

Manuel Santana

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EDUCATION

PhD. Applied and Computational Mathematics June 2027 (expected)
California Institute of Technology, Pasadena California

B.S. Computational Mathematics, Computer Science Minor May 2022
Utah State University, Logan, Utah 3.90 Cum. GPA

Research Experience

Undergraduate Researcher August 2021 – May 2022
Utah State University, Logan, Utah

- Currently using sparse regression to discover governing equations of dynamical systems and partial differential equations with biological applications.

Research Experience for Undergraduates May 2021 - July 2021
Emory University, Atlanta, Georgia, Virtual

- Studied CT image reconstruction using numerical linear algebra and optimization techniques.

Research Experience for Undergraduates May 2020 - July 2020
Michigan State University, East Lansing, Michigan, Virtual

- Studied the Parabolic Optimal Transport Equation via numerical analysis methods.

Undergraduate Researcher March 2020 – March 2021
Utah State University, Logan, Utah

- Studied directed graph labelings and their applications using quasi-groups.

Research Articles

Published:

Brauer A, Krawick M, and **Santana M.** 2020. Numerical Analysis of the 1-D Parabolic Optimal Transport Problem, *SIAM SIURO*, Vol 14:150-166, 2021

Beasley L, Brown D, Mousley J, and **Santana M.** (In press) Cordiality of Digraphs. *Journal of Algebra, Combinatorics, Discrete Structures, and Applications* arXiv:2110.08706

Huynh M, **Santana M.** 2021. Alternating Minimization for Computed Tomography with Unknown Geometry Parameters, *SIAM SIURO, Vol 15:62-76*, 2022 DOI:10.1137/21S1441638

Submitted:

Beasley L, Brown D, Mousley J, and **Santana M.** 2020. (2,3) Cordial Paths and Trees, arXiv:2012.10591 Submitted to *Proceedings of the 49th Southeastern Conference on Combinatorics, Graph Theory, and Computing*.

Beasley L, Brown D, Mousley J, and **Santana M.** 2020. (2,3) Cordial Oriented Hypercubes, arXiv 2012.11091. Submitted to *Proceedings of the 49th Southeastern Conference on Combinatorics, Graph Theory, and Computing*. .

Research Presentations

Huynh M, **Santana M.** Alternating Minimization for Computed Tomography. Lightning talk at: 2022 Georgia Scientific Computing Symposium, 2022 February 19, Atlanta Georgia

Huynh M, **Santana M.** Point of Care Tomographic Imaging. Poster Presented at: Goldwater Symposium, 2021, August 7, Virtual.

Castillo A, Huynh M, **Santana M.** Point of Care Tomographic Imaging. Poster Presented at: Emory REU/RET in Data Science Poster Session, 2021 July 28; Atlanta Georgia. Virtual.

Santana M. (2,3) Cordial Paths and Trees. Paper presented at: Southeastern International Conference on Combinatorics, Graph Theory, and Computing; 2021, March 11. Boca Raton, Florida. Virtual.

Mousley J, **Santana M.** (2,3) Cordial Digraphs Paper Presented at: Utah Conference on Undergraduate Research; 2021, Feb 29, Provo. Virtual.

Mousley J, **Santana M.** (2,3) Cordial Digraphs Paper Presented at: Fall Undergraduate Research Symposium; 2020, Dec 10, Logan Utah. Virtual.

Brauer A, Krawick M, **Santana M.** Numerical Analysis of the 1-D Parabolic Optimal Transport Problem. Paper Presented at: Shenandoah Undergraduate Mathematics and Statistics Conference; 2020 December 5, Harrisonburg, Virginia. Virtual.

Santana M. (2,3) Cordial Digraphs. Paper presented at: Rapid Fire Research; 2020, Nov 6. San Marcos, Texas. Virtual.

Santana M. Numerical Analysis of the 1-D Parabolic Optimal Transport Problem. Paper presented at: Gulf Coast Undergraduate Research Symposium; 2020 October 31; Houston Texas, Virtual.

Brauer A, Krawick M, **Santana M.** Numerical Analysis of the 1-D Parabolic Optimal Transport Problem. Paper Presented at: Summer Undergraduate Michigan Mathematics Conference; 2020 July 10; Deerborn, Michigan. Virtual.

Technical Skills

- Python including Numpy, Pandas, Seaborn, and Scikit Learn
- Java
- Matlab including parallel computing toolbox, optimization toolbox, and image processing toolbox.
- Julia
- C/C++ including OpenMP, MPI, and CUDA
- Git
- Latex

Teaching Experience

Linear Algebra Recitation Leader

August 2020 – August 2021

Utah State University, Logan, Utah

- Teach four recitations for an introductory Linear Algebra course weekly.
- Assist students in office hours with understanding course material.

Tutor AP Calculus

August 2020 - December 2020

- I remotely tutored one student in AP Calculus AB and helped to understand homework questions and prepare for tests.

Numerade Remote Internship

January 2020 – April 2020

Numerade, Los Angeles, California, Virtual

- Assisted in the creation of online material study material for Calculus 1 and College Algebra.

Awards

Goldwater Scholar

March 2021

NSF Graduate Research Fellowship Program Fellow

April 2022

Undergraduate Researcher of the Year - College of Science, Utah State University

2021

Undergraduate Researcher of the Year - Math Department, Utah State University

2021

Hispanic Scholarship Fund Scholar

May 2020

Utah State University Presidential Scholar

August 2016

Clubs and Organizations

Utah State Science Council – Undergraduate Research VP

August 2021 – Current

- Promoted undergraduate research on campus by organizing a research presentation competition, and an REU application workshop night.

College of Science Peer Mentorship Program - Mentor

August 2021 – Current

- Met weekly with a freshman student to offer help with knowing what classes to take, developing good study habits, and obtaining a research position.

Emory REU Activities Committee

May 2021 – July 2021

- Planned weekly social activities for the REU.

Member, Latter-day Saint Student Association

August 2019 – May 2021

- Helped to plan and hold interfaith and diversity promoting events on campus.

Student Access Nutrition Center - Recruitment VP

August 2019 – Jan 2020

- Organized events to recruit new members to help prepare and distribute food to food insecure students.

Participant, Collegiate Handball Nationals

August 2016 – May 2017