Erick Jimenez Berumen

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Research Interest

My primary academic interests lie in Geometry Processing and Computer Graphics. I am particularly interested in Discrete Differential Geometry and its applications to previously mentioned fields.

EDUCATION

California Institute of Technology   Pasadena, California
Applied and Computational Mathematics   GPA: 3.6/4.0
Expected Graduation: Spring 2023

Research Experience

Caltech Summer Undergraduate Research Fellowship   Planned for Summer 2022
Research Fellow
- Computing Tri-Partitions and Bases of an Ordered Complex (mentored by Peter Schröder)
    - Implement the novel algorithm developed by Edelsbrunner and Ölsböck (2021) for computing tri-partitions of an ordered complex.
    - Generalizes the idea tree-cotree decomposition by Eppstein (2002)

MIT Summer Geometry Institute   Summer 2021
Research Fellow
- Singularity-Free Frame Fields on Pixel Domains (mentored by Mikhail Bessmeltsev and Edward Chien)
    - Adapted Trivial Connections on Discrete surfaces (Keenan Crane et al.) to pixel domains.
    - Continuing work on this project to this date
- Joints For Elastic Strips (mentored by Christian Hafner)
    - Developed a UI in Matlab for generating stiffness profiles for elastic strips that bend to form spline curves.
- Subdivision Surface Fitting (mentored by Paul Zhang)
    - Applied a novel method to generate coarse meshes whose subdivision surface approximate a dense target mesh.

CODING EXPERIENCE

Matlab (Advanced), C++ (Proficient), Python (Proficient), Mathematica (Proficient)

Relevant Coursework

CS 171: Introduction to Computer Graphics   Fall 2021
Grade: B+
- Created a 3D model renderer in C++ using OpenGL
- Implemented computer algorithms for Shading, Texturing, and Animating 3D models
- Wrote a script for Ray Tracing superquadric surfaces
- Implemented Implicit Fairing on surfaces (Desbrun et. al), a hallmark paper of Computer Graphics, written here at Caltech

CS/ACM 177: Discrete Differential Geometry   Winter 2021-2022
Grade: A (Expected)
- Implementated several DDG concepts in Javascript through geometry-processing-js by the Geometry Collective

ACM 11: Introduction to Matlab and Mathematica   Spring 2019
Grade: A+
- Utilized Matlab and Mathematica to complete three mathematical visualization projects.

Awards

Questbridge National College Match Scholarship Recipient   Fall 2019 - Spring 2023
- Full scholarship given to low-income students to increase under-represented attendance at selective colleges.
- 1 out of only 6 students matched to Caltech in 2019.