

# Next generation computational modelling

## Centre for Doctorial Training

The University of Southampton recently established the EPSRC-funded Centre for Doctorial Training in Next Generation Computational Modelling (NGCM). It has dedicated space on our new £116m Boldrewood Campus and builds on our strong history in computer science and engineering. The £10m centre will produce the next generation of computational modellers empowered with the latest techniques and software to exploit hardware advances.

### Technological advantages

- The only UK CDT in computational modelling
- Access to world class expertise and computing power
- Complex systems modelling including CFD, nano and quantum engineering and biological systems
- Eight partial studentships available per year

### Example projects

#### Challenging topological prejudice - automated airframe layout design

There is little evidence that the commonly used, risk preventative 'tube plus wing and cruciform tail' type airframe layout is optimal. This project aims to answer an important question: Given a topologically flexible geometry description, would a sophisticated multi-disciplinary analysis driven optimization process yield a conventional airframe layout or would it yield unexpected results?

#### Flow control for aircraft manoeuvres and loads alleviation

With high potential to set directives for the design of future air vehicles, this research project aims to develop computational fluid dynamics modelling techniques. With applications such as completing aircraft configurations employing fluidic controls as novel manoeuvre effectors and for load alleviation, this project may provide results with many benefits over conventional control surfaces.

#### High-fidelity simulations of the interaction of freestream turbulence with turbulent boundary layers

In this project, novel numerical tools will be implemented into an in-house high-performance numerical solver to enable a series of direct numerical simulations and large eddy simulations. This will develop understanding of the fundamental physical mechanisms involved in the interactions between free-stream turbulence and the turbulent boundary layer, which could improve the performance of high-pressure turbines blades, wind-turbine arrays and flow-control technologies.

### Collaboration opportunity

We are now ready to accept industry projects for summer and PhD research. There are 8 partial studentships available per year from the Centre to be matched by industry partners with at least £12,500 per year, over 4 years. Industry partners are welcome to invest more than £12,500 p.a. to either boost the student stipend or to fully fund studentships to attract students outside the 8 competitive studentships

If you would like to know more please contact [ngcm@soton.ac.uk](mailto:ngcm@soton.ac.uk)