Juan F. Atehortúa

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EDUCATION

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

MEng in Computer Science
May 2025 | Cambridge, MA
GPA: 5.0 / 5.0

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

BS in Mathematics, AI + Decision Making
May 2025 | Cambridge, MA
GPA: 4.6 / 5.0

COURSEWORK

GRADUATE

Schur/Schubert Polynomials
ML for Inverse Graphics
Computer Vision
Robotic Manipulation
Interactive Data Visualization
Algebraic Number Theory
Natural Language Processing
Theory of Computation
Computational Geometry

UNDERGRADUATE

Algebraic Combinatorics
Seminar in Topology (Braid Groups)
Abstract Algebra (I & II)
Intro. to Topology
Design and Analysis of Algorithms
Mathematical Prin. of Machine Learning
Real Analysis
Computer Systems
Algorithms & Data Structures
Linear Algebra
Multivariate Calculus
Probability & Statistics

SKILLS

PROGRAMMING

Java • C • Python • TypeScript • Julia • C++ • MATLAB • LaTeX

FRAMEWORKS

PyTorch • Keras • CGAL • Drake • WebAssembly • Three.js • NumPy • Boost • Bazel • Angular • React • Abseil

AWARDS

2023 USFCA All-Academic Team
2021 Colby DataFest Honorable Mention
2020 QNM Scholar

EXPERIENCE

NVIDIA | SWE Intern - Autonomous Vehicles

May 2024 - Aug. 2024 | Santa Clara, CA

- Implemented and ablated multiple spatial indexing data structures as a back-end for a lightweight BEV representation of the road elements around ego.

GOOGLE | SWE Intern - Project Starline

May 2023 - Sept. 2023 | Seattle, WA

- Collaborated and coordinated with multiple teams within Project Starline to implement a real-time head tracking and pose prediction visualization web app using the Three.js framework.
- Integrated WebAssembly into the web app to leverage existing C++ code and libraries.

GOOGLE | STEP Intern - LearnX YouTube

May 2022 - Aug. 2022 | New York, NY

- Created Quiz Posts in YouTube, a project designed to facilitate interactions between learning creators and their audiences.
- Designed robust testing, maintained code health, used internal Learning API's, worked cross-functionally with YouTube PMs, Engineers, and UX Leads.

RESEARCH

ROBOT LOCOMOTION GROUP @ MIT | UROP Researcher

Sept 2024 - Curr. | Cambridge, MA

Optimizing path planning using graphs of convex sets via efficient convex decomposition of configuration spaces. (Supervisor: Alexandre Amice, PI: Prof. Russ Tedrake)

- Experimenting leveraging facial reduction as preprocessing for graph of convex sets optimization.
- Improving on existing methods using maximal cliques of points sampled in configuration space to generate a convex decomposition.

GDP GROUP @ MIT | UROP Researcher

Sept 2022 - May 2023 | Cambridge, MA

Improved random Fourier sampling for better neural network training on low-dimensional domains. (Supervisor: Dr. Paul Zhang, PI: Prof. Justin Solomon)

- Implemented testing environment in PyTorch with novel techniques in low-dimensional domain training such as SAPE and SIREN.
- Researched improvements in the way positional arguments are encoded into frequency space via an initial Fourier transform layer.

SUMMER GEOMETRY INSTITUTE @ MIT | Research Fellow

July 2021 – Aug 2021 | Cambridge, MA

Used geometry processing techniques (differential geometry, optimization methods, numerical methods, etc.) applied to a myriad of projects presented by leaders in the field for me and other fellows from around the globe to work on.

- Extended, generalized, and improved an algorithm for the generation of higher-order triangle meshes that perfectly discretizes a curved 2D domain without geometric error. (Mentor: Prof. Marcel Campen, Peer: Foqia Shahid)
- Implemented Schrödinger bridges with anisotropy over arbitrary triangle meshes for optimal transport between two density functions over the mesh. (Mentor: Prof. Justin Solomon, Peers: Jonathan Mousley and Faria Huq)