The LSCITS Training Programme is centred on the delivery of an innovative, custom-designed, world-class Engineering Doctorate (EngD). The EngD is a full doctoral-level qualification that is much more industrially focused than the traditional academic PhD. The first phase of the LSCITS EngD will launch in September 2008, and is intended to graduate at least 40 students over the period 2012-2015. The EngD Centre will be based at the University of York, with teaching and supervision from senior faculty at the Universities of Bristol, Leeds, Oxford, St Andrews, and York. The UK’s Engineering & Physical Sciences Research Council (EPSRC) has reserved funds of £4m to support this EngD. Additional support, in cash or in kind, will come from industrial sponsors. Inquiries from new sponsors are always welcome.

EngD or PhD?

While a traditional PhD education is an excellent grounding for someone intent on pursuing a career as an academic researcher based in a university, it has been recognised for some time that an equivalent qualification with a different emphasis would better serve the requirements of business, industry, and other non-academic organisations where the need for enterprising and commercially successful research and innovation plays a key role. The UK’s Engineering Doctorate (EngD) programme was set up more than a decade ago to meet this need. Various British universities now house a total of over 20 EngD centres. Each centre is focused on a particular problem-domain or theme, and several involve partnerships between multiple collaborating universities and industrial partners.

EngD students, known as Research Engineers (REs), are required to pass a number of taught courses (similar in style and content to those found on master of science, or master of business administration, degree courses), and to pursue independent research leading to the submission of a doctoral thesis. The thesis should be single coherent document, but may be based on a portfolio of related research studies.

Industrial Involvement

All Research Engineers (REs) studying for an EngD are expected to work closely with a sponsoring institution. For many REs, the sponsoring institution will be their employer, who releases the RE to attend the EngD’s taught courses and who helps specify the scope of (and topics explored in) the RE’s independent research activities. For other REs, the sponsoring institution is likely to have suggested a desired research topic or theme, provided some funds to support the RE, and agreed to hosting the student for extended periods of time. Many such REs will receive their primary funding (stipend and fees) from EPSRC studentships. Typical sponsoring institutions could be: a private-sector company at any stage of maturity from start-up to global multinational; or a public-sector entity such as a government agency, a state-funded healthcare provider, or a division of the armed forces or emergency services. For ease of reference, any such sponsoring institution is referred to here as an “industrial sponsor”.

What’s in it for the Industrial Sponsor?

In an extensive independent survey conducted for EPSRC by Strategic Marketing Associates (SMA’s “Review of the Engineering Doctorate Scheme: Stakeholder Survey”, Mar. 2006: available from the EPSRC), previous industrial sponsors listed various reasons for getting involved in an EngD. These included: a means for directly connecting with and becoming involved in university research; a cost-effective method of getting research done (of particular value to SMEs); the attraction of working with the RE as a commercially-oriented recruit; the opportunity to “grow your own” researchers in light of recruitment difficulties; and the attractive prospect of treating the interaction between the sponsor and the RE as a form of four-year job interview. The same report states that, for industrial sponsors, a major distinction of the EngD in comparison to a PhD is the advantage that the RE will be based for much of the time at the company and hence will be available to work on a project on a full-time basis. Nevertheless, given the four-year time-scale for an EngD, it is seen as best suited to a project that addresses an underlying problem (e.g. strategic or pre-competitive research) rather than a current immediate tactical need.
What's in it for the Student?

All EngD programmes are explicitly intended to equip their Research Engineers (REs) for senior roles in industry and commerce. (Nevertheless, an EngD would also be a valuable route into academic research.) They do this by providing high-quality collaborations between the universities and a range of companies, and immersing the REs in leading-edge research in a commercial context. In contrast to the traditional UK three-year academic PhD, EngD courses last for four years, carry a higher annual stipend, and require that 70% or more of the RE’s time is spent on a project for the sponsoring organisation, with at least 25% of that time spent on-site at the sponsor.

A March 2007 review of the UK's EngD programmes found that, when compared to a standard PhD, in most cases the number of publications from EngD REs was higher, while both the completion rates and the academic standards of the final theses were directly comparable.

While most EngDs do accept REs with no prior industrial experience, historically over 50% of all REs have spent between 1 and 5 years in industry prior to enrolling, and 20% have more than 6 years industrial experience at enrolment. SMA's March 2006 survey of the UK EngD Programme found that the strong industrial connection is one of the main reasons for choosing to do an EngD; it states: “one third of all REs had not considered doing a PhD but were attracted to the EngD because of the chance to work in a real industry environment.”

LSCITS EngD Aims

The LSCITS EngD offers its REs a unique opportunity to become members of a new generation of specialised engineers and scientists, who – by their interaction with, and active participation in, the LSCITS Research Programme – will become members of a wider national and international community of researchers and practitioners dedicated to meeting the challenges inherent in dealing with current and future large-scale complex IT systems and systems-of-systems.

Our primary aim is that graduates of the LSCITS EngD will have a good understanding of relevant issues and methods across all components of the LSCITS Stack (described in more detail in the related LSCITS Research Programme flyer), and of how the different components of the Stack interrelate, interface, and integrate. The EngD REs, and also the LSCITS PhD students and postdoctoral researchers working directly on the Initiative’s Research Programme, will collectively aim to deliver intellectual tools (and software) that will allow us to improve our understanding of how to analyse and design, and deploy and manage, current and future LSCITS.

LSCITS EngD Course Structure

The LSCITS EngD requires REs to successfully complete a number of core taught modules, and also a sufficient number of optional taught modules. REs who accrue sufficient course credits from their taught modules may progress to pursue their individual research studies, leading to submission of their thesis.

The LSCITS EngD core modules are:

- Systems Engineering for LSCITS
- Empirical Methods for LSCITS
- Predictable Software Systems
- High-Integrity Systems Engineering
- Socio-Technical Systems
- Technology Innovation

For further details see the website at: www.lscits.org

The LSCITS EngD Centre at York

Faculty at the University of York have worked closely with other members of the LSCITS Consortium, and with various potential industrial sponsors, to design the LSCITS EngD. The EngD is an entirely new degree course, centred in York’s Department of Computer Science (rated "6*" and ‘excellent’ in independent reviews of its research and teaching) but with significant additional involvement from The York Management School and from the partner sites of the LSCITS consortium. The York LSCITS EngD Centre Director is Gerald Luettgen, PhD.

For further details see the website at: www.lscits.org

Email: EngDInquiry@lscits.org

LSCITS Undergraduate Intern Scheme

A paid undergraduate intern scheme will also operate as part of the LSCITS Initiative over 2008-2012.

For further details see the website at: www.lscits.org

Email: InternInquiry@lscits.org