

Building inclusive communities in an interdisciplinary, multi-institutional Centre for Doctoral Training

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1. Who are we?

The **EPSRC Centre for Doctoral Training (CDT) in Aerosol Science** is a partnership between 9 UK institutions and 90+ industrial and public sector partners.

We deliver comprehensive and broad-based training in aerosol science, offering:

- a 4-year **cohort-based training and research PhD** (including the option for **part-time study**)
- **Continued Professional Development opportunities** for Partner employees

The CDT is **highly multidisciplinary**:

- PGRs have a broad-range of undergraduate backgrounds (see Fig. 1., right)
- Our 60+ academics span 5 STEM faculties
- ~25% of our PGRs are returners to education
- PGRs are **alumni of over 40 different UK institutions**

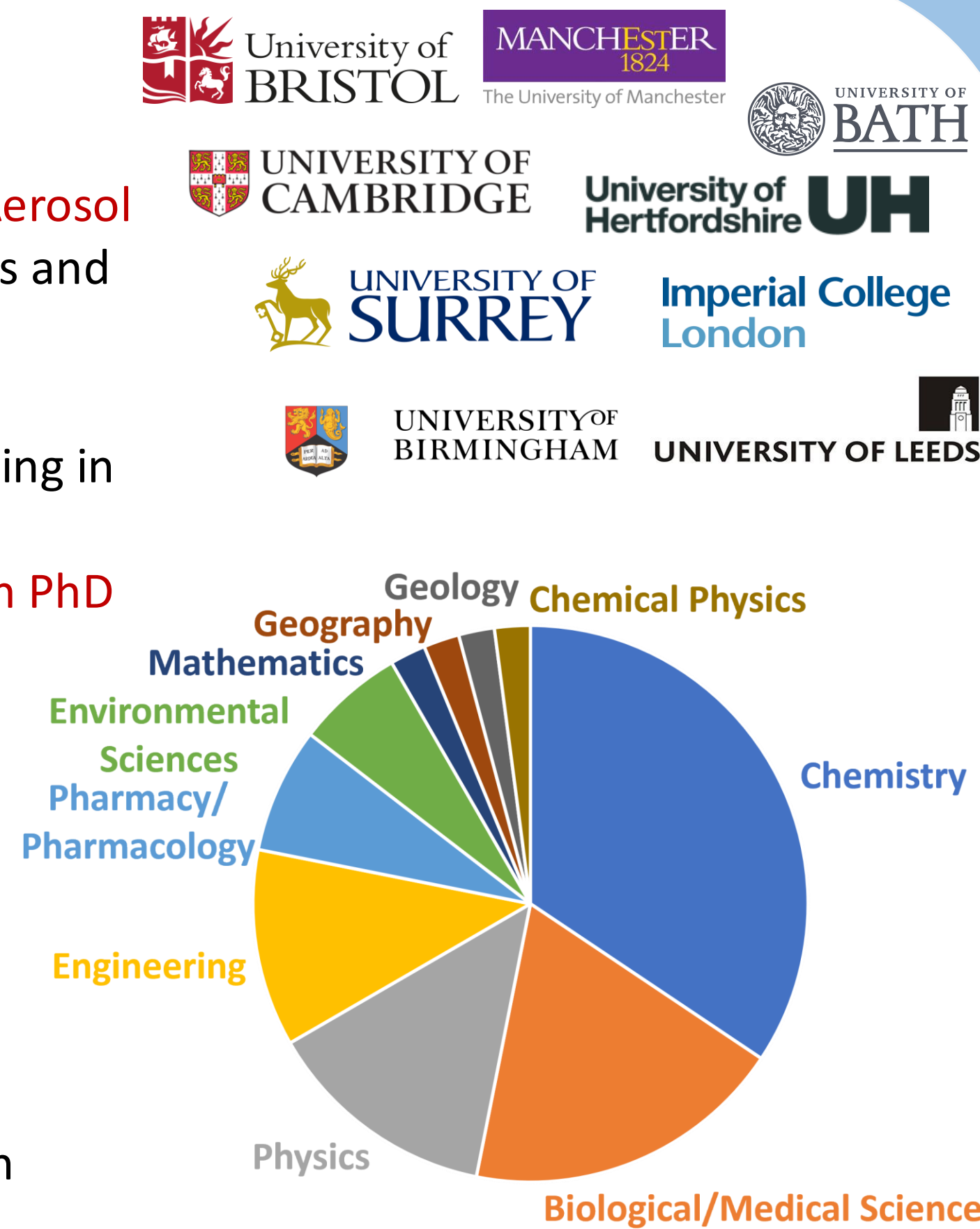


Fig. 1. Undergraduate disciplines of Cohorts 1-5, n = 96

2. A Centre co-created with our community

Despite aerosol science underpinning a wide range of scientific areas (Fig 2., right), prior to the CDT there was no UK-based aerosol science degree program, either at undergraduate or postgraduate level.

The CDT research culture, graduate curriculum and training model were co-created with stakeholders from across the aerosol science community (Fig. 3).

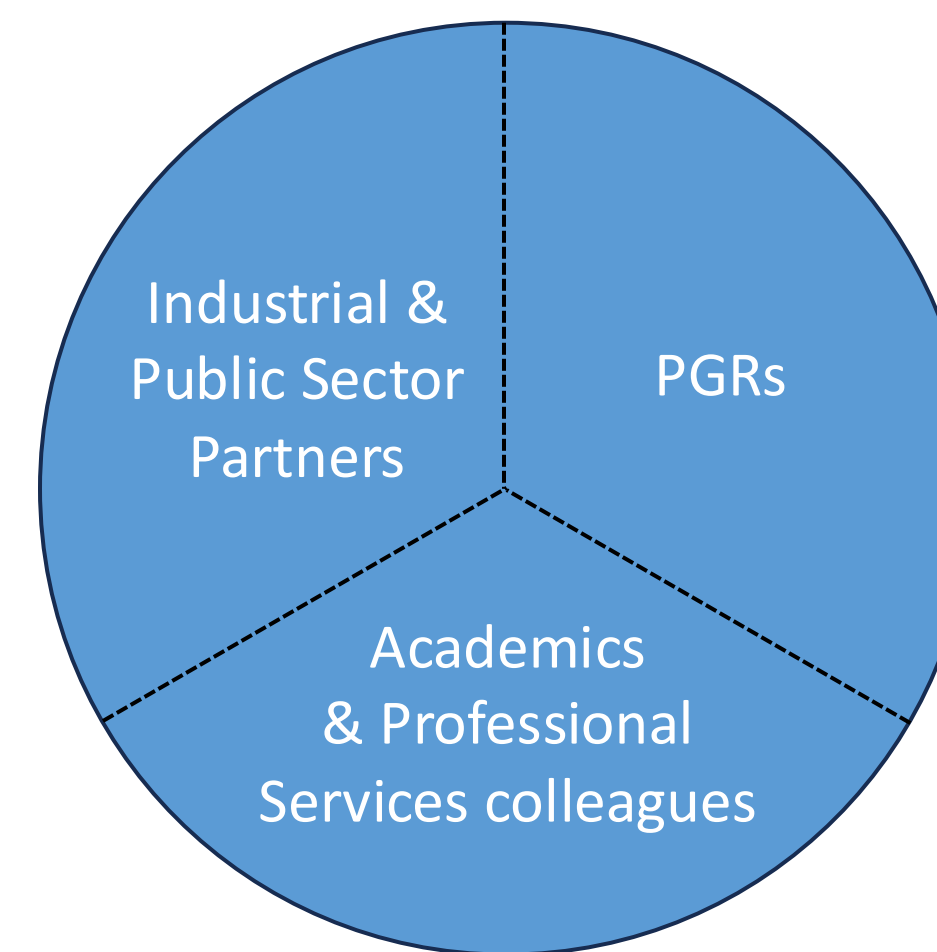


Fig. 3. Stakeholders involved in CDT co-creation



Fig. 2. Disciplines underpinned by aerosol science

Our inclusive community was built...

‘from the top down’

- True embedding of ED&I (not ‘bolt-on’)
- Considering inclusivity in design of frameworks/processes

And **‘from the bottom up’**

- Culture reinforced by day-to-day environment and interactions
- ‘Whole person’ approach – ‘we value you as an individual’

3. Stakeholder co-creation

In 2018, The Aerosol Society of the UK and Ireland held a stakeholder workshop for professional aerosol science practitioners that included representatives from 26 UK-based enterprises, industries and public-sector organizations, along with academics involved in training PGRs in aspects of aerosol science.



The workshop objectives were:

1. **Identify the critical research objectives** in aerosol science for each discipline.
2. Explore the **training needs of current and future employees** of stakeholders in each sector
3. **Determine the frameworks** in which the relevant training could be delivered.
4. To share **ideas for ongoing stakeholder engagement** with researcher training.
5. To agree on **key words to describe core concepts** required in the training of aerosol science researchers.

→ **Outputs collated and summarised in interim review**

A post-workshop consultation programme was used to refine the interim review through an online survey, 1:1 telephone consultations with stakeholders, and PGR focus groups.

Fig. 4. Stakeholder co-creation workshop



4. CDT Training and Research PhD programme

The CDT offers a 4-year training and research PhD with an **intensive taught first year**. All PGRs, regardless of their home institution, spend the **first 8 months studying as a cohort** in Bristol.

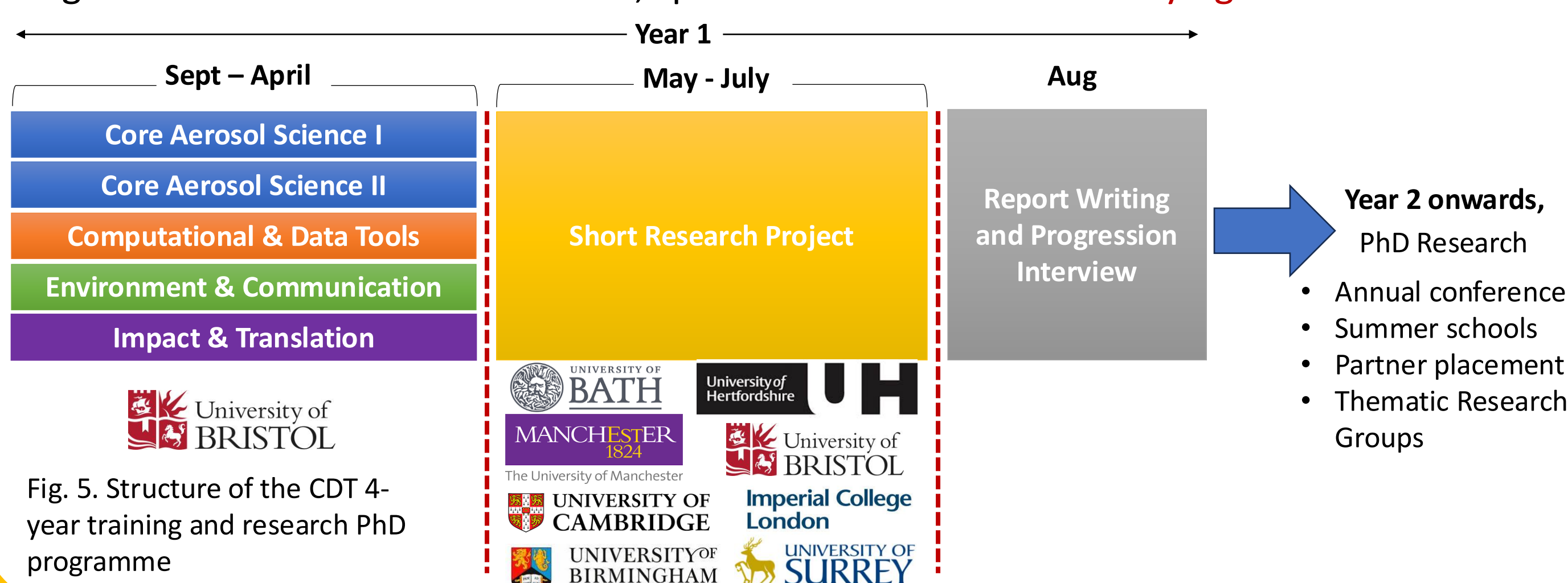


Fig. 5. Structure of the CDT 4-year training and research PhD programme

OUTPUTS

3a. The Nine Graduate Competencies for Aerosol Scientists

Graduates in aerosol science should demonstrate the following competencies:

1. Apply theoretical knowledge of aerosol science across a range of problems of a chemical, physical, biological or technological nature.
2. Undertake independent design and conduct experiments/models with technical mastery, as well as analyse and interpret data.
3. Identify, formulate, critique and solve research problems within their specialised context to advance the understanding of aerosols.
4. Develop or adapt advanced methodological approaches to contemporary problems, recognising the complexity and tolerating the ambiguity that arises in real-world systems.
5. Synthesise new approaches to meet an identified outcome within realistic constraints such as economic, environmental, social, political, ethical, safety, manufacturability, and/or sustainability.
6. Act in congruence with professional & ethical values, & manage ethical dilemmas in formulating scientific solutions.
7. Function effectively and confidently in multidisciplinary teams, acting autonomously and taking responsibility for the scientific activity of others.
8. Communicate and share research knowledge to both expert and non-expert audiences, and guide the learning of those from outside their discipline.
9. Manage personal intellectual development as a self-critical, reflective scientist with the agility to respond to new challenges.

3b. Co-created training frameworks

- **Intensive first training year**, including short **interdisciplinary research project**
- 2-3 month Work-Integrated Learning **placement with Partner** organisation

3c. CDT Guiding Training Philosophy

- 1) Guided by the nine graduate competencies, we will **ensure that our PGRs engage in practice and receive feedback in each area of their training, and we will assess their progress.**
- 2) We will draw upon **research on how learning works** and **research-based instructional strategies** in devising this practice, feedback and assessment.
- 3) We will take a **holistic approach to issues of equality, diversity and inclusion**, considering these when designing learning and assessment approaches, including their scheduling and accessibility *via* part-time study.
- 4) We will support our PGRs to **integrate a consideration of issues of impact, outreach and public engagement** throughout their practice.

5. Inclusive recruitment

We run a bespoke recruitment process designed to:

- attract a **diverse range of applicants**
- explicitly assess **research potential**

→ **Blind shortlisting** based only on a candidate narrative statement

→ **Competency-based interviews**; applicants scored using a **set rubric**; **no CVs**

→ Applicants provided with **preparation resources for interviews**

→ Assessors given guidance on **unconscious bias and fair recruitment**

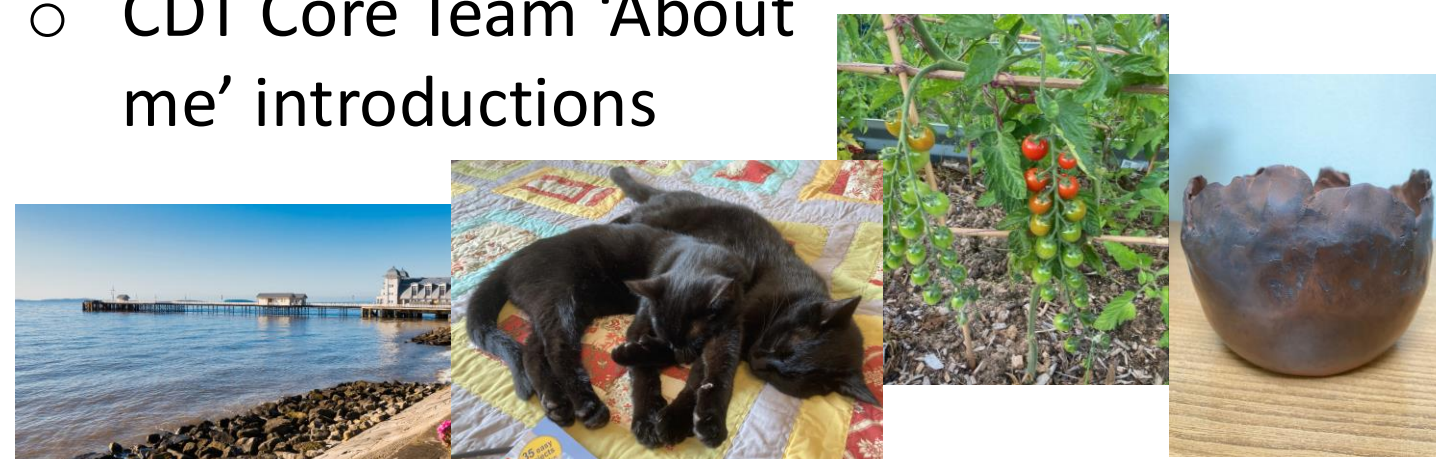
→ Opportunity for applicants to give **anonymous feedback** on the application process.

Applicant demographics monitored at all stages of the recruitment pipeline

6. CDT Training Environment

PGR induction and culture setting

- CDT Core Team ‘About me’ introductions
- Cohort ‘About me’ introductions (optional!)
- Clearly state we welcome feedback!
- CDT handbook - Entitlements, support etc.
- How we want to work together activity



We operate a ‘Whole person approach’ – actively showing we welcome and value everyone’s diverse experience

Constructive alignment of pedagogy

- **Team-Based Learning (TBL)**
 - Research based instructional strategy
 - Builds **communication and teamworking skills**
 - Peer-to-peer learning and **support networks**
- **Engaged Learning**
 - Taking student learning into **real-world environments**
 - Connecting with **communities & organisations**
 - Learning through **authentic experiences**



Fig. 6. CDT training activities

