# PhD Studentships

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Flow-induced vibration in rods and rod bundles: an experimental and computational benchmark study</th>
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<tbody>
<tr>
<td>Lead Supervisor</td>
<td>Dr Andrea Cioncolini</td>
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<tr>
<td>Co-Supervisor(s)</td>
<td>Prof Hector Iacovides</td>
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| Programme | PhD in Mechanical Engineering  
PhD in Nuclear Engineering |
| Research Theme | Modelling and Simulation  
Nuclear Engineering |
| Description | The study addresses flow-induced vibration in tubular rods and rod bundles in external parallel flow, a configuration of interest for the nuclear industry for light water nuclear reactors, notably generation 3 and 4 pressurised water nuclear reactors.  
As a result of the fluid-structure interaction, fuel rods in nuclear reactors vibrate and occasionally come into contact. This causes mechanical fatigue and structural damage (so called fretting wear), shortening the fuel residence time in the reactor. A better understanding and predictive capability of fretting wear in nuclear fuel rods would yield more durable fuel. Using existing infrastructures at the University of Manchester (notably, the large scale thermal hydraulics loop and a stereo PIV set up), we will run experiments to resolve both the fluid flow field around the rods and the mechanical response of the vibrating rods, generating a high quality fluid-structure interaction databank for analysis, modelling and numerical benchmarking/simulation. |
| Skills required | Entry requirements can be found by selecting the relevant PhD programme at this link:  
[http://www.mace.manchester.ac.uk/study/postgraduate-research/degree/](http://www.mace.manchester.ac.uk/study/postgraduate-research/degree/)  
Basic knowledge of fluid mechanics, flow-induced vibration and experimental techniques (notably PIV) would be an advantage. |
| Industrial Links | The studentship is co-funded by EDF Energy within the MACE Beacon Scholarship scheme. Funding covers stipend and full tuition fees for home/EU students. Overseas students will need to identify additional funding to cover the difference in fees.  
The student will be fully funded as follows:  
Home/EU Fees - £4,195  
Maintenance - £14,553 per year  
Maintenance top-up - £1,000 per year  
Information on standard fees is available here: |

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**Faculty of Engineering and Physical Sciences**  
**School of Mechanical Aerospace & Civil Engineering**
Information on typical stipend is available here: [http://www.mace.manchester.ac.uk/study/postgraduate-research/funding/](http://www.mace.manchester.ac.uk/study/postgraduate-research/funding/)

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<th>Closing date for applications</th>
<th>30 April 2018</th>
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<tr>
<td>Project specific enquiries</td>
<td>Prof Hector Iacovides (<a href="mailto:h.iacovides@manchester.ac.uk">h.iacovides@manchester.ac.uk</a>)</td>
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**General enquiries:**
General enquiries relating to the postgraduate application process within the School of Mechanical, Aerospace & Civil Engineering should be directed to:

**Martin Lockey** - Senior PG Recruitment & Admissions Administrator
Tel: +44(0)161 275 4345

**Further information about how to apply can be found at:**
[http://www.mace.manchester.ac.uk/study/postgraduate-research/apply/](http://www.mace.manchester.ac.uk/study/postgraduate-research/apply/)