



**Project 18/38:** SunbYte: Sheffield University Nova Balloon Lifted Telescope with NASA

**Company:** The University of Sheffield

**Supervisor:** Dr Viktor Fedun

**Location:**

Department of Automatic Control and Systems Engineering  
Faculty of Engineering  
University of Sheffield  
Mappin Street  
Sheffield,  
S1 3JD  
United Kingdom

**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 on the role of systems Engineer to integrate Electronics and Mechanics together and deliver a working device capable of tracking the Sun at low pressure and low temperatures. The student will be based at the University of Sheffield's department of Automatic Controls and Systems Engineering STAR laboratory. As part of the verification process, the intern will need to visit various thermal testing facilities to prove the experiment meets the required standard. There, the applicant, together with other members of the engineering team, will need to test the ability of the experiment to withstand near-space, vacuum pressure and temperatures down to -80C. This will be achieved by fitting our experiment into a chamber (Manchester University), which will be slowly cooled whilst air is drawn out. Various electronics will be operated in sequence to identify weak points in the system and investigate thermal contraction in mechanical linkages which may cause the system to freeze.

This is a challenging but rewarding role suitable for 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 role will prepare student for working in the Space sector by giving them the experience necessary to fill the “skills gap” desired by companies. At the end, the student will participate in assembling of the prototype and also create a scientific poster with the opportunity of applying to publish a conference paper with the University of Sheffield.

If the student shows high performance during mid review, they maybe offered the opportunity to travel to NASA in late July 2018 to conduct thermal vacuum testing on behalf of the team from the University of Sheffield. This is a major milestone for the project as it certifies the experiment as being safe and space worthy for launch on the high altitude balloon sponsored by NASA.

### **Applicant Specification:**

#### Technical:

- Advanced capabilities in Solidworks to facilitate working with mechanical and structural designs;
- Comfortable with programming in at least in one of the following languages: MATLAB, C/C++, Java or Python
- Ability to work with Linux OS (e.g. Ubuntu, Raspbian) for coding control systems;
- Basic knowledge on stepper motors, drive controllers, arduinos, raspberry Pis, dc/dc converters, power electronics, and a range of sensors (temperature, pressure, humidity and current).

#### Soft:

- Deliver presentations suitable for technical and non-technical audiences.
- Learn to communicate with people from different engineering or science backgrounds

### **Minimum Requirements:**

#### Technical:

- A first class undergraduate degree (or strong 2.1) in Engineering discipline i.e. Systems control, Electronics Engineering or Mechanical Engineering;
- Experience in programming;
- Experience with power electronics, control systems, and telecommunication techniques (preferable).

#### Soft:

- Evidence of interest about the space industry;
- Evidence of interdisciplinary project experience.

### **Further details:**

8 weeks minimum fixed term contract to be agreed with successful candidate but nominally with a start date around 18 June 2018, when the SPIN Induction Day will be held at the Satellite Applications Catapult, Harwell. Salary is £1,500 per calendar month.

### **Closing Date for Applications: Tuesday 6 June, 5pm**

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.

**Apply here:** <https://sa.catapult.org.uk/people/space-placements-industry-spin/>