UNIVERSITY of GREENWICH

Information on Postgraduate Research Scholarship - Ref:VCS-FES-01-23			
Faculty:	FES	**Department:**	Wolfson Centre for Bulk Solids Handling Technology
Lead Supervisor:	Dr Atul Sharma		
Project Title:	***Enhancing efficiency of dense phase conveying of powders to facilitate reductions in carbon emissions from in-plant transport of ingredients and products in food, chemicals, minerals, and other industries.***		
Project Description:	This project is an opportunity to contribute towards significant energy saving in manufacturing processes, in a collaboration with a European multi-national process engineering company and a world-leading academic research centre. A major consumer of energy in manufacturing is transfer of solid materials (powders, granules etc) in air in pipeline systems. In particular, food and pharmaceuticals find it beneficial because of containment, cleanliness and flexibility of routing. However, this adds significant cost and carbon footprint to manufacturing which needs to be reduced. One method that can be used is so-called "dense phase" flow of the material in slugs, instead of transport in disperse "lean phase" conditions, which has been seen to save up to 70% of energy in some instances. However, the mechanics of slug transport are poorly understood. Some materials naturally support slug flow, whereas others block the pipe when slugs form; also, pipeline geometry appears to have an effect, especially pipe bends. The ability to negotiate bends is a major advantage of pneumatic conveying, so to apply dense phase conveying more widely to reduce power consumption, the effects of pipeline geometry including bends and their interaction with the properties of the conveyed materials, must be better understood. Previous work on bends is mostly limited to lean phase. The industry sponsor has pilot plant data that hints at the importance of the geometry of the bends in this regard. However, this has not been explored exhaustively; the behaviour of different materials is very different, but the role of the fundamental properties of the conveyed material (particle size distribution, shape, cohesiveness, friction, surface energy etc) are completely unclear. **Aim and Objectives** To improve understanding of slug behaviour in dense phase conveying, in particular in relation to interaction between material properties, pipeline geometry and air control, and to enshrine this understanding in a predictive model.		

	Training will be given where necessary to take a creative approach to address problems associated with pneumatic transport and complement the broad range of expertise of the successful candidate.
Duration:	3 years, Full-Time Study

Bursary available (subject to satisfactory performance):
Year 1: £18,622.00 (FT) Year 2: In line with UKRI rate Year 3: In line with UKRI rate

In addition, tuition fees will be covered for the three-year study.

This fee is subject to an annual increase.

Person Specification of Essential (E) or Desirable (D) requirements:	
Criteria:	**E or D**
Education and Training:	
• 1st Class or 2nd class, First Division (Upper Second Class) honours degree or a taught master's degree with a minimum average of 60% in all areas of assessment (UK or UK equivalent) in a relevant area to the proposed research project	**E**
• For those whose first language is not English and/or if from a country where English is not the majority spoken language (as recognised by the UKBA), a language proficiency score of at least IELTS 6.5 (in all elements of the test) or an equivalent UK VISA and Immigration secure English Language Test is required, if your programme falls within the faculty of Engineering and Science a language proficiency score of at least IELTS 6.5 overall with a minimum of 6.0 in all elements of the test or an equivalent UK VISA and Immigration secure English Language Test is required. Unless the degree above was taught in English **and** obtained in a majority English speaking country, e.g. UK, USA, Australia, New Zealand, etc, as recognised by the UKBA.	**E**
Experience & Skills:	
• Previous experience of undertaking research (e.g. undergraduate or taught master's dissertation)	**E**
• Previous experience of pneumatic conveying technology	**D**
• Previous experience of Powder Technology	**D**
• Experience of automated control systems	**D**
Personal Attributes:	
• Understands the fundamental differences between a taught degree and a research degree in terms of approach and personal discipline/motivation	**E**
• Able to, under guidance, complete independent work successfully	**E**
Other Requirements:	
• This scholarship may require Academic Technology Approval Scheme approval for the successful candidate if from outside of the EU/EEA	**E**
• The scholarship must commence before 30 September 2023	**E**

Closing date for applications:	***midnight UTC on 31/08/2023***
For further information contact:	**wolfson-enquiries@gre.ac.uk**

Making an application:

Please read this information before making an application. Information on the application process is available at: https://www.gre.ac.uk/research/study/apply/application-process. Applications need to be made online via this link. **No other form of application will be considered**.

All applications **must include** the following information. **Applications not containing these documents will not be considered.**

- **Scholarship Reference Number (Ref)**– included in the personal statement section together with your personal statement as to why you are applying
- **a CV including 2 referees** *
- **academic qualification certificates/transcripts and IELTs/English Language certificate if you are an international applicant or if English is not your first language or you are from a country where English is not the majority spoken language as defined by the UK Border Agency** *

**upload to the qualification section of the application form. Attachments must be a PDF format.*

Before submitting your application, you are encouraged to liaise with the Lead Supervisor on the details above.