

Title: Aerodynamics and Aeroacoustic Simulation and Design Optimization of Urban Air Mobility Systems

Type of award PhD Research Studentship

Department Aerospace, Fluids and Aerodynamics Research Group

Scholarship Details Minimum £16,062 p.a. subject to eligibility and confirmation of award

Duration 3.5 years

Eligibility Home/EU (UK settled status) with permanent UK residency

Start Date Flexible from Sept 2022

PhD Topic Background/Description

With the emergence of Urban Air Mobility (UAM) systems, the aeroacoustic consideration is elevated to center stage in the design process and no longer treated as a design constraint. However, the optimal control settings or shape of a design that correspond to minimal far field noise is typically not known as a priority. This challenge is compounded by the fact that noise and aerodynamic design objectives are often competing. The proposed project aims to numerically investigate, using high-fidelity simulation, the complex noise generation and radiation mechanisms of isolated and installed propeller configurations. The numerical efforts are complemented by experimental validation. In addition, an efficient adjoint-based optimization framework will be developed to minimize the tonal and broadband noise components of propeller-powered configurations via shape optimization. The baseline and optimized designs will be studied both numerically and experimentally. The outcome of this project is expected to elucidate various important physical mechanisms responsible for UAM noise and provide a critical enabling technology for the UAM community to efficiently predict and minimize the noise from their designs. Successful candidate will have access to large-scale high performance computing resources on ARCHER2, UK's largest supercomputing facility. In addition, the successful candidate will also be offered a rare opportunity to interact and collaborate with major aerospace industry and research establishments around the world.

URL for further information: Bristol Aeroacoustics Team: <http://www.bristol.ac.uk/aerodynamics-research/aero-acoustics/>.

Supervisor: https://drive.google.com/file/d/12R8kynviRmdxmtl7CehNJkeE87e8_xlG/view?usp=sharing

Candidate Requirements

Applicants must hold/achieve a minimum of a master's degree (or international equivalent) in a 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](#).

Basic skills and knowledge required

A strong background in numerical methods. Experience with programming languages such as C/C++ and Fortran.

Scholarship Details

Stipend at the UKRI minimum stipend level will also cover tuition fees at the UK student rate. Funding is subject to eligibility status and confirmation of award.

Funding is 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).

For eligibility and residence requirements please check the [UKRI UK Research and Innovation](#) website.

Informal enquiries

For informal enquiries, please email Dr Beckett Zhou, beckett.zhou@bristol.ac.uk or Prof Mahdi Azarpeyvand m.azarpeyvand@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](#) [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 **Aerospace Engineering** Department” and specify the title of the scholarship in the “other” box below with the name of the supervisor.

Interested candidates should apply as soon as possible. Applications will remain open until the position is filled.