Development Seminar at Ohio State University Organizer, 2022- present
 ★ Meeting with math. graduate students on a biweekly basis to discuss professional and career advice
 ★ Recruiting faculty to speak with students about their academic career paths

Math to Industry Career Preparation and Speaker Series at OSU Creator & Organizer, 2017- present
 ★ Bring in representatives from industry-leading companies to talk to the students about their careers
 ★ Run professional development and resume workshops with Career Services
 ★ u.osu.edu/careerprep/

RESEARCH

Prescribed projections and efficient coverings by curves in the plane,
(with Alan Chang & Alex McDonald) (arXiv:2310.08776)

Realizing trees of hypergraphs in thin sets
(with Allan Greenleaf & Alex Iosevich) (arXiv:2401.11597)

- Nonempty interior of configuration sets via microlocal partition optimization*
(with Allan Greenleaf & Alex Iosevich) *Math. Z.* 306 (2024), no. 4, Paper No. 66.
- Infinite constant gap length trees in products of thick Cantor sets,*
(with Alex McDonald) (arXiv:2211.10750, to appear in *Proceedings of Royal Society of Edinburgh*)
- Finite Point configurations in Products of Thick Cantor sets & a Robust Nonlinear Newhouse Gap*
(with A. McDonald), (*Math. Proc. Cambridge Philos. Soc.*, 175(2023), no. 2, 285-301.).
- Transversal families of nonlinear projections and generalizations of Favard length*
(with R. Bongers), (*Anal. PDE* 16 (2023), no.1, 279–308.).
- Lattice Points Close to the Heisenberg Spheres*
(with E. Campolongo), *Matematica*, 2 (2023), no. 1, 156–196.
- Dimension and Measure of Sums of Planar sets and Curves*
(with K. Simon), (*Mathematika* 68) (2022), no. 4, 1364–1392.
- Finite Point Configurations and the Regular Value Theorem in a Fractal setting,*
(with Yumeng Ou), (*Indiana Journal of Math.*) 71 (2022), no. 4, 1707–1761.
- Upper and lower bounds on the rate of decay of the Favard curve length for the Cantor four-corner set,*
(with Laura Cladek, B. Davey), (*Indiana Journal of Math*), 71 (2022), no. 3, 1003– 1025.
- A quantitative version of the Besicovitch projection theorem via multiscale analysis,*
(with B. Davey), (*The Journal of Geometric Analysis*) 32 (2022), no. 4, 55 pp.
- On k -point Configurations with Nonempty Interior*
(with Allan Greenleaf, Alex Iosevich), (*Mathematika*) 68 (2022), no. 1, 163-190.
- The Finite Field Distance Problem*
[book review of MR4306670]. *Amer. Math. Monthly* 129 (2022), no. 7, 695–700
- Measure and dimension of sums and products*
Previously: On the Fourier dimension of Sums and Products of Subsets of Euclidean Space
(with K. Hambrook), (*Proceedings of the AMS*) vol. 149 (2021), no. 9, 3765-3780.
- Configuration Sets with Nonempty Interior*
(with Allan Greenleaf, Alex Iosevich), (*The Journal of Geometric Analysis*)
vol. 31 (2021), no. 7, 6662-6680.
- Pinned geometric configurations in Euclidean space and Riemannian Manifolds*
(with A. Iosevich and I. Uriarte-Tuero), (*Mathematics*) (2021), <https://doi.org/10.3390/math9151802>
- Interior of Sums of Planar sets and Curves*
(with K. Simon), *Mathematical Proceedings of the Cambridge Philosophical Society*, 1-30.
vol. 168 (2020), no. 1, 119-148.
- Finite trees inside thin subsets of \mathbb{R}^d ,*
(with A. Iosevich), (*Springer Proc. Math. Stat.*) 291, Springer (2019) 51-56.
- Maximal operators: scales, curvature, and the fractal dimension*
(with A. Iosevich, B. Krause, E. Sawyer, and I. Uriarte-Tuero), (*Anal. Math.*), (2019)
<https://doi.org/10.1007/s10476-018-0307-9>
- Finite chains inside subsets of \mathbb{R}^d*
(with M. Bennett, A. Iosevich), *Analysis and PDE*, vol. 9, no. 3, 597-614, (2016).

Intersections of sets and Fourier analysis

(with S. Eswarathasan, A. Iosevich), Journal d'Analyse Math. vol. 128, issue 1, 159-178, (2016).

The lattice point counting problem on the Heisenberg groups

(with R. Garg, A. Nevo), Ann. Inst. Fourier (Grenoble), 65, no. 5, 2199-2233, (2015).

On the Mattila-Sjölin theorem for distance sets

(with A. Iosevich and M. Mourougolou), Annales Academiae Scientiarum Fennicae Mathematica, Volume 37, 557-562, (2012).

Applications of generalized Radon transforms to problems in harmonic analysis, geometric measure theory, and analytic number theory

Thesis work for Ph.D. in Mathematics, (2012).

Lattice points close to families of surfaces, non-isotropic dilations, and regularity of generalized Radon transforms

(with A. Iosevich), New York Journal of Mathematics, 17, 1-19, (2011).

Fourier integral operators, fractal sets and the regular value theorem

(with S. Eswarathasan, A. Iosevich), Advances in Mathematics, 228, Issue 4, 2385-2402, (2011).

INVITED TALKS, MEETINGS, AND WORKSHOP PARTICIPATION

- December 2024, Invited talk at ICERM workshop on *Harmonic Analysis and Convexity*, Providence, RI
- September 2024, Invited talk in workshop *Geometry of Deterministic and Random Fractals II*, Budapest
- May 2024, Invited talk at the University of Washington Rainwater seminar. Seattle, WA.
- May 2024, Invited talk in *Madison Lectures in Harmonic Analysis Conference*, U. Wisconsin, WI.
- January 2024, Invited talk in JMM Special Session, San Francisco, CA
- December 2023, Invited talk in *Workshop in Analysis*, Georgia Tech, Atlanta, GA.
- April 2023, Invited address in AMS Central Sectional Meeting, Cincinnati, OH.
- April 2023, Invited talk in AMS Central Sectional Meeting, Cincinnati, OH.
- March 2023, Invited talk in AMS SE Sectional Meeting: *Session on Discrete Analysis*, Georgia Tech
- March 2023, Invited talk in AMS SE Sectional Meeting: *Session on Harmonic Analysis*, Georgia Tech
- November 2022, Invited talk at ICERM workshop on *Extremal Problems in Harmonic Analysis*, Providence
- June 2022, Invited talk at Birthday Conference honoring K. Simon, Budapest University, Hungary**
- April 2022, Invited talk *Hausdorff Center for Mathematics & Bonn*, Germany**
- April 2022, Invited Colloquium, Michigan State
- March 2022, Invited talk in AMS Sectional Meeting: *The Interface of Harmonic Analysis and Analytic Number Theory* (Virtual; formerly at Purdue)
- March 2022, Invited talk in AMS Sectional Meeting: *Crossroads in Ergodic Theory, Harmonic Analysis, and Combinatorics* (Virtual; formerly at Tufts)
- February 2022, Invited Colloquium, University of Montana, Missoula
- January 2022, Invited Colloquium, Montana State University, Bozeman
- January 2022, Invited talk in HIM workshop on Harmonic analysis and PDEs, Bonn, Germany
- January 2022, Invited talk at JMM, distance problems session, Seattle, WA.
- December 2021, Invited talk at online CMS 2021 winter meeting, Harmonic Analysis & Fractal Geometry
- October 2021, Invited talk at online Dalhousie University Mathematics Colloquium
- September 2021, Invited talk at Invitations to Mathematics Seminar at the Ohio State University
- June 2021, Invited talk at Virtual AMS Sectional at San Francisco State
- May 2021, Invited talk at online CMS 2021 summer meeting, Harmonic Analysis & PDE session
- April 2021, Invited talk online Ergodic Theory and Dynamical systems sem., University of Vienna, Austria
- March 2021, Invited talk at Virtual Analysis seminar at the University of Indiana, Bloomington
- March 2021, Invited talk at Virtual Analysis Seminar at the University of Bristol, UK
- February 2021, Invited talk at Virtual Analysis Seminar at the University of Wisconsin at Madison
- February 2021, Colloquium on virtual at Missouri State
- November 2020, Invited talk at Virtual Harmonic Analysis Seminar at the University of Edinburgh
- October 2020, Invited talk at Virtual Colloquium Series at Virginia Tech
- May 2020, Invited talk at Amos Nevo's Birthday conference, Technion, Israel (*rescheduled)

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- April 2020, Colloquium, Oregon State University, Oregon (*rescheduled)
 - April 2020, Invited talk at University of Oregon Analysis Seminar, Oregon (*rescheduled)
 - April 2020, Invited talk at Purdue, AMS sectional, West Lafayette, Indiana (*rescheduled)
 - March 2020, Washington University Analysis seminar (virtual)
 - March 2020, Invited talk at CIRM workshop (*rescheduled)
 - September 2019, Invited talk at Mizzou- Analysis at Missouri: a Midwestern Symposium, Missouri
 - April 2019, Invited talk at Kent State, Measure theory seminar, Kent State, Ohio
 - March 2019, Invited talk at the University of Kentucky, Analysis and PDE seminar, Lexington, Kentucky
 - February 2019, Colloquium speaker at Portland State University, Portland, Oregon
 - February 2019, Invited talk at Purdue, Analysis and PDE seminar, West Lafayette, Indiana
 - December 2018, Invited talk at the CMS Winter Meeting, Vancouver, Canada
 - November 2018, Colloquium speaker at the University of Washington at Saint Louis, Missouri
 - October 2018, Invited talk at the fifth annual Midwestern Workshop on Asymptotic Analysis, Indiana
 - October 2018, Invited talk at San Francisco State, AMS meeting, California
 - August 2018, Invited talk at UCLA, California
 - March 2018, Plenary talk at SEAM conference, Georgia Tech.
 - February, 2018, Invited talk at Analysis seminar at University of Michigan
 - November 2017, Invited talk at semester workshop Fractal geometry and Dynamics- Stockholm, Sweden
 - July 2017, Invited talk the MCA 2017- Mathematical Congress of the Americas
 - April 2017, PDE/Analysis seminar at MIT- Massachusetts Institute of Technology
 - Feb 2017, Primary **organizer** of the conference HAFS-Harmonic Analysis and fractal sets, OSU
 - January 2017, Connections for Women in Harmonic Analysis, MSRI
 - December 2016, Invited talk at Analysis seminar at the University of Wisconsin, Madison
 - April 2016, Invited talk in the Analysis seminar at Georgia Tech, Georgia
 - March 2016, Invited talk at the AMS Sectional meeting, Stony Brook, NY
 - March 2016, Invited colloquium talk at CCNY, NY
 - February 2016, Invited talk at ICERM, Brown University
 - Feb-March 2016, Participant at ICERM Semester Program on *Dimension and Dynamics*
 - January 2016, Invited talk at the Ohio State Analysis seminar
 - December 2015, lecture series for graduate students, Invitations to Mathematics at the Ohio State
 - November 2015, lecture for math undergraduates, Radical Pi at the Ohio State
 - November 2015 Invited talk at the Ohio State TGDA seminar
 - September 2015, Invited talk at the Ohio State Welcome Seminar
 - May 2015 Participant at AIM at the workshop *Carleson theorems and multilinear operators*
 - May 2015 Participant at IMA at the workshop *Women in Analysis and PDE*
 - March 2015 Invited talk at the University of Rochester combinatorics seminar
 - March 2015 Invited talk at the University of Colorado
 - November 2014 Invited talk at the University of Washington Rainwater seminar
 - October 2014 Invited talk at ICERM's Workshop in Discrepancy Theory at Brown University
 - October 2014 Invited talk at the University of Madison analysis seminar
 - September 2014 Invited talk at Microsoft
 - September 2014 Invited talk at the University of British Columbia harmonic analysis seminar
 - September 2014 Invited talk at Michigan State University analysis, PDE, and Math. Physics
 - July 2014 Workshop, Environmental Data Analytics, NCAR, Boulder, Colorado
 - April 2014 Invited talk at the IMA postdoc seminar, Minneapolis, Minnesota
 - April 2014 Invited talk at the University of Minnesota P.D.E. seminar
 - February 2014 Invited talk at The Workshop on Operator Theory at Ort-Braude College, Karmiel, Israel
 - November 2013 Invited talk at University of Rochester analysis seminar, Rochester, New York
 - November 2013 Invited talk at the SLU analysis seminar, Saint Louis University, Missouri
 - June 2013 Workshop, Ergodic Theory with Connections to Arithmetic, Heraklion, Greece
 - March 2013 Invited talk at Bar-Ilan analysis seminar at Bar-Ilan University, Tel-Aviv, Israel

- November 2012 Technion, Israel Institute of Technology non-linear analysis seminar, Haifa, Israel
- September 2012 Invited talk at University of Wisconsin, Madison analysis seminar

*some events and invited talks were rescheduled due to the pandemic. Those that were moved online are indicated as such.

TEACHING EXPERIENCE, MENTORING OUTREACH, AND AWARDS

Courses taught, Department of Mathematics, The Ohio State University

- * *Topics in Real Analysis (8210)* (Fall 2020, Fall 2023).
- * *Graduate Real Analysis II (6212)* (Spring 2023).
- * *Intro. to Analysis (4547)* (Fall 2021, Spring 2023).
- * *Honors Advanced Calculus (4181H)* (Fall 2021, Fall 2023).
- * *Graduate Real Analysis I & II (6211, 6212)* (Fall 2018, Spring 2019).
- * *Foundations of Mathematics (3345)* (Spring 2018, 2020, 2021).
- * *Real Analysis I & II (5201, 5202)* (Fall 2016, Spring 2016).
- * *Graduate Real Analysis I (6211)* (Fall 2015).
- * *Honors Analysis (4181H)* (Fall 2019 (sub.)).

Student Dissertations & Theses Advised

Department of Mathematics, The Ohio State University

- * Samantha Sandberg, PhD candidate, (expected date of graduation: Spring 2026)
- * Natalie Patten, graduate student, (expected date of graduation: Spring 2028)
- * Yan Xuan (Research Distinction, Bachelors, 2024)
- * Elizabeth Campolongo (PhD, 2022)

Ross Program instructor and mentor

Summer 2016, 2018, 2019

Department of Mathematics, The Ohio State University

Prestigious math program for international high school students

- * Leading regular number theory problem sessions with groups of 25.

Postdoctoral Mentor on NSF funded Research Experience for Undergrads. Summer 2014

SmarTrac cell phone analytics group

IMA, University of Minnesota

- * Leading group discussions on research progress and creative problem-solving approaches.
- * Utilizing R statistical software for reading and analyzing data.
- * Mentoring students in finding and reading published academic articles.

Graduate Teaching Instructor/Assistant

2010- 2012

Department of Mathematics, University Rochester

Rochester, New York

- * Lecturing and Grading *Graduate Graph Theory* (Spring 2010).
- * Lecturing and Grading *Graduate Real Analysis* (Fall 2010, Fall 2011).