

DRD Industry Engagement & Training

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Why industry?

- Government focus – greater return. Strategy.
- Industry engagement – manufacturing needed for strong UK presence.
- Industry insight – Advice on manufacturability.
- Wider value in collaboration.
 - Buy-in from industry to our research goals
 - Exploitation of developed technology. Spin outs. Revenue.
 - Metrics – KEF?
 - Relevance of study.
 - Public profile of collaborations.
 - Graduate destinations in engineering roles.

STFC / CERN Industry Activities : Present

- Industrial liaison operations (ILO) focusing on Procurement opportunities for UK industry.
- Seeking to engage in more CERN development collaborations (eg CESAR)
- Seeking to strengthen exploitation of CERN IP / knowledge. Collaborative innovation. (CERN Global Innovation Campus).
- Engage with CERN academic community more comprehensively around industry.
 - DRD activity.
 - Business Engagement and Data Analysis role.
- Important to consider STFC's 'Combined Role' in funding grants and supporting industry. Challenges in governance.

DRD plans (with STFC)

- Develop an Industry Programme Board.
- Create a core technologies roadmap for DRD.
- Identify core technologies where UK can engage.
- Promote a UK technology supply chain for DRD.
- Construct a UK 'Trusted Suppliers' database to support engagement.
- Fund short term 'prototyping' for industry on proof-of-concept projects.
- Seek longer term structural funds to support longer term industrial collaboration.

Training

- We will establish an instrumentation training programme for staff and students
 - Lecture series – **Graduate training**
 - Graduate level school – **In-person School**
 - Coordinate UK-wide training of the experts who will operate equipment & facilities – **Specialist training**
- Seek a Centre of Doctorate Training linked to the DRD projects and UK experimental programme.
- A longer-term aim will be the establishment of UK instrumentation fellowships, to complement existing fellowships.

Graduate Training

- Establish and run a **national** training programme in the DRD research areas.
- The training programme will be linked to **all** the aspects of the UK DRD programme.
- Programme will incorporate existing activities at institutes and nationally
 - Builds on existing long-term UK experience running multi-site graduate training schemes.
 - E.g. Scottish Universities Physics Alliance Graduate school (SUPA), Midland Physics Alliance Graduate School (MPAGS), Advanced UK Instrumentation Training Lectures
- Aim
 - strengthen the UK instrumentation training of the new generations.
 - build the expertise of our engineers, technicians and physicists.
 - foster a network of UK experts.
 - Laid the groundwork for the CDT
- To consolidate the learning and strength the cohort an annual in-person residential school will be provided
 - hosted by the different institutes of the UK DRD
 - separate bid for an Instrumentation Summer School Series to STFC School funding programme

Existent UK on-line course

- <https://indico.cern.ch/event/1277888/>
- Series of online lectures to support UK PhD student training in instrumentation, along with continued development of postdocs and beyond
 - No fee / Open to non-UK
- Geared towards the needs of the silicon/semiconductor community
 - Semiconductor Theory
 - Electronics and DAQ
 - Mechanics and cooling
 - Fabrication and structures
 - Experimental techniques
 - TCAD electric field & transport simulations
 - Software tools
 - Short topics
- Lectures given by UK experts run on
 - Tuesday afternoons 13:00 - 17:00 BST
 - Friday mornings 9:00 - 13:00 BST
 - in the weeks May 1 - June 19 inclusive.
- UK steering committee
- **We will expand this to include other areas as required by the DRD areas**
 - The existing RAL detector lectures and other Graduate schools' instrumentation courses will be incorporated
 - Reducing effort for the lectures will broadening the offering to the students.

In-person school

- The successful HEP Summer School provides a template for the DRD-UK residential component
- The annual schools in the series will be residential and hosted by the different institutes of the DRD network.
 - Separate bid for an Instrumentation Summer School Series to STFC School funding programme
- Will include laboratory sessions, tutorials, Q&A, visit to local experimental facilities, and opportunities to network with industrial partners
- Build on successful bid for a Silicon Summer School

Silicon Summer School

- Funded via the STFC Schools programme
- 24 students – 20 funded and 4 international
- When: First two weeks of July 2024 in Oxford
- 4 groups rotate around 4 lab sessions
 - Sessions include Tutorials and Q&A discussion sessions
 - Reinforcing major parts of the on-line course
- Evening events allow networking and career path discussion

	Monday	Tuesday	Wednesday	Thursday	Friday	Weekend - Free	Monday	Tuesday	Wednesday	Thursday	Friday
Group 1	Introduction	Device simulation		Electronics			Lab: Electrical Characterisation	Lab: Particle Detection		Close Out	
Group 2		Electronics		Device simulation			Lab: Particle Detection	Lab: Electrical Characterisation			
Group 3		Lab: Electrical Characterisation		Lab: Particle Detection			Device simulation	Electronics			
Group 4		Lab: Particle Detection		Lab: Electrical Characterisation			Electronics	Device simulation			
Evening	Poster Session 1	Academic careers 1	UK infrastructure	Industrial careers 1		Poster Session 2	Academic careers 2	College dinner	Industrial careers 2		

Specialist training and Equipment register

- We rely on Common & Shared tools, equipment, and general infrastructure to deliver instrumentation research.
 - The UK has a wealth of equipment and facilities
 - Of course, never enough!
- To maximise return on investment the DRD will coordinate the use & training of these common tools.
- We will set up a web-based interface to aid the information sharing and create a UK pool of high-end research equipment and expert users.
- We will coordinate UK-wide training of the experts who will operate the equipment.
 - Examples: TCT & DLTS systems, X-ray and Proton irradiation facilities

Instrumentation CDT

- Establish and run an instrumentation Centre of Doctorate Training linked to the DRD projects.
 - Will not replace the CASE awards
 - Will engage with STFC as not an established STFC student funding route
 - Use EPSRC as a model
- The topics of individual PhDs driven by the DRD-UK research lines
- The programme will build on and extend what we have (and plan to do)
- It will consist of:
 - a mix of online and face-to-face lectures and courses on a variety of subjects
 - residential laboratories and workshops focused on hardware
 - networking events; soft- skills training
 - industry placements.

Instrumentation CDT

- Central request for student funding hosted over range of institutes
 - EPSRC require minimum 20% funding from non-RCUK
 - EPSRC ask for 50+ students over 5 years
- We will seek matched funding from
 - The typical science and engineering research companies, our “industrial partners”
 - Benefiting from Industrial engagement activity
 - Also, from companies who benefit from scientists with transferable skills:
 - E.g. science communication companies, management companies and venture capital and investment companies.

Instrumentation CDT

- EPSRC requires a cohort approach to doctoral education including peer-to-peer learning both within and across cohorts.
 - provided throughout the lifetime of each student's doctoral training programme.
 - a significant commitment to and support for the training environment by the hosts and **partners** including appropriate co-creation and co-delivery of the centre
 - opportunities for all students to gain experience beyond their doctoral projects
- Build the cohort experience
 - Planned training
 - Industrial placements
 - Mobility between the different DRD institutes
- EPSRC requires an independent advisory board, to provide external challenge on CDT strategy, stakeholder engagement and delivery
 - I suggest that this is the DRD steering board

M&O in the CG application

- Funds for attendance at the school and for the CDT will be subject to future bids.
- Instrumentation for the school is bid for
 - budgeted at £35k for the first cohort
 - reduced to £11k for updates and expansions for further iterations
- Travel for training for staff is folded into the travel costs
 - Requested total for all travel is £29k per annum

Funds are requested to support the engagement with industrial partners.

- Funds for the industry programme board for travel of five industrial members and five UK academic visits to UK industry at £4k per annum.
- Technical support for UK company database and website request of £0.5k per annum.