SunrIde: Sheffield University Rocket Innovative Design Engineering

Company: The University of Sheffield

Code: 18/52

Location: Department of Automatic Control and Systems Engineering, Faculty of Engineering, University of Sheffield

Company Description:

The University of Sheffield is one of the UK's top universities with over 24,000 students from more than 124 countries. It has an international reputation for providing cutting-edge research, teaching excellence and an outstanding student experience. The University was established in 1828 as the Sheffield School of Medicine, and received University Charter status in 1905. Our founding motto Rerum Cognoscere Causas (to discover the cause of things) has driven our success in world-class research and teaching. We have received outstanding public acknowledgement and numerous accolades and awards for our endeavours, including Queen's Anniversary and Nobel Prizes.

Our standing as a world-class university is repeatedly confirmed by our excellent performance in rigorous external assessments. The most recent Research Excellence Framework in 2014 confirmed our place as a world-leading university. The results demonstrated our research excellence across a range of disciplines, putting us in the top 10 per cent of all UK universities. In addition, the University is rated 84th in world in the 2016 QS World University Rankings and 109th in the world and 13th in the UK according to the 2017 Times Higher Education World University Rankings. Sheffield was proud to be awarded third best nationally for student experience in the Times Higher Education Student Experience Survey in 2017. In the same survey our Students' Union was voted top nationally for the ninth consecutive year. Our academic departments are each based in one of five faculties: Arts and Humanities; Engineering; Medicine, Dentistry and Health; Science; Social Sciences.

Project Description:

The applicant will take the role of a structural and mechatronics engineer to design the structure of the rocket followed by testing and analysis of stability (also, if interested, applicant will be able to work on electronics part which is responsible for rocket stabilisation and up/down link data transfer). The structural engineering for the design of the body tube and other integral parts of the rocket will require simulations on the open source software - "OpenRocket". Thereafter, knowledge will be gained for in how to select a suitable motor and propellant according to the design and structure of the rocket. A sufficient understanding of electronics will be required for the telemetry and flight computation needed for altitude tracking.

The student will be based at the University of Sheffield's department of Automatic Controls and Systems Engineering STAR laboratory. As a part of the verification and testing, the intern will need to visit the launch site (near Cambridge) to prove that the design of the rocket meets the competition standards. As a part of the test process, the intern will need to get the required certification from the United Kingdom Rocketry Association (UKRA) to pass all the safety requirements for the launch.

This challenging but rewarding opportunity will only be offered to high-calibre students passionate about working in the space industry. In alignment with section 4 of the UK Space Agency Education Strategy and the objectives of SPIN, this real hands-on space engineering experience will be ideal for preparing the student to work in the Space sector and will fill in key "skills gaps" desired by companies. At the end,

(1) the student will create a scientific poster and will have the opportunity to publish a conference paper affiliated with the University of Sheffield;
(2) participate in the Space Port America Cup 2019 (http://www.soundingrocket.org/sa-cup-home.html).

Applicant Specification:

Technical:

- Advanced (if possible) or at least proficient capabilities in Solidworks to facilitate working with mechanical and structural designs;
- Be comfortable with programming in C/C++, Java and Python for working with Linux (e.g. Ubuntu, Raspbian) for coding control systems;
- Have analytical skills in MATLAB to evaluate test data;
- Gain a solid grounding in integrating the following key components into the rocket design: stepper motors, drive controllers, arduinos, raspberry PIs, dc/dc converters, power electronics, and a range of sensors (temperature, pressure, humidity and current).

Soft:

- Team work with a range of different stakeholders including students and academics;
- Liaise with engineers from other companies and universities;
- Knowledge of a space project cycle;
- Knowledge of the near space operating environment from 25 km to 60 km;
- Learn to communicate with people from different engineering or science backgrounds;
- Develop tools to engage with non-technical people such as marketing to promote the work done;
- Deliver presentations suitable for technical and non-technical audiences.

Minimum Requirements:

Technical:

- A first class or 2.1 undergraduate degree in an Engineering discipline such as Systems control, Electronics Engineering or Mechanical Engineering. This is an important role so the applicant's technical abilities must be high;
- Familiarity across a range of CAD packages including Solidworks, AutoCAD, Inventor and FE/CFD packages such as ANSYS/Abaqus;
- Programming experience in C, C++ and Python;
- Experience with power electronics, control systems, and telecommunication techniques.

Soft:

- Evidence of professional working experience at an engineering company;
- Evidence of technical knowledge about the space industry;
- Evidence of interdisciplinary project experience within an academic environment, in a role with leadership and management tasks (e.g. sub-team leader or team leader of a project).

Further details:

8 weeks minimum fixed term contract to be agreed with successful candidate but nominally with an END Date of 28 February 2019. Salary is £1,500 per calendar month

Closing Date for Applications:

5 November 2018

Applications should be made through the online form attaching a CV, before the closing date. Please note that elements of the form left incomplete will be deemed to render the application ineligible. They will be checked for eligibility and forwarded to the employer.