

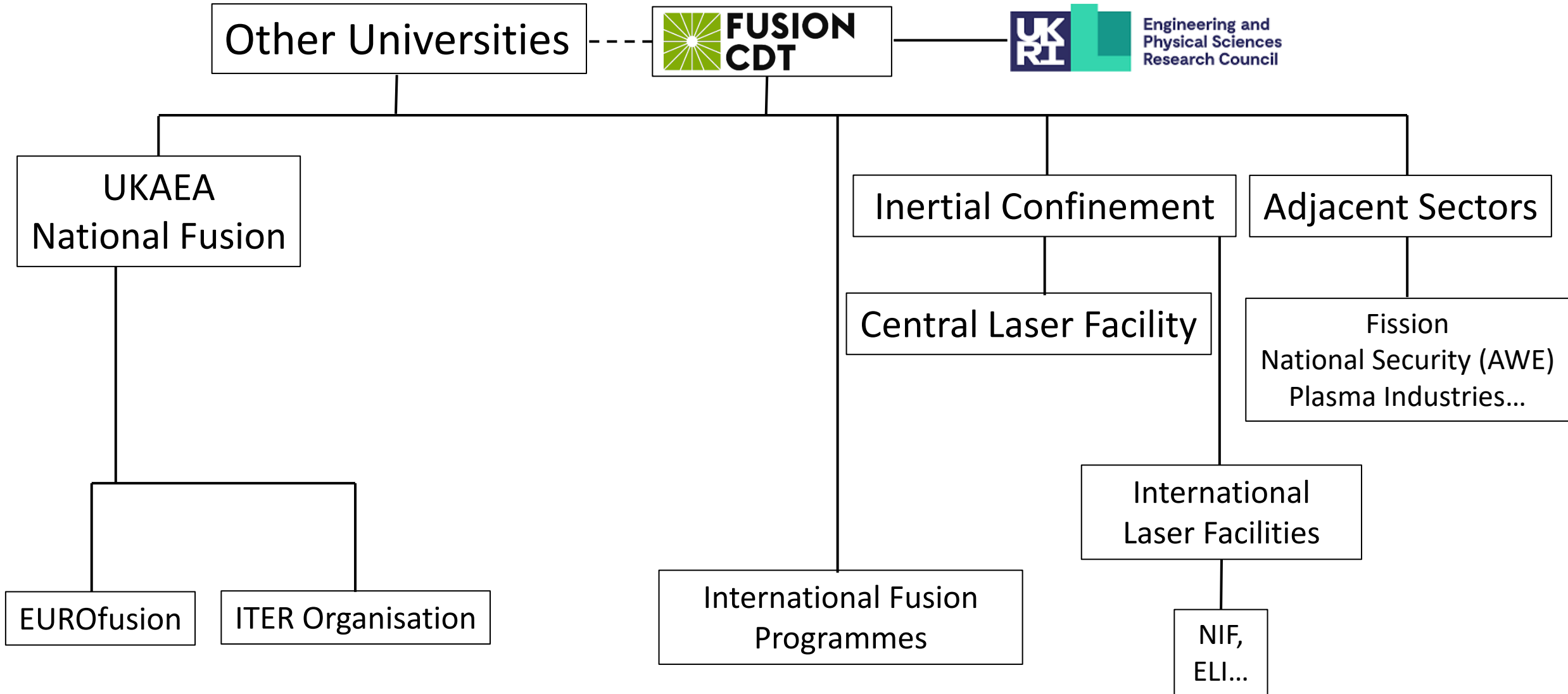


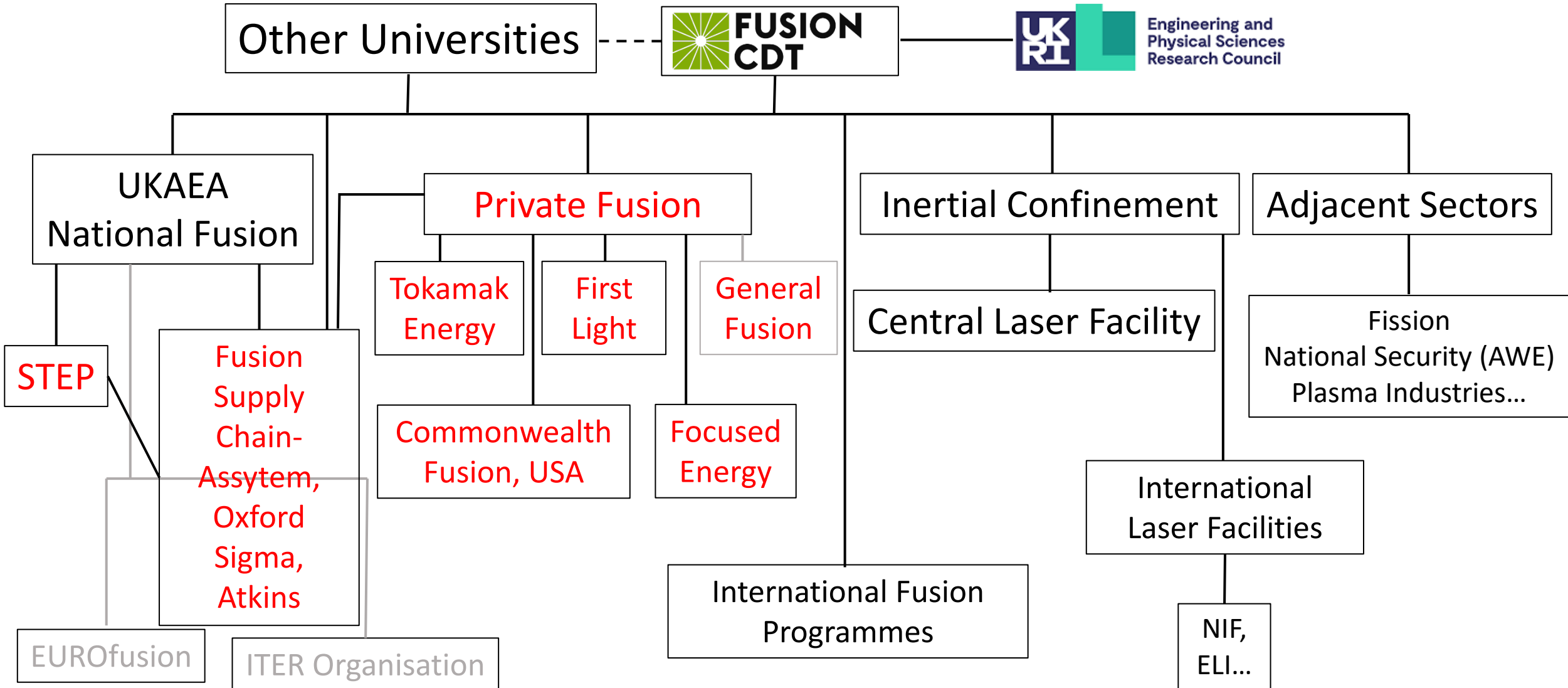
Overview and updates

David Armstrong



- Climate change and energy security are driving an expansion in fusion energy R&D, and with increased urgency
- The demand for fusion skills is stretching supply
 - Strong growth in the UK, as well as internationally (e.g. EU, US, China)
 - Driven by both government and private fusion programmes gearing up for delivery
 - Supply chain must also grow towards establishing the future fusion industry, further enhancing the skills needs
- The aim of the Fusion CDT is to make a major contribution to doctoral fusion skills requirements





- We cut across both magnetic and inertial fusion energy approaches
- Our scope covers two of the main fusion science areas and related technologies
 - Plasma Physics
 - Materials Science
- As we advance towards building and operating fusion prototypes, we are growing our social science expertise in key areas:
 - Regulation and licensing
 - Public acceptability
 - Governance and stakeholder appetite
 - Energy justice

- Breadth of expertise is provided by our network of five universities:
 - Durham, Liverpool, Manchester, Oxford and York
 - We also have students with universities of Sheffield, Warwick and, soon, Bangor
- Collaborating with national and international partner laboratories
 - UKAEA, AWE, F4E, ITER, NNL, RAL, EUROfusion...
- ...and industry, including private fusion companies and wider supply chain
- To train the next generation of fusion experts who will:
 - Exploit ITER, DEMO design and international laser facilities
 - Design, build and then operate STEP
 - Support private fusion endeavours – inertial and magnetic
 - Support the development of the fusion supply chain
 - Contribute to industries in adjacent sectors

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total Students recruited	EPSRC Grant (£M)
Fusion DTN	Yes	Yes	Yes	Yes	Yes											31	2.4
Fusion CDT Pt1			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes						85	3.8
Bridging CDT								Yes	Yes	Yes	Yes					10	0
Fusion CDT Pt2									Yes	Yes	Yes	Yes	Yes	Yes	Yes	60	4.35
Total Students Recruited																186	10.55

- We are presently recruiting our final cohort for CDT2
 - Preparations for a renewal are in final stages – Fusion Power Production 2024-33
- EPSRC is the dominant funding organisation, matched from other sources:
 - Our partner universities (match EPSRC studentships) – Sheffield
 - EUROfusion (via UKAEA)
 - Partner organisations: UKAEA, AWE, CLF, First Light Fusion, Tokamak Energy, Oxford Sigma, Atkins, Assystem, NIF, National Nuclear Lab...

- Four year cohort-based PhD programme:
 - Early group introductory modules with team-building
 - Formal taught programme in first 6-7 months
 - Core modules (intros to plasma, materials and computational methods) and specialist modules all focused around power plant design
 - Major research project across remaining 3.5 years – 75% with industrial or National Lab funding
 - Improved and tailored non academic skills training (key request from partners)
- “Collaboratory” mini-project (typically during second year)
- Annual “Frontiers and Interfaces of Fusion” plus student conference
- Optional outreach programme
- Funding to attend international conferences

- We successfully delivered two Fusion Industry Schools, partnering with UKAEA : fusion-cdt.ac.uk/fusion-industry-school/
- Across two separate weeks in 2022 and 2023:
 - York in June, Oxfordshire in September
- Year 1 30+ delegates at each (45 in total)
- Year 2 60+ delegates at each (80 in total)
- Delegates from range of organisations
 - ARUP, Assystem, Atkins, Doosan Babcock, Environment Agency, Jacobs, Rolls Royce, TWI, UKAEA...
- Expert lecturers from UK and overseas gave tailored lectures for industry
- Profits feed into our ED&I activities
- Successful event, so will continue to hold annually





ITER Poloidal Field Coil PF4
Credit © ITER Organization,
<http://www.iter.org/>



NIF Target Chamber
Credit © LLNL



Fusion Industry School



A 2-week programme delivered by world-leading experts in fusion and related fields.

The Fusion Centre for Doctoral Training and UK Atomic Energy Authority (UKAEA) have worked with the fusion community to create this programme. You should finish the course with a broad understanding of the fusion landscape and the challenges that remain to be solved.

The school consists of lectures, networking sessions, panel discussions and Q&As as well as visits to the visits to UKAEA's fusion facilities in the second week.

'The Fusion Industry School 2022 gave us the opportunity to learn from the industry leading experts about a wide range of topics.'
Agnes Auledas, Atkins

'The School was a very comprehensive overview of the fusion industry, its current status and the challenges that need to be overcome'
Joe Large, Jacobs



JET
Credit © EUROfusion

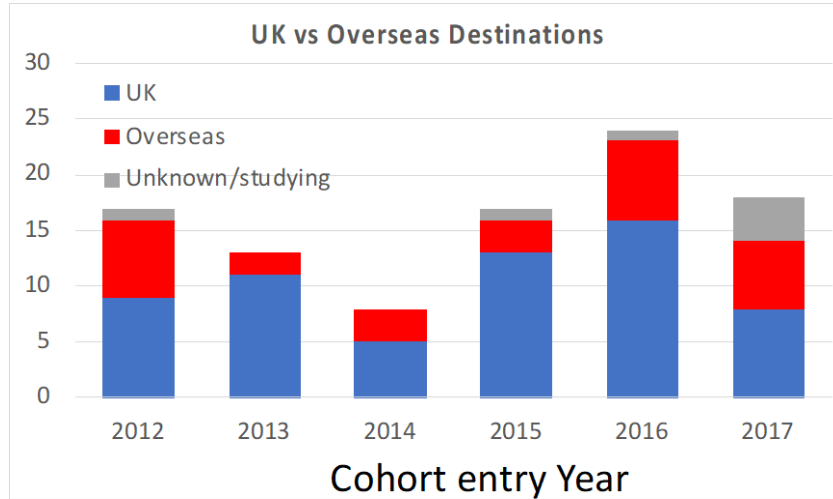
YORK
19th - 22nd June 2023
Focus on fusion science and technology

OXFORDSHIRE
25th - 28th September 2023
Focus on engineering applications

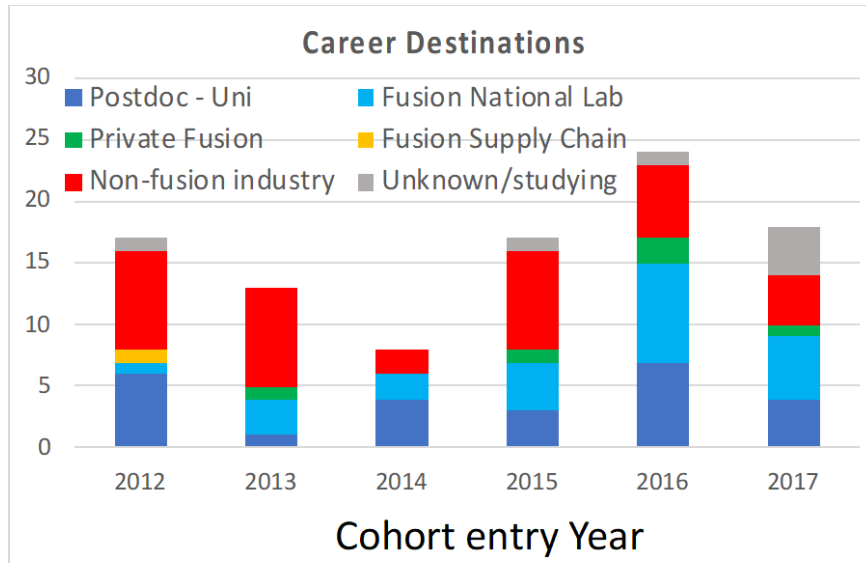
REGISTRATION NOW OPEN

<https://fusion-cdt.ac.uk/fusion-industry-school/>

fis-enquiries@york.ac.uk
+44 (0)1904 326764



- Some evidence for a growth in overseas destinations recently
 - Healthy international impact of programme, provided there is a 2-way flow



- Interesting shift from roughly balanced fusion vs non-fusion in early years, to increased fusion careers recently

The retention and drop in recruited numbers of female students needs to be understood, and fed into a forward plan with support from EDI consultancy companies

- The comment was with regard to the 2020 cohort
 - Recruitment was hampered by late announcement of grant
 - Note previous grant also announced late in 2014
- Numbers recovered

