

PhD Opportunity

Space Environment and Radio Engineering (SERENE) Group, University of Birmingham

Supervisor(s)	Prof. Matthew Angling, Dr Sean Elvidge
Application Deadline:	1 March 2016
Project Title:	Multi-model ensembles for upper atmosphere modelling
Institution:	University of Birmingham
School:	School of Engineering, Space Environment and Radio Engineering (SERENE) group
Funding availability:	The studentship is being jointly undertaken by the University of Birmingham and the Defence Science and Technology Laboratory under the EPSRC Industrial CASE award scheme.
Research interests/description of main research theme:	<p>The Defence Science and Technology Laboratory (Dstl) and the Royal Academy of Engineering (RAEng) sponsor a Chair at the University of Birmingham with the aim of developing a programme of internationally recognised research in the field of Space Environment and Radio Engineering. As part of the plan to develop the group, an opportunity has arisen for a fully funded ICASE PhD studentship.</p> <p>The neutral atmospheric density from 200 to 1000 km altitude can change by 80% diurnally as well as by one to two orders of magnitude during geomagnetic storms. The upper atmosphere forecast models currently in use can result in large uncertainties in the orbital parameters when applied to satellite orbit forecasts (i.e. positional errors on the order of kilometres after a day). The accuracy of such models (nowcast and forecast) is further limited by the lack of neutral atmosphere measurements at the appropriate altitudes. Without the capability to more accurately predict orbital trajectories, and thereby better plan satellite collision avoidance manoeuvres, orbital collisions could become frequent enough to cause a cascade, known as the Kessler Syndrome. This has the potential to prevent the use of low Earth orbit (LEO).</p> <p>The use of multi-model ensembles (MMEs) is emerging as a possible way to improve the performance of atmospheric density models and thereby improve orbital predictions. Initial MME work has demonstrated a significant reduction in the RMS errors of total neutral density (by approximately 60%). The proposed programme will aim to demonstrate the use of MMEs over wider range of conditions; formalise the construction of the MME; and expand the use to ionospheric as well as thermospheric densities. Work placements will be undertaken at Dstl and will be focused on testing the new models against data.</p> <p>UK students with interests in upper atmospheric modelling and data assimilation are invited to apply for this fully funded post. Applications are open to students that have, or expect to obtain, a 1st class degree (or equivalent) in a wide variety of scientific disciplines including mathematics, physics and engineering. Due to the nature of the project, the applicant must be able to demonstrate a high level of mathematical and programming ability.</p> <p>To find out more about studying for a PhD at the University of Birmingham, including full details of the research undertaken in the School and guidance on making your application, you can order a copy of our Doctoral Research Prospectus, at: www.birmingham.ac.uk/drps</p>
Funding notes:	The studentship covers University fees plus a stipend (tax-free maintenance grant) of £16k p.a. for the first year, and at least this amount for a further two and a half years. UK students only.
Notes:	Students must undertake placements at DSTL (minimum of 3 months over the duration of the PhD)
Contact for enquiries	Prof. Matthew Angling, m.angling@bham.ac.uk