Title: A Framework for Economic Assessment of Digital Twin Enabled Smart Assembly

Type of award: PhD Research Studentship
Department: Mechanical Engineering
Scholarship: Minimum £15,609 p.a. (2021/22) plus an additional £4,308 p.a. from the industrial sponsor
Duration: 4 years
Eligibility: Home (UK) and EU citizens who have confirmation of UK settlement or pre-settlement status under the EU Settlement Scheme.

Start Date: October 2021

PhD Topic Background/Description
In this PhD, the student will establish a cost estimation framework in the form of an information system by integrating digital twins, engineering methods including tolerance stack up and dimensional analysis, manufacturing technologies knowledgebase and engineering economics to assess the viability of creating and utilising digital twins to improve assembly. The PhD will start with a review of the relevant technologies such as model-based control, model-based engineering and virtual product development and literature.

Technical study of a GKN assembly process as a case will then follow to establish the basic framework that can incorporate the necessary Computer Aided Engineering methods. The framework is enhanced by incorporating the details of a second independent case study to make sure that the techniques that are developed can be used in multiple engineering contexts. A method such as Monte Carlo or Discrete Events simulation is then used to test the sensitivity and robustness of the framework and incorporate additional “smart manufacturing” technologies. Finally, the framework is validated using a third case study to identify its affordances in a complicated engineering environment. The scope could span areas such as passenger aircraft and urban autonomous mobility.

Further Particulars

Candidate Requirements
Applicants must hold/achieve a minimum of a master’s degree (or international equivalent) in a science, mathematics, or engineering discipline. Applicants without a master’s 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.
If English is not your first language, you need to meet this profile level:

**Profile E**

Further information about [English language requirements and profile levels](https://www.epsrc.ac.uk/skills/students/help/eligibility/).

**Basic skills and knowledge required.**

Knowledge of digital engineering tools (such as CAD and CAE), coding (Python, Julia, etc.) or uncertainty management would be welcome.

**Scholarship Details**

Stipend at the UKRI minimum stipend level (£15,609 in 2021/22) plus an additional £4,308 p.a. from the industrial sponsor. The scholarship will also cover the amount of tuition fees associated with UK-based students. Funding is subject to eligibility status and confirmation of award.

Open to UK students who have been ordinarily resident in the UK for at least 3 years prior to the start date of their programme. Also open to EU applicants who have no restrictions on how long they can stay in the UK and have been ordinarily resident in the UK for at least 3 years prior to the start of the studentship (with some further constraint regarding residence for education).

Candidates can check the eligibility criteria for the award at [https://www.epsrc.ac.uk/skills/students/help/eligibility/](https://www.epsrc.ac.uk/skills/students/help/eligibility/)

**Informal enquiries**

For informal enquiries, please email Prof Aydin Nassehi, aydin.nassehi@bristol.ac.uk

For general enquiries, please email came-pgr-admissions@bristol.ac.uk

**Application Details**

To apply for this studentship, submit a PhD application using our [online application system](https://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 Mechanical Engineering Department” and specify the title of the scholarship in the “other” box below with the name of the supervisor Prof Aydin Nassehi.

**Closing date for application:** 30 Sept 2021