Spencer Morgenfeld - (650) 285-7657 - smorgenf@caltech.edu

Education

California Institute of Technology (Class of 2021); Pasadena, CA

- Mechanical Engineering Major, Aerospace Engineering Minor
- GPA: 3.70 (4.0 Scale)

Skills

- Leading and working in teams to design, construct and program competitive robots
- Design, simulation, and visualization using SolidWorks and Ansys
- Fabrication: manual mill, waterjet, laser cutter, 3D printer, lathe, drill press, band saw
- Programming: Python, C#, Java, C, C++ (Arduino), Javascript, Labview

Experience

Summer Undergrad Research Fellow at NASA Jet Propulsion Laboratory; Remote (Summer 2020 - Present)

- As part of JPL's Innovation to Flight program, I developed from the ground up a drone-portable solar-powered battery recharging and swapping station for extending the operational range of our fixed-wing/VTOL drone. I also selected the drone's motors/propellers and designed the drone's swapping station-compatible custom fuselage.

Teaching Assistant, Engineering Design Laboratory; Caltech, CA (Summer 2020 – Present)

- I am currently designing the 2021 ME72 robotics competition and will aid teams as they build their robots this fall. I was selected to TA this course based on my team's performance in last year's competition.

Undergraduate Researcher at the Aerospace Robotics and Control Lab; Caltech, CA (Fall 2019 – Spring 2020)

- I aided the development of an autonomous VTOL flying ambulance by designing a 3D printable wing extension for a modified Skywalker X8 drone and writing a script to scrape motor data off a motor vendor's website.

Optics Intern at Powervision; Belmont, CA (Summer 2018, 2019)

- To improve implant fitting, I advanced Powervision's lens power metrology by implementing a Python vision processing algorithm to better measure lens diameter, exploring the effects of temperature changes on lens power, and developing a novel wet cell lens holder to improve the consistency of lens power measurements.
- The second summer, I characterized a medical laser system used for post implant adjustment of lens power, and designed, assembled and tested a system for vacuum filling lenses with oil. I also wrote software to shoot a laser pattern through a lens while measuring the lens's power change and monitoring the laser beam profile.

Positions & Projects

PARSEC Rocketry Club Structures Lead (2018 – Present)

- As Structures Lead, I organize projects related to the rocket's internal structure and mechanisms. I have also designed the rocket's internal helium tank support and a passively detachable launch lug.

Caltech Cross Country Captain (2019 – Present)

- As a cross country captain, I help run team activities, practices and meets.

Ruddock House Treasurer & Co-Steward (2019 – 2020)

- As the elected Treasurer I managed Ruddock's ~$25,000 yearly budget. As Co-Steward, I served as the House's point of contact with Caltech's housing office and ensured Ruddock's public spaces were properly maintained.

Peninsula Robotics (FIRST Robotics Competition) (2015 – 2017)

- As Founder and Captain, I had a variety of responsibilities, including leading the design and construction of competition robots, running team meetings, overseeing fundraising efforts, and resolving intrateam disputes.

Other

- Goose, Bell & Rake (2020) – A trio of amphibious robots designed to compete in Caltech's ME72 competition. All three robots were fan driven and scooped foam softballs out of the water; Bell and Rake shot balls using a flywheel, while Goose featured tank treads for land mobility. Teams of five built these robots over two terms.
- RC Plane (2019) – Constructed an Arduino-controlled, semiautonomous RC plane for a design fabrication class.
- ME14 Transmission Project (2019) – Designed and built a 6:1 planetary gearbox for a design fabrication class.
- 'Markov Masher' (2016) – Javascript page allowing users to combine two Wikipedia pages using a Markov chain.

Achievements

- Caltech Track (Varsity Letter Winner, 9th Place SCIAC Championship Steeplechase, SCIAC All-Academic Team, 2018-20)
- Caltech Cross Country (Varsity Letter Winner, NCAA DIII West Regionals Qualifier, SCIAC All-Academic Team, 2017-19)
- FIRST Calgames Rookie Inspiration Award (2016)
- Eagle Scout (2014)