

# Industry partnerships and doctoral employability – the case of the CDT in Formulation Engineering

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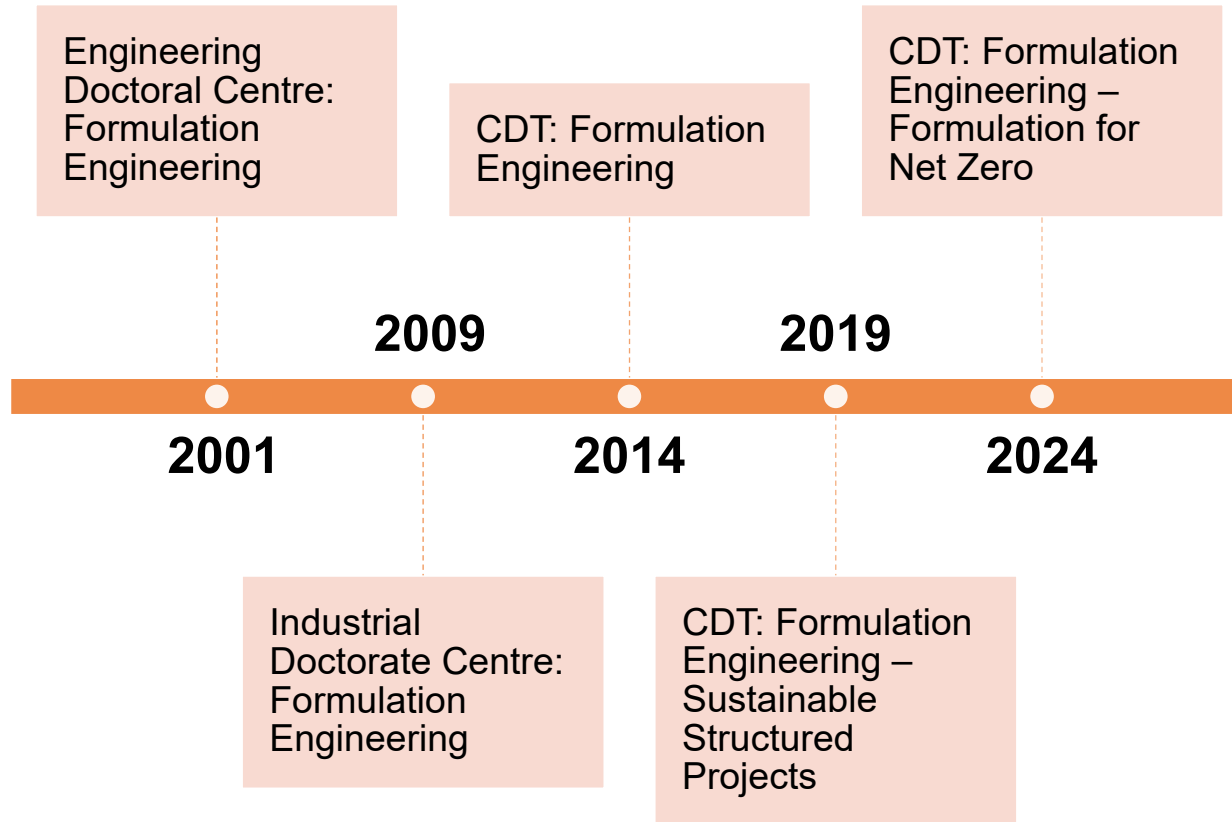
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21 March 2024

# History of the CDT



Pioneering the concepts of **Formulation Engineering** in the UK, the CDT won the Queen's Anniversary Prize 'for excellence in Formulation Engineering' in 2011



# What is Formulation Engineering?

- Chemistry is not enough;
- Ensure the right microstructure;
- This controls consumer response.

## Industry:

- Foods: structured solids; mouth and stomach
- HPC: tablets, gels and creams; teeth, skin, clothes
- Pharma: tablets, gels and creams
- Fine chemicals

**Central to UK prosperity  
£95bn GVA in 2021**

UNIVERSITY OF  
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FORMULATION  
ENGINEERING CDT



# Formulation Engineering – (some) Industrial Partners



# Why a CDT?

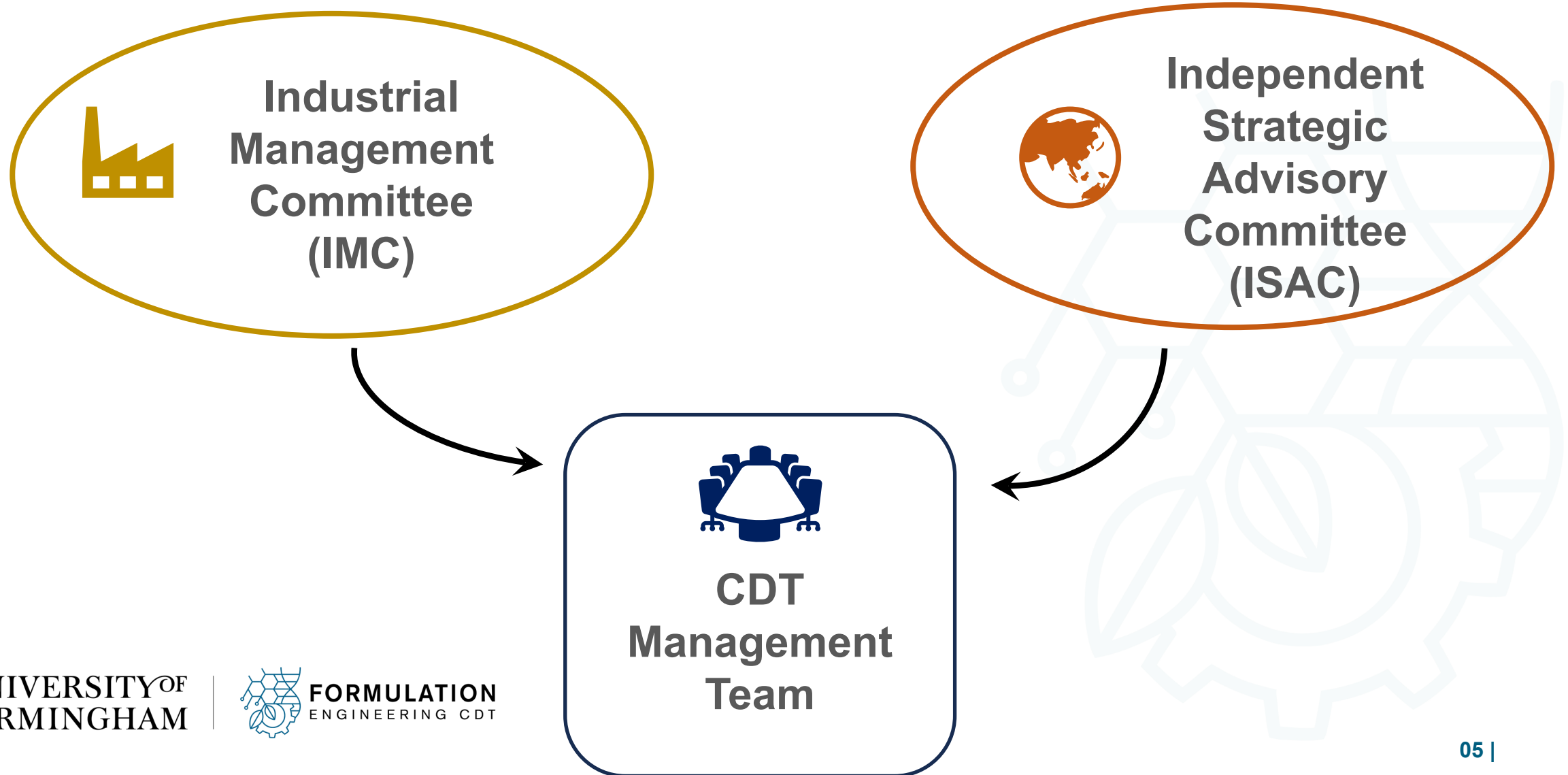
## Industry Partners

- Receive a recent graduate working on industrially relevant problems with the support of one of the UK's leading Schools of Chemical Engineering;
- Significant financial benefits, with students receiving an EPSRC stipend rather than salary whilst working on potentially patentable research;
- Whilst there is no obligation to employ the Research Engineers at the end of the four years, the programme often acts as a four-year 'interview'.

## Research Engineers (Students)

- Competitive stipend (Industry top-up bursary);
- Engagement with a wider research community;
- Interdisciplinary training and research projects;
- Integral engagement with leading industrial partners in both training and research.

# Operation of the current CDT



# The Programme (EngD/PhD with integrated study)

Fully funded 4-year research programme

- Students receive stipend (as per UKRI published rates); an industrial top-up contribution and tuition fees (up to Home fee rate).

All projects are based with an industrial partner

- Students have both academic and industrial supervisors.
- We expect students to spend around 75% of their time working at the partner's facilities.

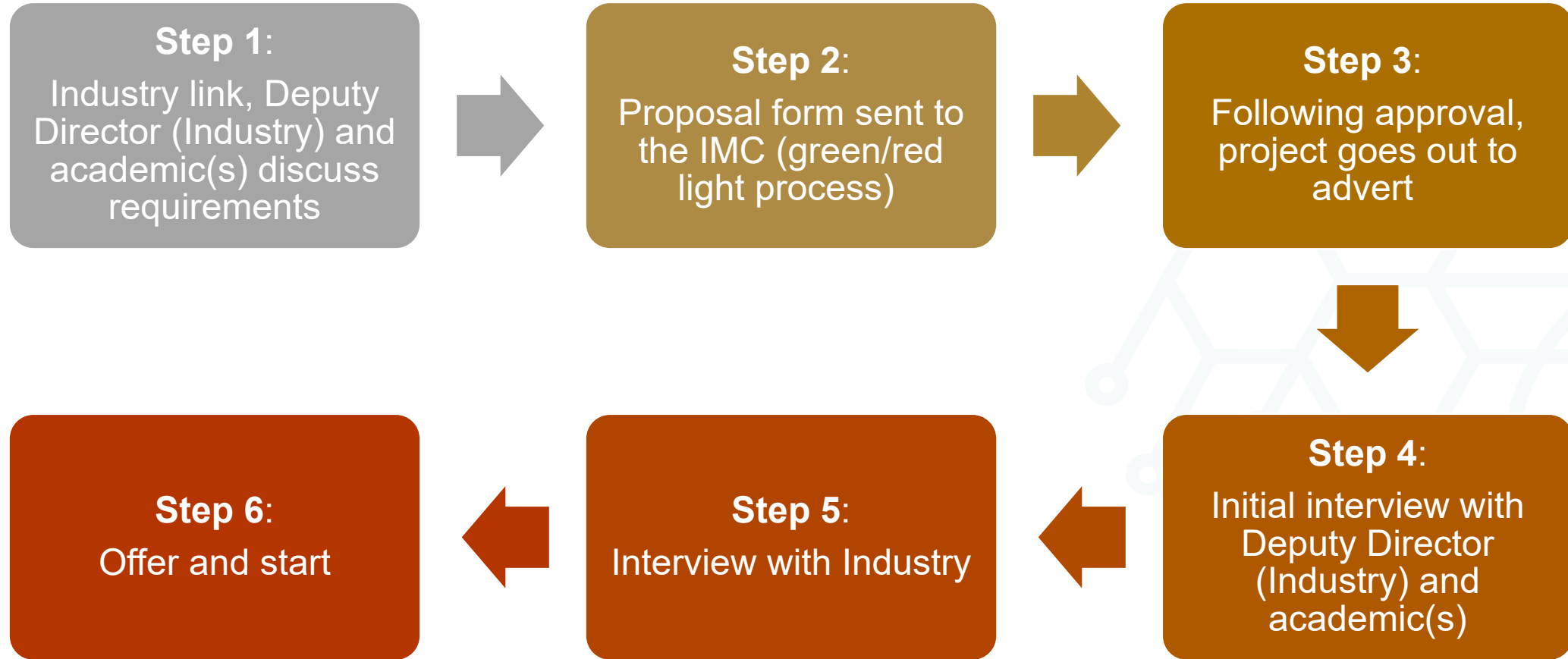
Students complete 120-credits of taught material alongside their research

- All modules from ChemEng Bham MSc programmes available
- **Innovation Toolkit module focusing on Responsive Research and Innovation (RRI)**
- Business and Entrepreneurship

Dissemination opportunities

- A minimum of two internal conferences per year are held, with all students presenting their research
- Opportunity and funding to attend national and international conferences to present research.

# The EngD Projects



# The supervisory team

## ❖ Academic supervisors

- 36 staff available across Chemical Engineering, Material Science and Chemistry.
- **diverse background** (e.g., chemical engineers, materials scientists, chemists, biologists, and physicists) with expertise in **systems thinking**.

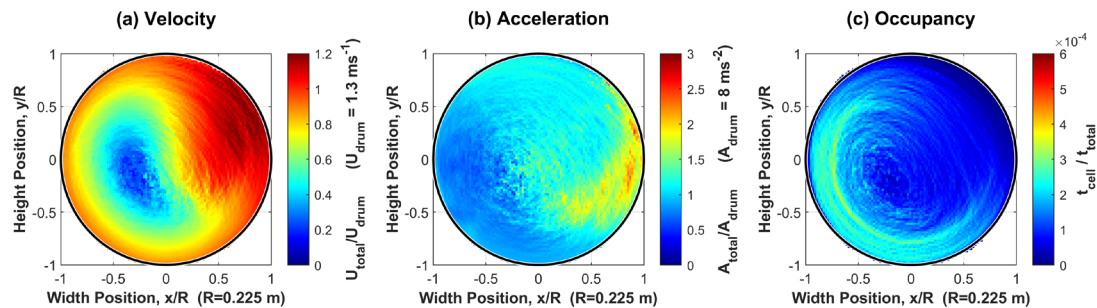
## ❖ Industrial supervisors

- + 100 across pool of industrial partners.
- specialists in their **field**, with extensive industrial **expertise** and/or PhD

# Quality of Research and Impact

– 4\* REF cases in Engineering –

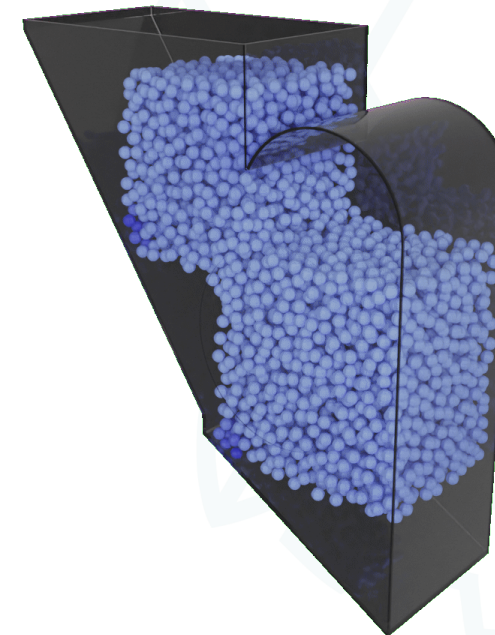
- ❖ Underpinning science of cleaning (P&G)



- ❖ Low fat food design (Pepsico, Unilever & others)

- ❖ Novel processes for turbine blade design (Rolls Royce)

- ❖ Development of process understanding with Positron Particle Tracking – PEPT (P&G, JDE, Johnson Matthey & others)



# Co-creation with Industry

The CDT has been consciously co-created with industry, to ensure it meets demand and clear need



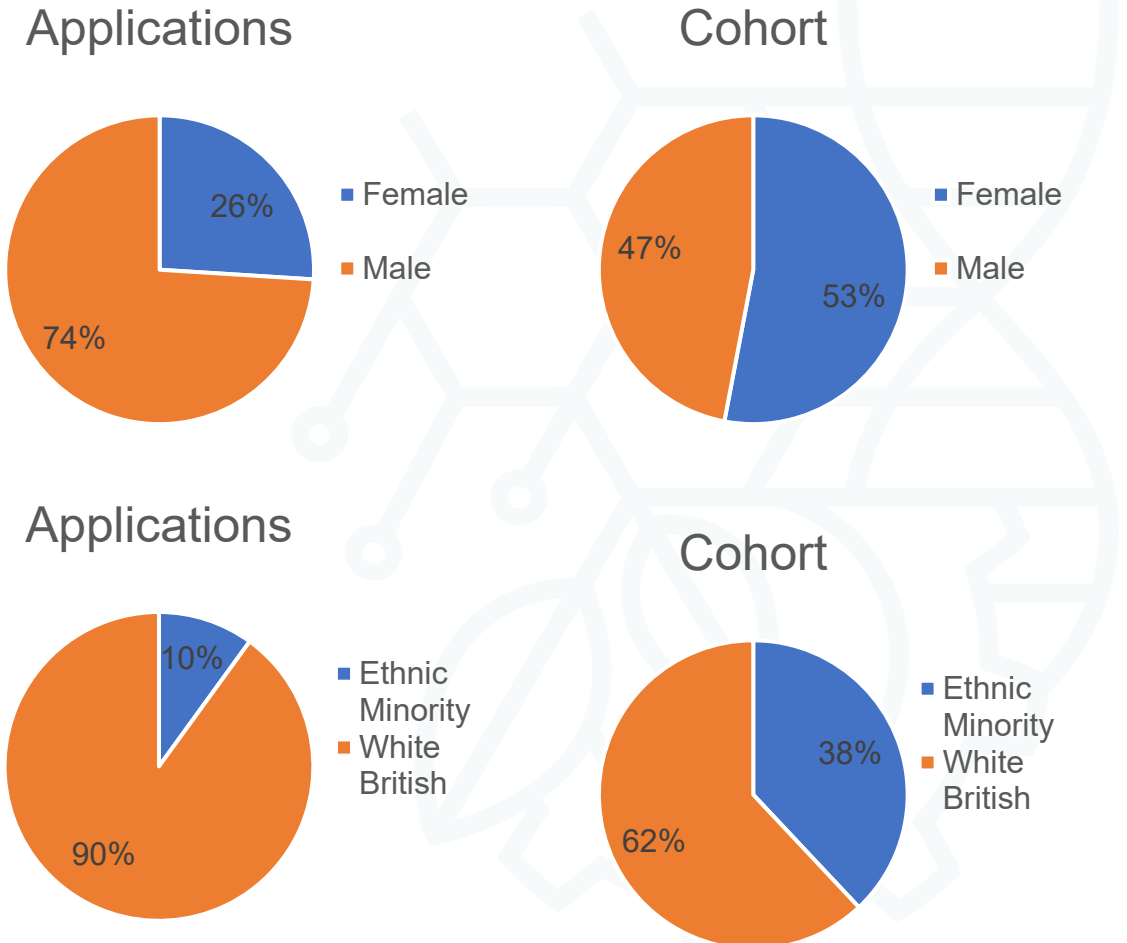
- **Strategy:** workshops to identify the sector needs and define bids strategy
- **Taught modules:** creating training content adapted to workforce demands
- **EngD projects:** exploiting common problems to generate unique solutions

**Our recipe for graduate employability**

# Employability – statistics

Of the 110 graduates from 4 CDT grants to date, all but four have taken positions in either their sponsor or other formulation industries (>96%).

- Nationally, the [IChemE](#) reported that the applicants at UG level in 2023 were 33% female and 49% from an ethnic minority group.
- In Industry, [EngineeringUK](#) reported that in 2021 16.5% female and 11.4% from an ethnic minority group are employed in core and related engineering occupations.



# Useful to Industry !!



*“Development of such highly skilled Formulation Engineers is essential to enable high value-added manufacturing to succeed across the UK supply chain and academia..the CDT has enabled a productive ‘talent recruitment pipeline’ for Specialists which would not have existed otherwise”.*



*“The CDT – FFN0 - is positioned to make a unique contribution to the design, scale-up and manufacture of Net Zero formulated products, by applying digital approaches to complex multi-disciplinary multi-component challenges, with immediate industrial application...9 alumni of this CDT have taken up permanent employment with Unilever R&D, 4 of which are now in leadership positions within Unilever R&D.”*



*“7 of our 12 graduates have taken a first position with Johnson Matthey. We have recruited a further 3 graduates from other sponsoring companies. This is further testament to the quality of the students, their training and the vital importance of formulation engineering to JM.”*



# Thanks for your attention !

We acknowledge support from  
EPSRC (grants EP/L015153/1  
and EP/S023070/1).

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