

Bristol Composites Institute Doctoral Research Symposium

12th April 2022

bristol.ac.uk/composites



EPSRC CDT in Composites Science, Engineering and Manufacturing

CDT Director: Prof. Steve Eichhorn
Tuesday 12th April, 2022



CDT vision and evolution

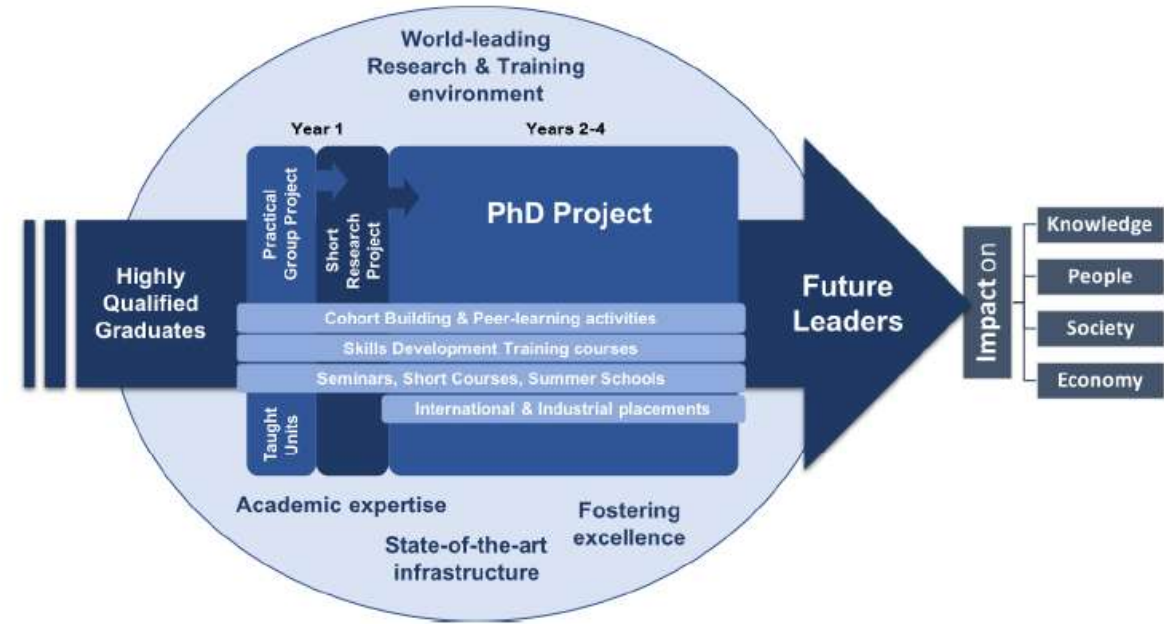
To develop highly talented science and engineering graduates by giving them the technical toolsets and the multidisciplinary research and professional skills required to become the next generation of technology leaders in the science, engineering, and manufacture of advanced composite materials

- Established in 2019 with £6.3m award from the EPSRC
- Training outstanding graduates until 2028 – last intake 2023
- Embedded within the Bristol Composites Institute (ACCIS)
- Funded by EPSRC, University and industrial partners
- Significant industrial support
- National and international academic collaborations
- Evolved from two previous composites CDTs spanning 2009-2022 - last intake 2018



What we offer

- 4-Year PhD in Advanced Composites
- At least 10 funded places per year
- Cohort-driven training approach
- Transferable skills training
- International and industrial placements
- Public engagement
- Integrated taught component:
 - Small group teaching
 - Hands-on laboratory work, including flagship group design, build and test (DBT) project
 - Individual 3-month exploratory research project
- Wide choice of cutting-edge PhD projects – blue skies and applied



Management team



Prof. Steve
Eichhorn
CDT Director



Prof. Ian
Hamerton
Deputy Director



Dr Alberto
Pirrera
Deputy Director



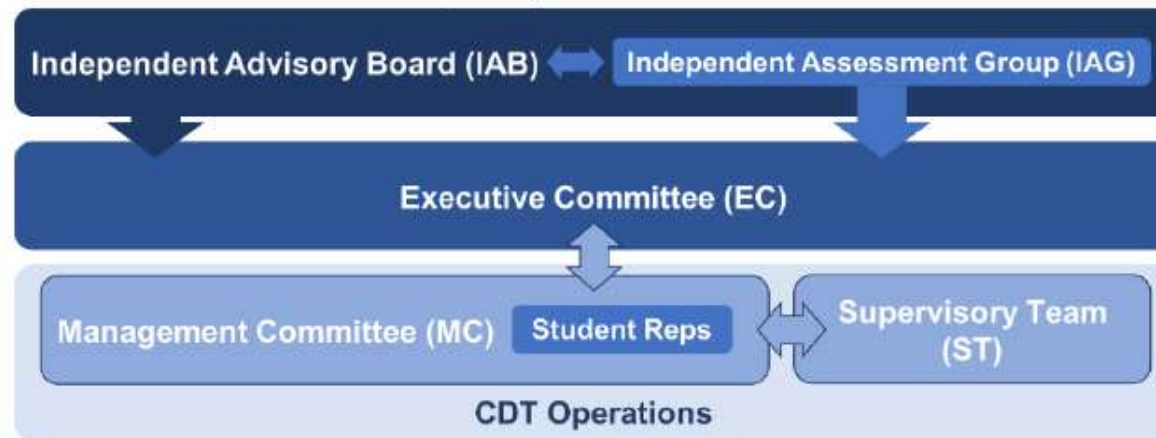
Keri Montague
Industry
Engagement
Manager



Vicky Blyde
CDT Manager (maternity cover)

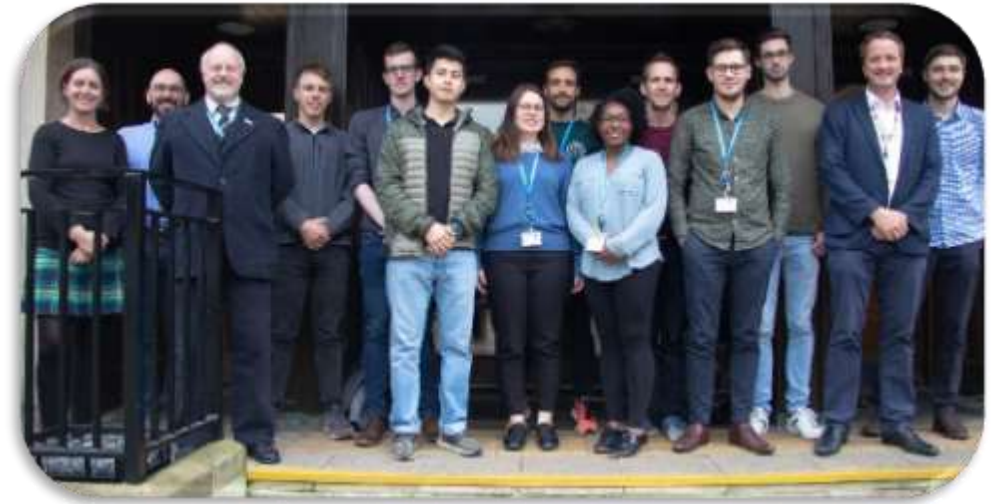


Ellie Jackson
CDT Administrator



Our cohorts

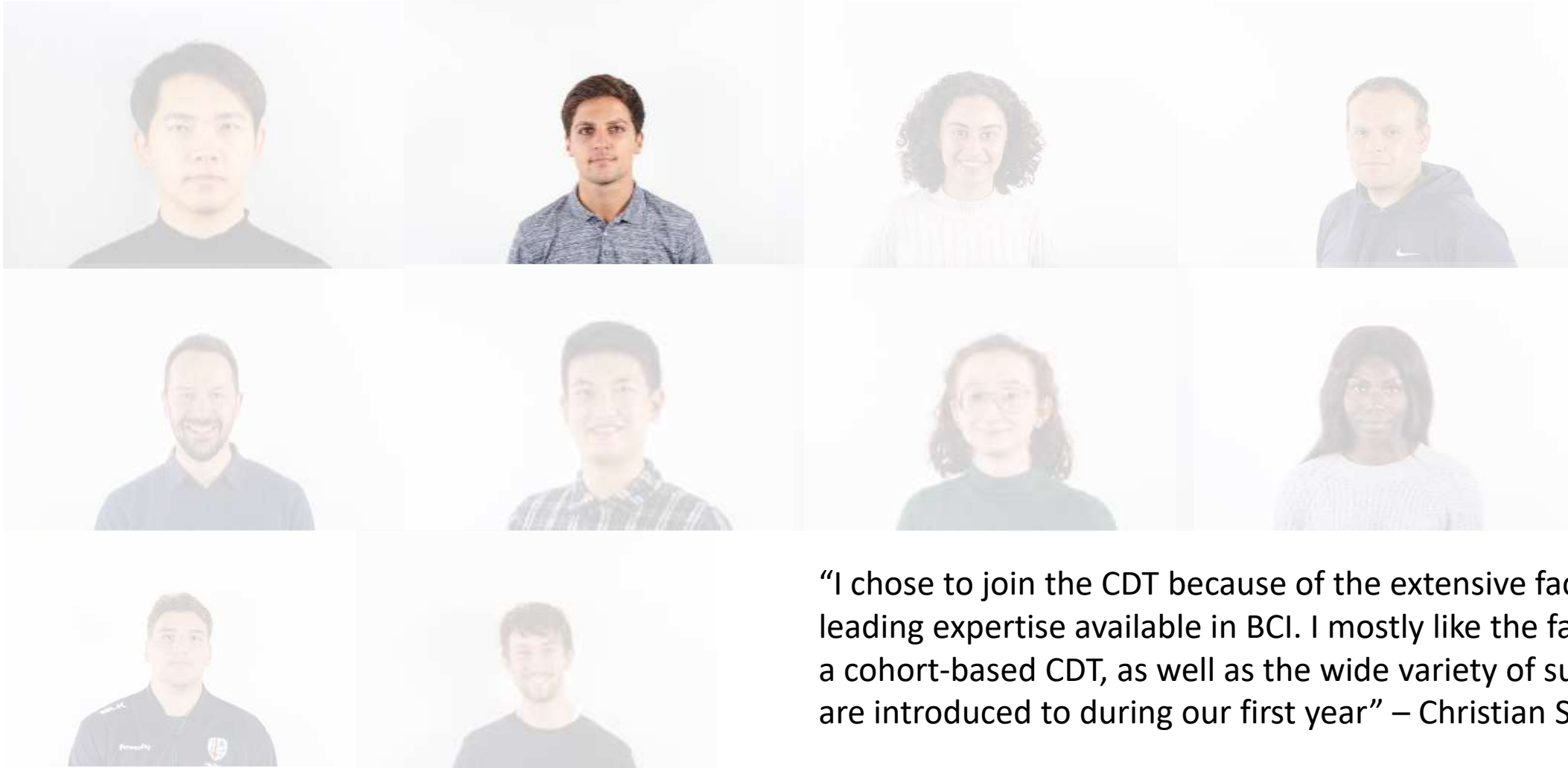
- First three intakes in 2019, 2020, 2021
- 29 core students, plus 2 aligned students
- Diverse backgrounds in engineering (chemical, computer systems, aerospace, mechanical) and science (chemistry, physics materials)
- UK, EU and international



Our CDT2021

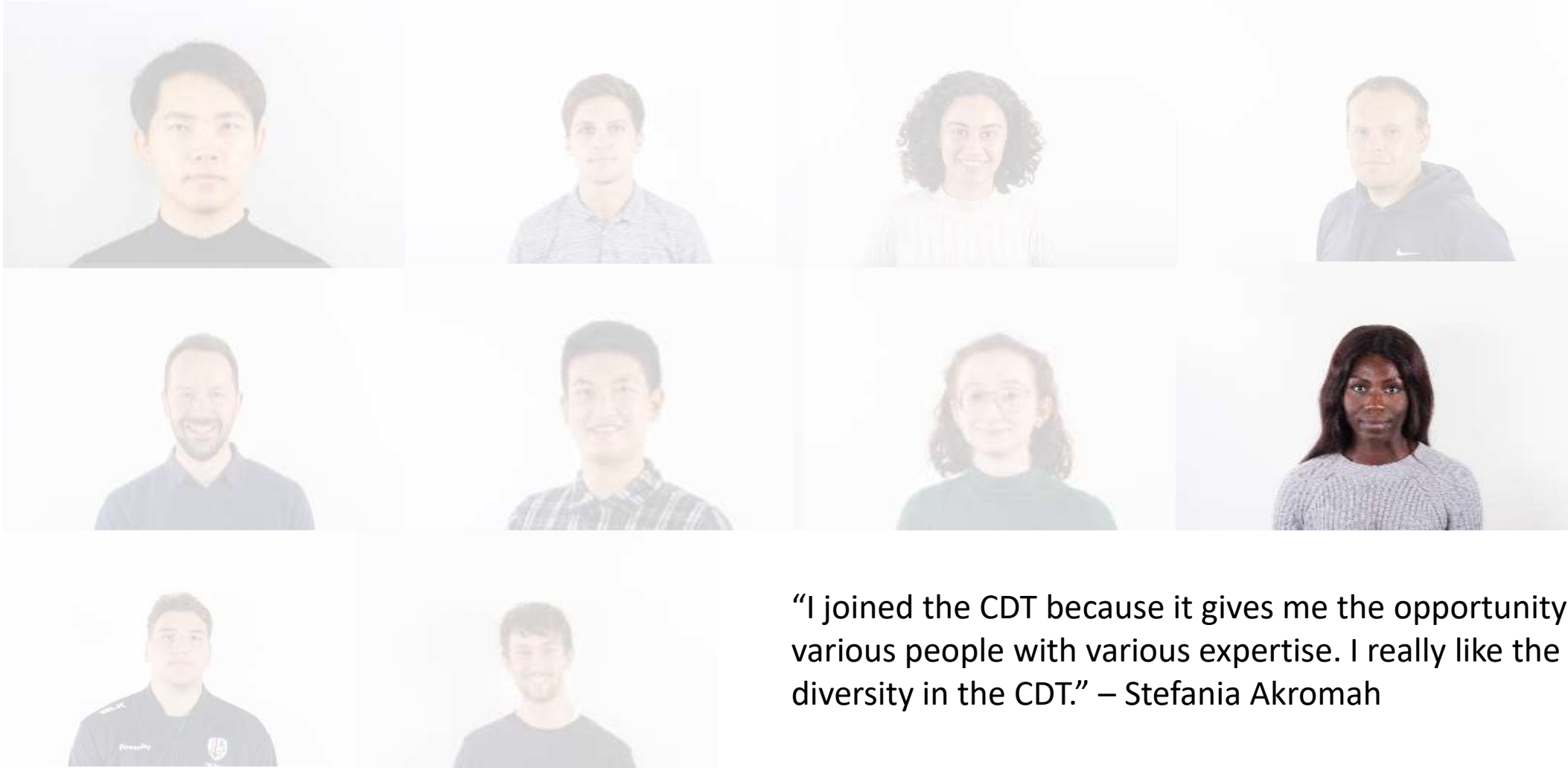


Our CDT2021 – in their own words



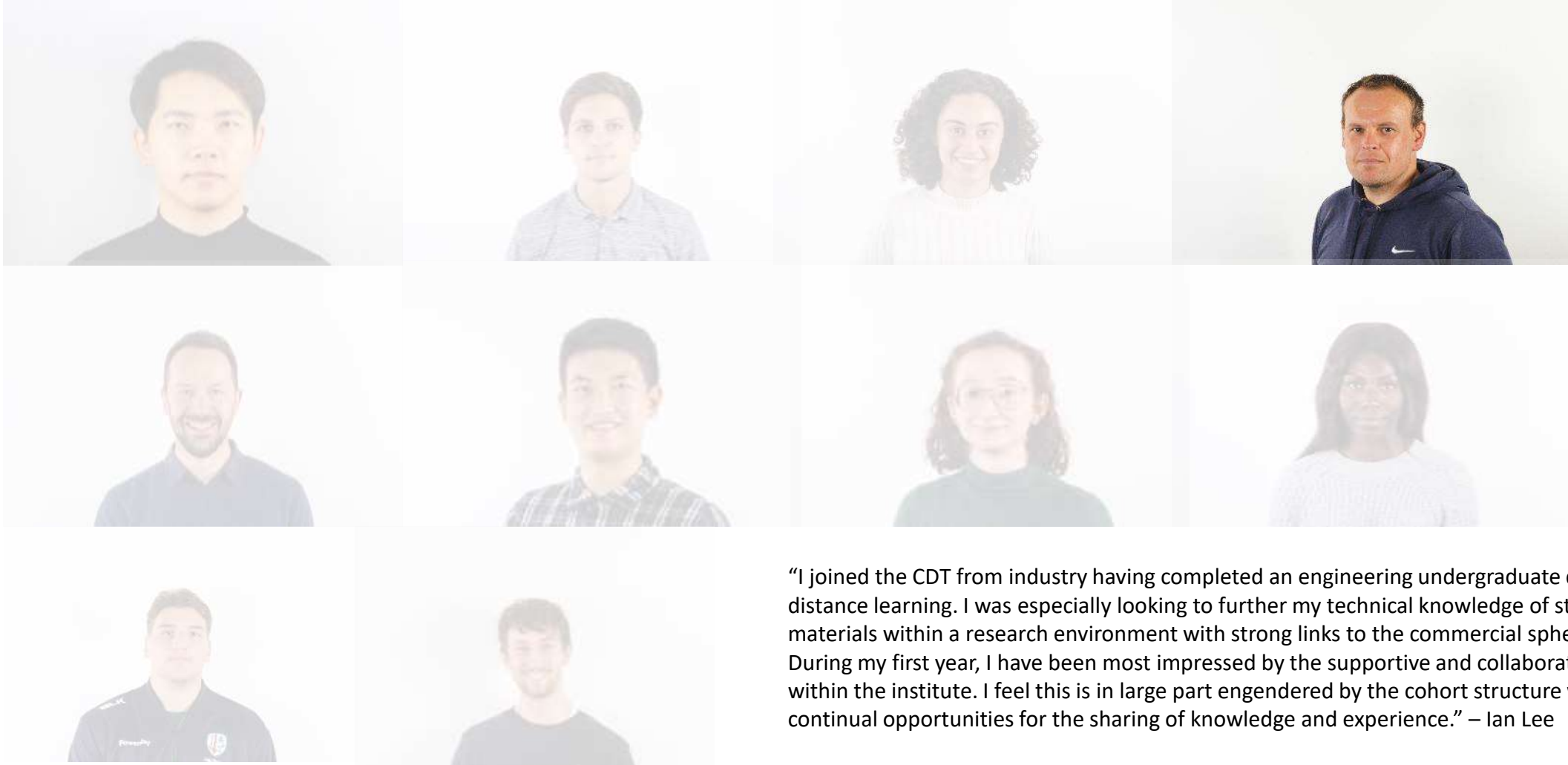
“I chose to join the CDT because of the extensive facilities and leading expertise available in BCI. I mostly like the fact that it is a cohort-based CDT, as well as the wide variety of subjects we are introduced to during our first year” – Christian Stewart

Our CDT2021 – in their own words



“I joined the CDT because it gives me the opportunity to meet various people with various expertise. I really like the cultural diversity in the CDT.” – Stefania Akromah

Our CDT2021 – in their own words



“I joined the CDT from industry having completed an engineering undergraduate qualification through distance learning. I was especially looking to further my technical knowledge of state-of-the-art materials within a research environment with strong links to the commercial sphere. During my first year, I have been most impressed by the supportive and collaborative environment within the institute. I feel this is in large part engendered by the cohort structure which provides continual opportunities for the sharing of knowledge and experience.” – Ian Lee

Taught component

- 12 months / 180 credit points
- Tailored to academic background
- Additional support for non-engineers
- Wide range of topics comprising:
 - **Core** composites units
 - e.g. Mechanics of Composite Materials, Advanced Composite Materials
 - **Broadening** units
 - e.g. Sustainable Composite Material, Smart Materials, Nature's Materials
 - **Deepening** units
 - e.g. Advanced Composites Analysis, Composite Product Development
- 3-month Research Project from June-September (60 cps)
- Adapted for online delivery from March 2020 due to the Covid-19 pandemic



Research projects

3-Month Research Project June-September of Year 1

- Projects sought from wide-ranging research interests of BCI and our external industrial / academic collaborators
- Selected from theme areas during the Autumn Term
 - Get in touch with your BCI contacts *now* to discuss collaboration opportunities, or contact our engagement manager, Keri Montague, keri.montague@bristol.ac.uk
- Can develop into a PhD project

PhD Project Years 2-4

- Projects chosen towards the end of Year 1
- £7k personal PhD project budget (conference travel, equipment etc)
- International Placement Scheme



Read project summaries on the website at:
bristol.ac.uk/composites/cdt/research-projects/

CDT19 cohort PhD projects

- Transtibial prosthetic socket design: Understanding the requirements for a healthy residual limb
- Development of multiscale modelling methodology for the discovery and design of composite materials
- Design, fabrication and testing of porous material-metal hydride composites for hydrogen storage
- Advanced high fidelity modelling of woven composites (with Rolls-Royce)
- Manufacture, characterisation, and optimisation of WrapToR stiffened skin panels for aerospace applications
- Lattice cores for high performance sandwich composite structures
- An investigation into the performance of aligned, discontinuous carbon fibre produced with the scaled-up HiPerDiF process (with Solvay)
- Tow steering for the structural dynamics of launch vehicles
- Topological optimization of large, additively manufactured composite structures with a graded lattice core (with ORE catapult)
- Design for 4D printing: Modelling of smart porous networks for in-vivo deployment

Collaborators

- Airbus
 - CHOMARAT
 - Centre for Process Innovation
 - ELG Carbon Fibre
 - FiberLean Technologies
 - GKN
 - Heraeus Holdings GmbH
 - Hexcel
 - INSA
 - National Composites Centre
 - ORE Catapult
 - Oxford Space Systems
 - QinetiQ
 - Rolls-Royce
 - Solvay
 - Vestas
 - Victrex
 - Deakin University
 - Harvard University
 - Hong Kong University of Science and Tech
 - Lulea University of Technology
 - Massachusetts Institute of Technology
 - Nantes University
 - RMIT University
 - Technical University of Dresden
 - Texas A and M University
 - University of British Columbia
 - University of Delaware
 - University of Leuven
 - University of Michigan
 - University of Nottingham
 - Zhejiang University
- Placements
 - Site visits
 - Short courses
 - Quarterly student-run industrial seminar series
 - iCOMAT, Solvay, NCC, ATI
 - Industry sponsored prizes
 - Best taught mark
 - 2020 joint winners Chantal Lewis & Chris Grace
 - Best 3-month project
 - PhD project sponsorship
 - Rolls Royce, Solvay, ORE Catapult, ELG-Carbon Fibre

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