

# Matthew Kowalski

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## Education

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### University of California, Los Angeles

Los Angeles, California

**Ph.D.** Mathematics

August 2021 - Present

**M.A.** Mathematics

August 2021 - December 2022

- Focused areas of study: dispersive PDEs, completely integrable systems, and harmonic analysis

### Michigan State University

East Lansing, Michigan

**B.S.** Advanced Mathematics

August 2017 - May 2021

**B.S.** Physics

August 2017 - May 2021

**B.S.** Computational Mathematics

August 2017 - May 2021

- Minor in Computer Science, Honors College, graduated with high honors

## Research Positions

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### Graduate Student Researcher

University of California, Los Angeles

Under supervision of Monica Viřan and Rowan Killip

Spring 2023 - Present

- Focus: dispersive partial differential equations, completely integrable systems, and harmonic analysis  
Currently investigating dispersive decay for a variety of dispersive models.

### Professorial Assistant

Michigan State University

Under supervision of Tyce DeYoung, with the IceCube Neutrino Observatory

Fall 2017 - Spring 2021

- Focus: experimental particle astrophysics, computational simulation  
Created a simulation of photons scattering within ice. Goal was to correct approximations used in IceCube's detector model.

## Publications/Preprints

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### A note on dispersive decay for the energy-critical nonlinear wave equation

(in preparation)

Matthew Kowalski

exp. Nov 2024

*Abstract.* We prove pointwise-in-time dispersive decay for solutions to the energy-critical nonlinear wave equation in  $d = 3$ .

### Dispersive decay for the energy-critical nonlinear Schrödinger equation

arXiv:2411.01466

Matthew Kowalski

2024

*Abstract.* We prove pointwise-in-time dispersive decay for solutions to the energy-critical nonlinear Schrödinger equation in  $d = 3, 4$ .

### Turbulent threshold for continuum Calogero-Moser models

James Hogan, Matthew Kowalski

2024

*Pure and Applied Analysis, Vol. 6, No. 4, 2024*

## Selected Presentations

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### Dispersive decay for the energy-critical nonlinear Schrödinger equation

Institute of Applied Physics and Computational Mathematics (invited)

July 2024

Poster Session - International Congress of Basic Science, Beijing

July 2024

Student Section - UC Berkeley Nonlinear PDEs Summer School

June 2024

Student Section - Erwin Schrödinger Institute program on Nonlinear Waves and Relativity

May 2024

Caltech Analysis and PDE Seminar (invited)

May 2024

UCLA Participating Analysis Seminar

May 2024

### Turbulent threshold and dispersive decay for continuum Calogero-Moser models

Special Session on Nonlinear Hamiltonian PDEs - 2024 Spring Eastern Sectional Meeting (invited)

April 2024

### Continuum Calogero-Moser models

UCLA Participating Analysis Seminar + Advancement to Candidacy

February 2024

## Mentoring and Service

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### Lead Instructor

UCLA Olga Radko Endowed Math Circle

September 2024 - Present

Once a week, led a class of high school students through advanced mathematics topics.

### Departmental Reading Program Mentor

University of California - Los Angeles

January 2024 - Present

- Shawn Mosharaf, *Quantum computing and error correction*
- Shawn Mosharaf, *Ehrenpreis's fundamental principle for systems of linear PDEs with constant coefficients*
- Bradyn Klein, *Quantum computing and Shor's algorithm*
- Shawn Mosharaf, *Fourier analysis and split-step methods for cubic NLS*

Fall 2024

Spring 2024

Spring 2024

Winter 2024

### Departmental Reading Program Co-organizer

University of California - Los Angeles

September 2024 - Present

Helped to organize the departmental reading program, match participants to mentors, and schedule the colloquium.

### First-Year Graduate Student Mentor

University of California - Los Angeles

September 2024 - Present

Mentored an incoming graduate student.

### Guest Judge for Annual Science Fair

Portola Highly Gifted Magnet Program

January 2024 (upcoming)

## Teaching

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### University of California - Los Angeles

Teaching Fellow

September 2021 - Present

- Analysis — Math 131A
- Calculus of Several Variables — Math 32A
- Linear Algebra — Math 115A
- Differential Equations — Math 33B
- Ordinary Differential Equations — Math 135
- Linear and Nonlinear Systems of Differential Equations — Math 134
- Differential and Integral Calculus, Integration and Infinite Series — Math 31AB
- Calculus of Several Variables — Math 32B
- Complex Analysis for Applications — Math 132

Fall '24

Fall '24

Spring '24, Fall '23, Spring '23

Spring '24, Winter '23, Spring '22

Winter '24

Fall '23

Spring '23, Fall '22, Fall '21

Winter '23, Winter '22

Fall '22, Summer '22

### Michigan State University

Undergraduate Learning Assistant

August 2017 - May 2019

- Physics for Scientists and Engineers II — Physics 184
- Introductory Physics I/II — Physics 231/232C

Spring '19

Spring '18, Fall '17

## Honors and Awards

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July 2024 **Outstanding Poster Award**, International Congress of Basic Science

BIMSA

June 2022 **Summer Mentored Research Fellowship**,

UCLA

May 2021 **Board of Trustees Award**,

MSU

April 2020 **Dr. Marshall and Barbara Hestenes Endowed Scholarship Award**,

MSU