Daniel Alejandro Santiago-Alvarez

(+1) 787-908-0590 | dsantiagoalvarez@math.harvard.edu | dasantiag.github.io

EDUCATION

Harvard University   Cambridge, MA
PhD in Pure Mathematics   *Expected June 2029*

Massachusetts Institute of Technology   Cambridge, MA
Bachelor of Science in Pure Mathematics   *Expected June 2024*

RESEARCH EXPERIENCE

MIT Summer Program for Undergraduate Research   June 2023 – August 2023
                                                                                                                        Cambridge, MA

- Worked with graduate student Michael Law and undergraduate Isaac Lopez on a project generalizing the Positive Mass Theorem.

SMALL REU at Williams College   June 2022 – August 2022
                                                                                                                        Williamstown, MA

- Researched knotoids and links in handlebodies in the Knot Theory group at SMALL under Professor Colin Adams.

MIT Undergraduate Research Opportunities Program   September 2021 – June 2022
                                                                                                                        Cambridge, MA

- Studied explicit examples of cusp formation in the Plebanski-Demianski family of Einstein Metrics with Professor Tristan Ozuch and undergraduate Carlos Alvarado.

Research in Factorization Theory   August 2019-May 2020
                                                                                                                        Mayagüez, PR

- Worked with Professor Reyes M. Ortiz at the University of Puerto Rico
  on research in τ_n-factorizations over the integers.

PUBLICATIONS AND PRE-PRINTS

1. Adams, C., Bonat, A., Chande, M., Chen, J., Jiang, M., Romrell, Z., Santiago, D., Shapiro, B. and Woodruff, D., 2022. Hyperbolic Knotoids. European Journal of Mathematics, 10, 43.

2. Adams, C., Bonat, A., Chande, M., Chen, J., Jiang, M., Romrell, Z., Santiago, D., Shapiro, B. and Woodruff, D., 2022. Generalised knotoids. Mathematical Proceedings of the Cambridge Philosophical Society

3. Alvarado, C.A., Ozuch, T. and Santiago, D. , 2022. Families of degenerating Poincaré-Einstein metrics on $\mathbb{R}^4$. Annals of Global Analysis and Geometry, 65, 5.

4. Adams, C., and Santiago, D., 2023. Composition Properties of Hyperbolic Links in Handlebodies. New York Journal of Mathematics, 29, 1097-116.

5. Law, M., Lopez, I., and Santiago, D. Positive mass and Dirac operators on weighted manifolds and smooth metric measure spaces. Journal of Geometry and Physics, 209, 105386.

AWARDS

- Hartley Rogers Jr. Prize for best paper in the 2023 MIT Summer Program for Undergraduate Research. Received with Michael Law and Isaac Lopez.

Work and Reading Experience

Grader   February 2022 -May 2022
Cambridge,MA

- Worked as a grader for the Introduction to Topology Class (18.901) at MIT

MIT Mathematics Directed Reading Program   January 2022, January 2023
Cambridge,MA

- Read *Topics in Heat Equations* under the supervision of Julius Baldauf.
- Read Lawson and Michelson's *Spin Geometry* under the supervision of Natalia Pacheco-Tallaj.

MIT Undergraduate Research Opportunities Program   July 2021- August 2021
Cambridge,MA

- Read about Riemannian metrics with constant Gauss curvature in dimension 2 with Professor Tristan Ozuch.

Expository Papers

1. The Spherical Bernstein Problem in S^3. Final Paper for the Seminar in Geometry course at MIT.

Conference Presentations

1. Pi Mu Epsilon poster presenter at 2023 Joint Mathematics Meetings. Presented on the projects *Hyperbolic Knotoids* and *Generalized Knotoids and Knotoidal Graphs*.

Community & Leadership

Staff Member in MIT Undergraduate Math Association   2020-2021, September 2022-Present
Cambridge, MA

- Worked as Committee Head of the Diversity, Equity, Inclusion and Outreach Committee
  of the Undergraduate Math Association. Helped organize events and plan activities of the Association.

Technical Skills

Languages: Bilingual (English and Spanish)
Computer Skills: LaTeX, Wolfram Language, Python