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

Mathematics Tutor **September 2012 – June 2018**

Self-employed, Pittsburgh

- Accumulated over 3,000 hours of tutoring experience across diverse mathematical subjects
- Taught students ranging from pre-algebra to graduate-level mathematics
- Built a successful tutoring business with dozens of regular students
- Developed personalized teaching approaches based on individual student needs
- Gained valuable insights into effective teaching methodologies and common educational gaps

Senior Software Engineer **March 2022 – September 2024**

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 **July 2019 – March 2022**

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
- **Languages:** English (Native), Spanish (Intermediate)

Publications

- Mirra, J. (2018). *Hölder Continuous Mappings into Sub-Riemannian Manifolds.* Ph.D. Thesis, University of Pittsburgh.
- Mirra, J. (2017). "On the Regularity of Hölder Continuous Mappings in Sub-Riemannian Geometry." *Journal of Geometric Analysis.*
- Mirra, J. & Smith, A. (2016). "Approximation Properties of Sub-Riemannian Manifolds." *Differential Geometry and its Applications.*

Miscellaneous

- **Professional Memberships:** American Mathematical Society, Mathematical Association of America
- **Conferences:** Attended and presented at various mathematics and computer science conferences
- **Volunteer Work:** Mathematics tutor for underprivileged students, STEM education advocate
- **Interests:** Rock climbing, hiking, chess, piano