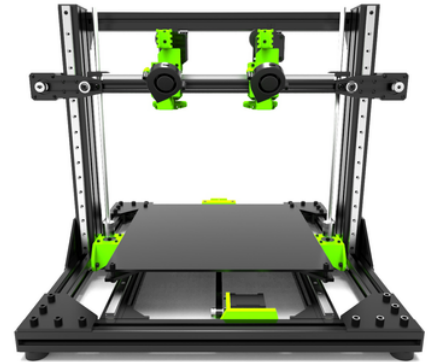
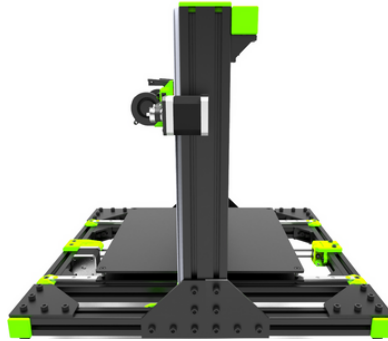
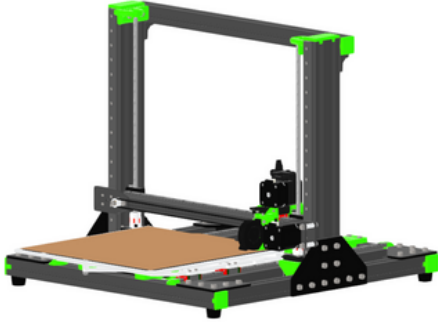


3D PRINTER - V CAST - RAT RIG



What?

- Design of a new DIY cartesian 3D printer with IDEX system

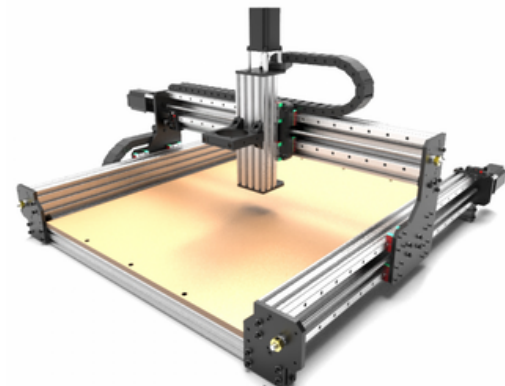
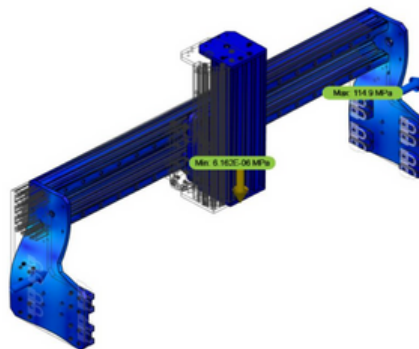
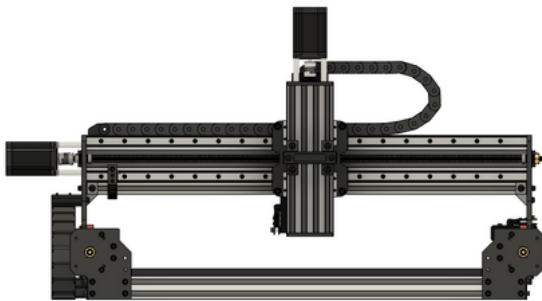
How?

- Designed using **Fusion360**
- Used **FEA** to optimize geometry of components
- Used **DFA** to make the printer user friendly

Results

- Combined metal and 3D-printed parts to achieve the best cost-benefit ratio
- First of its category to be released in Europe
- Machine capable of light cutting, milling, and engraving duties

CNC MACHINE - KILLER BEE RAT RIG



What?

- Design of a CNC machine based on a Workbee CNC with linear rails and stronger structure
- Design compatible with any Workbee and LeadCNC machines

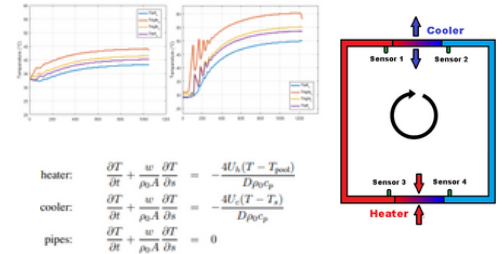
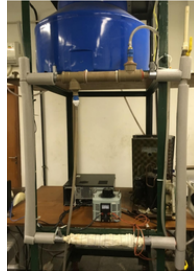
How?

- Designed using **Fusion360**
- Used **FEA** to identify improvement points and simulate changes
- Used **ANSYS Granta** to select the right substitute materials for all plates

Results

- 3.65x less deformation under normal working stress, resulting in greater durability
- Precision increased by 15%
- Increased working volume by 13%

SINGLE-PHASE COOLING SYSTEM - ELETRONUCLEAR AND UERJ



What?

- Design of a passive, single-phase cooling system to be used as a heat exchanger at a Nuclear Spent Fuel Pool

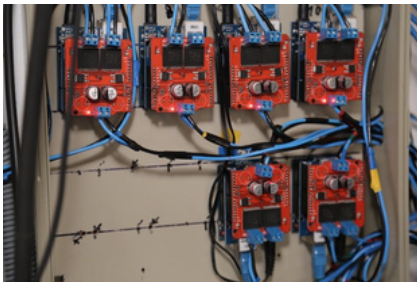
How?

- Designed a prototype of a natural convection loop
- Developed a protective automation system using **Python**, **C** and **Arduino** to perform in case of high temperatures

Results

- Presented six papers and published two journal articles, one of which received an honorable mention for excellence
- The results are helping engineers to improve the Angra 2 nuclear power plant in Brazil

AUTOMATION OF EFFLUENT TREATMENT PLANT - NM2 AND UERJ



What?

- Minimize human-operator costs by automating an effluent treatment plant for use in remote locations

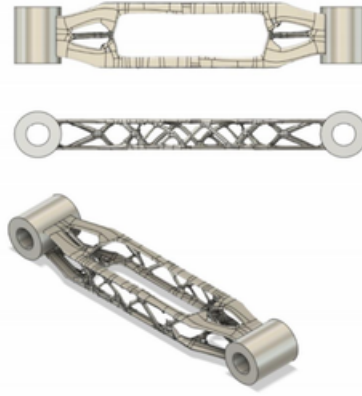
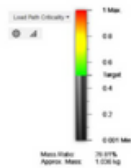
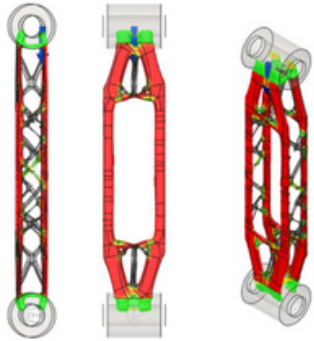
How?

- Designed an automation system using **Python** and **C**
- Developed a master-slave server using **MQTT**, 42 Arduinos UNO R3, and **Raspberry pi 3**
- Designed actuators using **3D-printed parts**

Results

- Developed an automation system capable of controlling 250+ micro-wastewater treatment units remotely
- Participated in the 8th World Water Forum (Brasilia, Brazil – 2018)

DESIGN OF A ROBOTIC ARM - UNIVERSITY OF THE ALGARVE



What?

- Design of a robotic arm to carry up to 50kg in a non-industrial environment

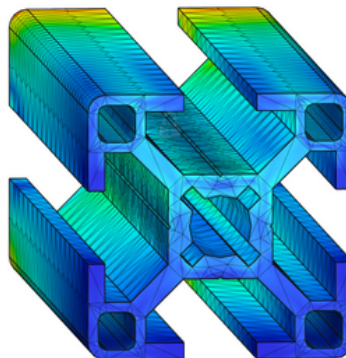
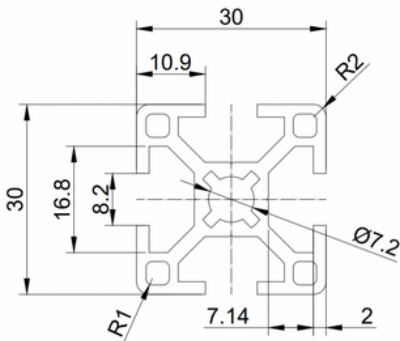
How?

- Designed using **Fusion360**
- Used **generative design** and **topology optimization** to achieve the best strength-to-weight ratio
- Used **ANSYS Granta** to select the ideal material (AlSi10Mg)

Results

- Weighs 71% less than similar models
- Can be built locally using FDM technology
- Easy and safe to move

ALUMINIUM PROFILES - RAT RIG



What?

- Design of a new line of aluminium profiles

How?

- Designed using **Fusion360**
- Used **FEA** to optimize geometry and define the maximum load capacity

Results

- Developed 14 new products
- Increased the portfolio size by 67% and the sales of aluminum profiles by 85%

ACADEMIC PRODUCTION

- Experimental analysis of a single-phase cooling system. Brazilian Journal of Renewable Energy, p. 113-138, 2018.
- Experimental analysis of a single-phase cooling system. Congress of Renewable Energies, p. 294-308, 2017.
- Experimental modeling of a passive cooling system. 9th World Conference on Experimental Heat Transfer, p.37-49, 2017
- Technological development of a passive cooling system. SEMIC 2018,
- Automation of an effluent treatment plant. SEMIC 2018,
- Study of the influence of operational and geometric parameters on the efficiency of passive cooling systems. SEMIC 2017,
- Experimental analysis of a single-phase cooling system. Congress of Renewable Energies, 2017.
- Monitoring of a monophasic natural convection circuit by telemetry and numerical simulations. SEMIC 2016,
- Experimental study of the thermo-hydraulic stability of passive single-phase cooling systems. SEMIC 2016,