Zoë Marschner

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Education

Massachusetts Institute of Technology, Cambridge, MA — 2019–Expected 2023

Anticipated BS in Computer Science & Engineering (Course 6-3) and Mathematics (Course 18)

Ithaca High School, Ithaca, NY — 2015-2019

Regents Diploma with Advanced Designation in Math and Science, GPA: 4.23/4.33

Cornell University, Ithaca, NY — Fall 2017

Took Object Oriented Programming and Data Structures class during high school

Research

Intersections of Higher-Order Patches using SOS Relaxation — Spring 2020–Current

MIT Geometric Data Processing Group — *Mentored by David Palmer, Paul Zhang, and Justin Solomon*

In this currently ongoing work, we apply sum-of-squares relaxation to many problems involving higher-order patch elements, including finding self-intersections, intersections between patches, and the time of first collision between two patches. SOS relaxation allows us to solve these problems precisely, which has the potential to open up the possibility of using higher-order patches across a wide variety of applications from surface parameterization to cloth simulation.

Hexahedral Mesh Repair via Sum-of-Squares Relaxation — Winter–Spring 2020

MIT Geometric Data Processing Group — *Mentored by David Palmer, Paul Zhang, and Justin Solomon*

We introduce the machinery of SOS relaxation to the field of geometry processing by applying it to the problem of evaluating the validity of hexahedral elements, thus providing a method to robustly evaluate the quality of an element of a hex mesh. We also present an iterative method to repair an invalid hex mesh that results in a certifiably valid mesh.

Publication: Marschner, Z., Palmer, D., Zhang, P. and Solomon, J. (2020), "Hexahedral Mesh Repair via Sum-of-Squares Relaxation". *Computer Graphics Forum*, 39: 133-147. doi:10.1111/cgf.14074.

Experience

Salesforce, Software Engineering Intern — Summer 2020

- Worked on real-time analytics tool for Salesforce Philanthropy Cloud, a platform which enables companies to incentivise donations and volunteering

Women in Computing at Cornell, iOS App Development — 2017–2019

- Designed and built an iOS app to help WICC organize their events

Involvement

HackMIT 2019–2020

- Member of Dev committee of organizing team for HackMIT 2019, Blueprint 2020, and HackMIT 2020
- Designed and coded software used by over 1,000 people, including creating 3D graphics for the virtual world developed for HackMIT 2020

MIT Battlecode 2019

- Member of Tech team for Battlecode 2020, MIT's AI-based programming competition

Ithaca High School/Cornell University Math Seminar 2018–2019

- Implemented results from knot theory computationally with mentoring from a Cornell grad student
- Created a Python program to create a smooth mesh of the Seifert Surface of a user-inputted knot

Ithaca Sciencenter 2018–2019

- Volunteered at science museum teaching kids about science concepts

Honors

Anna Pogosyants UROP Award 2020
Cornell University Department of Computer Science Award 2019
Hans Bethe Prize in Physics (awarded by Cornell University) 2019
1st Place in Cornell Girls High School Programming Contest 2019
RIT Computing Medal 2018