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Broadening horizons in the Digital Economy

PhD research at the
Horizon Centre for Doctoral
Training in My Life in Data

horizon
CENTRE FOR DOCTORAL TRAINING



Autumn 2017
www.cdt.horizon.ac.uk

Contents

- 3 About the CDT
- 4 Our partners
- 5 PhD studentship opportunities
- 6 Horizon CDT programme
- 7 CDT internships
- 9 Our alumni – where are they now?
- 11 Case studies

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Design: Creative Triangle

About the CDT

The EPSRC Horizon Centre for Doctoral Training (CDT) was originally launched in September 2009, with the overarching research theme of Ubiquitous Computing for the Digital Economy. Five cohorts of students were recruited between 2009 and 2013 under this theme.

In 2013, the Centre was again successful in receiving funding from the EPSRC CDT scheme and, since September 2014, has recruited an additional four cohorts of students to the EPSRC Centre for Doctoral Training in My Life in Data.

So far we have recruited **over 100 students**, and **39 alumni** have graduated from the programme. Our alumni have gone on to secure employment across Europe, the Middle East and the United States in both industry and academia.

This brochure has been produced to:

- Highlight the breadth of innovative transdisciplinary digital economy research that is undertaken in the CDT, with the support of industry partners and world-class supervisors.
- Showcase the career paths of Horizon CDT alumni and describe how an Horizon PhD has equipped them to progress to professional positions in the thriving digital economy, and contribute to real-world impact.
- Demonstrate the various opportunities that are available for students within the My Life in Data CDT, and the plethora of skills, expertise and knowledge they can expect to gain as an Horizon CDT student.

We have included case studies from existing students and alumni that we hope you find interesting and inspiring.



Professor Steve Benford
CDT Director



Professor Sarah Sharples
CDT Director



Our partners

The Horizon CDT is fortunate to be able to collaborate and receive support from a wide range of partners from industry, government, innovation centres, creative agencies and not-for-profit organisations. Examples of current partners include BBC, e.on, Experian, Nottingham University Hospitals NHS Trust, Ordnance Survey and Unilever.

Collaborations with digital economy organisations help contribute to the ways that CDT students will establish the technologies, applications and principles to enable citizens to construct digital identities from personal data and effectively manage them to derive economic and social value.

The PhDs that emerge from our CDT are therefore distinct from conventional PhDs; we produce rounded individuals with the skills to work in transdisciplinary teams, including technologists who appreciate the societal context for emerging technologies, and social scientists who are able to shape new technologies.

Each recruited CDT student is carefully matched with an Horizon CDT industry partner based on their skills, qualifications and experience, with the aim of establishing and delivering strong mutual benefit for both the organisation and the student. The CDT student will carry out a three month PhD internship with their partner organisation.

“Within the Horizon CDT there is a whole host of disciplines that we value, from Human Factors through to English Studies, and the opportunity to bring those together in a multidisciplinary environment is extremely valuable to us.”

Jeremy Morley, Chief Geospatial Scientist,
Ordnance Survey

Why collaborate?

Industry partners have continual involvement at all stages of the PhD programme including the recruitment of the student, co-creating the research projects and hosting student internships. In addition, collaborators are able to contribute and help shape the CDT including contributing to doctoral training and strategic input into the Centre via Advisory Board membership.

Specific benefits of partnering with the Horizon CDT:

- It is a cost-effective way for organisations to be involved in relevant leading edge research in digital identity where you may not have the resource or expertise to undertake this alone
- The research project is co-created with the partner so the research is of real commercial significance to their organisation
- Our students are graduates who possess excellent academic track records and are highly committed to solving real world research problems. They experience broad training in transdisciplinary research and professional skills ready for careers in industry as well as delivering a relevant and innovative PhD thesis
- By hosting the student for internships, partners are helping shape the employees of the future who can make a significant impact in the global digital economy
- Through the CDT, partners have access to a network of expert supervisors across a range of disciplines, and opportunities to work with other industry partners.

“The Horizon CDT projects are also relevant to Unilever internal activities and development.”

Rob Treloar, Lead Scientist, Unilever Research

“We have been very impressed with both CDT students; in terms of their work ethic, background knowledge, ability to quickly assimilate new project ideas and develop them to make a real difference. They have integrated well with the team it has been a pleasure to host them.”

Brian Newby, Scientist, Unilever

PhD studentship opportunities

There are now opportunities to apply for fully-funded studentships with the Horizon Centre for Doctoral Training in My Life in Data. They are open to UK, EU and international applicants.

The technologies of digital identity and personal data pose some of the most profound technical and social challenges facing our digital society today. Our digital identities will define the interfaces to future services we will use for entertainment, wellbeing, government, transport, energy, retail and finance. They will be constructed from our personal data, digital records that capture who we are, and the histories of our digital, physical and social interactions. We are at an exciting moment in time where there are a vast range of opportunities for research in personal data. The Horizon CDT offers the opportunity to shape the future by recognising a growing public awareness of the value of personal data, presenting exciting opportunities to address concerns over how data is being created, analysed and used.

Our vision is to create digital identity technologies that operate in a fair and transparent manner to empower their users. This is a transdisciplinary challenge, one that needs to bring together expertise in digital technologies, perspectives on digital identity from the social sciences and humanities, and a deep understanding of real-world applications.

The Horizon My Life in Data CDT provides a community of PhD students with the interdisciplinary skills to drive the digital identity and personal data agenda for the twenty-first century. While we do not expect every student to be an expert in all of the areas mentioned above, our aim is to train people to work in transdisciplinary teams, and be ready to become future leaders in industry, the third sector and academia.

Join us

We are interested in students from a variety of backgrounds, including computer science, engineering, mathematics, human factors, psychology, sociology, business, geography, social science and the arts – with an excellent degree who can demonstrate an enthusiasm for interdisciplinary research. The minimum entry requirement is a 2.1 undergraduate degree and English language IELTS average score of 6.5, with no less than 6.0 in any element.

Benefits

- A fully-funded four-year PhD programme that integrates a leading-edge research project with research training in interdisciplinary skills
- At least one internship with one of our partners
- An enhanced stipend of £16,800 per annum (2018 entry), as well as a personal laptop and additional facilities and resources to support the PhD
- A cohort of high achieving PhD researchers
- A world-class research environment with a proven track record of successful Horizon CDT graduates.

How to apply

Application forms can be downloaded from **www.cdt.horizon.ac.uk/apply/current-opportunities** and should be returned by email by the advertised closing date, along with a detailed CV, transcript, references and a statement of research interests to emma.juggins@nottingham.ac.uk.

More information on our current research can be found at **www.cdt.horizon.ac.uk**

Horizon CDT programme: My life in data

Horizon adopts a radical approach to training that combines taught elements with industry engagement and practice-led research in a highly flexible manner.

Under the guidance of a personal mentor, each student will undertake a journey from an initially narrow disciplinary focus to a point where they are fully equipped for a career within industry or academia.

This will involve developing transdisciplinary skills in the human-centred design of ubiquitous computing, as well as transferable skills in research, innovation and appreciation of societal impact.

Our Centre for Doctoral Training programme comprises **three core elements**:

The **taught programme** involves **180 credits of modules** covering interdisciplinary and transferable skills.

Each student undertakes a **three-month internship** with an external partner during their first 36 months of study, contributing 20 credits to the 180.

The **research programme** involves a **20-credit PhD research proposal** with supervisors and external partners from multiple disciplines and follows a proposal developed during the first year of training.

PhD research topics will be developed during the first year of the programme, drawing on ideas and discussions involving the students, potential supervisors and external partners. That said, the following list offers a few illustrative research topics that would fall under the overarching agenda of the CDT:

- Exploration of genomic data sharing that affects individuals, their relatives, health behaviours and clinical outcomes
- Brain controlled film
- Using personal data to configure navigation support for blind and partially-sighted people
- Understanding rail travel through the curation of personal data
- Enchanted smart objects for health behaviour change
- Studying the potential effects of smart packaging on customer brand engagement within the fast-moving consumer goods industry
- Towards user centric regulation: Exploring the interface between Information Technology law and Human Computer Interaction
- Understanding place: Considering the value of social media data for the enrichment of geographic information systems.



CDT internships

Horizon CDT students benefit from a three month internship with their collaborating industry partner, or with an organisation that will be of benefit to both the student and the hosting establishment. Students have completed internships in countries such as Denmark, India, Malta, Tanzania, the United Kingdom and the United States of America.

Examples of organisations where Horizon CDT students have already completed internships include:

- BBC
- City Arts Nottingham
- Digital Catapult Centre
- Experian
- International Institute of Information Technology, Bangalore
- Microsoft Research Lab, Cambridge
- Ordnance Survey
- Nottinghamshire County Council Public Health
- Satellite Applications Catapult
- The Insight Lab
- The World Bank
- Transport Systems Catapult
- Unilever
- University College London
- University of Southern Denmark

Internship case study

Investigating the future of data sharing
at the Digital Catapult Centre.



Tatiana Styliari, a member of the 2014 cohort, completed her internship at the Digital Catapult Centre in London in Summer 2016. She focussed on the role of personal data receipts in the future of data sharing.

“When I joined the Horizon CDT I gained three academic supervisors from a variety of different disciplines (film studies, computer science, human-computer interaction) and two industrial partners: Broadway Cinema & Media Centre and Digital Catapult. After collaborating with them for two years, I decided that a summer internship at the Digital Catapult Centre would be a natural next step.

My three-month project was entitled ‘**Researching transparency in data sharing practices: the case of a consent receipt**’ and was supervised by Michele Nati, the Digital Catapult’s Lead Technologist in Personal Data & Trust. My work revolved around using many technical skills in areas including UX design, prototyping, qualitative research, privacy, personal data, and digital identity.

I was delighted to hear the outcomes of my internship project had led to an official Digital Catapult project, which is being piloted internally by a team of people I had the pleasure of collaborating with.

This experience not only gave me a successful project to add to my CV and helped me develop necessary skills and knowledge, it also introduced me to many people from different backgrounds and departments. These people were always willing to contribute their time and knowledge, and supported me throughout my internship.”

“It was extremely valuable that Tatiana was able to spend several months carrying out research and exploratory work on the idea of personal data receipts, which originated from the Catapult’s Personal Data & Trust Network.”

Marko Balabanovic, Chief Technology Officer,
Digital Catapult.

“This experience not only gave me a successful project to add to my CV and helped me develop necessary skills and knowledge, it also introduced me to many people from different backgrounds and departments.”

Tatiana Styliari, CDT Student (2014 cohort)

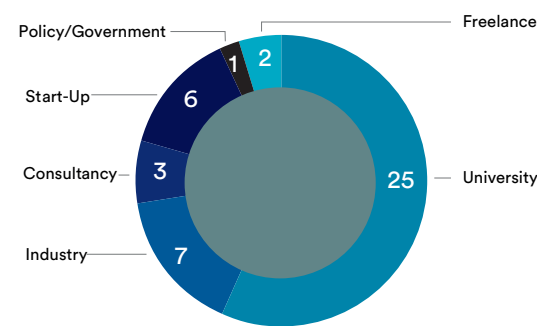
Our alumni – where are they now?

The Horizon CDT is very proud of the success it has achieved since its launch in 2009 and takes pride in the fact that graduates have left the CDT with not only a PhD, but with high-level doctoral skills, expertise, experience and knowledge to progress to professional careers around the world in a variety of sectors.

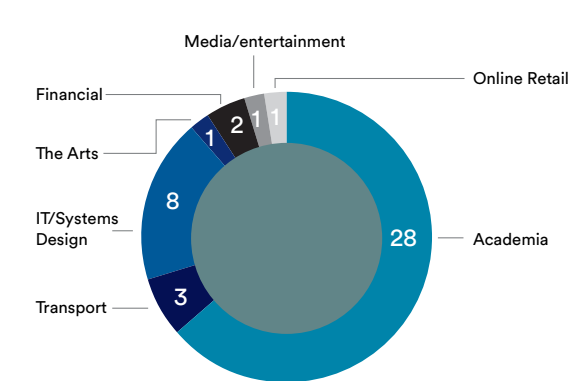
Job titles of Horizon CDT alumni
(first and second destinations)

Job title	No. of alumni
Assistant Professor	4
Auditor	1
Chancellors Fellow	1
Data Scientist	1
Digital Designer	1
Flight Deck & Human Factors Specialist	1
Founder/Co-Founder	9
Lecturer	2
Postdoctoral Researcher	6
Research Associate	7
Research Fellow	9
Senior Engineer	1
Senior Human Factors Engineer	1
Senior Lecturer	1
Senior Technical Consultant	2
Software Developer/Engineer	3
User Experience Consultant/Researcher	6

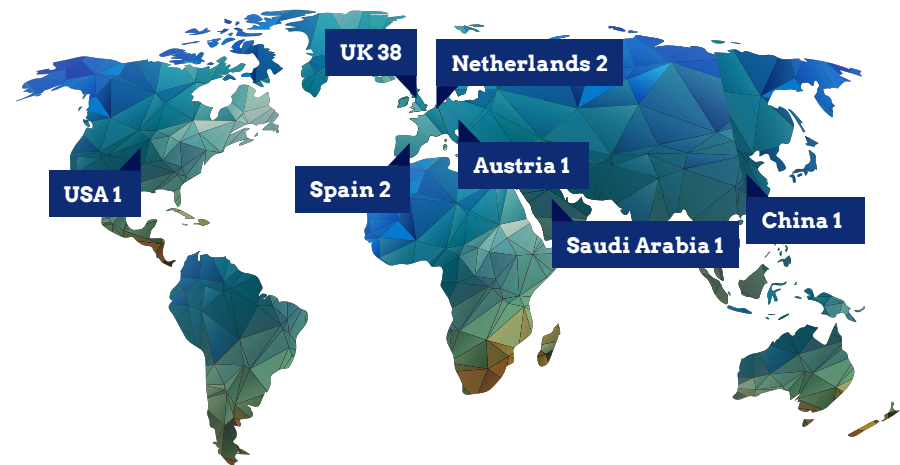
Employing organisation types of Horizon CDT graduates



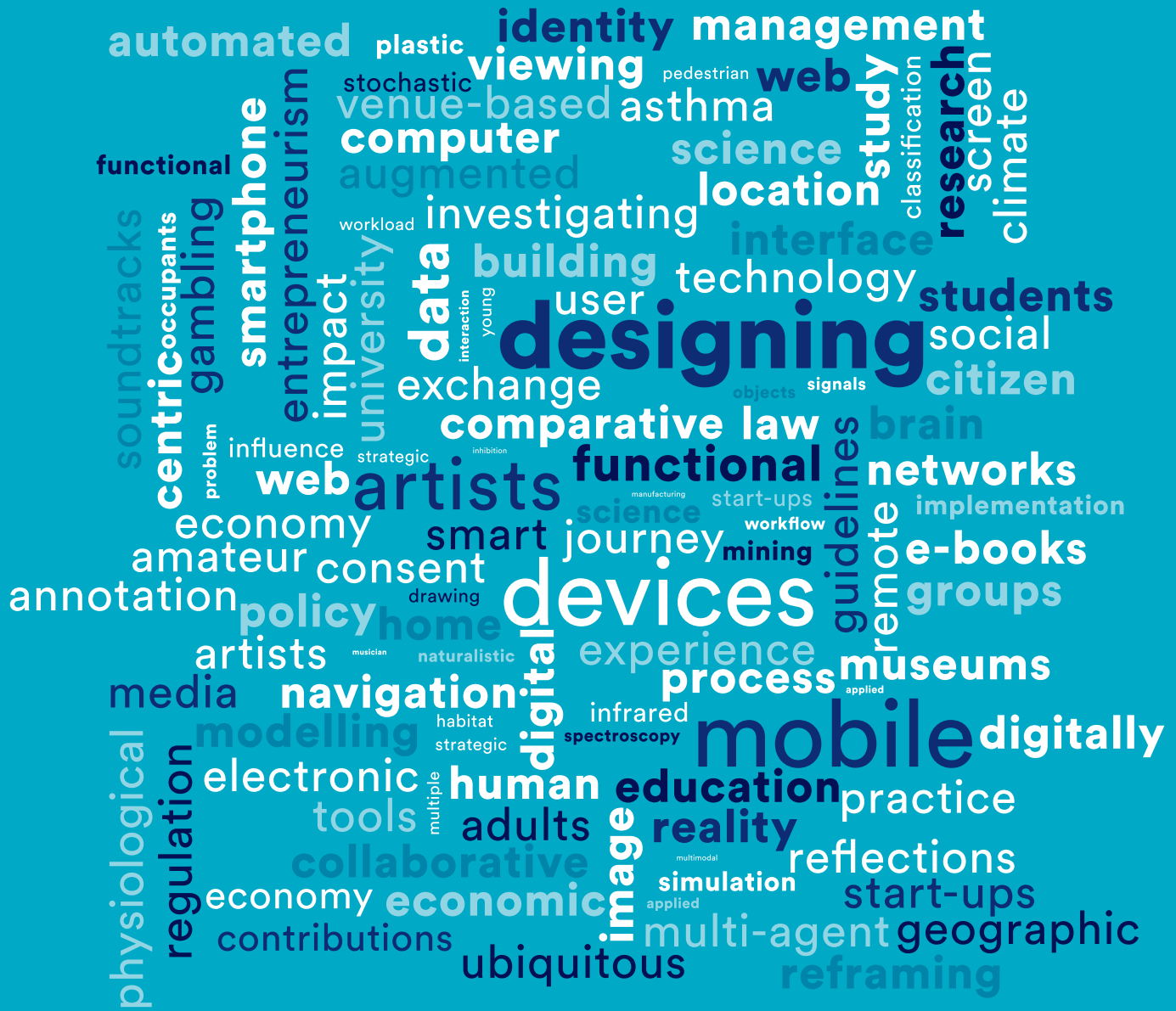
Employing sectors of Horizon CDT graduates



Countries where Horizon CDT graduates are employed



Horizon CDT thesis titles



Case Study: Youngest CDT graduate launches user experience start-up

Some of our CDT students have gone on to launch and be involved in successful digital start-ups, both during and after their PhD study.

Dr Sam Howard was the first to complete from the 2012 cohort after a successful PhD viva in October 2016, as well as being the youngest ever student to graduate from the CDT.

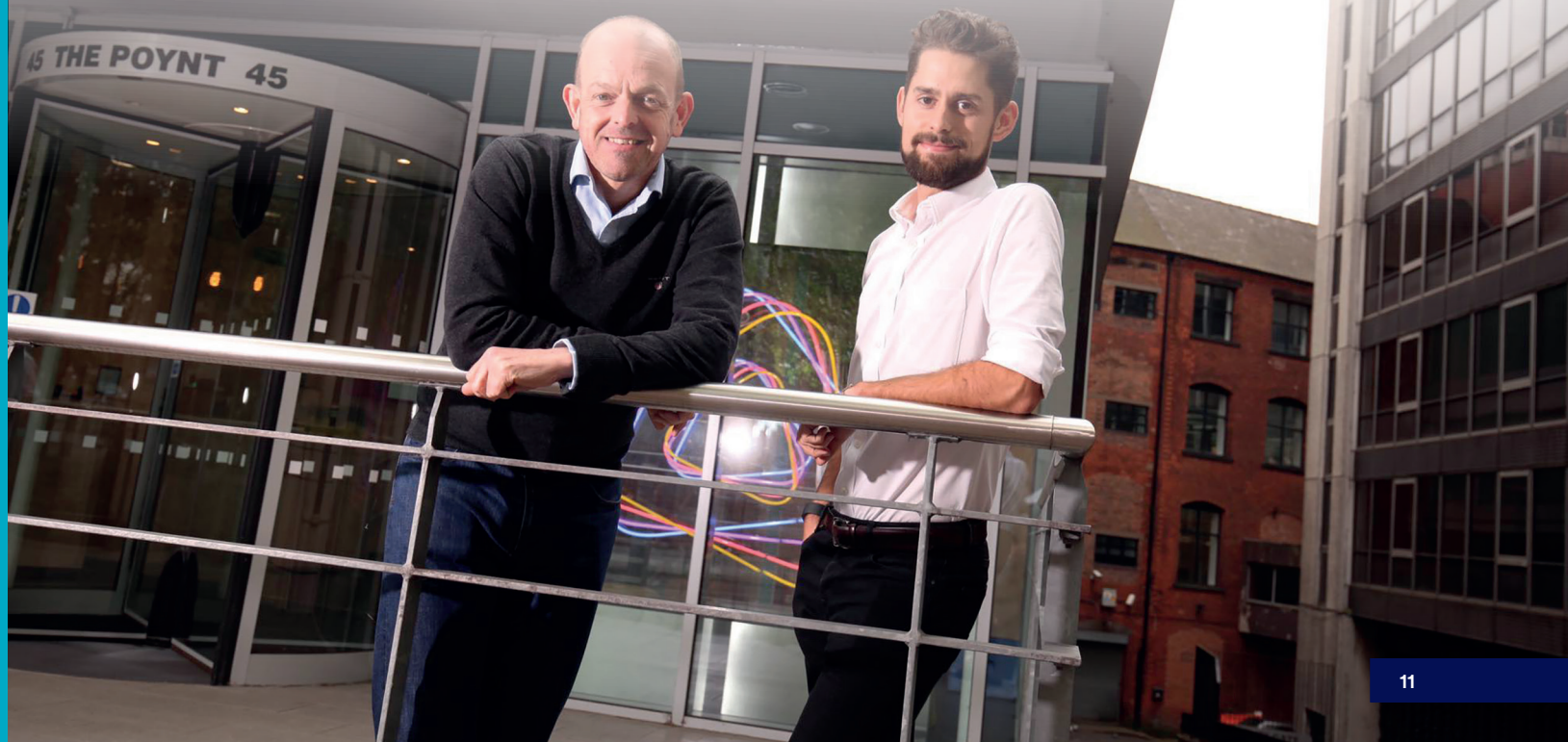
Sam's research drew on an identified need to accurately monitor how adherent asthma patients are to their inhaled medication, in order to detect when patients are at risk, when they require intervention, and the impact of different interventions in clinical trials to understand how adherence can best be improved.

His decision to focus on the use of Electronic Monitoring Devices (EMDs) in Asthma for his PhD research was due to them offering the most precise method for recording inhaler use and have shown to improve adherence when they contain a reminder function or adherence data is fed-back to the patient. When Sam started his PhD in 2012, there had been little to no research to date investigating how EMDs can be designed and developed to ensure they meet the needs of both patients and healthcare providers.

The research resulted in various international collaborative publications and speaking engagements including in acceptances for the BMJ's Open Respiratory Research journal, the European Respiratory Journal and the International Symposium on Human Factors and Ergonomics in Healthcare. Research and data collection methods included questionnaires, interviews, three-way Delphi surveys, workshops, as well as tech-trials with sixth form pupils at Long Eaton School in Derbyshire.

It is envisaged that the research impact from Sam's work will help inform the future development of EMDs through identifying important issues for both patients and healthcare professionals, as well as acting as a trigger for future user-focused research in asthma care.

After completing his PhD, Sam initially went on to a Research Associate role in the Horizon Digital Economy Institute before going on to co-found Userfy; an expert-led user research and usability testing start-up based in Nottingham in April 2017.



Case study: CDT alumna joins expert-led user insight consultancy

Dr Michaela Murphy (2011 cohort)



Left to right: Dr Vicky Coughlan, Dr Emily Webber (2009 cohort) and Dr Michaela Murphy (2011 cohort).

Michaela joined the CDT in Autumn 2011 with a background in social sciences.

She completed her PhD in the Mixed Reality Lab, looking at amateur musician's needs and practices; exploring the ways in which digital technologies facilitate musician networking alongside creating, performing and distributing their music to a professional standard.

Despite sharing their music digitally online, Michaela found that the tangible artefact also had strong shared meaning amongst the musicians, alongside event-oriented networking. Her research explored how the digital could be more subtly embedded into these handcrafted tangible objects.

Michaela completed her CDT internship with Microsoft Research in Cambridge. The work she undertook whilst there led to a new collaborative research project to further develop tools to support musicians' networking practices, both digitally and in person.

After successfully defending her thesis in January 2017, Michaela now works as a User Experience Researcher at The Insight Lab in Nottingham, together with fellow CDT graduate Dr Emily Webber (2009 cohort). Emily is Head of Insights for Bionical, which became the lab's parent company in 2017.

Case study: Mixed reality researchers secure additional EPSRC funding

Dr Horia Maior (2012 cohort) and Richard Ramchurn (2015 cohort)

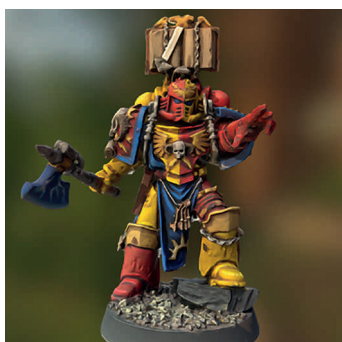
Horizon CDT students Horia Maior and Richard Ramchurn are based in the Mixed Reality Lab at the University of Nottingham. They have collaborated on various research projects and academic papers in the area of brain-computer interaction.

Dr Horia Maior passed his viva in July 2017, and in the same year secured a further two years of funding from the University of Nottingham EPSRC Doctoral Prize to continue to develop his research, whereas Richard has been awarded £10,000 from the EPSRC Telling Tales of Engagement 2016 call, to develop and tour a new live brain-controlled movie entitled 'The Moment' to the general public.



Case study: Collaborative research project with The National Videogame Arcade

Dimitri Darzentas (2012 cohort)



In 2016, Dimitri Darzentas was successfully awarded a University of Nottingham EPSRC Impact Acceleration Award to fund a one-year knowledge transfer project to fast-track and enhance the impact of his Horizon CDT research in the area of the digital footprints of physical objects.

In February 2017, Dimitri engaged the public with his research at the National Videogame Arcade (NVA) in Nottingham, via an interactive exhibition.

As part of the Mixed Reality Storytelling Project, Dimitri exhibited a 3D scanning photobooth, where NVA visitors could bring their miniature wargaming figures and have them brought to life via a Virtual Reality (VR) process.

Future plans will involve featuring these 3D models, along with the personal stories behind them, in a special VR exhibition to be staged at the NVA in Autumn 2017, where the scanned miniatures will become life-sized exhibits.

You can find out more about this work at:
www.mixedrealitystorytelling.net

Case study: Former CDT student becomes academic supervisor

Dr Chris Carter (2010 cohort)



Chris was a member of the 2010 cohort and graduated in 2016 after completing his PhD in social media research.

Chris is now an Assistant Professor in Entrepreneurship and Innovation at the Haydn Green Institute for Innovation and Entrepreneurship at the Nottingham University Business School.

In 2017, Chris became a CDT academic supervisor for 2016 cohort CDT student Christian Tamakloe, who is focusing his research on how personal data can augment passenger travel time, in collaboration with industry partner Thales UK.

THALES

Case study: Increasing the accessibility of IT law through privacy ideation cards

Dr Lachlan Urquhart (2012 cohort)

Lachlan was a member of the 2012 cohort and graduated with a PhD from the Horizon CDT in July 2017, after successfully passing his viva in March of the same year.

During his PhD Lachlan was looking to understand the role of technology designers in addressing some of the challenging regulatory questions around emerging technologies, like the Internet of Things. He was interested in how much IT Law and HCI could conceptually be aligned, and the areas of practical crossover between the two disciplines.

His research involved developing a set of physical ideation cards, which looked at doing 'privacy by design' in practice. The cards provide a great tool to sensitise the design community to legal issues, where law may not be a traditional area of focus or familiarity.

Lachlan is now a Research Fellow in IT Law at the Horizon Digital Economy Research Institute at the University of Nottingham, focusing on aligning the fields of IT Law and Human Computer Interaction (HCI), so that academics and designers can work together to address regulatory challenges of emerging data driven technologies.



Case Study: Research and innovation in infant imagery analysis

Dr Mercedes Torres Torres (2010 cohort)

Mercedes' research interests lie at the intersection between computer vision, machine learning and healthcare. After completing the Horizon CDT programme in 2014, Mercedes secured a post-doctoral Research Fellow position in the Computer Vision Lab (CVL), as well as a part-time lectureship, in the School of Computer Science at the University of Nottingham.

Mercedes was involved in the CVL's GestATional Age Research Project, which was funded by the Bill & Melinda Gates Foundation. This involved developing a new crowd-sourcing app, BabyFace, to estimate the gestational age of premature babies. The app was launched in 2015 to specifically assist doctors in being able to determine the gestational age of children born in isolated regions and thus help reduce unnecessary deaths worldwide.

BabyFace received national and local press and media coverage both in The Guardian and on local radio via BBC Radio Nottingham.

Mercedes was also involved in a Depression Study research project, which aimed to bring self-diagnosis and self-monitoring one step closer to reality by analysing if Major Depression Disorder can be classified and monitored using audio-visual information.

In November 2016, Mercedes secured a promotion to be a Transitional Assistant Professor within the Horizon Digital Economy Research Institute at the University of Nottingham.





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The University of Nottingham has made every effort to ensure that the information in this brochure was accurate when published. Please note, however, that the nature of the content means that it is subject to change from time to time, and you should therefore consider the information to be guiding rather than definitive.

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