

Research Assistant in Custom Additive Manufacturing Hardware for Medical Applications

Job Ref: REQ260424

School/Department summary:

This post will support research into real-time control of additive manufacturing systems for medical and pharmaceutical applications, as part of a multidisciplinary project developing new approaches for patient-specific manufacturing. The wider project aims to develop materials, hardware, in-process inspection methods, geometric toolpaths and adaptive manufacturing workflows for high-precision multi-material 3D printed pharmaceutical tablets and related medical devices. At Loughborough, the work focuses on the development of additive manufacturing hardware, reconfigurable manufacturing procedures, directly designed toolpaths, in-situ inspection and real-time adaptation of the manufacturing process, using in-house additive manufacturing software including FullControl.

Project Description:

This post will support research into custom additive manufacturing hardware for medical and pharmaceutical applications, as part of a multidisciplinary project developing new approaches for patient-specific manufacturing. The wider project aims to develop materials, hardware, in-process inspection methods, geometric toolpaths and adaptive manufacturing workflows for high-precision multi-material 3D printed pharmaceutical tablets and related medical devices. At Loughborough, the work focuses on additive manufacturing hardware, reconfigurable manufacturing procedures, directly designed toolpaths, in-situ inspection and controlled adaptation of the manufacturing process, using in-house additive manufacturing software including FullControl.

The Research Assistant will contribute to the practical development, modification and testing of laboratory-scale additive manufacturing hardware. This will include modifying existing 3D printer platforms, integrating different toolheads such as filament and pellet extruders, changing or configuring 3D printer control boards, and designing fixtures, brackets, adapters and other hardware required to mount tools, sensors or components onto existing systems. The role will involve practical design, prototyping and manufacture of fixtures, including CAD design, 3D printing and working with machined components where required.

The postholder will also need to understand the relationship between hardware capability and toolpath requirements. They will not be expected to lead the toolpath-design research, but they will need to liaise effectively with colleagues developing direct toolpaths, understand how toolpath requirements affect hardware design, and support experimental testing of complex paths on modified additive manufacturing and multi-axis systems. This will include helping to characterise system performance, such as positional precision, repeatability, acceleration limits, velocity limits and other metrics that affect whether intricate medical or pharmaceutical structures can be manufactured reliably.

Job Description

Job Family and Grade: Specialist and Supporting Academic Research Grade 5

Job Purpose

To support the development, modification and experimental assessment of custom additive manufacturing hardware for medical and pharmaceutical applications. The postholder will assist with 3D printer hardware

modifications, toolhead integration, fixture design and manufacture, control-board configuration, and system performance characterisation, while working closely with colleagues developing direct toolpaths and adaptive manufacturing workflows.

Job Duties

- To assist with the development, modification and testing of custom additive manufacturing hardware for medical and pharmaceutical manufacturing applications, including modified 3D printer platforms and related motion/deposition hardware.
- To integrate and test different additive manufacturing toolheads, such as filament extruders, pellet extruders and other deposition or inspection tools, onto existing or modified hardware platforms.
- To design, prototype and manufacture fixtures, brackets, adapters and other hardware modifications required to mount toolheads, sensors or auxiliary devices onto existing 3D printer or multi-axis hardware.
- To support the replacement, configuration, calibration and troubleshooting of 3D printer control boards, machine electronics and related hardware-control systems.
- To characterise the precision and performance of additive manufacturing and multi-axis systems, including positional accuracy, repeatability, velocity limits, acceleration limits and other relevant motion or deposition metrics.
- To work with colleagues developing direct toolpaths to ensure that hardware capabilities, limitations and test results are understood and incorporated into the manufacturing workflow.
- To collect, organise, analyse and present experimental data relating to hardware performance, fixture performance, toolpath execution, process repeatability and manufacturing accuracy.
- To feed back to the project team on progress, to make recommendations for next steps.
- To contribute to project promotion and public engagement events.
- Always maintain confidentiality and ensure that intellectual property (IPR) agreements are not violated.
- Engage in training programmes in the University (or elsewhere) that are consistent with the needs and aspirations of the project and those of the Department.

Points To Note

The purpose of this job description is to indicate the general level of duties and responsibility of the post. The detailed duties may vary from time to time without changing the general character or level of responsibility outlined in the document.

Organisational Responsibility

Reports to Andy Gleadall

Person Specification

Your application will be assessed based on the essential and desirable criteria listed below.

Applicants are strongly encouraged to explicitly demonstrate how they meet each essential (and desirable) criteria at the application stage. The criteria that you need to demonstrate in your application will be listed as Stage 1 in the table below.

Stages of assessment are as follows:

- 1 – Criteria measured at Application
- 2 – Criteria measured at Test/Assessment Centre/Presentation
- 3 - Criteria measured at Interview

Essential Criteria:

Area	Criteria	Stage
Experience	Experience of additive manufacturing hardware, mechatronics, machine control, robotics, automation or a closely related engineering area. Practical experience may have been gained through academic projects, research activities, placements, employment or other relevant activities.	1,3
Experience	Experience of developing or modifying 3D printer hardware or similar devices. Practical experience may have been gained through academic projects, research activities, placements, employment or other relevant activities.	1,3
Experience	Experience of designing, prototyping and manufacturing fixtures, brackets, adapters or other hardware modifications using CAD and practical manufacturing methods such as 3D printing, machining, laser cutting or workshop fabrication. Practical experience may have been gained through academic projects, research activities, placements, employment or other relevant activities.	1,3
Skills and abilities	Good written and oral communication skills.	1,3
Skills and abilities	Self-motivated, organised and able to manage time and tasks effectively.	1,3
Training	A willingness to undertake further training as appropriate and to adopt new procedures, tools and safety practices as required.	3
Qualifications	Have or soon to have a Bachelor's or Master's degree in Mechanical Engineering, Manufacturing Engineering, Mechatronics, Robotics, Control Engineering, Electronic/Electrical Engineering, Computer Science, Physics or a closely related discipline, or equivalent relevant experience.	1
Other	Uphold and actively contribute to the University's commitment to Equity, Diversity and Inclusion.	1,3

Desirable Criteria:

Area	Criteria	Stage
Experience	Experience of modifying, configuring, building or testing 3D printer hardware or comparable motion/deposition systems. Practical experience may have been gained through academic projects, research activities, placements, employment or other relevant activities.	1,3
Experience	Experience of working with machined parts and external manufacture, including preparing designs, drawings or specifications for custom fixtures or hardware components. Practical experience may have been gained through academic projects, research activities, placements, employment or other relevant activities.	1,3
Experience	Experience of multi-axis 3D printing systems. Practical experience may have been gained through academic projects, research activities, placements, employment or other relevant activities.	1,3
Skills and abilities	Awareness of hardware-control systems, such as 3D printer control boards, microcontrollers, motion controllers or equivalent systems.	1,3
Skills and abilities	Awareness of direct toolpath design for additive manufacturing, or of working closely with toolpath/software developers to test complex manufacturing paths.	1,3

Skills and abilities	Awareness of the use of programming to support hardware testing, machine control, toolpath execution or experimental workflows.	1,3
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Conditions of Service

The appointment will be subject to the [University's Terms and Conditions of Employment](#) relevant to the job grade.

Shared University Responsibilities

As a member of the Loughborough community, you are expected to:

- Take reasonable care of yourself, others and the environment, and to prevent harm by your acts or omissions. All staff are therefore required to adhere to the University's Health, Safety and Environmental Sustainability Policies & Procedures.
- Support and contribute to the University's commitment to Equity, Diversity, and Inclusion (EDI), while carrying out all duties in a way that respects these principles and upholds the right to free expression. Further information about EDI at Loughborough and our strategic aims is available on our website

Our Purpose, Vision, and Values

Our purpose, Vision and Values underpin all that we do and shape how we work together at Loughborough.

We're proud to promote our values: **Adventurous, Collaborative, Creative, Authentic** and **Responsible**. Our people bring these values to life every day, and they are central to the positive and supportive culture that makes Loughborough unique.

If you join us, you'll be encouraged to bring these values to life in your own work and contribute to the positive, supportive culture that makes Loughborough unique.

Read more about our [vision and values](#).

Our Accreditations



We strive to create a culture that supports equality and celebrates diversity throughout the campus. The University holds a [Bronze Athena SWAN award](#) which recognises the importance of support for women at all stages of their academic career.



We are proud to be a [Race Equality Charter Member](#). The Charter aims to improve the representation, progression and success of all minority ethnic staff and students within higher education and address issues of racism within higher education institutions (HEIs).



We are proud to be a Disability Confident Employer and have adopted a proactive approach to employing disabled people and to creating a more diverse workforce. We ensure that our recruitment processes are inclusive and accessible. We guarantee to offer an interview to all applicants who have declared themselves with a disability, provided they meet the essential criteria for a role. We proactively anticipate and provide reasonable adjustments and support existing employees who acquire a disability or long-term condition to thrive in the workplace.



We are a real living wage employer, and our Living Wage Employer Mark shows our commitment to paying our staff according to the cost of living.



We are proud supporters of the [City of Sanctuary movement](#) and delighted to be recognised as a University of Sanctuary. This national network brings together, university staff, lecturers, academics and students, who together work to make Higher Education institutions place of safety, solidarity and empowerment for people seeking sanctuary.

As part of the University's ongoing commitment to redeployment, please note that this vacancy may be withdrawn at any stage of the recruitment process if a suitable redeployee is identified.