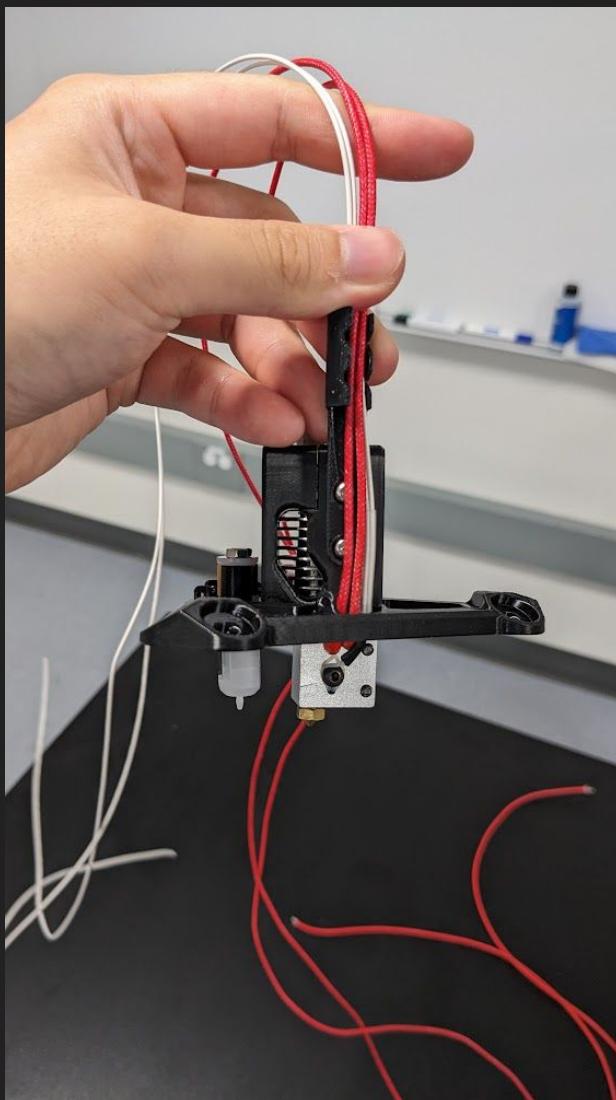


Custom Delta 3D Printer

May 2023 - Present

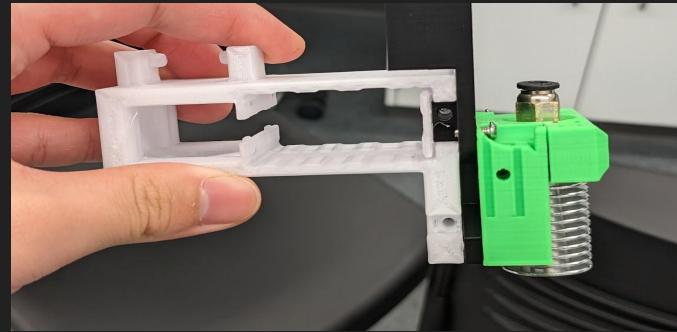
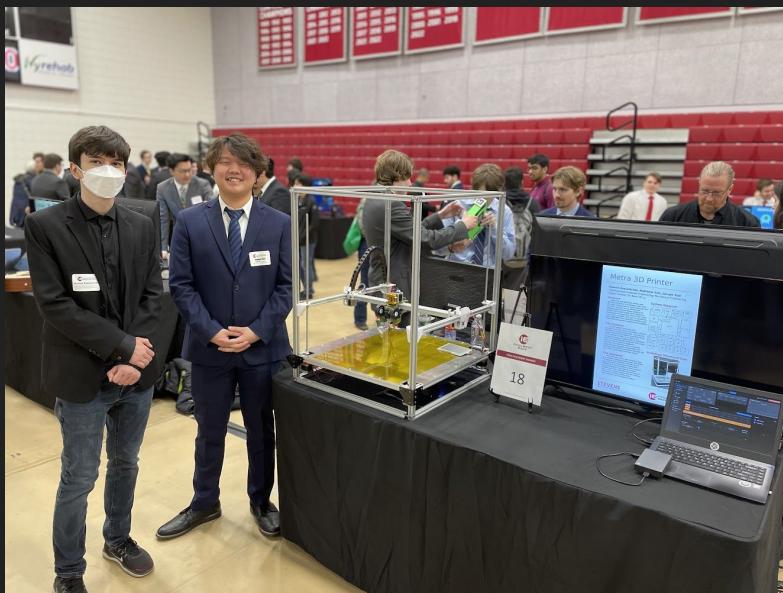
- Loosely based on the PhoenixDelta 3D printer by Rolohaun
- Currently being built with unused components from previous projects that were lying around the lab



Senior Design Project - Metra

March 2023 - May 2023

- Based on the RepRap Alto 3D Printer
- Presented at the Stevens Innovation Expo 2023
- Redesigned hotend mount in Fusion360 to fit our hotend
- Brought onto the project as a freshman to provide 3D printing expertise to the senior



Metra 3D Printer

Kamen Kresnitchki, Matthew Suh, Joseph Tsui
Electrical and Computer Engineering/ Mechanical Engineering
Project Advisor: Dr. Kevin W. Lu

Abstract

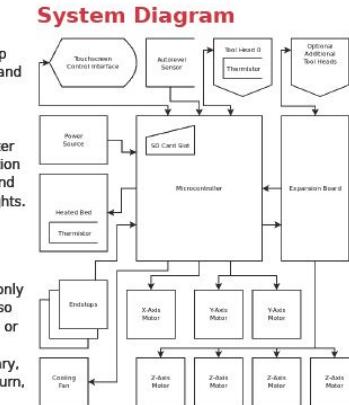
Metra is a self-replicating, flexible, and affordable 3D printer. It is designed to be cheap and easily modified with its off-the-shelf parts and free, libre, and open source software and hardware specifications. Modern desktop 3D printers tend to have limited work volume and functionality; in comparison, Metra's cubic meter work volume, flexibility, and ease of customization and modification frees users from limitations and allows them to take their creations to new heights.

The Problem

Current desktop computer-aided manufacturing tools, such as 3D printers, can only print small to medium sized items. They are also usually capable of only additive manufacturing or machining, but not both. To be able to use multiple techniques, multiple tools are necessary, which can be prohibitively expensive. This, in turn, serves to limit the general populace's manufacturing capabilities, and on a grander scale, the democratization of technology: the increase in accessibility and control the public has over various technologies and their impact.

The Approach

Metra provides a large work volume as well as a universal tool head mount system that allows it to function as a 3D printer, CNC machine, or laser cutter. By increasing work volume and flexibility in terms of functions, as well as having open specifications, Metra allows for easier, cheaper, and more accessible manufacturing of larger, more complex projects with less resource investment necessary, furthering the democratization of technology via making.



Custom Arcade Controller

August 2022 - Present

- Fully modeled using Fusion360
- Played around with different button layouts in different revisions
- Designed to be high-performance for fighting games
- Built as an alternative to high-cost commercial options with comparable performance (costs around \$175)
- Received design optimization review from a Senior Engineer working in the 3D printing industry
- Custom spacing between buttons for personal ergonomics
- Sliding dovetail lid for easy access to wiring and components



First Prototype



Second Prototype



Third Prototype

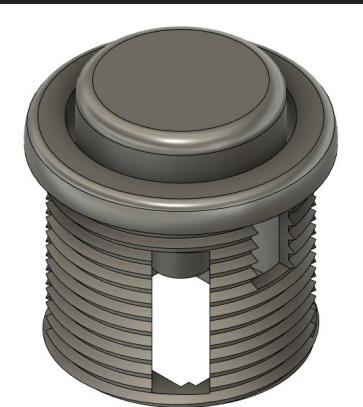
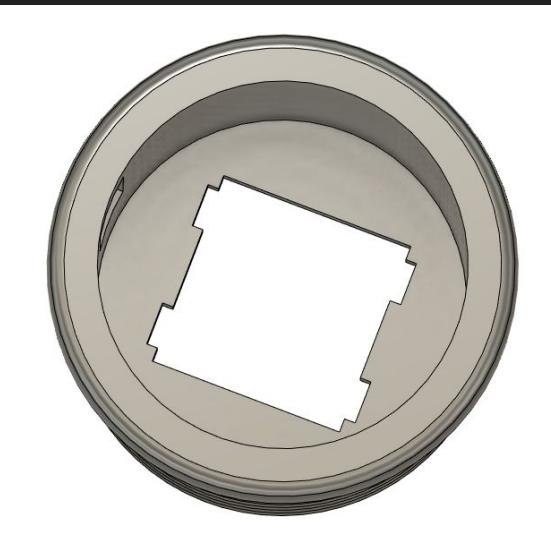
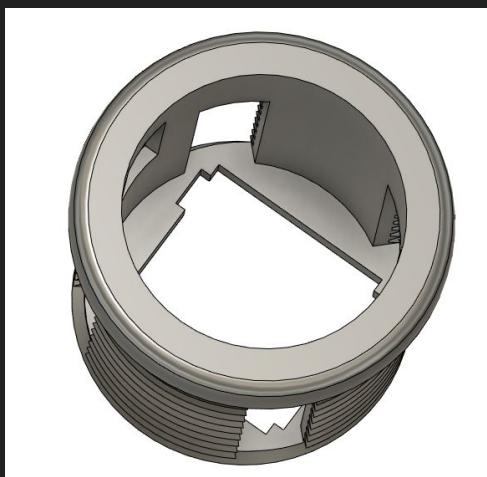
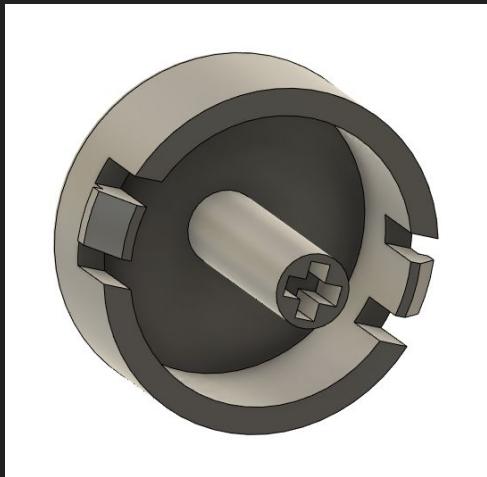


Fusion360 Model

Custom 3D Printed Arcade Buttons

July 2023 - Present

- Fully designed in Fusion360
- Designed to be used in custom arcade controller
- Cheap alternative to buying arcade buttons without sacrificing performance
- Uses keyboard switches for actuation which allows customization for the feel of each button
- Designed 2 different sizes: 30mm and 24mm



Custom Hitbox Controller

February 2022

- Converted a Mayflash F101 arcade stick
- Switched from lever to buttons for comfort
- Built as an alternative to using a keyboard to play fighting games
- Used keyboard switches and keycaps for the added buttons
- Custom spacing between buttons for personal ergonomics
- Designed custom acrylic front panel using Adobe Illustrator
- Front panel cut using a laser cutter



Miscellaneous Projects

- Custom 3D Printed Grip Trainer for Rock Climbing
 - Designed in Fusion360
 - Based on Lattice Training Quad Block
- Custom Keyboards
 - Modified key switches for enhanced feel and sound
- Custom PC Builds
 - Utilized resources such as YouTube to teach myself about components and how to build computers



Miscellaneous Projects Cont.

- Custom SmashBox Style Controller
 - Controlled using an Arduino Micro
 - Cut holes into an old keyboard box to mount the switches
 - Soldered switches to Arduino
- Stevens Engineering Class Final Project
 - Collaborated in a group of 3
 - Built and programmed a robot that could navigate an obstacle course
 - Used 3D printed parts for sensor and arduino mounts

