





10th - 11th May 2023

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Please view our conference <u>Code of Conduct</u> to ensure all delegates have an enjoyable and fulfilling experience during our event.





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Welcome

Annual Conference 2023

Welcome to our third annual conference!

Bringing together the CDT's students, academics and industrial partners, our annual conference provides an exciting opportunity to discover and discuss the latest developments in the CDT's research.

Our 71 students will give updates on their progress, whilst our plenary speaker and panel line-ups will bring fresh perspectives to the community. We hope that this will be an insightful occasion for our multi-disciplinary network of aerosol scientists, researchers and partners to catch up and ignite further collaboration!

By attending the 2023 conference, you will learn more about the training, mentoring, resources and opportunities available within the CDT. We will also give an update on the recruitment of our 5th cohort (starting September 2023), as well as an update on the progress being made towards our EPSRC bid submission for the CDT's renewal in 2024.

We wish you an interesting and enjoyable conference,

The Core Team, Aerosol Science CDT







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Plenary Speaker Professor Spyros Pandis University of Patras (Greece)

Reducing Atmospheric Particulate Matter Levels to Improve Human Health: Back to the Future

Spyros Pandis is Professor in the Chemical Engineering Department of the University of Patras and collaborating Faculty in the Institute of Chemical Engineering Sciences of the Foundation for Research and Development Hellas (FORTH). He received his PhD from the California Institute of Technology and joined the faculty of Carnegie Mellon University (Departments of Chemical Engineering and also Engineering and Public Policy) in 1993 and of the University of Patras in 2004. He is one of the co-directors of the Center for the Study of Air Quality and Climate Change of FORTH.

His research includes theoretical and experimental studies of atmospheric chemistry as it relates to urban and regional pollution and topics related to global climate change. He has received the Ken Whitby Award by the American Association for Aerosol Research, the CAREER award by the US National Science Foundation, the Book of the Year Award by the American Meteorological Society, the Vaughn Lectureship by Caltech, the Sinclair Award by the American Association for Aerosol Research, the Cecil Award for excellence in environmental engineering research by the American Institute of Chemical Engineering, the Lacey Lectureship by Caltech, an ERC Senior Investigator award, the Vilhelm Bjerkness Medal from the European Geophysical Union, and the Fuchs award from the International Aerosol Research Association. He has been the recipient of the Elias Chair in Carnegie Mellon University, the Kun Li award and the University of Patras award for Excellence in Research, and the Benjamin Teare award for Excellence in Engineering education. He is an ex-president of the American Association for Aerosol Research and a former editor of Aerosol Science & Technology. He has been the advisor of approximately 50 PhD students and postdocs and 10 of them are now faculty members in the US, Mexico, Switzerland, Denmark, Sweden, Italy and Greece.





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Thank youConference Sponsors









Plenary Speaker Sponsor:



Poster Session & Poster Award Sponsor:



Poster Session Sponsor:







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Thank you

Tier 2 Partners



















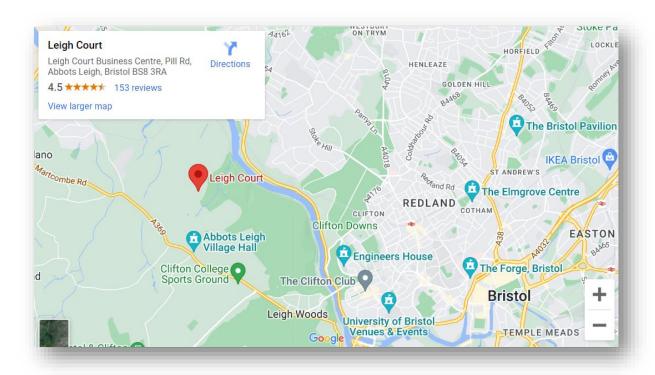




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Venue Leigh Court

Located 15-minutes north-west of Bristol city centre, Leigh Court has easy access to the M4 & M5, as well as free parking, electric car charging points and bike racks









LEIGH COURT



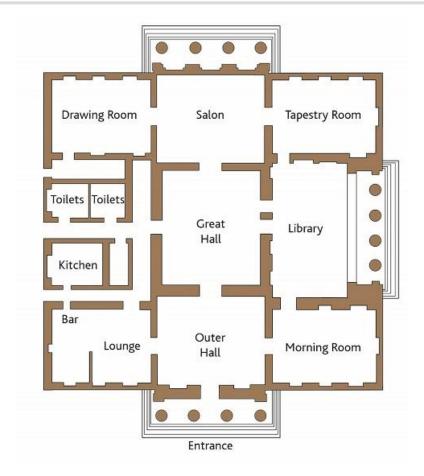


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Venue

Leigh Court

Floor Plan









LEIGH COURT





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Agenda

Wednesday 10th May 2023

Time	Activity
10:30	Arrivals & Registration
11:15	Welcome
11:20 syngenta	Cohort 2 Presentations (1) 11:20 Presentation by Conference Sponsor - Syngenta 11:25 Robert Alexander - Coughs and sneezes spread diseases: Modelling the airborne viability of viruses and bacteria 11:40 Jianghan Tian - The microphysics of exhaled aerosols and airborne disease transmission 11:55 Stanislaw Koper - Early warning detection for viral aerosols 12:10 Ellie Vokes - New Precursors to Printed Electronic Metal Oxides 12:25 Jack Macklin - Humidity dependent self-assembly 12:40 Joanna Egan - UV absorption on Venus: a (nearly) 100-year-old mystery
13:00	Lunch
14:00	Cohort 3 Posters
15:15	Break
15:30 © Cambustion © VIATRIS	Cohort 2 Presentations (2) 15:30 Presentation by Conference Sponsor - Cambustion 15:35 Edward Neal - Understanding the Impact of Particle Morphology on Resuspension with a 3D Printed Wind Tunnel 15:50 Fergus Lidstone-Lane - Charged Aerosol Particle Loss through Aviation nvPM Sampling Systems 16:05 George Downing - Preferential Concentration of Aerosols in Turbulence 16:20 Presentation by Conference Sponsor - Viatris 16:25 Frederick Bertani - Improving the Evaporative Light Scattering Detector using experiments and modelling 16:40 Rob Lewis - Fibre Diameter Predictions Through Phase Function Analysis 16:55 Josh Hassim - Experimental Investigation of the Effect of Relative Humidity on Particle Charging
17:10	Closing Remarks
17:20	Drinks Reception
18:15	Dinner
20:30 21:00	Coach Departures to Bristol City Centre See details on page 22





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Agenda

Thursday 11th May 2023

Time	Activity
09:00	Arrivals
09:25	Welcome
09:30	Cohort 4 Posters
10:45	Break
11:15 Nanopharm O	Cohort 2 Presentations (3) 11:15 Presentation by Conference Sponsor - Nanopharm 11:20 Lance Jiang - Development of Dual Aerodynamic Particle Sizers Method to Understand Aerosol Plume Dynamics at High Relative Humidity 11:35 Caterina Fantuzzi - Assessing pulmonary concentration of inhaled aerosols 11:50 Altin Kocinaj - In-vitro modelling of the lung's response to environmental nanoparticulates 12:05 Georgia Gamble - Understanding the Health Impacts of Aviation Emissions 12:20 Olivia Jackson - Understanding Atmospheric Transport of Pesticides using Mass Spectrometry
12:40	Lunch
13:40	Plenary Speaker: Professor Spyros Pandis, University of Patras Reducing Atmospheric Particulate Matter Levels to Improve Human Health: Back to the Future
14:30	Partnerships Forum & Career Talks See details on next page
15:45	Third Annual Forum on Education in Aerosol Science See details on next page
16:45	Poster Award, Close & Coach Departures See details on page 22



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Agenda

Partnerships Forum & Career Talks

Thursday 11 th May	Library	Morning Room	Salon & Tapestry Room
14:30 - 14:45			
14:45 – 15:00	Placements: student & partner	Working in academia: academics panel	
15:00 – 15:15	panel and Q&A Session chaired by Dr Laura Urbano	and Q&A Session chaired by Professor Andrew Orr-Ewing	
15:15 - 15:30			Exhibitors and poster presentations from partners
15:30 - 15:45	Working in industry:		
15:45 - 16:00	and Q&A Session chaired by Professor Adam Boies	Third Annual Forum on Education in Aerosol Science Session chaired by Dr Kerry Knox	
16:00 – 16:15	"Engineering Serendipity: How to Create Career		
16:15 – 16:30	Opportunities for Scientists"		
16:30 – 16:45	Talk and Q&A with Ben Miles, CEO of Spin Up Science Session chaired by Dr Dan Hardy		





EPSRC CDT in Aerosol Science Annual Conference 2023

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Topic	Thursday 11th	Room
Placements: student & partner experience panel discussion and Q&A	14:45 – 15:15	Library



Toria Legh-Land (Cohort 1 – placement at Chiesi) is conducting her research on the principles of aerosol dynamics in the respiratory system at the University of Hertfordshire. Her project is supported by Chiesi Farmaceutici S.p.A., with whom she has undertaken an industrial placement.



Ted Robson (Cohort 1 – placement at Imec, Belgium) is conducting his research at the University of Bath on aerosol-assisted chemical vapour deposition of semiconducting materials. He conducted a three-month placement at the micro-electronics company 'IMEC International', based in Leuven, Belgium.



Katie Thompson (Cohort 1 – placement at Rothamsted Research) is conducting her research at the University of Leeds on ice-nucleating particles from agricultural sources. She conducted a placement at Rothamsted Research, UK.



Gareth Hardwell (Senior Analytical Scientist at Chiesi) is a senior analytical scientist in Chiesi Limited who is the primary point of contact for method development and validation, the testing of all raw materials, in-process, finished goods, and stability samples. Responsible for leading project analytical activities, shaping project strategy, managing external contractors and compliance activities to achieve CMC objectives and working in multi-disciplinary teams across multiple sites. Gareth's core belief is that science drives civilization, where written and analytical skills are not only a fundamental part of academic excellence but are also the building blocks of critical thinking. In addition to previous being a member of the impactor sub and preliminary groups for EPAG, Gareth has developed and validated multiple HPLC methods for all clinical phases of a product life cycle during his 20 years in the pharmaceutical industry.



Dr Jonathan Symonds (Managing Director at Cambustion) is head of the Products Division and R&D Director at Cambustion in Cambridge, an SME that develops and manufactures novel aerosol instrumentation for a global market. He holds a degree in Physics and a PhD in Chemical Physics, both from the University of Cambridge. He is a past recipient of IARA's Fissan-Pui-TSI Award for international collaboration in aerosol science, is a Fellow of the Institute of Physics and a Fellow of the Institution of Engineering and Technology, and is the current treasurer of the Aerosol Society.



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Topic	Thursday 11th	Room
Working in academia: academics panel discussion and Q&A	14:45 – 15:15	Morning Room



Dr Michael Cotterell (University of Bristol) is a Research Fellow in Physical Chemistry. His research interests are concerned with studies of the physicochemical properties and behaviours of aerosols through the development of new laser-based spectroscopy tools. After completing his PhD at Bristol in 2016, Michael completed a joint postdoctoral research position between the University of Exeter and the Met Office. In 2019, he was awarded a NERC Independent Research Fellowship that allowed him to establish a multidisciplinary research group at Bristol spanning research themes at the interface of physical and atmospheric chemistry.



Prof Simone Hochgreb (University of Cambridge) is Professor of Engineering at the University of Cambridge. Her main research involves understanding processes in combustion and reacting flows, as relevant to engines, gas turbines, and industrial processes. She has developed methods for the investigation and analysis of autoignition, premixed turbulent flames, sprays, soot and particle formation, as well as thermoacoustics, and is the co-author of around 180 journal publications. Her more recent interests are in the application of optical diagnostics to the measurements of temperatures and species in turbulent flames, hydrogen combustion, thermoacoustics, aerosols and flame synthesis. Prior to Cambridge she held positions at MIT and Sandia National Labs. She holds a BSc in Mechanical Engineering from the University of São Paulo, Brazil, and PhD in Mechanical and Aerospace Engineering from Princeton University, USA. A Fellow of the Royal Aeronautical Society and the Combustion Institute, she has received the Wolfson Merit Award and the Society of Automotive Engineers Ralph R. Teetor Award.



Dr Adam Squires (University of Bath) graduated with an undergraduate degree in Chemistry from Oxford (1997), and a PhD from Imperial College in Physical Chemistry (2001). He then worked as a postdoctoral researcher in the Physics Department in Cambridge from 2001-end 2005, and as a Physical Chemistry Lecturer then Senior Lecturer at the University of Reading from 2006-2017, when he took up a Senior Lectureship in Physical Chemistry at Bath.



Dr Stephanie Wright (Imperial College London) is a Lecturer in Environmental Toxicology in the Medical Research Council Centre for Environment and Health, Imperial College London (ICL). She completed her PhD in Biosciences at the University of Exeter (2015), which focused on the toxicity of microplastics in the marine environment. She then joined King's College London, where she held two fellowships on the topic of microplastics and human health before joining ICL. Now, she leads the Microplastics team, whose interdisciplinary research advances analytical and data science approaches to quantify external and internal micro- and nanoplastic exposure, in complement to assessing their adverse outcomes in vitro. She is an editor for Microplastics and Nanoplastics (Springer) and has been in working groups for the European Commission and World Health Organisation.



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Topic	Thursday 11th	Room
Working in industry: partners panel discussion and Q&A	15:30 – 16:00	Library



Lilly Manzoni (LettUs Grow) is Head of Research & Development at LettUs Grow. Lilly's role is to make sure that the company invests in work that will be most valuable for the development of the controlled environment agriculture industry and for the good of the planet. Lilly is an aerosol chemist, and as part of LettUs Grow's original team, was a key figure in the design of our innovative aeroponic technology. Lilly also conducts crucial research into studying aerosol root interactions. Lilly is a passionate advocate for representation and inclusion in the STEM sector.



Neil Morgan (Syngenta) studied Horticulture at the University of Reading, developing an interest in pesticide application technology that led him to Cranfield University, where he studied for an MSc in Bio-Aeronautics and went on to research the implications of air assistance for field crop spraying for his PhD. Whilst at Cranfield, Neil gained experience in drop sizing and nozzle characterisation and field studies to measure drift and operator exposure. Neil then moved to York to work for the Chemicals Regulation Directorate, the UK body responsible for regulating pesticides and biocides and built up a wealth of experience in human risk assessment. In 2013 Neil joined Syngenta as an operator exposure specialist and is now a Principal Technical Expert in Science Strategy. This role sees him involved in external collaborations with academic institutes, hence his keen involvement in the Aerosol Science CDT.



Dr Gareth Morris (Dyson) works in air filtration and new technology development at Dyson in his time there he has managed research teams, set up collaborations with external partners and acted as a subject matter expert across the business. Prior to this he completed his PhD in minerals processing at Imperial College London and spent several years as a Post Doc in the Earth Science and Engineering department there. He has an MEng in aerospace engineering from Southampton University, taught English in Japan and briefly dallied with Space mining.



Cristina Rey Blanes (Nanopharm Ltd, an Aptar Pharma Company) is a Principal Scientist in the New Modalities Pharmaceutical Development Department. She studied at University of Malaga, completing an undergraduate degree in Biochemistry with a thesis on the effect of plant extracts on angiogenesis. In 2018, she collaborated as a Research Assistant at CIMES, where she worked on a project characterising immediate early genes in the formation of memory. In 2020, she obtained a MSc in Advanced Biotechnology, working on a project focused on bioremediation of pollutants in the environment. Since joining Nanopharm that same year, Cristina has acquired competences in respiratory and nasal drug delivery, focusing on pressurised metered dose inhalers and dry powder inhalers in vitro characterization and generics development. More recently, she started working on the development of nasal sprays comprising antibodies and proteins against viral infections and for nose to brain delivery. To date, she has presented her work at a couple of international conferences in nasal and inhalation delivery.





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Topic	Thursday 11th	Room
"Engineering Serendipity: How to Create Career Opportunities for Scientists" Talk and Q&A with Dr Ben Miles	16:00 – 16:45	Library



<u>Dr Ben Miles</u> (CEO Spin Up Science) completed his PhD in Nanophysics at the University of Bristol in 2016. Following his PhD, Dr Miles joined Ziylo as Lead Physicist to commercialise a diabetes therapeutic later acquired for \$800m by Novo Nordisk.

Dr Miles supported the launch of Unit DX, Bristol's first science incubation facility as Head of Membership and Partnerships, before supporting quantum start-up companies as Enterprise Developer at the Quantum Technology Enterprise Centre.



In 2018, Dr Miles founded Spin Up Science with the goal of supporting scientists and engineers' efforts to translate their research into the market.

In 2021, Dr Miles co-founded the Science Angel Syndicate to support investment into ventures emerging from academic institutions.

Topic	Thursday 11th	Room
Third Annual Forum on Education in Aerosol Science	15:45 – 16:45	Morning Room

We gather once a year to celebrate and further education in aerosol science, considering both classroom or laboratory teaching and the supervision of doctoral research in this interdisciplinary field.

As our first cohort of postgraduate researchers (PGR) approach graduation, we will be taking the opportunity to celebrate this progress and to hear from them in the form of a panel discussion.

We will then work in small groups, bringing together PGRs, CDT academics and CDT partners to co-create the future of education in aerosol science by thinking about our proposed CDT for 2024-32. This activity will pick up on a selection of ideas generated at a recent stakeholder co-creation event, with a focus on the PGR experience of training with the CDT.

All conference attendees are welcome, with our CDT academics particularly warmly encouraged to join us.







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Cohort 3 Posters

Environmentally Friendly Plasma Treated Pressurised Metered Dose Inhalers by Mahmoud Ahmed

Nanoscale analysis of London pollution particles and their interaction with airway epithelial cells by Alexander Mitchener

The Drying Kinetics and Crystallisation of Multi-Component Aqueous Inorganic Salt Droplets by Barnaby Miles

Optical and Morphological Properties of Light Absorbing Internally Mixed Aerosol Particles by Gwen Lawson

Deep learning-based classification of bioaerosols by Hao Zhang

Polyaromatic Hydrocarbons and Cardiovascular Health by Joe Morris

Mechanics of Soft Aerosols by Jamie Mclauchlan







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Cohort 3 Posters

Microfluidic Technology for Atmospheric Biological Ice Nucleating Particle Analysis by Polly Foster

Photochemical Processing of Atmospheric Aerosols by Abigail McConnell

Particle generation for instrument calibration by Kelvin Risby

Investigating Aerosol Collection into Liquid Droplets in Electrostatic Precipitators by Priya Chopra

How atmospheric particulate affects lung infection and immune response by Samuel Hyman

First-principle model for the evaporation and crystallisation of a saline droplet by Benjamin Mignot

A Systematic Review of Reviews on Indoor Aerosols Affecting Respiratory & Cardiovascular Health

by Prem Kumar Perumal







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Cohort 3 Posters

Jet engine lubrication oil droplets as contrail ice-forming particles

by Joel Ponsonby

Droplet surface tension and charge measurements on microsecond timescales from single picolitre droplets and collisions of aged droplets

by Isabel Quant

Non-Exhaust Emissions in Vehicle Wakes

by Aaron Varzdari-Barber

Classification of DSTL aerosol scattering data using variational auto-encoder neural network by Skhathi Mthembu







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Cohort 4 Posters

Venus, Volcanoes and Vacuum Cleaners: Understanding Triboelectric Charging in Aerosols by Tom O'Hara

Workplace lifecycle exposure and risk from Advanced Materials by Sam Hall

Time-resolved Photochemistry of Organic Solutes in Aqueous Microdroplets by Conlan Broderick

Characterisation of a New Oxidation Flow Reactor for Secondary Organic Aerosol Formation by Stephen Robertson

Comparing the airborne survival of enveloped and non-enveloped viruses by Kennedy Peek

Developing and deploying new sensors for in-situ monitoring of clouds by Charlie SB

Responsive Aerosol: A Design Framework for Aerosol with Required Properties by Sorrel Haughton







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Cohort 4 Posters

Next-Generation Nasal Drug Delivery Exploiting non-Newtonian Fluids and Smart Thermoresponsive Materials

by Hessam Rasooli Nia

Photoinitiated Chemistry in Single Levitated Aerosol Droplets using Cavity Ring-Down Spectroscopy

by Xu Zhang

The structure of exhaled droplets and aerosols

by Faizan Ahmad

The impact of aircraft engine emissions and alternative fuels on contrail formation by Oliver Driver

Nanoparticles from non-exhaust emissions: lung deposition and potential health impacts by Siriel Saladin

Towards a better understanding of the lifecycle of Pesticides in the Atmosphere by Ujjawal Arora







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Cohort 4 Posters

Field Effected Aerosol Assisted Chemical Vapour Deposition of Thin Film Materials by Joshua Buckingham

Airborne microplastic detection and quantification – developing, evaluating, and applying novel laboratory and field-based approaches

by Henry Blake

Optimising LS based pulmonary drug delivery by Melih Engur

Radioactive Aerosols in Wall-Bounded Turbulent Flow by Gregory Marsden

Interaction of SARS – CoV2 and Influenza Viruses with Particulate Matter Air Pollution by Erin Kiely

Digital Microfluidic Lab-on-a-chip for multiplex detection of biomarkers in exhaled breath by Daisy Ashton







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TransportationCoaches

Getting to Leigh Court on Wednesday 10th May (Day 1)

Are you a student or academic travelling via Leeds, Manchester or London?

Please use the coach to transport you to Leigh Court that will depart outside Temple Meads station at <u>10:40</u>; after the arrival of the 10:28 service from London Paddington (via Bristol Parkway) and the 10:32 service from Manchester & Leeds (via Birmingham New Street). **Pick-up point:** exit Temple Meads station and walk down the right-hand side of station approach, towards the main road at the bottom. The pick-up point is the last bus stop at the bottom of the ramp.

Are you a student or academic who lives in/near Bristol?

Please use the coach to transport you to Leigh Court that will depart from Woodland Road/Cantock's Close (by the School of Chemistry) at **10:15**.

After the conference on Wednesday 10th May (Day 1)

Coaches will depart Leigh Court at <u>20:30</u> and <u>21:00</u>. Both coaches will drop-off at Premier Inn Lewins Mead (Bristol City Centre) and Woodland Road/Cantock's Close.

Getting to Leigh Court on Thursday 11th May (Day 2)

Travelling from the Premier Inn (Lewins Mead)

Please use the coach to transport you to Leigh Court that will depart outside the hotel at **08:45**.

Are you a student or academic who lives in/near Bristol?

Please use the coach to transport you to Leigh Court that will depart from Woodland Road/Cantock's Close at **08:45**.

Returning home after the conference on Thursday 11th May (Day 2)

Two coaches will depart Leigh Court at <u>17:00</u> to transport you to Bristol Temple Meads station. One of these coaches will then continue on to drop-off at Woodland Road/Cantock's Close.





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EPSRC Centre for Doctoral Training in Aerosol Science

Core Team

Prof Jonathan Reid - CDT Director

Dr Rachael Miles - CDT Course Manager

Dan Hardy – CDT Deputy Course Manager Kate Lucas – CDT Administration Manager

Yaelle Hartley – CDT Partnerships Manager

Sam Archard - CDT Administrator





