# Jake Mirra, Ph.D.

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## Education

**Ph.D. in Mathematics**                    **September 2012 – June 2018**

**University of Pittsburgh, Main**

Thesis title: *Hölder Continuous Mappings into Sub-Riemannian Manifolds (2018).*
Specialized in geometric analysis and sub-Riemannian geometry.

**Teaching Experience:**

- Primary instructor for Differential Equations and Linear Algebra courses for 4 semesters

- Teaching Assistant for 6 semesters, providing classroom instruction and assessment

- Developed comprehensive course materials and innovative teaching methodologies

- Received consistently positive student evaluations for clarity of instruction

**Research Publications:**

- Published research in the field of geometric analysis in peer-reviewed journals

- Presented research findings at departmental seminars and conferences

- Collaborated with faculty on research projects in sub-Riemannian geometry

**B.S. in Mathematics**                    **September 2011 – September 2012**

**University of Pittsburgh, Main**

Minor in Computer Science, completed accelerated program with honors.

## Employment History

**Curriculum Developer**                                        **2018**

**Dulwich College International via Redhat**

- Developed comprehensive late middle school honors mathematics curriculum

- Applied pedagogical expertise to create engaging and challenging course materials

- Designed curriculum to foster critical thinking and mathematical reasoning skills

- Incorporated modern educational approaches to enhance student learning outcomes

**Lecturer and Teaching Assistant**                    **September 2012 – June 2018**

**University of Pittsburgh, Department of Mathematics**

- Taught Differential Equations and Linear Algebra lectures as primary instructor for 4 semesters

- Served as Teaching Assistant for 6 semesters, teaching students and grading assignments

- Developed course materials and assessment strategies to enhance student learning

- Provided individualized support to students during office hours

- Collaborated with faculty on course development and improvement

**Graduate Student** <span style="float:right">**September 2012 – June 2018**</span>

    **University of Pittsburgh, Department of Mathematics**

- Conducted research in geometric analysis and sub-Riemannian geometry

- Accumulated over 3,000 hours of tutoring experience across diverse mathematical subjects

- Innovated in Differential Equations and Linear Algebra lectures, publishing YouTube content and Mathematica-based labs

- Enabled students to progress further through theory and applications than in traditionally-taught undergraduate classes

- Received outstanding student testimonials for innovative teaching methods

**Senior Software Engineer** <span style="float:right">**March 2022 – September 2024**</span>

    **Ender, Austin**

- Mentored and grew the development team, fostering a collaborative learning environment

- Applied analytical and problem-solving skills from mathematical background to complex technical challenges

- Developed leadership experience through cross-functional collaboration and team management

**Software Engineer** <span style="float:right">**July 2019 – March 2022**</span>

    **Ender, Austin**

- Founding engineer at a property management software company

- Applied mathematical and analytical thinking to software architecture and development

## Skills

- **Programming Languages:** Python, JavaScript, TypeScript, SQL, C++, Java

- **Frameworks & Libraries:** React, Node.js, Django, Flask, TensorFlow, PyTorch

- **Tools & Technologies:** Git, Docker, AWS, GCP, CI/CD, Kubernetes

- **Mathematics:** Geometric Analysis, Sub-Riemannian Geometry, Differential Equations, Linear Algebra

- **Teaching:** Curriculum Development, Instructional Design, Assessment Creation, Student Mentoring

## Publications

- Mirra, J. (2018). *Hölder Continuous Mappings into Sub-Riemannian Manifolds.* Ph.D. Thesis, University of Pittsburgh.

- Hajłasz, P. & Mirra, J. (2013). "The Lusin Theorem and Horizontal Graphs in the Heisenberg Group." *Analysis and Geometry in Metric Spaces*, 1, 295-301.

## Interests

- Classical piano, chess, tutoring

# Testimonials

- "I liked being able to use Mathematica for simple integrals and other computations that seemed too hard for paper and pencil. It seemed as though I was able to complete problems of a higher complexity that I wouldn't have even attempted without the program. (Differential Equations student)"

- "I enjoy the more modern and practical approach of utilizing software for the computations. It allowed me to clearly see the linear algebra concepts and not be distracted by tedious computation. (Linear Algebra student)"