AIDAN LORENZ

(215) 837-6589 ⦿ [aidanlorenz@gmail.com](mailto:aidanlorenz@gmail.com) ⦿ [linkedin.com/in/aidan-lorenz](http://www.linkedin.com/in/aidan-lorenz) ⦿ [github.com/aidanlorenz](https://github.com/aidanlorenz) ⦿ [aidanlorenz.github.io](file:///Users/aidanlorenz/Documents/Info/Resume/aidanlorenz.github.io)

**TECHNICAL SKILLS**

**Languages:** Python, R, SQL, Java ⦿ **Additional Software:** Git, PyTorch, scikit-learn, NumPy, pandas, Anaconda, RStudio, Matlab, LaTeX, Mathematica

**EDUCATION**

**PhD in Mathematics***, Vanderbilt University* (3.94 GPA) 2019 – May 2024 (Expected)

Dissertation topics: Geometric group theory, low dimensional topology.

Selected courses: Mathematical Data Science ⦿ Data Structures ⦿ Database Management Systems ⦿ Machine Learning ⦿ Optimization

**Master’s in Mathematics***, Vanderbilt University* 2023

**Honors Bachelor of Science**, Mathematics & Physics, Certificate in Programming, *Temple University* 2015 – 2019

Awards: Sholomskas Award for Outstanding Students (Mathematics) ⦿ Robert A. Figlin Family Research Award ⦿ Most Promising Mathematics Major Award ⦿ President’s (full tuition merit) Scholarship ⦿ Science Scholars Program ⦿ Magna Cum Laude ⦿ Phi Beta Kappa ⦿ Dean’s List

**DATA SCIENCE EXPERIENCE**

**Independent Project, Generative AI in Robotics**

*In Progress* December 2023 – Present

* Experimenting with methods of incorporating generative AI (variational autoencoders in PyTorch) to improve upon current standards of sampling-based motion planning in robotics.

**Participant, Data Science Bootcamp** September – December 2023

*Erdős Institute*

* Developed a beer recommendation system with a group of 4 using matrix factorization optimizing across 3 different loss functions.
* Won “with distinction” honors in project competition.
* Completed comprehensive semester-long course on Machine Learning techniques.

**Participant, Math to Industry Bootcamp** June – July 2023

*University of Minnesota, Institute for Mathematics and its Applications*

* Collaborated with a group of 7 at Pacific Northwest National Laboratory on research style projects assessing robustness of generative AI deep learning models (Meta’s Segment Anything Model, GPT-2, Bloom, Pythia, and other large language models).
* Utilized semantic text embedding algorithms (via Hugging Face) as well as standard computer vision and natural language processing metrics in our assessment.

**RESEARCH EXPERIENCE**

**Doctoral Mathematics Researcher** 2019 – Present

*Vanderbilt University, Department of Mathematics*

* Built package integrating Python, Sage, Regina, and Mathematica to work with small dilatation pseudo-Anosov homeomorphisms using Veering triangulations to detect provable results.
* Solved open problems related to dynamics and symmetries of surfaces.
* Attended 7 conferences and delivered 11 invited academic talks developing both technical and non-technical communication skills.

**Undergraduate Research Assistant, Mathematics** 2017 – 2019

*Temple & Cornell Universities, Departments of Mathematics*

* Designed programs in Python and GAP to carry out group-theoretic computations leading to 2 publications.
* Won Honorable Mention at the Undergraduate Research Symposium Poster Session.

**LEADERSHIP EXPERIENCE**

**Instructor of Record** 2020 – December 2023

*Vanderbilt University, Department of Mathematics*

* Taught as Instructor of Record for 3 courses including Statistics Lab in R and served as TA for 5 calculus courses.
* Won the B.F. Bryant Prize for Excellence in Teaching based on exemplary student reviews: across all years, reviews were 11% better than the math department average and 6% better than the College of Arts and Science average.
* Earned optional Certificate in College Teaching.

**PUBLICATIONS** *\*Authors listed in alphabetical order*

* [What are GT-shadows?](https://arxiv.org/abs/2008.00066), *Vasily Dolgushev, Khanh Le, Aidan Lorenz*, **Algebraic & Geometric Topology (2023)**
* [On the replacement property for PSL(2,p)](https://arxiv.org/abs/1908.06511)*, David Cueto Noval, Aidan Lorenz, Baran Zadeoglu,* **Communications in Algebra (2021)**