horizon
CENTRE FOR DOCTORAL TRAINING

Creating Our Lives in Data

Horizon Centre for Doctoral Training

Introduction

The Horizon Centre for Doctoral Training was initially established in Autumn 2009 as a doctoral training centre, funded by the Engineering and Physical Sciences Research Council (EPSRC) to train cohorts of research students within the digital economy ubiquitous computing arena.

In 2014, the CDT was successful in receiving renewal funding from the EPSRC with 'My Life in Data' becoming the core research theme for the University of Nottingham based Centre.

In February 2019, the EPSRC funding was renewed once again with 'Creating Our Lives in Data' being the research theme for the Horizon CDT.

As of Autumn 2020, we have recruited over **140 CDT students**; grown a **network of 100 supervisors** across various disciplines and universities; collaborated with more than **50 industry partners** who have contributed over £1.5M cash funding; and have had 76 students successfully pass their vivas.

The CDT has published over 300 academic research papers; and received multiple awards, including two best paper awards at the ACM CHI Conference, an Internet Society 'Global 25 under 25' award for Kate Green (2016 cohort), three EPSRC "Telling Tales of Engagement" awards for Roma Patel (2013 cohort) and Richard Ramchurn (2015 cohort), best presentation award at Midlands Doctoral Consortium for Symeon Dionysis (2017 cohort) as well as a number of academic honours.

Our graduates have secured employment in business and academia across Europe, the Middle East, and the United States. Employers of CDT alumni include Sony, United Nations, World Bank, Microsoft Research, BBC R&D, Thales, Capital One, Airbus and Jaguar Land Rover, as well as many remaining in academia in world-class Universities, or choosing to start-up their own businesses or consultancies.

The multidisciplinary environment, the breadth of training, the extent of opportunities available to students, and the wide range of impacts including media coverage, prizes, awards and case studies are noted as key successes.

In April 2020, PhD researcher Richard Ramchurn successfully submitted his PhD thesis entitled 'Brain Controlled Cinematic Interactions'. Richard was the first student of the CDT to submit his PhD during the Global Pandemic.

This brochure has been produced to:

- highlight the breadth of innovative multidisciplinary 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 a 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 Creating Our Lives in Data CDT, and the plethora of skills, expertise and knowledge they can expect to gain as a Horizon CDT student

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

**Professor
Steve Benford**
CDT Director

Dr Nicholas Walson
CDT Deputy Director

CDT
Partners

Over 50 partners from business, government, innovation centres, creative agencies, and not-for-profit organisations have engaged with and supported the Horizon CDT. BBC, Digital Catapult, Dstl, GlaxoSmithKline, Internet Society, Nottingham University Hospitals NHS Trust, Ordnance Survey, RSSB, and Unilever are some of the current partners.

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 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 carries out a three-month PhD placement with their partner organisation.

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 placements. 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 placement, 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

"CDT students provide a fresh perspective for us at RSSB. They have the research time and skills to help us build our knowledge and to bridge the gap between research and rail industry needs"

Huw Gibson, Head of Human Factors, RSSB

"We have been very impressed with the 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

"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

"I can say it's a real pleasure to work with PhD students from the CDT, and immerse them in BBC research and partnerships, via the projects that play to the focus of the PhD and the overlap between research directions."

Phil Stenton, Research Scientist, BBC

"We want students who come from the perspective of balancing technology development with the trusted use of personal health data."

Lindsay Edwards, Head of Data & Analytics, GSK

PhD
Studentships

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 Creating Our Lives 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 multidisciplinary teams, and be ready to become future leaders in industry, the third sector and academia.

Horizon CDT
Programme

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 academic staff and the CDT Team, 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 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 an **extensive placement** with an external partner during their first 36 months of study, contributing 20 credits to the 180.

- The **research programme** involves developing and implementing a PhD research project with supervisors from multiple disciplines and external partners, following a proposal developed during the first year of training.

The PhD research topics will be developed during the first year of programme, drawing on ideas and discussions involving the students, potential supervisor's and external partners.

The following list offers a few illustrative **research topics** that would fall under the overarching agenda of the CDT:

- Understanding (Political) Internet Memes and their effects on social media users

- Cybersecurity & Trust in Internet of Things (IoT)

- Online Harms/Law and Regulation

- Transparency and accountability in automated decision-making

- Exploring late adopters' (dis)engagement with digital technology in the rail sector

- How does legal digital literacy impact access to justice?

- Data Donation, Data Linkage and Health Outcomes

- Farmers, digital technologies and the future of agriculture

- Implementing RRI in Practice

- An exploration of applications of Deep Learning for credit risk assessment

- Understanding the motivation and methodology of offenders sexually grooming and exploiting children and young people (under 18) online

- Digital Relationships: Creating meaningful and new relationships with audiences

- Application of Artificial Intelligence to Connected Transport and Logistics

- Interacting with the Smart City

- Interactive and responsive broadcasting

- User-centred design of interactive personalised prosthetics

- Enabling environmental citizenship

- Embedding digital interventions into everyday life – Measuring mood with wearable technology

- Studying the potential effects of smart packaging on customer brand engagement within the fast-moving consumer goods industry

- Audio augmented objects
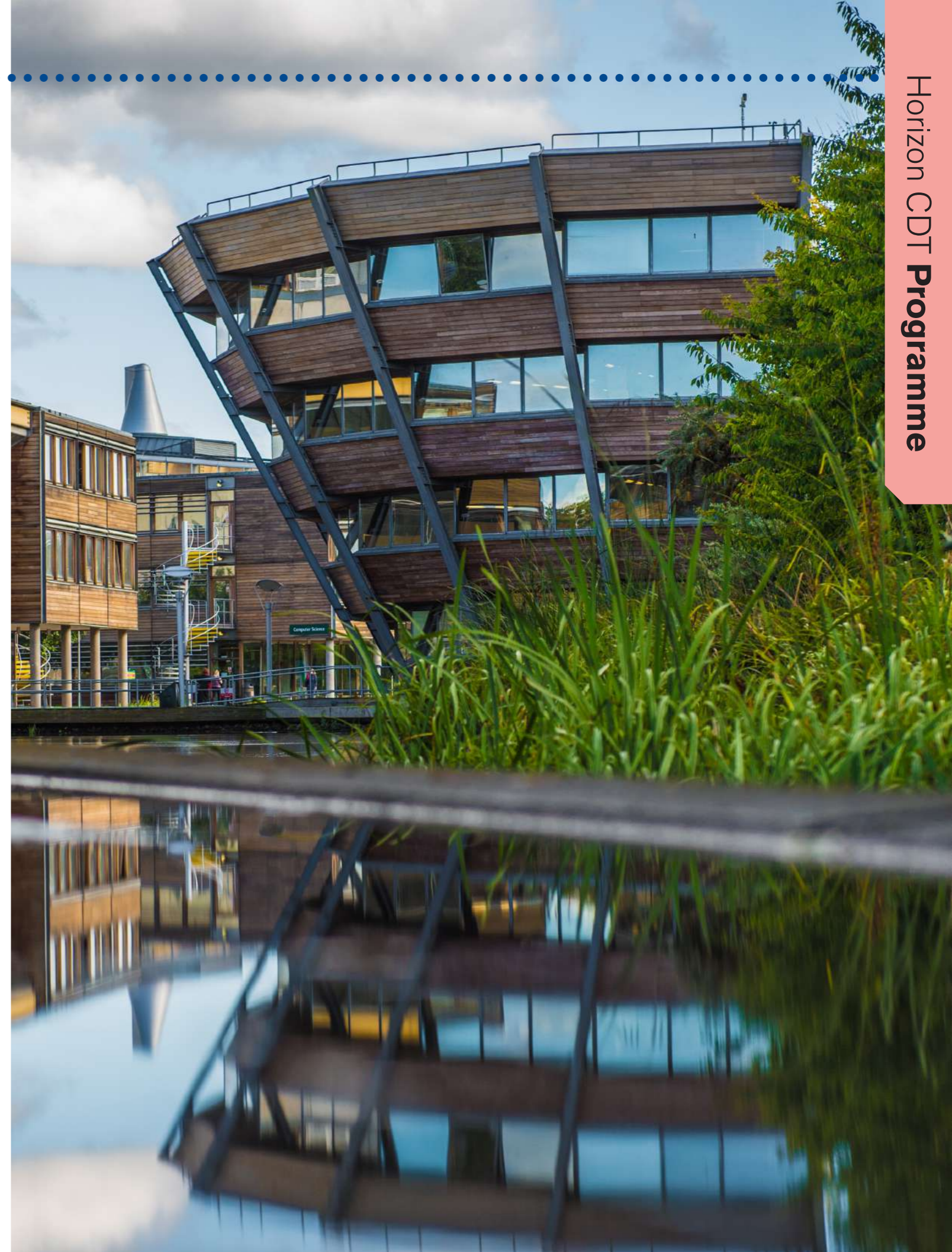
CDT
Placements

Horizon CDT students benefit from a three month placement with their sponsoring industry partner, or with an organisation that will be of benefit to the student's research and collaborating organisation.

Students have completed placements in countries such as Czech Republic, Denmark, Hong Kong, India, Japan, Malta, Tanzania, the United Kingdom and the United States of America.

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

- BBC Research & Development
- BlueSkeye AI
- Boots
- Cambridge University Press
- City Arts Nottingham
- Connected Places Catapult
- Digital Catapult Centre
- Experian
- International Institute of Information Technology – Bangalore (India)
- ISOS Group
- Locision Technology Limited (Hong Kong)
- Merck Sharpe and Dohme – MSD (Prague)

- Microsoft Research Lab – Cambridge
- National Videogame Arcade
- Network Rail
- Nottinghamshire County Council Public Health
- Open Data Institute
- Ordnance Survey
- Satellite Applications Catapult
- Royal National Institute of Blind People (RNIB)
- Thales Group
- The Insight Lab/Bionical
- The People for Change Foundation (Malta)
- The World Bank (USA)
- Transport Systems Catapult
- Unilever
- University College London
- University of Cambridge – Trustworthy Technologies SRI
- University of Southern Denmark
- Worcester Polytechnic Institute (USA)

CDT Alumni

The Horizon CDT is extremely 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 high-level doctoral skills, expertise, experience and knowledge to progress to professional careers around the world in a variety of sectors.

Horizon CDT has:

- 77 PhD graduates

Examples of Horizon CDT alumni employers:

- Airbus
- The Alan Turing Institute
- Capital One
- Goldsmith, University of London
- Horizon Digital Economy Research Institute
- Jaguar Land Rover UK
- Methods
- Microsoft Research
- New York University
- Royal College of Art
- Sony Interactive Entertainment Europe
- Thales
- IFC, The World Bank Group
- United Nations
- University of Cambridge
- University of Edinburgh
- University of Manchester
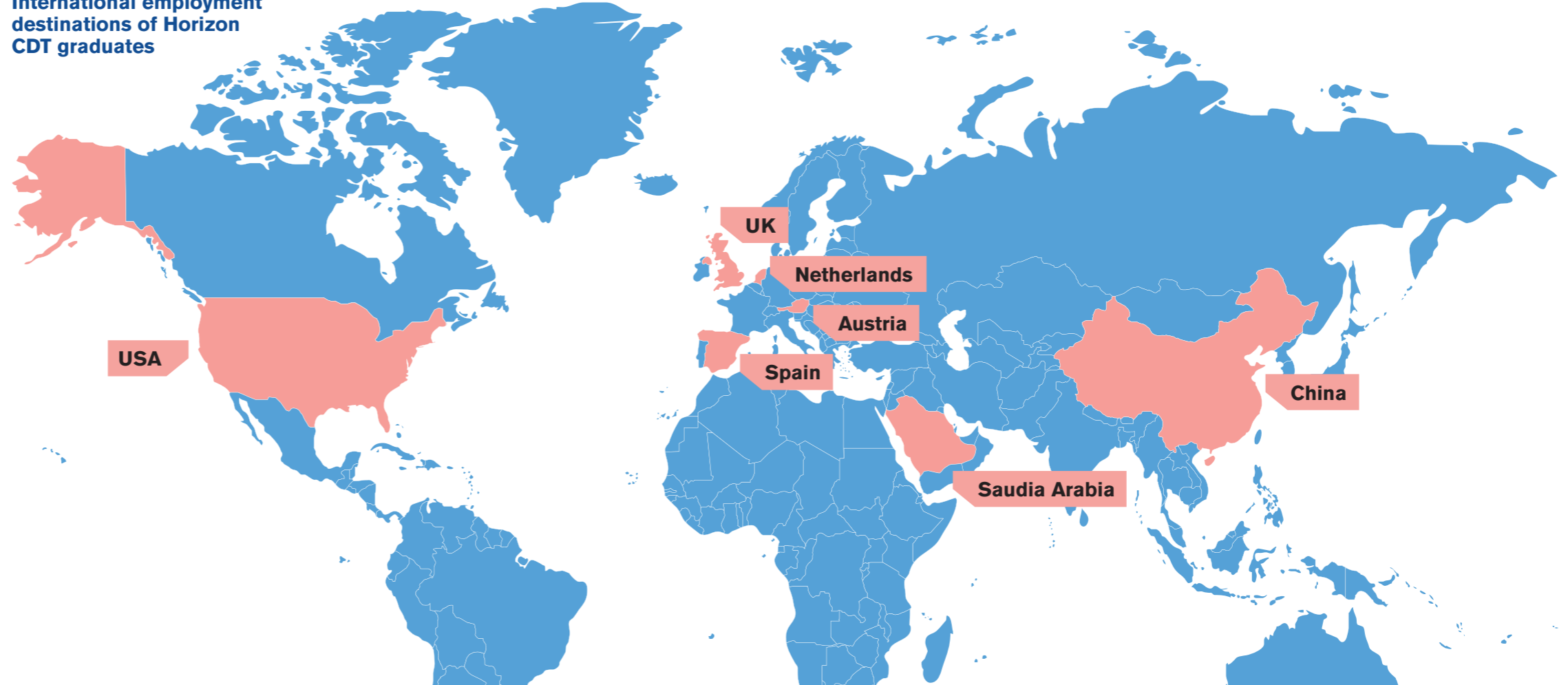- University of Nottingham

Employing organisation types of Horizon CDT graduates

- Policy/Government   1
- Start Up   6
- Consultancy   3
- Industry   8
- University   25
- Freelance   2

Employing sectors of Horizon CDT graduates

- Online Retail   1
- Media/entertainment   2
- Finance   2
- The Arts   1
- IT/Systems Design   8
- Transport   3
- Academia   28

International employment destinations of Horizon CDT graduates

UK
Netherlands
Austria
Spain
USA
Saudia Arabia
China

Interacting with
the Smart City

Peter joined the Horizon CDT after completing an undergraduate degree in Mathematics and a postgraduate degree in Human-Computer Interaction, both at the University of Nottingham.

Peter Boyes
(2018 cohort)

"During my masters I developed a keen interest in human interaction with data, tools, and each other. My background gave me experience with quantitative and qualitative research, and helped develop the skill of finding and communicating logical arguments to different audiences.

Partnered with Ordnance Survey, I am exploring smart cities and the challenges that will face decision makers in an urban environment that is being increasingly populated by sensors and other connected sources of data in the age of Internet of Things (IoT). These are complex environments with multiple sources of data available to decision makers, and we are interested in how to support the decision-making process under different time pressures.

Initial studies have been understanding the environments that team sensemaking and decision-making take place in, using semi structured interviews and ethnographic studies to elicit the similarities and differences between the collaborative situations. The next step will be to prototype and evaluate an intervention that enhances the sensemaking process and supports the team decision-making, moving a step closer to enabling the smart cities of the future."

Late Adopters of Technology in **the Rail Sector**

Charlotte Lenton
(2020 cohort)

Charlotte Lenton began the Horizon CDT programme after studying at the University of Lincoln, UK. Charlotte's background is in tourism management and the implementation of digital technologies in the public sector with research experience in issues of social justice and equality in the tourism sector. Her previous experiences lend themselves well to Charlotte's PhD research which will investigate the technological, physical, and psychological barriers to travel experienced by late adopters of technology in the rail sector.

Late adopters of technology have been marginalised in academic and industry research in favour of exploring the perspectives and experiences of early technology adopters. Similarly, digital illiteracy has rarely been examined as a potentially disabling factor preventing access to travel. Charlotte's research will investigate the travel experiences of this marginalised group of users whilst also exploring how an inability or reluctance to use digital technologies could be a source of barriers to travel. The overall objective of Charlotte's PhD is to make rail more appealing and accessible for all passengers by removing the barriers to travel encountered by late technology adopters as a diverse group of passengers.

Future Experience **Technologies**

Joe entered the Horizon CDT programme after studying at the Universities of Oxford and Nottingham. Joe's academic background is in Experimental Psychology and their practical background is in the Theatre Industry.

Joe Strickland
(2017 cohort)

"My varied background in both psychology and theatre allows me to approach my PhD topic of Future Experience Technologies from many different directions and in a multi-disciplinary way that greatly benefits my research. Using skills from previous research in reading and interpreting audience behaviour, and my creative skills from writing, directing, designing, and producing live performances, I've been able to help further understanding about the ways in which storytellers can collect and utilise audience behaviour data to help them create meaningfully interactive digital experiences.

My research involved creating a multi-linear branching narrative that audiences could influence in several different ways; some conscious, some unconscious. By altering the way in which the experience was interactive, and how that interactivity influenced the narrative, and then comparing it to audience enjoyment measurements we began to better understand how new technology could be used by storytellers to create entertaining, enlightening, and socially bonding interactive narrative experiences that feel live and immediate like a traditional in-person performance."

Digital Technology for Early Warning Signs in **Mental Health Conditions**

Shazmin holds a BSc degree in Psychology and a MSc degree in Psychological Research Methods. She worked as a lead researcher as the Institute of Mental Health (University of Nottingham) before beginning a PhD partnership with NIHR Nottingham Biomedical Research Centre Mental Health & Technology Theme. Shazmin is currently a research psychologist based at the Mixed Reality Lab at the University of Nottingham investigating how to capture early warning signs of relapse using digital technology for those with bipolar disorder.

Shazmin Majid
(2018 cohort)

Combining human-computer interaction, data science and psychology, Shazmin has designed and is currently testing a digital self-tracking tool that combines passive and active sensing techniques to measure early warning signs for those with bipolar disorder. Involving users with lived experience of bipolar disorder in the design of technology is at the core of Shazmin's research, and she has explored how this is done currently in mental health technology and how we can improve.
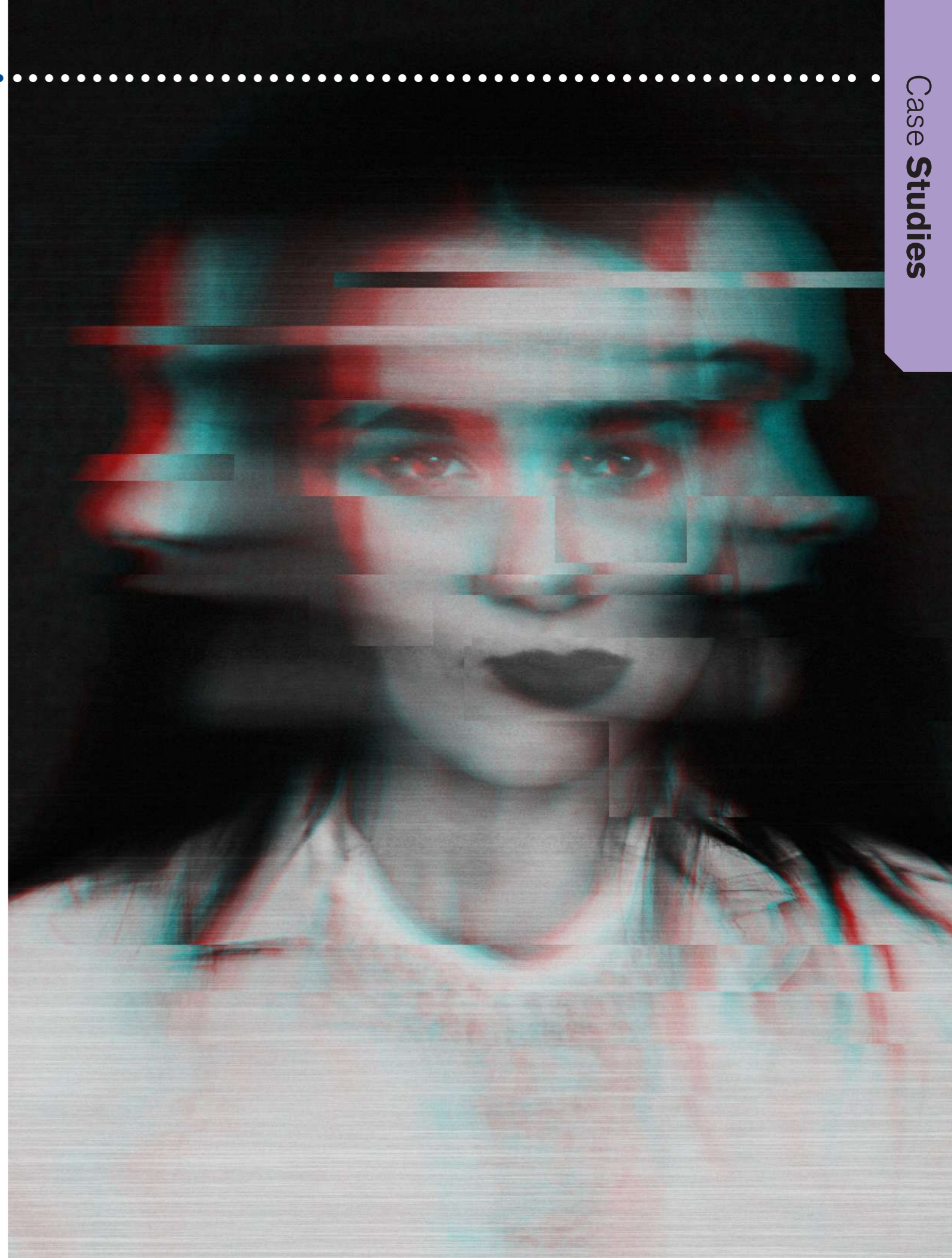
Impacts of Differential Privacy in **Loan Applications**

Ana Rita Pena began the Horizon CDT PhD programme after completing a master's degree in Mathematical Physics at the University of Nottingham.

Ana Rita Pena
(2019 cohort)

Ana's work aims to better understand the impact of implementing differential privacy, a privacy enhancing technology, in the context of automated loan applications. Her PhD work combines the technical evaluation based in statistics and computer science with a user-focused evaluation of the public's attitudes towards loan applications as well as technologies and data sources used in the process. As the implementation of differential privacy has been shown to have disparate accuracy loss across different groups, it is of great importance to understand this occurrence in a range of different contexts before implementation. This research not just has some academic value, but it will also be of value to regulatory bodies and the industry.

Ana is currently doing her placement with her industry partner, Capital One, working on a series of projects around responsible Artificial Intelligence (AI) implementation.

Accurate Detection Methods for **Image Synthesis**

Motivated by the rapid advancements in AI driven image forgery techniques, Matt's PhD project focuses on using a mixed methods approach to improve the detection of synthetic earth observation data (EO) that has been produced by state-of-the-art generative adversarial network models (GANs).

Matthew Yates
(2018 cohort)

In partnership with the Defence, Science and Technology Laboratory (Dstl), this project aims to combine computer vision techniques with human factors research into expert knowledge to find novel methods for detecting AI generated earth observation data.

The novel approach taken to this problem is to utilize domain specific, human expert knowledge with our research finding that there is a significant correlation between self-identified expertise and performance in correctly classifying EO images as real or false. The final goal of this PhD project is to identify and use expert knowledge to facilitate more accurate detection models that can more robustly predict the authenticity of EO images.

Influencing Patients' Behavioural Change **Using Context Data**

Vanja Ljevar
(2017 cohort)

Vanja started her Horizon CDT PhD after several years of working as a Senior Customer Insight Analyst. This valuable industry experience in the field of data science, in combination with her MSc in Marketing, was a useful starting point for her multidisciplinary PhD that combines data science and psychology.

Vanja's thesis marries the strength of several methodological approaches to investigate the mechanisms of socio-cognitive factors and how they affect a particular behaviour - adherence to asthma medication. Non-adherence to medication is a multidimensional problem and some features such as socio-cognitive factors or simply - perceptions are very hard to measure and even detect. Therefore, this work relies on creating a synergy from the findings of qualitative interviews, Tweets analysis, statistical analysis, and novel machine learning algorithms.

Drawing from both psychology and data science paradigms, Vanja's work signifies how people should be seen as inevitably intertwined with their social environment. This is particularly relevant since today we are surrounded by digital traces that can be used to create insights about patients. These insights could inform a more proactive approach in medicine and mitigate the stress of managing a serious health condition such as asthma.

How Social Media Affects Looked-after Young People

Cecily Pepper began the Horizon CDT doctoral programme after completing a degree in Psychology with Cognitive Neuroscience at the University of Leicester.

In collaboration with the NIHR Nottingham Biomedical Research Centre (BRC) and The Rudd Centre for Adoption Research and Practice at the University of Cambridge, Cecily's research aims to explore the impact of social media platforms on the mental well-being of looked-after young people. In particular, Cecily's research focusses on the mental aspects of the self, including self-esteem, self-worth and identity. Due to looked-after young people being highly vulnerable to developing mental health issues, and with such frequent use of social media within the younger generation, it is extremely important to explore the impact of social media (both positive and negative).

The research project is exploring these issues by using in-depth interviews with both young people and frontline social care professionals, and critical incident technique combined with think aloud protocol with young people. The think aloud method stems from the human-computer interaction field and, in this case, aims to explore which specific features of social media platforms are affecting emotional wellbeing. Therefore, the project is multidisciplinary in nature and includes aspects from psychology, social care and computer science and communication fields.

Potential implications of the research include resources and guidelines for education and awareness purposes, advice for policy makers and social media designers, and advice and tools that young people can utilise to make social media a positive emotional experience.

Cecily Pepper
(2019 cohort)
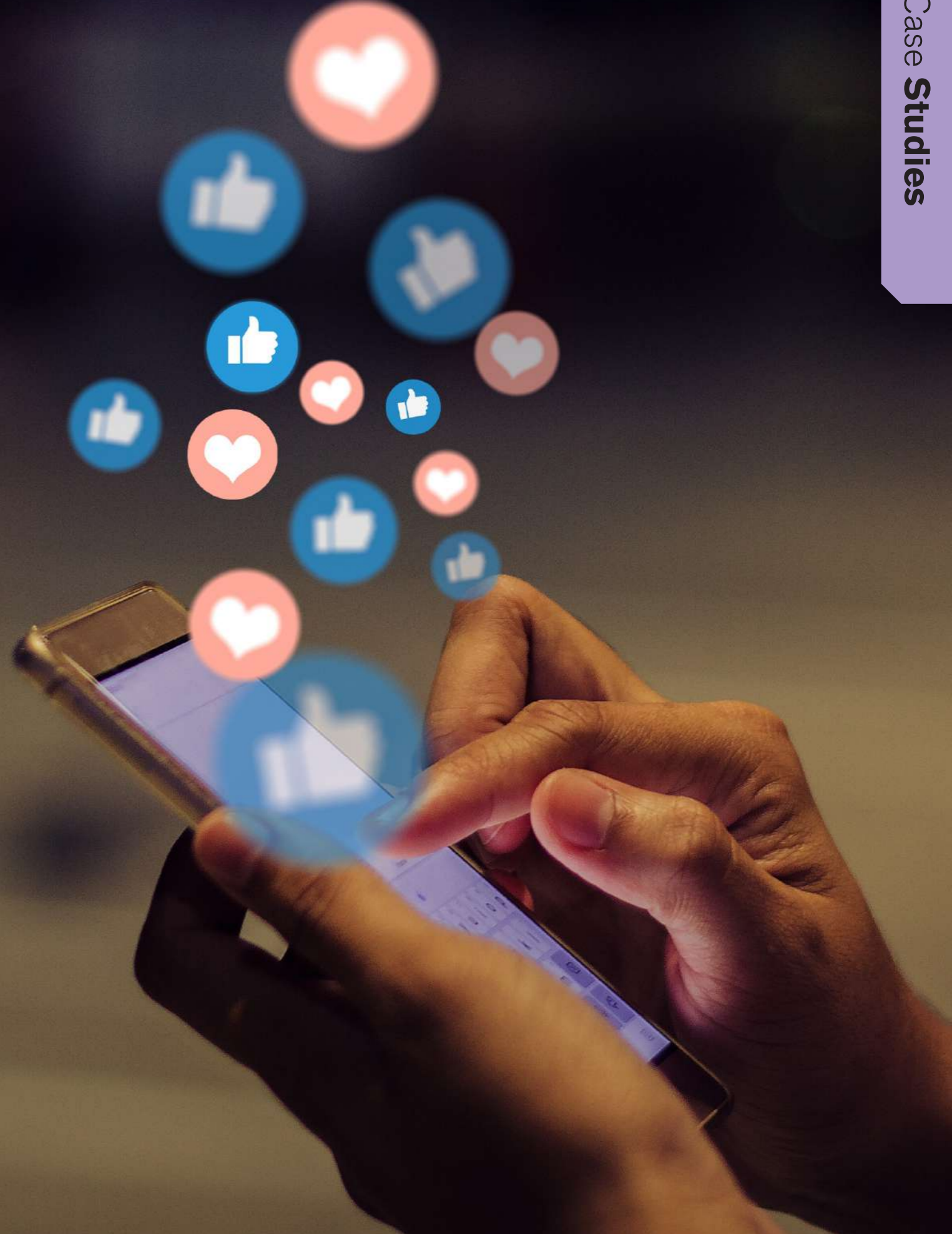
CDT Sprint Project
with Helyx

The 2019 Horizon CDT cohort undertook a Sprint project based on the 5-day Sprint method designed by Jake Knapp.

- Day 1 - the design challenge is set and the group map out all its elements and concerns

- Day 2 - sketching out as many possible solutions to the challenge without critique

- Day 3 - one solution is chosen to take forward and its requirements fully fleshed out

- Day 4 - creating a lo-fi prototype of the technological solution

- Day 5 - prototype is then evaluated with users

This Sprint design challenge was set by Anneley Hadland of Helyx SIS Ltd, a professional services company specialising in the provision of information management, exploitation, assurance (IM/IX/IA) and geospatial information systems (GIS) services and solutions. Three different design challenges were set by Anneley and colleagues which were all focused on how Artificial Intelligence (AI) tools could be developed to account for potential bias, ethical concerns and risks in the areas of autonomous driving, automated mapping and car insurance. Working in two groups, our students tackled the autonomous driving and automated mapping challenges, producing (digital) paper prototypes which Anneley and fellow Helyx colleague (and CDT alumni) Sam Meek evaluated.

Following completion of the sprint project, Anneley arranged for our CDT students to present to the Open Geospatial Consortium (OGC), a worldwide community committed to improving access to geospatial, or location information. CDT students Angela Thornton and Ana Rita Pena alongside Adrian Hazzard (CDT Training Manager) and Anneley took part in the OGC meeting and presenting their work.

We would like to thank Anneley and Helyx for their support and the opportunities they kindly provided over the course of this CDT Sprint project.

Sprint Projects **with Consumer Goods Company**

Gustavo and Velvet, together with members of the Mixed Reality Lab, have collaborated on two Sprint projects in conjunction with a large consumer goods company. These Sprint projects were aimed at conducting fast-paced research focused on specific and often risky areas of interest for Horizon's industry partners.

The projects were focused on increasing consumer engagement in digital gifting through the addition of functionalities to consumer goods. As a foundation for their work, they used participatory design workshops which then informed the design of a 'minimal viable product', which they then tested in the field to gather insights about people's experience. They worked on one consumer good for each project as described below:

- 'Blobby' was a probe inspired by the '*message in a bottle*' tradition, which used the packaging of laundry pods to provide a way to send and receive messages among their users. Blobby incorporated an element of interpersonal communication into people's laundry practices.

- 'The mindful tea experience app' was a web application that provided wellbeing activities tailored for different tea blends and promoting the appreciation of the present moment. The access to these activities was seemingly accomplished through scanning the tea packaging.

They were able to offer design recommendations taking into account opportunities and challenges for the design of augmented versions of consumer goods for a wider community interested in digital gifting and human-packaging interaction. Horizon, on their part, was able to give their members both hands-on experience with research in the industry and an opportunity to appreciate the relevance of their work outside the academic environment.

They would like to thank all the academics and students who have contributed to these projects including Steve, Jocelyn, Boriana, Juan, Stine, Rebecca, and Hanne, among many others.

Gustavo Berumen
(2017 cohort)

©Ant Belle (antbelle.com)

Velvet Spors
(2017 cohort)

# Placement Cybersecurity Specialist - **Connected Places Catapult**

Neeshé Khan
(2018 cohort)

Neeshé's PhD research applies traditional engineering safety models to tackle unintentional insider threat within cybersecurity.

For a period of three months, Neeshé undertook a placement with Connected Places Catapult (CPC) as a Cybersecurity Specialist reporting to the Director of Applied Data and Technology directorate. CPC gave Neeshé the opportunity to collaborate across designations and throughout the department engaging with numerous projects. Utilising her expertise she inputted into CPC's response to a governmental consultation about the cyber security of private 5G networks. Neeshé analysed and evaluated CPC's existing and potential project portfolio to identify existing gaps and future opportunities pertaining to cybersecurity elements.

During her placement, she led a consultation with small and medium enterprises (SMEs) to produce a report on the cyber security challenges of implementing Digital Twins within the Future Air Mobility (FAM-DT) domain. Her work also included creating a cyber security framework for Living Labs project which assists healthy aging. Neeshé created 'Cyber security series' for CPC which included a game and website design to raise awareness on a range of topics within cyber security for SMEs developing emerging technologies and local councils implementing them as part of their early adoption initiatives.

Neeshé is using this industry experience to inform the design of her novel framework for unintentional insider threats emerging from her previous research study. Conducting stakeholder evaluations at CPC as part of horizon scanning has provided Neeshé with a unique opportunity to understand the barriers that alienate users from engaging with and understanding the relevance of cyber security in their daily lives.
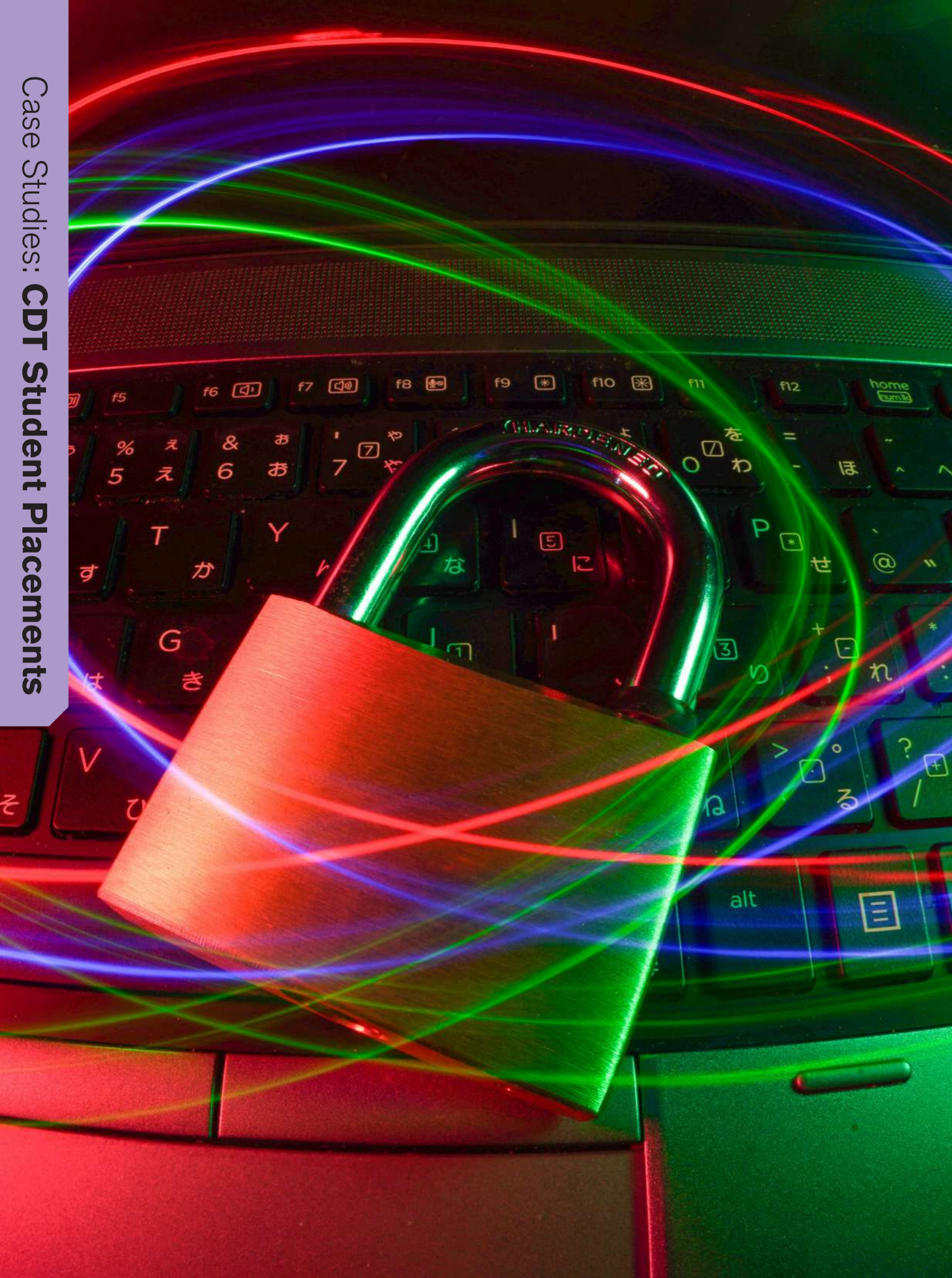
Placement:
Researching HGV Drivers' Behaviour - Microlise

Jimiama's PhD explores the use of domain experts and intelligent methods to automatically fuse and regulate multiple sources of data for the assessment of driving performance. He aims at developing a fair and explainable intelligent driver-assessment system.

Jimiama Mafeni Mase
(2018 cohort)

Jimiama completed his placement at Microlise in Nottingham, UK. Microlise is a tech company that develops telematics solutions for fleet companies to run their businesses more cost-effectively, compliantly, safely and efficiently. During the placement, Jimiama was responsible for investigating the effects of camera-monitoring and supervisory coaching in improving the driving behaviours of Heavy Goods Vehicle (HGV) drivers. He was given access to large datasets of HGV driving incidents before and after the installation of cameras and coaching. The outcome of his placement is published in the high impact 'Accident Analysis and Prevention' Journal and the manuscript is titled 'Evaluating the Impact of Heavy Goods Vehicle Driver Monitoring and Coaching to Reduce Risky Behaviour'.

Jimiama reported that the placement improved his presentation skills and confidence, as he was required to regularly present key findings of his analysis to senior management. He also mentioned a significant improvement in time management, problem definition, data and statistical analysis skills. Jimiama believes the placement helped him to have a clearer understanding of driving behaviour domain and influenced the enhancement of his research methodology.

Combining sensing technologies with traditional crafts material to create innovate interactive and **sensory spaces for children.**

Roma Patel
(2013 cohort)

Roma's thesis investigated how sensing technologies can create new modes of narrative, multisensory experiences and play in theatre for young audiences.

Her PhD research has led to several visual arts commissions since 2017 including The Enchanted Forest commissioned by Theatre Hullabaloo in Darlington and co-supported by an internal Horizon CDT Impact Grant. Over a period of one year, a total of 17,147 children and adults, including international delegates at TakeOff Festival, experienced the installation.

Roma has been invited to facilitate over 15 practical digital arts workshops for arts practitioners, Theatre and HCI researchers, nursery practitioners, young children and families, care workers and care home residents both national and internationally. In 2020, she received the Telling Tales of Engagement award (EPSRC) for PhD research and was the Artist in Residence at Nottingham Festival of Science and Curiosity between 2020-2021.

After completing her PhD, Roma founded the spin-off company Makers of Imaginary Worlds (MOIW) supported by Arts Council England (ACE) Developing your Creative Practice fund. MOIW works explore mixed reality spaces that merge sensing and wearable technologies with traditional theatre craft to create sensory playful performance installations for young audiences. Her company has created three public interactive installations supported by ACE since 2019 and in partnership with the Lakeside Arts Centre and Mixed Reality Lab at the University of Nottingham.

MOIW is currently exploring the potential of hybrid storytelling spaces with researchers at Horizon Digital Economy and the integration of robotics in art installations with UKRI Trustworthy Autonomous Systems Hub.