

## ADVERT FORMAT

**Job title: Post-Doctoral Research Fellow in Hybrid Set-Membership Methods for Control and Robotics**

**Salary grade/ range: 6 or 7 / £27,854 – £32,267 depending on the experience**

**Hours per week/ weeks per year: 37 hours per week**

**Fixed term/ permanent: Fixed term for one year**  
(Give length if fixed term)

**Location:** Plymouth

**Wider University context:**

### **Text relating to the post:**

As a result of a recently-awarded EPSRC Grant (EP/R005532/1: hybrid set-theoretic approaches for constrained control and estimation with applications to autonomous sailing boats) to Dr Jian Wan, a post-doctoral research fellow position is available within the Autonomous Marine Systems (AMS) Research Group, School of Engineering, Faculty of Science and Engineering at the University of Plymouth. This vacancy is a full-time post working 37 hours per week on a fixed term basis for 12 months.

The EPSRC Grant project aims to develop hybrid set-membership methods that can integrate the advantages of individual set-membership tools such as interval analysis, zonotope and polytope geometry so as to solve constrained control and optimisation problems with improved accuracy and efficiency. Particularly, exact polytopic set computation for nonlinear systems is to be explored systematically on the basis of bisecting a polytope and representing a polytope exactly by the intersections of zonotopes. The developed set-theoretic approaches for control are also to be applied to autonomous sailing boats for their reachability analysis, control invariance and obstacle avoidance. The project is being led by Dr Jian Wan (PI) in collaboration with Professor Luc Jaulin from ENSTA Bretagne, France.

The role of this post is to work along with the PI and the collaborator on the following tasks:

- To test and extend a hybrid set-membership MATLAB toolbox
- To explore theoretical applications of the developed toolbox to reachability analysis, set invariance, state estimation and other control issues
- To explore and implement practical applications of the theoretical research results to an autonomous sailing boat
- To lead the progresses of the research project and writing up/publishing results of the research work as directed by the PI and the collaborator

You should have a PhD or near to complete your PhD viva within 3 months of hiring in some relevant subjects of set-membership methods for control and robotics. Understanding set-theoretic methods in control and being familiar with MATLAB programming will be essential for the post. It is also desirable to have evidence of relevant research activity and published research as well.

**Contact for informal discussion:**

Dr Jian Wan ([jian.wan@plymouth.ac.uk](mailto:jian.wan@plymouth.ac.uk)), Lecturer in Control Systems Engineering, Tel: +44 (0)1752586157

**Closing date: 12midnight, 5<sup>th</sup> October 2017**

**Shortlisting to be completed by: 9<sup>th</sup> October 2017**

**Interview date: 20<sup>th</sup> October 2017**

