The
University
Of
Sheffield.

About
The
Job.

Advanced Manufacturing Research Centre (AMRC)

Erasmus Internship Student

(2 posts)

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Overview

About the Department

The University of Sheffield AMRC is a cluster of industry-focused manufacturing R&D centres and supporting facilities.

The original Advanced Manufacturing Research Centre with Boeing, established in 2001, is a world-leading centre of advanced machining and materials research for aerospace and other high-value sectors. It has over 70 industrial members, from global giants such as Boeing, Airbus,

Rolls-Royce, BAE Systems and Messier-Bugatti-Dowty to local small businesses, and works with hundreds of other companies on specific projects.

The Nuclear AMRC, established in 2009, applies the same model of collaborative research to the nuclear supply chain. It has over 40 members, and helps UK manufacturers compete at home and worldwide for work in the energy sector.

Both the AMRC with Boeing and Nuclear AMRC are part of the High Value Manufacturing Catapult, a consortium of seven leading manufacturing and process research centres backed by the Technology Strategy Board.

The AMRC Training Centre opened in 2013 to provide the practical and theoretical skills that manufacturing companies need to compete globally, from apprenticeship to higher-level skills. The AMRC group also includes Namtec, which provides training and consultancy to the manufacturing supply chain; Castings Technology International, a leading provider of technology and expertise to the cast metals sector; and the AMRC Knowledge Transfer Centre, a dedicated meeting, conference and training hub.

Recent developments include the new AMRC Design Prototyping and Testing Centre; AMRC Factory 2050, which will be the UK's first fully reconfigurable assembly and component manufacturing facility for collaborative research; and the Medical AMRC, a dedicated team focusing on healthcare technology.

AMRC is part-funded by the European Regional Development Fund.

Project Description

Robotic milling is an area of research that has become increasingly relevant, due to the need for flexible and reconfigurable manufacturing systems. The key challenges with robotic machining are the static and dynamic deflection of the robotic system, which leads to form errors, poor surface finish and low productivity. Besides, the control system performance, the coolant techniques to be applied are the other key factors to be investigated. The sub projects related to the robotic milling concept are listed as below.

1) **Modelling of kinematic chain and motion of the hexapod robot:** The objective of this project is modelling the kinematics of a hexapod robot used for milling operations. The solid models and corresponding dimensions for assembly of the kinematic chain are available. The student is expected to derive the kinematic equation of motion for the hexapod system. Then, the derived kinematic chain equations will be used for identification of workspace without any singularity or out of limit conditions. The kinematic chain model will be used to develop Jerk limited motion model of the robot to simulate the acceleration, speed and position of the robot throughout a milling tool path.

2) **CFD Modelling of minimum quantity lubrication (MQL) flow for milling applications:** The objective of this project is to model the minimum quantity lubrication flow for milling applications. MQL is a technique, where minimum amount of lubricant oil is misted to the tool tip through nozzles. The key parameters are air pressure, MQL flow rate, air flow rate and the nozzle geometry. The student is expected to develop a CFD model of the flow and validate this model through experimental observations.

Person Specification

Applicants should provide evidence in their applications that they meet the following criteria. We will use a range of selection methods to measure candidates' abilities in these areas including reviewing your on-line application, seeking references, inviting shortlisted candidates to interview and other forms of assessment action relevant to the post.

	Criteria	Essential	Desirable
	Qualifications and experience		
1.	Being 2nd or 3rd year student in Mechanical, Manufacturing or relevant engineering discipline.	X	
2.	Willing to work in the fields required by the project aims.	X	
3.	Previous experience in the area related to the project.		X
4.	Proven interest to the area of the project through previously taken courses during undergraduate education.		X
	Management skills		
5.	Time management ability throughout short-term projects.	X	
6.	Ability to provide progressive updates about the project work.	X	
	Communication skills		
7.	Effective communication skills, both written and verbal, report writing skills, experience of delivering presentations; communicating to staff at all levels the organisation's strategic plan and their personal contribution towards it.	X	

8.	Ability to effectively communicate complex theories, problems andresearch findings to a variety of audiences.	X	
	Problem solving and decision making		
9.	Ability to develop creative approaches to problem solving.	X	
10.	Ability to analyse and solve problems with an appreciation of longer-term implications.	X	
	Project management		
11.	Ability to assess and organise resources, and plan and progress work activities.	X	
	Personal effectiveness		
12.	Experience of adapting own skills to new circumstances.		X

Further Information

This post is fixed-term for 2 months an end date before 30 September 2016.

This post is full-time subject to Erasmus Internship Mobility Programme conditions.

Enquiries about Erasmus Internship Mobility: Please contact the Erasmus Office in your University for further information about the Erasmus Internship Mobility application.
Closing date: 04 March 2016

Informal enquiries: For informal enquiries about this post, department and selection process, contact: Lutfi Taner Tunc on taner.tunc@namrc.co.uk