Andrew Ortegaray

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Education

California Institute of Technology (Caltech) — Pasadena, CA
Bachelor of Science in Mathematics and Physics; GPA: 3.63 — *Sep. 2016 – June 2020*

Experience

Wolfram Research — Online
Symbolic Algorithms Research Intern — *Aug. 2020 – Aug. 2021*

- Researched and implemented recursive and iterative FFT-style algorithms for computing Number Theoretic Transforms with the goal of fast convolution computations. Implemented Fast Multipole algorithms for fast evaluations of scalar potentials.

California Institute of Technology — Pasadena, CA
Teaching Assistant — *Mar. 2018 – Dec. 2019*

- Ph 1ab/Ph 2c: The yearlong introductory physics courses at Caltech. Graded student papers, typeset new solutions, and assisted students with course topics.
- Ma 0: The introduction to proofs course at Caltech. Held weekly office hours and graded student assignment on topics including the Peano axioms and complex numbers.
- Ma 5a: The introductory abstract algebra course at Caltech. Graded student papers, typeset new solutions, and assisted students with course topics.

Tutoring — Various Locations
STEM Tutor — *Dec. 2016 – Present*

- Provided tutoring services for students across the US in courses ranging from Algebra 1, to Multi-Variable Calculus, to Bayesian Statistics, etc.

Projects

Wolfram Summer School (WSS) — Online
Student — *June 2020 – Aug. 2020*

- WSS is a project-based program that provides formal training in the Wolfram Language. Developed a notebook that computed Persistent Homology of the Vietoris-Rips complex of point cloud data. See papers below.

Summer Undergraduate Research Fellowship (SURF) — Pasadena, CA
Research Fellow — *June 2016 – June 2017*

- SURF is a Summer research program by Caltech. Participated in research analyzing linguistic data in a geometric setting. See papers below.

Selected Papers

- Heat Kernel Analysis of Syntactic Structures (with R. Berwick and M. Marcolli), *Mathematics in Computer Science*, Vol. 15 (2021), 643–660
- Phylogenetics of Indo-European Language Families via an Algebro-Geometric Analysis of Their Syntactic Structures (with K. Shu, R. Berwick, and M Marcolli), *Mathematics in Computer Science*, Vol. 15 (2021), 803-857
- `Wolfram Community |` "[WSS20] Persistent Homology"