Jake Ammons

About

I work at Formlabs as a software engineer on Fuse, our SLS 3D printer. Over the last five years, I have contributed to printer firmware, factory calibration software, print process optimization, and my largest focus, our print generation pipeline.

I currently specialize in polygon geometry processing and laser path planning.

Before Formlabs, I studied computer science and computer engineering at Clemson University where I focused on robotics research.

Experience

Formlabs, Research and Development

> **Print Pipeline Software Technical Lead**, PreForm
>
> *August 2021 - Present*
>
> - Shipped new laser path planning methods resulting in an average 25% print time reduction
> - Shipped new method for preserving model geometry with small details
> - Shipped method of compensating for lag in the Fuse 1+ laser-galvonometer control system
> - Designed and tested full electrical and software stack for next generation 3D printer prototype
> - Designed and tested circuit board and firmware for new thermal process control method

> **Print Process Intern**, Fuse
>
> *May - August 2021*
>
> - Optimized heating and powder handling routines to reduce print time

- Tested thermal sensor candidate for new 3D printer prototype

Clemson University, Department of Electrical and Computer Engineering

Graduate Research Assistant

May 2020 - May 2021

- Designed and published novel method for 3D printing concrete with a cable driven rubber hose
- Designed and tested novel method for automating the movement of a kitchen faucet hose

Undergraduate Research Assistant

August 2019 - May 2020

Formlabs, Research and Development

Embedded Software Intern, Fuse

May - August 2019

- Contributed to circuit board firmware and bring up for Fuse 1
- Tested various methods of automated print failure detection for Fuse 1
- Developed automated methods for calibrating motion axis home positions during machine assembly
- Developed and tested motion planning software on new prototype hardware

Walt Disney Imagineering, Animatronics

Robotic Animation Software Intern

January - May 2019

- Designed testbed for integration testing of animatronics and safety systems

Projects

KinoCalendar.com

2026 - Present

- Built a website that aggregates every movie showtime in a city into one UI
- Wrote Python scrapers to collect and normalize showtimes across individual theater sites
- Built an account system, watchlists, and weekly email notifications, all on a serverless architecture

Publications

3D Printing of Concrete with a Continuum Robot Hose Using Variable Curvature Kinematics

IEEE International Conference on Robotics and Automation

May 2022

Abstract: We present a novel application of continuum robots acting as concrete hoses to support 3D printing of cementitious materials. An industrial concrete hose was fitted with a cable harness and remotely actuated via tendons. The resulting continuum hose robot exhibited non constant curvature. In order to account for this, a new geometric approach to modeling variable curvature inverse kinematics using Euler curves is introduced herein. The new closed form model does not impose any additional computational cost compared to the constant curvature model and results in a marked improvement in the observed performance. Experiments involving 3D printing with cementitious mortar using a continuum hose robot were also conducted.

Education

Clemson University, College of Engineering Computer and Applied Sciences

BS, Computer Science

May 2020

Activities: Research Assistant, Teaching Assistant, ASME Student Design Competition, IEEE Hardware Competition

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