

## Project proposal template – Faculty studentships Summer 2014

<i>Project title</i>	Combustion and detonation of hydrogen with suspended particles and droplets	<i>Director of Study</i>	Dr K Volkov
<i>Second Supervisor</i>	Dr S Dembele	<i>School</i>	Mechanical and Aut ▼
<i>Other members of supervisory team</i>		<i>Any requirements from applicant (eg degree in specific subject area)</i>	
<b>Project summary</b> <b>(max 1,000 characters)</b>			
<p>Hydrogen is increasingly used as an energy carrier in transport, stationary and other applications. Detonation is a worst case scenario for accidents with unscheduled hydrogen release. Risk assessment of hydrogen applications presents new challenges due to a large difference in properties of hydrogen and natural gas (reactivity, ignition energy, flammability and detonability limits, buoyancy, transport properties). Prediction of detonation parameters, as well as blast parameters beyond the detonation zone is important for hydrogen safety engineering, particularly for risk assessment through realistic safety distance assessment for hydrogen infrastructure and development of mitigation technologies. Computational fluid dynamics (CFD) tools have the potential to model the physics and dynamics of explosion and detonation, but without relevant physical and mathematical models, choice of appropriate numerical methods, adjustment of computational parameters and proper user guidelines based on extensive validation work, poor prediction capability is expected. Laser-induced detonation in gas-particle mixture is simulated, and contribution of parameters of laser pulse and composition of the mixture to minimum pulse energy is studied.</p>			