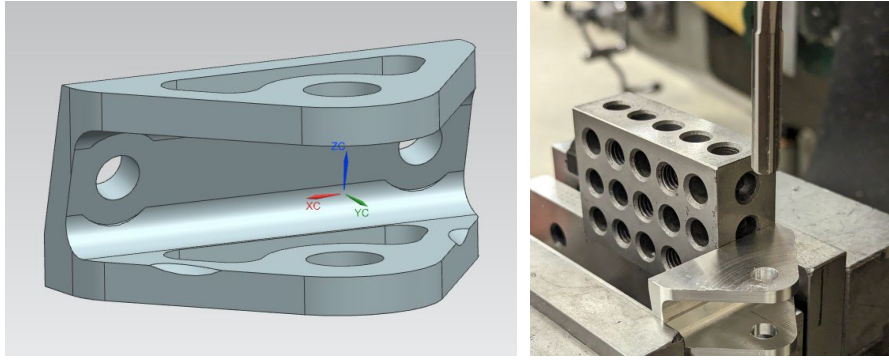


# Engineering Projects Portfolio

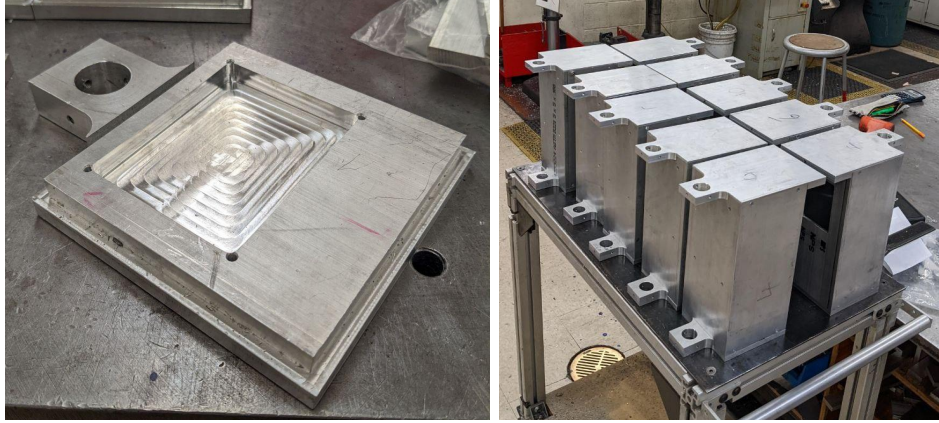
Pavel Matyukhin

# Suspension Clevises for GFR24 (Capstone Project)

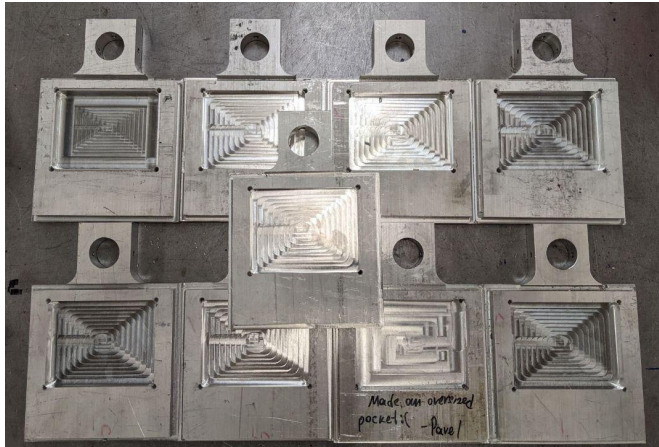


- Redesign of Suspension Clevises for GFR24e and 24d electric racecars
- 11 unique components, 88 parts over 4 cars
- Manufactured on a 3-axis CNC and Manual mills
- All parts designed for Safety Factor  $>1.8$
- Reduced total weight of the system from 1100g to 700g compared to previous year
- Improved manufacturability by standardizing features across all parts and sizing for tools
- Reduced the number of unique parts by keeping features symmetrical where appropriate

# Aluminum Case Assemblies (Manufacturing Project)



- Aluminum assemblies to hold cameras / data acquisition equipment in forest environment
- Programmed and setup CNC Mill to continuously manufacture identical components
- A set of 10 identical aluminum assemblies consisting of 6 components each
- Made engineering drawings with GD&T to ensure assembly between
- Fast-paced project completed and assembled in 5 weeks



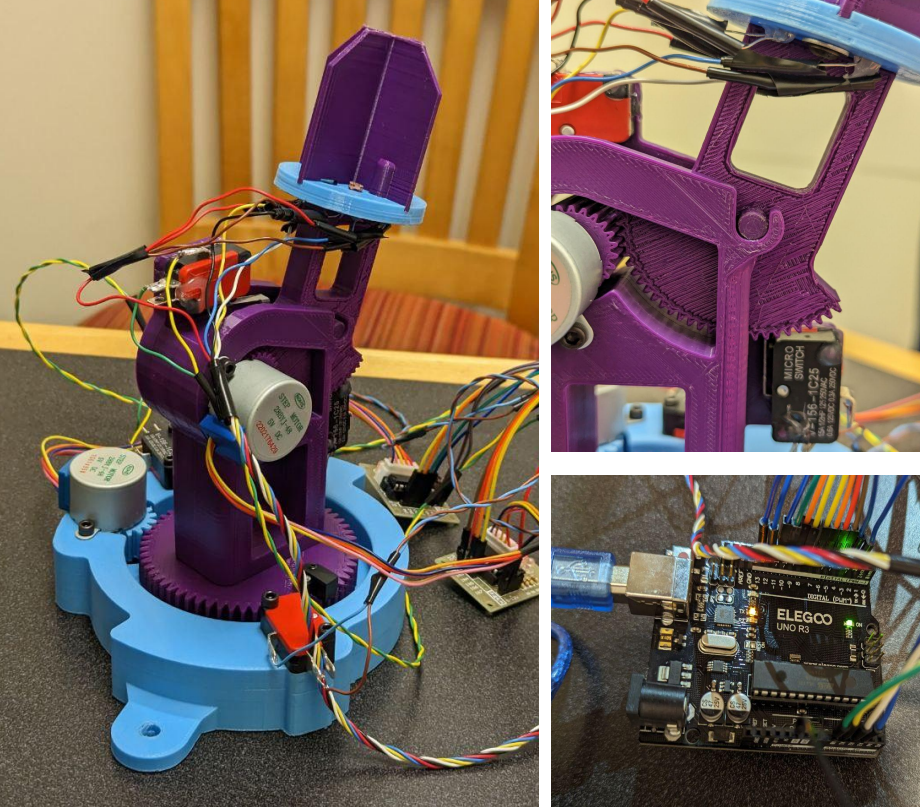
# 3D Printed Suspension Clevises



- Alternative version of suspension clevises for GFR24 race cars
- Designed through nTopology, implementing topology optimization and static stress analysis
- Potential weight savings of more than 20% from traditional design
- Design was made considering both functional and aesthetic features
- Currently, designing the lightest version possible for safety factor of 1.7
- Physical parts were sponsored and printed by HP



# Arduino Sun-Tracker



- A Sun-tracker assembly that tracks source of light and records light levels in real time
- Consists of 3D printed case, gearing mechanism, light splitter; switches, sensors and stepper motors for 2 axis movement
- Light is detected by 4 photosensors, separated by a 3D printed “light splitter”
- Utilizes 2 stepper motors to rotate sensors around 2 axes to point at source of light
- Continuously locates source of light and records light levels derived from electrical values
- Runs on single Arduino Uno board

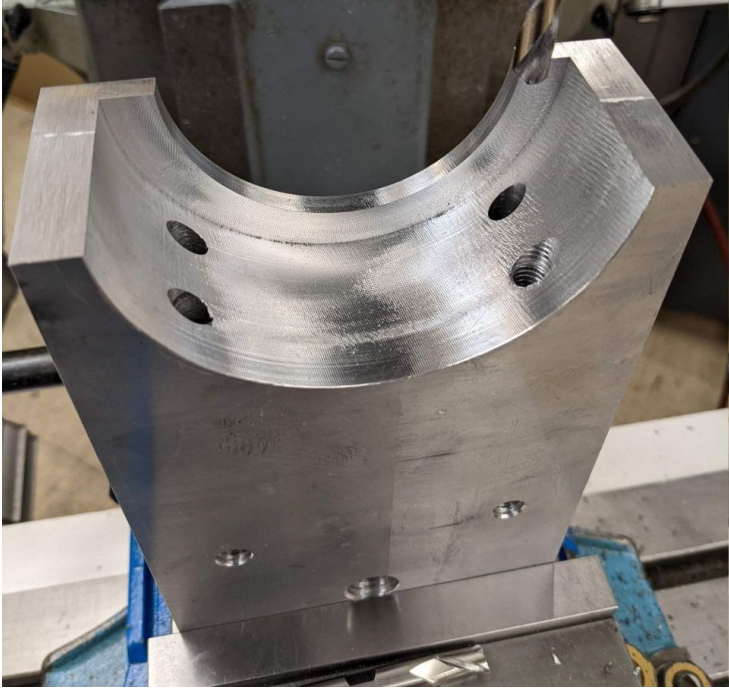
# Kitchen Multi-Tool



- Class project designed considering customer requirements and products available on the market
- Concepts were generated using DFMEA and house of quality methods
- Designed, manufactured, assembled and tested within 6 weeks
- Utilizes 3D printed parts and off the shelf electronic components
- Allows variable speed settings, and multiple tool attachments which are attached on a common thread
- Includes documentation with technical specifications and engineering drawings



# Other examples of work



## Other examples of work

