# Job Description – EPSRC DTP Internship: Fatigue testing of 3D printed metamaterials

*“EPSRC’s Vacation Internships scheme gives undergraduate students a taster of what it is like to do research. The students are given practical, first-hand experience of working on and carrying out research in a UK university.”*

Source: [Internships and placements – UKRI](https://www.ukri.org/councils/epsrc/career-and-skills-development/studentships/flexibility-for-funders/internships-and-placements/)

To be eligible for an EPSRC Vacation Internship you **must**:

* be an undergraduate or Masters student in a STEM subject area.
* not have completed your degree studies before the planned end of the internship. An internship should generally take place in the summer vacation **before** your final year of study.
* have a right to work in the UK and carry out the placement whilst resident in the UK. We are **not** able to sponsor visas for the internship.

**About the Role**

The successful candidate will join a team researching the mechanical properties of an intriguing class of metamaterials. Our investigations have explored honeycombs based on aperiodic patterns, such as the famous Penrose tiles, and compared these to honeycombs based on periodically repeating patterns, including squares, and hexagons, using tensile simulation and physical compression testing.

A key result from these investigations is that the behaviour of honeycombs is dependent on the size, shape, and distribution of the cells of the geometric patterns they are based on. Also, honeycombs based on aperiodic patterns tend to be isotropic, which means they behave the same regardless of the direction of applied force. Isotropic performance is desirable for simplifying the adoption of honeycombs in engineering applications and is essential for design applications where the direction of applied force cannot be controlled.

As we move towards exploring practical applications for aperiodic honeycombs (for example in medical or aerospace engineering) a key consideration yet to be investigated is their durability under repeated cycles of applied force. This knowledge is essential if honeycombs are to be used in components such as medical implants or morphing wings. This project involves designing and 3D printing honeycombs based on a range of patterns, and then testing them for durability using our fatigue testing equipment.

The role will develop skills and experience in:

* planning and conducting scientific investigations
* scientific programming, for simulation and data analysis
* presenting outcomes of technical research to different audiences

**About the Unit**

The School of Engineering and Innovation supports multidisciplinary research across engineering, design, materials and environmental sciences, and hosts cutting edge equipment and facilities for 3D printing, simulation and mechanical testing and analysis. This project builds on the supervisory team’s established expertise in computational design, analysis, manufacturing, and material science, expanding on recent EPSRC-funded research into the behaviour of aperiodic honeycomb metamaterials.

**Key Responsibilities**

* Design and 3D print samples of metamaterials for fatigue testing
* Conduct supervised laboratory research into the durability of honeycombs
* Capture and summarise results in a research report and presentation

**Skills and experience**

Essential:

* Studying towards a degree in a STEM subject
* Python (or alternative) programming experience
* Ability to work in a multidisciplinary team
* Access to a computer/laptop, the Internet and Microsoft Office applications

Desirable:

* An enthusiasm for manufacturing technology and/or materials science
* Experience of applied mathematics and/or finite element modelling

If you would like further details about the role before making an application, then please email [stem-research-student-support@open.ac.uk](mailto:stem-research-student-support@open.ac.uk) quoting the reference number and job title.