“Here's your swarm medicine prescription”: Investigating the ethical and regulatory complexity of in-human testing of robotic nano-swarms

**Type of award**  PhD Research Studentship

**Department**  Engineering Mathematics

**Scholarship Details**  Minimum £15,285 p.a. (£15,609 in 2021/22) subject to confirmation of award.

**Duration**  3.5 years

**Eligibility**  Home (UK) and EU citizens who have confirmation of UK settlement or pre-settlement status under the EU Settlement Scheme.

**Start Date**  From July 2021

**PhD Topic Background/Description**

Nano-swarm technology involves multiple nano or microscopic robots or particles that, alone, do nothing, but when activated they cooperate to perform a specific function. There is significant potential to use this technology in medicine – for example by injecting nano-swarms into the body to treat certain types of cells. As and when this technology becomes ready for first-in-human tests, decisions will have to made about how it can and should be safely tested. Linked to this is the problem of how these tests would be regulated.

Medicines and pharmacological treatments are highly regulated in law and have strict regulatory processes, whereas new invasive procedures and devices are less heavily regulated and often introduced without research or rigorous testing. It is not clear whether nano-swarm technology is more like a medicine or a surgical device, and it is unclear which regulatory framework it would fall under.

We invite project proposals to explore this conceptual problem of classification and the practical implications of its solution for the regulation of in-human testing.

**URL for further information:** [https://tasfunctionality.bristol.ac.uk/](https://tasfunctionality.bristol.ac.uk/)

**Further Particulars**

**Candidate Requirements**

Applicants must hold/achieve a minimum of a Masters degree (or international equivalent) in a relevant discipline. Applicants without a Masters qualification may be considered on an exceptional basis, provided they hold a first-class undergraduate degree. Please note, acceptance will also depend on evidence of readiness to pursue a research degree.

Basic skills and knowledge required:
• **Essential:**
  Excellent analytical skills with a background understanding in one or more of the following:
  ▪ Research ethics
  ▪ Clinical trials
  ▪ Swarm robotics

• **Desirable:**
  Experience of interdisciplinary working

**Informal enquiries**
For questions about the research topic please contact Dr Sabine Hauert at sabine.hauert@bristol.ac.uk or Dr Jonathan Ives at j.ives@bristol.ac.uk

For questions about eligibility and the application process please contact SCEEM Postgraduate Research Admissions sceem-pgr-admissions@bristol.ac.uk

**Application Details**
Prior to submitting your application, please contact the academic listed to discuss your research proposal and see if it aligns with their current research. No indication of an offer can be made until we receive your completed application.

To apply for this studentship, submit a PhD application using our online application system [www.bristol.ac.uk/pg-howtoapply]

Please ensure that in the Funding section you tick “I would like to be considered for a funding award from the Engineering Mathematics Department” and specify the title of the scholarship in the “other” box below along with the name of the supervisor. In addition to the documents requested as part of the online application process, applicants should submit a research proposal (maximum two sides of A4) outlining how they would approach the topic. This should include a brief background, clear research question(s) and proposed methodology.

Interested candidates should apply as soon as possible. Applications from self-funded non-UK students are also welcome.

**Apply now**