

EPIC CDT

ANNUAL REPORT 2023

**EPSRC Centre for Enhancing Human Interactions and Collaborations
with Data and Intelligence Driven Systems (EPIC)**

July 2023



Introduction

This year saw an explosion of interest in artificial intelligence, fuelled mainly by the prominence of large language models (like Chat-GPT).

Many of the popular media stories focused on dystopian and catastrophic scenarios of AIs taken over the world and destroying human-kind. Even, the more sober coverage seemed to idolise the seemingly wondrous powers of these tools.

The EPIC Centre, meanwhile, remains fully committed to keeping the focus on people rather than machines. There are indeed real dangers from emerging technologies but these will come from people using the tools to manipulate the truth for financial gain, power or to carry out cyber-crimes.

We need to understand these risks and produce tools to identify such machine-driven faking or attacks. More positively, instead of ruminating on a world that sees people outpaced, outsmarted (and in even more dystopian outlooks, outwitted) by data and intelligence based algorithms and objects, our work elevates the most disruptive, creative and miraculous technology of all: the human.

As the Centre comes to the end of its 4th year we are seeing real fruits of the vision and ethos we all have worked to create. Yes, there are excellent publications; scholarly events organised; and, soon the first crop of theses submitted by Cohort 1 (who started their journey with us in 2019).

But, I am most proud of two outcomes beyond the conventional academic ones. Firstly, there are the real impacts on thinking, processes and practice that our cohorts are contributing to as they engage with their supporting stakeholders and in the social-impact projects.

Then, most importantly of all, I see a community of early-career researchers — our four existing cohorts, soon to be joined by a 5th — who have grown in expertise, empathy and identity.

The best, is truly, yet to come!



Matt Jones
Director

“ We see people as a source of wonder that can be exposed, expressed and celebrated through their use of interactive data and intelligence-driven systems that prioritise freedom, control and creativity. ”

The Centre's Home

The EPIC Centre continues to be housed in the Computational Foundry at Swansea University's Bay Campus, with the Cohorts having unlimited access to bespoke laboratories for each specialism of computational research (maker lab, theory lab, security lab, user experience lab, biometrics and vision lab, visualisation lab, IoT lab), and quality teaching, training and formal meeting spaces.

The EPIC Centre has a dedicated 271m² of space including collaboration and interaction spaces, as well as an allocated desk and storage space for each member of the Cohort. The EPIC Centre also has its own dedicated social breakout space.



Our Leadership Team

There have been no major changes to the management and leadership of our Centre.

Matt Jones (PI) continues to be the EPIC Centre Director and Co-I Markus Roggenbach (Deputy Director) continues to lead the theoretical computer science elements of the Centre and deputises for the Director as needed.

All Co-Is have dedicated 5% of their time to the EPIC Centre, and have provided their experience to support its delivery. Since the inception of the EPIC Centre, the Co-Is have provided the following: ensured that key scientific agendas emerging in their respective fields are reflected in the Centre; assisted the Director in leading the Sandpits; assisted in the recruitment of Cohorts 1–5; and been active advocates for the Centre and liaison points of contact for relevant stakeholders and partners.



Dr Jennifer Pearson
Co-Director of the MSc first year programme



Professor Markus Roggenbach
Centre Deputy Director



Professor Matt Jones
Centre Director



Dr Matt Roach
Strategic Stakeholder Lead



Dr Sherryl Bellfield
Centre Manager



Dr Simon Robinson
Co-Director of the MSc first year programme



Tashi Gyaltzen
Senior Business Engagement Officer



Oliver Williams
CDT Project Officer

Equality, Diversity and Inclusion



Equality, Diversity and Inclusion (EDI) continues to be a key driver of our activities and ethos of the Centre. Our management and governance structure includes EDI monitoring, reporting and assessment. Through the work of our internal EDI committee we continue to evolve the EDI strategy and policies of our Centre. The committee members include supervisors, students and external stakeholders.

The Cohort 5 recruitment cycle was deemed a success having received 91 applications. From a qualitative analysis of the applications, the diversity of applicants once again is from a wide range of disciplines and backgrounds. We believe that this has been achieved through promoting the ethos and ‘people first’ approach of the Centre. We continue to make improvements to our website and promotion material. We have also further refined our recruitment process; including using our international networks to promote our Centre.

Our students act as ambassadors to promote the vision of the Centre and we believe this has contributed to improve the diversity of applicants.

Diversity of our student Cohort has improved this year. We have continued to keep a thorough recruitment process, including interview panels with 3-4 members and a panel to reduce unconscious bias and establish a fair process. This has resulted in recruiting a Cohort of high calibre and diverse students.

The Centre maintains good representation across different protected characteristics, in terms of gender balance, disability, age, ethnicity and sexual orientation (Figures 1 to 5). We are proud of the diversity of our Centre and what we have achieved.

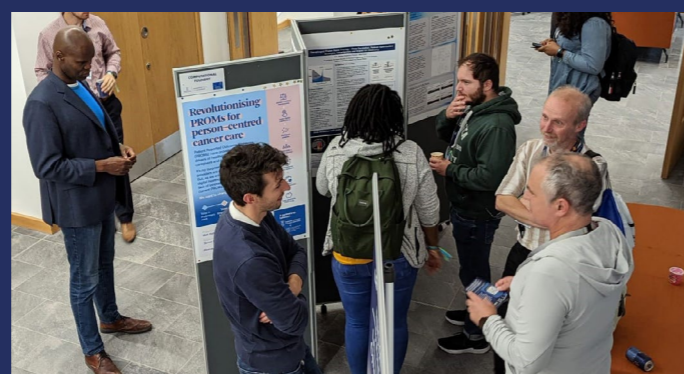


Figure 1 – Gender Balance of our CDT Students

| Gender | Cohort 1 | Cohort 2 | Cohort 3 | Cohort 4 | Cohort 5 |
|-------------------|----------|----------|----------|----------|----------|
| Female | 17% | 17% | 40% | 67% | 36% |
| Male | 83% | 75% | 60% | 25% | 46% |
| Other | 0% | 8% | 0% | 8% | 0% |
| Prefer not to say | 0% | 0% | 0% | 0% | 18% |

Figure 2 – Ethnicity of our CDT Students (student ethnicity data not collected for Cohort 1)

| Ethnicity | Cohort 1 | Cohort 2 | Cohort 3 | Cohort 4 | Cohort 5 |
|-------------------|----------|----------|----------|----------|----------|
| Asian | N/A | 8% | 10% | 15% | 27% |
| Black | N/A | 8% | 10% | 0% | 9% |
| Chinese | N/A | 0% | 10% | 0% | 0% |
| Mixed | N/A | 17% | 0% | 8% | 0% |
| White | N/A | 67% | 70% | 77% | 55% |
| Prefer not to say | N/A | 0% | 0% | 0% | 9% |

Figure 3 – Disability Characteristics of our CDT Students

| Disability | Cohort 1 | Cohort 2 | Cohort 3 | Cohort 4 | Cohort 5 |
|-------------------------|----------|----------|----------|----------|----------|
| Known disability (n) | N/A | 25% | 10% | 23% | 9% |
| No known disability (n) | N/A | 58% | 90% | 62% | 64% |
| Prefer not to say (n) | N/A | 17% | 0% | 15% | 27% |

Figure 4 – Age Distribution of our CDT Students (age distribution data was not collected for Cohort 1)

| Age | Cohort 1 | Cohort 2 | Cohort 3 | Cohort 4 | Cohort 5 |
|-------------------|----------|----------|----------|----------|----------|
| 24 or under | N/A | 59% | 40% | 54% | 46% |
| 25-29 | N/A | 8% | 50% | 15% | 27% |
| 30-34 | N/A | 17% | 10% | 15% | 9% |
| 35-39 | N/A | 8% | 0% | 8% | 0% |
| 40-44 | N/A | 0% | 0% | 0% | 0% |
| 45-49 | N/A | 8% | 0% | 0% | 0% |
| 50-59 | N/A | 0% | 0% | 8% | 0% |
| 60 and over | N/A | 0% | 0% | 0% | 0% |
| Prefer not to say | N/A | 0% | 0% | 0% | 18% |

Figure 5 – Sexual Orientation of our CDT Students (sexual orientation data was not collected for Cohort 1)

| Sexual Orientation | Cohort 1 | Cohort 2 | Cohort 3 | Cohort 4 | Cohort 5 |
|-----------------------|----------|----------|----------|----------|----------|
| Bisexual (n) | N/A | 25% | 0% | 15% | 9% |
| Gay man (n) | N/A | 0% | 0% | 0% | 9% |
| Gay woman/lesbian (n) | N/A | 9% | 10% | 8% | 0% |
| Heterosexual (n) | N/A | 50% | 90% | 54% | 64% |
| Other (n) | N/A | 8% | 0% | 0% | 0% |
| Prefer not to say (n) | N/A | 8% | 0% | 23% | 18% |

In December 2022, the National Centre for Diversity was commissioned to undertake a survey with members of our Centre (staff and students) to understand perceptions of how Fairness, Respect, Equality, Diversity, Inclusion, Engagement (FREDIE) is managed within the Centre.

The National Centre for Diversity reported that analysis of the results demonstrated positive results for the Centre stating:

‘There are some very good responses, in particular around a feeling that colleagues are respectful, value and include each other. There is also an excellent level of awareness of what unconscious bias is among respondents, and not letting this affect their behaviour in a negative way. Respondents also feel that the Centre is committed to improving its FREDIE culture through ensuring that there is a ‘zero tolerance’ approach to discrimination, bullying and harassment.

There are also excellent results for how respondents feel about having an equal opportunity to succeed within the Centre, and fairness in terms of: recruitment, training & development, promotion, reward, and remuneration.’



International Advisory Board

Our members

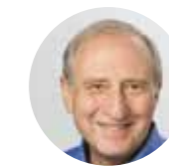
To ensure our Centre is inspiring, successful, challenged and of international relevance, we have set up an Advisory Board with academic members who are experienced in innovative training and who are setting the global computational science agendas.

Corporation for National Research Initiatives and the Defence Advanced Research Projects Agency and on the faculty of Stanford University. Vint Cerf sits on US National Science Board and is a Visiting Scientist at the Jet Propulsion Laboratory.



Vicki Hanson

Vicki Hanson FACM FRSE FBCS, is an American computer scientist noted for her research on human-computer interaction and accessibility and for her leadership in broadening participation in computing. She was named the Chief Executive Officer of the Association for Computing Machinery (ACM) in 2018 having served as its President from 2016 to 2018. Dr Hanson was a Distinguished Professor at the Rochester Institute of Technology within the HCI and Accessibility research groups. She was also Professor and Chair of Inclusive Technologies at the University of Dundee where she led multiple efforts related to inclusion of older adults and individuals with disabilities



Ben Shneiderman

Ben Shneiderman is an American computer scientist, a Distinguished University Professor in the University of Maryland Department of Computer Science, which is part of the University of Maryland College of Computer, Mathematical, and Natural Sciences at the University of Maryland, College Park, and the founding director (1983-2000) of the University of Maryland Human-Computer Interaction Lab. He conducted fundamental research in the field of human-computer interaction, developing new ideas, methods, and tools such as the direct manipulation interface, and his eight rules of design.



Vint Cerf

At Google, Vint Cerf contributes to global policy development and continued spread of the Internet. Widely known as one of the “Fathers of the Internet,” Cerf is the co-designer of the TCP/IP protocols and the architecture of the Internet. He has served in executive positions at the Internet Society, the Internet Corporation for Assigned Names and Numbers, the American Registry for Internet Numbers, MCI, the



Moshe Vardi

Moshe Vardi is an Israeli mathematician and computer scientist. He is a Professor of Computer Science at Rice University, United States. He is an expert in model checking, constraint satisfaction and database theory, common knowledge (logic), and theoretical computer science. He is the author of over 600 technical papers as well as the editor of several collections.



Elisabeth André

Elisabeth André is a full professor of Computer Science and Founding Chair of Human-Centered Multimedia at Augsburg University in Germany. She has a long track record in multimodal human-machine interaction, embodied conversational agents, social robotics, affective computing, and social signal processing. Drawing on the concept of computer-based role play with virtual characters, she has promoted a novel form of experience-based learning, for example, to help children and young people cope with bullying at school, develop intercultural sensitivity or master socially challenging situations, such as job interviews.



Anirudha Joshi

Anirudha Joshi is professor in the interaction design stream in the IDC School of Design, IIT Bombay, India. Anirudha is involved in designing interactive products for emergent users in developing economies. He has worked in diverse domains including healthcare, literacy, Indian language text input, banking, education, and industrial equipment. He received the IFIP Outstanding Service award in 2015 and the IFIP TC13 Pioneer Award in 2019. He is currently the VP Finance on the ACM SIGCHI Executive Committee, a member of the India HCI Steering Committee, and the chair of the INTERACT Steering Committee.



Charles (Chuck) Hansen

Charles (Chuck) Hansen is an IEEE Fellow and a Distinguished Professor of Computing in the School of Computing and a founding member of the Scientific Computing and Imaging Institute at the University of Utah. Chuck Hansen has published over 170 peer reviewed journal and conference papers and has been a co-author on three papers recognised with “Best Paper Awards” at the IEEE Visualisation Conference (1998, 2001, 2002). He was twice an Associate Editor in Chief (AEIC) of IEEE Transactions on Visualisation and Computer Graphics. His research has made contributions to the fields of scientific visualisation, computer graphics, parallel computation and computer vision.



Jinwoo Kim

Jinwoo Kim received his BS degree in computer science and statistics from Seoul National University in Seoul, South Korea. After receiving his master’s degree from Courant Institute of Mathematical Sciences (New York University), he continued his study in the PhD program at the Real Time Compilation and Instruction Level Parallel Processing Lab of NYU as a research scientist. He subsequently became involved with the Center for Research in Embedded Systems and Technology (CREST) at the Georgia Institute of Technology in Atlanta, Georgia where he spent another two and half years conducting research funded by the Department of Defense, Hewlett-Packard and the State of Georgia.

Stakeholder Strategic Advisory Board

The purpose of our Stakeholder Strategic Advisory Board is to extend the pathways for cohort engagement during and after graduation; and provide horizon scanning input in terms of regional, economic and societal changes and how the Centre might respond to these.

Our Members

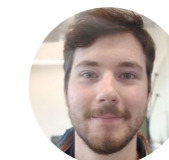
In 2022/23, the following people were members of our Strategic Stakeholder Advisory Board.



Elin Rhys

Elin Rhys grew up in Solva, Caernarfon and Llanelli. A graduate in Biochemistry from the then University of Wales Swansea in 1978, she worked as a scientist with the Welsh Water Authority before embarking on a career as a television presenter with HTV and S4C in 1984. In 1993, she founded her own television company with the aim of popularising science in the media, and to do so mainly through the medium of Welsh. Today, Telesgop is a multi-media company and has its headquarters in the city of Swansea. Telesgop productions – whether for television, radio or the Internet, in English and Welsh – are held in high esteem across the world. Fact-based programmes such as the Welsh-language farming and countryside magazine series, Ffermio, regularly attract the highest numbers of S4C’s audience. The series Dibendraw, which highlights leading scientists of the past and present has provided a platform for some of Swansea University’s science research stars to communicate their findings to the general

public. Alongside science, Elin Rhys has produced documentaries that explore some of the foremost figures of Wales and the world. Among these are programmes such as Edward VIII’s Murderous Mistress (Channel 4); The Davies Sisters: Bringing Art to Wales (BBC Wales); Heath v Wilson: the Ten Year Duel (BBC Four); Wallis Simpson: The Secret Letters (Channel 4); Darwin, Y Cymro a’r Cynllwyn (S4C); Syr Rhys ap Thomas – Cymro a laddodd Richard III (S4C); Gwirionedd y Galon: Dr John Davies (S4C) and documentaries on the musicians John Denver and Meat Loaf (BBC Four).



Rory Clark

Rory Clark is a member of Cohort 2 of our Centre. Rory’s PhD centres around ethnographic study to ensure that, not only are current radiologists and radiographers comfortable and confident with the Machine Learning tools that they use, but are able to identify, critique and evaluate potential new machine learning systems that they may wish to implement in the future. Rory’s external stakeholder partner is the National Imaging Academy of Wales.



Dr Jonathan Burnes

Joining from Swansea University, Dr Jonathan Burnes is tasked with overseeing delivery of the £1.3 billion investment portfolio throughout South West Wales. Dr Burnes has held a number of senior positions at the university in the last 12 years. These include Director of Information, Services and Systems; Digital Strategy Development Manager; and Associate Director of Planning and Strategic Projects. As the City Deal's Programme Director, Dr Burnes will establish and lead a new City Deal Programme Management Office that will coordinate a portfolio of major projects across the Swansea Bay City Region, which is made up of Carmarthenshire, Neath Port Talbot, Pembrokeshire and Swansea. The City Deal programme is aimed at creating conditions that attract business and stimulate economic growth for the City Region, making it an even more attractive place to live, work, do business and invest.



Laura Clark

Laura Clark is the UKI NHS Value & Partnership Manager at Amicus therapeutics. As NHS Value & Partnership Manager Laura is responsible for leading strategic collaborations across the NHS, life science industry and academia. Laura began her career at Pfizer Pharmaceuticals and has over 15 years' experience of working within the pharmaceutical industry in a number of senior commercial and operational roles, developing and delivering strategic programs across the UK to support life science collaborations with health systems to improve health and well-being and achieve outcomes that matter to patients. Laura is currently leading the Amicus collaboration with Swansea University, focusing on improving patient outcomes in the area of rare disease.



Prof Helen Griffiths

Professor Helen Griffiths was appointed Pro-Vice-Chancellor with responsibility for Research & Innovation at Swansea University in August 2020. Prior to this, she was Executive Dean of the Faculty of Health and Medical Sciences at the University of Surrey. Previously, Helen was Pro Vice-Chancellor International following from five years as Executive Dean of Life & Health Sciences at Aston University. Helen has been a member of the respective University Executive Boards and Councils since 2009. Helen is responsible for leading the development, implementation and continuous improvement of Swansea University's Research & Innovation Strategy.



Mark Casey

Mark Casey heads up the UK Hydrographic Office's Research and Innovation function. Mark has 30 years' experience of utilising geospatial data to produce navigation products and services in both the Air and Maritime domains. Initially 22 years spent in the Royal Air Force making aeronautical maps, charts and publications for the RAF and wider joint forces and has spent the last 8 years at the UK Hydrographic Office leading the Research and Innovation team in exploring new technologies and tools to create new marine data and navigation Proof of Concepts for UK Defence and the commercial maritime markets.



Dr Peter Waggett

Dr Peter Waggett has had an extensive research and development career. He started work as a Senior Research Scientist at the Marconi Research Centre and is now IBM's Director of Emerging Technology. He has advised a number of public and private sector clients on how to harness innovative and disruptive technologies and acted as a subject matter expert on a number of major projects. He now leads teams of specialists who are charged with developing first of a kind and prototype systems using research and development assets for IBM's clients and partners.

The team is based at IBM's Hursley laboratory near Winchester and at the Hartree Centre near Daresbury. The teams include developers of IBM's Watson cognitive computing offerings and 'big data' analytic solutions.



Dr Sonia Raikova

Dr Sonia Raikova is the Portfolio Manager of the ICT Theme within UKRI/EPSC. Sonia's interests include human interactivity; human computer interaction; human communications in ICT; natural language processing; pervasive and ubiquitous computing; and ICT programme grants.



Publications

The EPIC CDT provides a four year programme, consisting of one year MSc studies and three years of PhD research. At the time of writing this report, Cohorts 1, 2 and 3 had already progressed into the PhD phase — Cohort 4 is in the process of completing their MSc thesis, and Cohort 5 is taking up their studies. Publications by PhD researchers are listed below, with the researcher's name in bold.

Alan Dix, **Anna. R. L. Carter** and Miriam Sturdee. 2021. Where, Who, Why? Tools to Encourage Design In Context. In EduCHI 2021 Workshop, part of CHI 2021; May 15, 2021, Yokohama, Japan. <https://educchi2021.hcilivingcurriculum.org/wp-content/uploads/2021/04/educchi2021-final90.pdf>

Jakub Vincalek. It's the journey not the destination: building genetic algorithms practitioners can trust. In Proceedings of the Genetic and Evolutionary Computation Conference Companion (GECCO '21). Association for Computing Machinery, New York, NY, USA, 231–232. July 10-14, 2021

Connor Rees. AVERT (Addressing Violent Extremism and Radicalisation to Terrorism) International Research Symposium – Violent Extremism at the Crossroads: Persistence, Change and Dynamism 20 years after 9/11. Islamic State's Exploitation of File-Sharing Sites: Which Platforms and Why? 2021, November 3–5. Symposium, Melbourne, Australia — Conference Presentation

Stuart Macdonald, **Connor Rees**, & Joost S. Remove, Impede, Disrupt, Redirect: Understanding & Combating Pro-Islamic State Use of File-Sharing Platforms. April 2022. <https://www.resolvenet.org/research/remove-impede-disrupt-redirect-understanding-combating-pro-islamic-state-use-file-sharing>

Pranjal Jain, Alex Jordan Blandin, Jacki O'Neill, Mark Perry, Samia Ibtasam, Paul G. Allen, Suleman Shahid, Beni Chugh, David Sullivan, Heloisa Candello, James Pomeroy, Rajat Jain, Robert Dowd, Matt Roach, Matt Jones. Platformisation of Digital Financial Services (DFS): The Journey of DFS in the Global North and Global South. CHI '22 Extended Abstracts: CHI Conference on Human Factors in Computing Systems Extended Abstracts, New Orleans, LA, USA, April 2022

Yashi Jain, **Pranjal Jain**. Donut Plugin: A Circular Design Tool to Implement Circular Economy. InCHI '22: ACM CHI Conference on Human Factors in Computing Systems, April 30 – May 06 2022, New Orleans USA.ACM, New York, NY, USA

Pranjal Jain, Anirudh Nagraj, Kartik Joshi, Taru Jain, Dilrukshi Gamage, Sayan Sarcar, Nova Ahmed. HCI Knowledge Dissemination in South Asia through both Coursework and Community Engagement. EduCHI'22, April 30-May 1 2022, New Orleans, LA, USA

Jennifer Pearson, Gavin Bailey, Simon Robinson, Tom Owen, Chi Zhang, Thomas Reitmaier, Cameron Steer, **Anna. R. L. Carter**, Matt Jones, Deepak Ranjan Sahoo, Dani Kalarikalayil Raju. 2022. Can't Touch This: Rethinking Public Technology in a COVID-19 Era. InCHI '22: ACM CHI Conference on Human Factors in Computing Systems, April 30 – May 06 2022, New Orleans USA.ACM, New York, NY, USA.

<https://doi.org/http://dx.doi.org/10.1145/3491102.3501980>

Alex Blandin, Matt J Roach, Matt Jones, Jen Pearson, Daniele Doneddu, David Sullivant. Co-Designing Explainable AI for a Mobile Banking App. InCHI '22: ACM CHI Conference on Human Factors in Computing Systems, April 30 – May 06 2022, New Orleans USA.ACM, New York, NY, USA.

https://www.dropbox.com/s/etrs1qwio0avzh9/HCXAI2022_paper_23.pdf?dl=0

Craig MacDonald, Olivier St-Cyr, Colin. M. Gray, Leigh Ellen Potter, Carine Lallemand, Anna Vasilchenko, Jaisie Sin, **Anna. R. L. Carter**, Caroline Pitt, Eunice Sari, Deepak Ranjan Padhi, Ajit. G. Pillai. 2022. EduCHI 2022: 4th Annual Symposium on HCI Education. InCHI '22: ACM CHI Conference on Human Factors in Computing Systems Workshops and Symposia, April 30 – May 06 2022, New Orleans USA.ACM, New York, NY, USA. <https://doi.org/10.1145/3491101.3503703>

Anna. R. L. Carter, Gavin Bailey, Jennifer Pearson, Matt Jones, Simon Robinson, Dani Kalarikalayil Raju, Jonathan Hicks, Spencer Winter. 2022. Designing and Embedding a Tangible Public Interface in the Covid Era. InCHI '22: ACM CHI Conference on Human Factors in Computing Systems Extended Abstracts, April 30 – May 06 2022, New Orleans USA.ACM, New York, NY, USA. <https://doi.org/10.1145/3491101.3503556>

Anna. R. L. Carter, Miriam Sturdee, Alan Dix, Dani Kalarikalayil Raju, Martha Aldridge, Eunice Sari, Wendy Mackay, Elizabeth Churchill. 2022. InContext: Futuring User-Experience Design Tools. InCHI '22: ACM CHI Conference on Human Factors in Computing Systems Workshops and Symposia, April 30 – May 06 2022, New Orleans USA.ACM, New York, NY, USA. <https://doi.org/10.1145/3491101.3503739>

Suraj Ramchand. Rare Clinical Event Modelling and Prediction for Covid Patients. Wales Data Nation Accelerator Event. 26th May 2022. Cardiff University Emily Nielsen, Think Zebra: 3 Minute Talk Finalist, June 2022. <https://dl.acm.org/doi/10.1145/3531073.3531175>

Anna R. L. Carter, Miriam Sturdee, Alan Dix. Prototyping InContext: Exploring New Paradigms in User Experience tools. AVI 2022: Proceedings of the 2022 International Conference on Advanced Visual Interfaces June 2022. <https://dl.acm.org/doi/10.1145/3531073.3531175>

Andy Gray, Alma A. A. Rahat, Tom Crick, Stephen Lindsay, Darren Wallace. Using Elo Rating as a Metric for Comparative Judgement in Educational Assessment. 2022 6th International Conference on Education and Multimedia Technology. July 13-15 2022. Guangzhou, China Using Elo Rating as a Metric for Comparative Judgement in Educational Assessment ([researchgate.net](https://www.researchgate.net))

R. S. Clark, M. Porcheron, M. Jones, P. Wardle, V. E. Whitchurch Perspectives On Machine Learning and Artificial Intelligence from Trainee Radiologists, Scientific Exhibit, July 13-17, 2022. <https://dx.doi.org/10.26044/ecr2022/C-21806>

Suraj Ramchand; Gavin Tsang; Duncan Cole; Xianghua Xie. RetainEXT: Enhancing Rare Event Detection and Improving Interpretability of Health Records using Temporal Neural Networks 27-30 September 2022 RetainEXT: Enhancing Rare Event Detection and Improving Interpretability of Health Records using Temporal Neural Networks | IEEE Conference Publication | IEEE Xplore

Macdonald, Stuart., **Rees, Connor.**, and Joost S. Remove, Impede, Disrupt, Redirect: Understanding & Combating Pro-Islamic State Use of File-Sharing Platforms. Washington, D.C.: RESOLVE Network 2022. <https://doi.org/10.37805/ogrr2022.1>

Rees, C., Müller, B. All that glitters is not gold: trustworthy and ethical AI principles. AI Ethics (2022). <https://doi.org/10.1007/s43681-022-00232-x>

Ben Lloyd-Roberts, Phillip James and Michael Edwards. Mining Invariants from State Space Observations. https://nwpt.w.uib.no/files/2022/11/NWPT22_paper_3339.pdf

Luke Thomas, Michael Edwards, Austin Capsey, Alma Rahat, Matt Roach. Deep Visual Place Recognition for Waterborne Domains. The 29th IEEE International Conference on Image Processing (IEEE ICIP), Bordeaux, France in the period October 16-19, 2022

Matt Hall. Exploring Clinicians' Use and Perceptions of Patient-Reported Outcome Measures at a Tertiary Cancer Centre in Wales. ISOQOL 29th Annual Conference. 19-22 October 2022. Prague, Czech Republic

Jakub Vincalek, Sean Walton and Ben Evans. Evaluating the Effect of a Ducted Winglet on the Induced Drag of Wind Turbine Blade using CFD and Trefftz Plane Analysis. 19 April 2023. Engineering with Computers. Evaluating the effect of a ducted winglet on the induced drag of wind turbine blade using CFD and Trefftz plane analysis | SpringerLink

Colin. M. Gray, Craig. M. MacDonald, Carine Lallemand, Alannah Oleson, **Anna. R. L. Carter**, Olivier St-Cyr, Caroline Pitt. 2023. EduCHI 2023: 5th Annual Symposium on HCI Education. InCHI '23: ACM CHI

Ben Lloyd-Roberts, Phillip James, Michael Edwards, Simon Robinson, and Thomas Werner. 2023. Improving Railway Safety: Human-in-the-loop Invariant Finding. In Extended Abstracts of the 2023 CHI Conference on Human Factors in Computing Systems (CHI EA '23). Association for Computing Machinery, New York, NY, USA, Article 389, 1–8. <https://doi.org/10.1145/3544549.3573853>

Emily Neilsen. CHI'23: A Patient Centered Approach to Rare Disease Technology; EICS23: Simulating the Rare Disease Diagnostic Journey; IDDHI'23: Motivations of Technology Use in Undiagnosed Rare Disease Patients (workshop)

Alex Blandin, Matt Roach, Daniele Doneddu, Jen Pearson, Matt Jones, David Sullivan. A position on establishing effective explanations from human-centred counterfactuals for automated financial decisions. 13/14 April 2023. AISB Convention 2023. Swansea University. aisb2023.pdf

Brian O'Keefe, Tom Flint, Miriam Sturdee, Andrea Resmini, **Anna. R. L. Carter**, Mike Mastermaker and Andrea Chirico. 2023. Dancing with Technology – Towards a Choreography of Blended Experiences at ACM IMX '23. In IMX'23: ACM International Conference on Interactive Media Experiences. Workshops, June 12-15 2023, Nantes, France

L. Channon, M. Roach, L. Nouri Department and A. Rahat. The Use of Out-linking by the Far-Right. BISA 2023 Conference, 21-23 June 2023, Glasgow, Scotland

Anna R. L. Carter. Making Sense of Outdoor Public Places: Exploring the Role of Multisensory Interactions. 23rd June 2023. Northumbria University

Anna R. L. Carter, Marianna Obrist, Christopher Dawes, Alan Dix, Jennifer Pearson, Matt Jones, Dimitrios Zampelis and Ceylan Besevli. 2023. Scent InContext: Design and Development around Smell in Public and Private Spaces. In Designing Interactive Systems Conference (DIS Companion '23), July 10-14 2023, Pittsburgh, PA, USA. ACM, New York, NY, USA, 4 pages. <https://doi.org/10.1145/3563703.3591455>

Alex Blandin. Human-centred design study on establishing effective explanations based on counterfactuals for automated financial decisions. 23-28 July 2023. 25TH International Conference on Human-Computer Interaction. Copenhagen, Denmark

Jakub Vincalek. Analysing Extreme Right Visual Propaganda: Developing a Framework'. 20 Jul – 21 Jul, 2023. Terrorism Research in a Polarized World. 15th Annual International Conference. Iscte - University Institute of Lisbon, Portugal



Centre Activities

On the 28th and 29th September 2022, we held an induction event at the Vale Resort to welcome our new Cohort of students. Key members of the CDT team were in attendance as well as some of our current CDT students. To encourage team bonding, the induction event included a trip to St Fagans National Museum of History, one of Europe’s leading open-air museums, to learn about Welsh heritage. Fun and thought provoking team activities were also organised throughout the event including Picasso in a bag, quizzes and a creative animated video session.

Festival of Ideas



We were delighted to see the return of the Festival of Ideas on the 22nd and 23rd September 2022.

This year’s Festival was organised by the Computational Foundry Delivery Team and students from our Centre.

Our Centre aspires to have a high degree of diversity of perspective. This was embedded within the Festival. Our aim was to appeal to a multi-disciplinary audience; provoking thought, inspiration and excitement, whilst learning, networking and having fun!

The Festival gave postgraduates across disciplines the opportunity to share their ideas. This was achieved in one of two ways:

1. Via a 3 minute ‘Why My Research Matters’ talk and/or
2. A poster.

Prizes were given for the best entries!



Speakers

We had great high profile speakers, including former SAS leader, Star of Channels 4’s SAS: Who Dares Wins and Sunday Times Bestseller, Colin MacLachlan, founder of Women in Tech, Lisa Short, a renowned and highly regarded world leading environmentalist who has recently received a CBE, Tavi Murray, and a panel discussion with experts in cyber security from CYTREC.

International Seminar Series and Masterclasses

We are proud of the calibre of people who have participated in our International Seminar Series and Masterclasses. These people and associated titles of their talks include:



Lars Erik Holmquist – Bits Are Cheap, Atoms are Expensive: Reflecting on the Physical Turn in HCI and Why Interactive Hardware is Still Hard



Michael Evans – What Do We Need To Research? Who Do We Need To Be? Lessons Learnt Doing Human-Centred Research In the Future of Media



Sophie Ostlund – Enabling Hand Gesture Customisation on Wrist-Worn Devices



Lizzie Coles-Kemp – Universal Barriers: What Are They and How Do They Relate to Digital Security



Celine Latulipe – Creative Spaces: Supporting Engagement for Arts and Education in Gather.Town



Joel Fischer – Exploring the Capabilities and Potential of ChatGPT: A Deep Dive into Large Language Models and Interaction



Colin Gray – Combatting Dark Patterns through HCI Scholarship and Regulation



Helen Desmond – Publishing with Springer



Sameer Patel – Mental Models and User Experiences of the Tor Browser

International Research Retreat – Amsterdam



This year we took all PhD cohorts on an international research retreat to Amsterdam. Amsterdam has an ambition and philosophy that resonates with our own, investing £1bn in human-centred AI technologies <https://youtu.be/fEal2buscdg>, providing an effective living lab for AI solutions.

Our visit encompassed a range of cultural and technical site visits, masterclasses and knowledge exchange events over two days.

Day 1: Masterclass: Shaping Justice and Security Through Human-Centred Research

Location: Peace Palace & Schouwburgstraat, Den Haag, Netherlands (Leiden University)

Masterclasses building computational research skills with humanity at the heart. Inspired by a visit to the Peace Palace at the Hague as part of our internationalisation remit and to enhancing a multidisciplinary, responsible research approach to developing the next generation of data-driven algorithms. A full-sensory experience to take in the reasons and role of the Peace Palace, an icon of peace and justice in the world. There is worry and concern for the direction of the development of technology, with stories of AI and algorithm overlords gaining sentience and creating conflict, suppressing supplanting and superseding humans.

The students learned lessons about conflict resolution from the Peace Palace and applied these to developing new algorithms that enhance interactions between AI and Humans via the masterclasses. The students built multidisciplinary cross-cohort skills guided by social science and computational scholars. All contextualised in an information war played out on digital social platforms worldwide, empowered by social-technical systems that: spread misinformation; trap people in filter bubbles; enable the spreading of extremist recruitment messaging. Students learnt about Recommendation Systems and Filter Bubbles; Misinformation and Challenges Brought by OpenAI; and Experimental Design. In cross-cohort groups, the students devised either a methodology for how this problem can be researched robustly or a policy for how recommendation systems can be optimised to result in less harm to society.

Day 2: Knowledge Exchange and Research Communication Skills

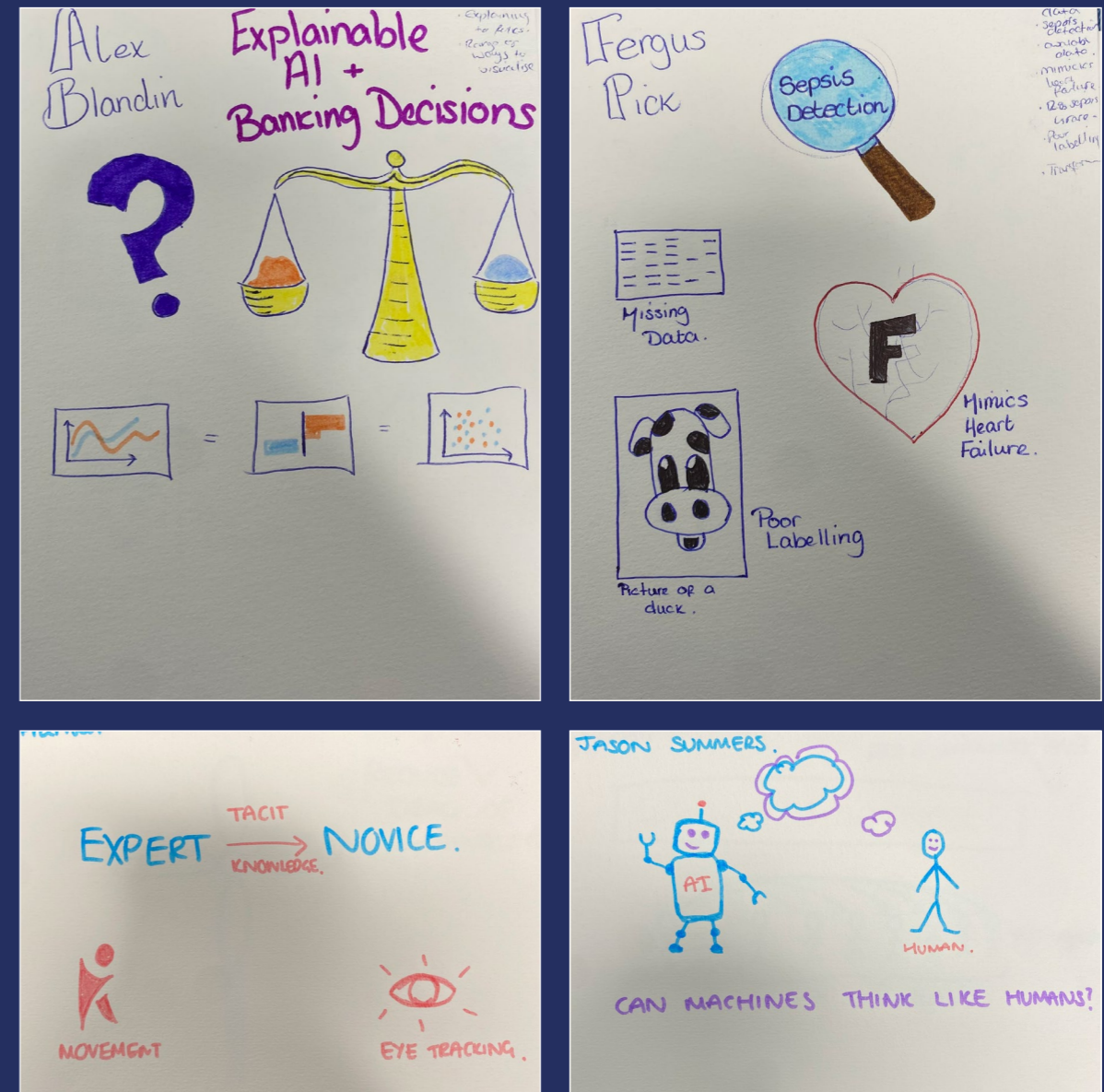
Location: Central Amsterdam

Opening Inspirations were delivered from Eric Nalisnick (Informatics Institute, University of Amsterdam) on building safe and robust intelligent systems with a human-centred design. Focusing on research questions such as: how can we incorporate a human's prior knowledge? how can we detect when the system is failing? and how to combine human and machine decision-making?



Researchers from Swansea and Amsterdam presented their work to each other via flash talks and an active listening and note-taking exercise, resulting in a sketchbook of notes for each student of 30 pages relating to the research topics presented.

This resulted in a total takeaway of nearly 900 pages of notes on the research presented at the exchange event. Pictures of the various student contributions are shown here.





Launchpad Crucible

Between the 15th and 18th May 2023, the Centre organised its inaugural 'Launchpad Crucible – Making Strong First Steps in Your Career'. The Crucible was held off site in Cardiff, and was facilitated by Sam Carrington – Founder of the Smirk Experience.

Smirk Experience was founded by Sam Carrington in 2017 to offer the corporate world skills training he has distilled from the realms of stand-up comedy and big brand media sales. Previous to Smirk, Sam spent 10 years at ITV, the last four of which he worked as one of the company's youngest sales controllers, responsible for monetising ITV breakfast's digital offering.



In 2012 Sam tried stand-up comedy and loved it. In the proceeding five years he's played close to 1,000 gigs, including a dozen or so festivals around the country and three full runs at the Edinburgh fringe festival.

He now promotes and mcs Smirk Experience nights for the public and corporations as well as participating in festivals and gigs as an independent comic. While combining his role at ITV and learning the ropes of stand-up comedy, Sam began observing the links between the corporate world and live performance, identifying areas such as public speaking, personal branding and creativity as possessing the most obvious crossover.



The Programme

This was the genesis of a concept that has now been successfully employed by Google, Investec, companies within Lloyds of London, leading UK media firms and more. The programme was designed to prepare the soon to-be PhD graduates to make strong first steps in their career outside of the Centre.

Basic Communications (Sam Carrington)
Ever wondered how stand-up comics remember a set, deal with nerves, bond with strangers (plus a million other things) and how you can use the same techniques in job interviews and presentations?

Personal Branding (Sam Carrington)
Branding is all around us. Jeff Bezos described it as 'what people say about you when you're not in the room' and if you aren't thinking about your personal brand then you should be.

How to Network (Sam Carrington)
People think this is a skill you either have or you don't, but they're wrong. Like anything, networking can be learnt and developed— you'll know how after this.

Creativity (Sam Carrington)
Children are some of the most creative people around, but adults can lose this skill easily unless checked. This module will show you how to have an endless stream of ideas for work, play or anything else.

An Introduction to Project and Time Management (Dr Steven Bidder, Planning and Strategic Projects Unit, Swansea University)
Understand the basics of project and time management and why it is so important in any career you pursue.



Job Searching and Salary Negotiation (Sam Carrington)
Learn how to job search properly and effectively and then practices, techniques and mindsets that will change how you approach negotiations about salary.

Team Working (Sam Carrington)
Individual achievements are dwarfed by what collaborations can do. Discover mindsets and techniques that will help you work with others to not only hit but surpass goals.

Resilience (Sam Carrington)
Contrary to common belief, everyone has to overcome obstacles. Successful people do it, unsuccessful people don't. Once you understand about how your primal brain can hold you back you won't hear from it again.

Interview Preparation (Gareth Hill, Employability, Swansea University)
How to make sure your application and interview stands out from the crowd.

Positivity (Sam Carrington)
Henry Ford once observed 'if you think you can or can't do something you're probably right'. You'll learn how to foster and maintain a positive attitude for whatever life throws at you.

Advanced Communications (Sam Carrington)
For those who wish to, this is your chance to put what we learnt in the Basic Communication section into practice in a very safe, supportive environment.



An Introductory Mental Health Awareness Session delivered by MHFA England

<https://mhfaengland.org/>

This introductory mental health awareness session is designed to give:

- An understanding of what mental health is and how to challenge stigma
- A basic knowledge of some common mental health issues.
- An introduction to looking after your own mental health and maintaining well-being.
- Confidence to support someone in distress or who may be experiencing a mental health issue.
- Learning takes place through a mix of group activities, presentations and discussions

Everyone who completes the course gets:

- A manual to refer to whenever they need it.
- A workbook including a helpful toolkit to support their own mental health.
- A certificate of attendance to say they are Mental Health Aware.

“ I have genuinely got a number of really helpful action points from every session that I can incorporate into my work. ”

“ Thanks for organising such a helpful event, really appreciate it. ”

“ It was received very well from what the other cohort members have said to me. ”

“ There wasn't a session we did with him that I didn't get something out of. ”

Feedback from the Launchpad Crucible



Summer Schools

A number of our students attend the ACDL 2022, 5th Advanced Course on Data Science & Machine Learning in Tuscany, Italy. ACDL 2022 was a week-long training course focused on deep learning & AI, providing a stimulating environment for our students, as well as networking opportunities with other academics and industry leaders.

The course aligned with the ethos of our Centre through its invited lecturers. These lecturers were world leaders in the advancements of applying AI to human-centred problems, for example, Mihaela van der Schaar leads state-of-the-art healthcare research, Žiga Avsec works for Deepmind, researching genomics, and Yukie Nagai investigates human-robot interaction and how robots can learn self-other cognition, estimation of emotion and altruism.



The Masters' Year

As we enter the fifth and final cohort of the Centre, it is nice to be able to look back on four MSc training years. For Cohort 1 we were still as a Centre very much finding our feet. Now, as Cohort 4 enter their MSc projects, and we await the arrival of Cohort 5, we have a thriving hub of MSc and PhD researchers focused on putting people at the start and heart of the work they do. It is particularly great to see members of Cohort 1 approach their PhD thesis submission point after four years of excellent and purpose-driven research.

Last year we reported on a midpoint year of reflection and refinement, and outlined a range of improvements that have now been put into place to improve and enhance the operation of the Centre. Our physical home in the Computational Foundry is a much-improved and more welcoming space than when we first began, and is also increasingly lively and active after another year of in-person activities.

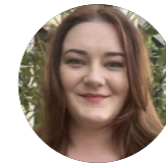


We have refined the range of taught modules and expanded the training opportunities available, and more of our members are able to get involved in cohort-led activities such as the Festival of Ideas (see details on page 18). Other highlights from this year include a Centre-wide retreat in Amsterdam to coincide with ACM CHI (in Hamburg). The timing of the conference meant that those in the MSc year were in the middle of their exam revision period during the event, but we extended the invitation to the whole Centre nonetheless, and were pleased that one Cohort 4 member chose to attend.

While timetabling of taught modules remains one of the key logistical challenges of the MSc year, the strong cohort-driven approach that we have created has helped and encouraged students to support each other. Because of this, Centre members have felt able to select modules across a broad range of subjects, and have benefited from the cross-disciplinary perspective that this brings.

In addition, as noted last year, the COVID-19 pandemic has led to lasting changes across the University that have supported this aspect. Course materials are available online to compensate for clashes, and cohort members help each other reciprocally, both strengthening bonds and enabling broader study across disciplines. As we write this, Cohort 4 are beginning their MSc projects, and looking forward to three further years of human-centred and impactful research. We welcome our fifth and final cohort in October, and look forward to another enjoyable and fulfilling MSc year.

Cohort Perspectives



Cohort 1 – Anna Carter

A Journey of Growth and Inspiration: My Student Perspective

The office, initially with a small size of 11 students has expanded to a hub of talents and perspectives with now 40+ students. The hit of COVID had a major effect on members comfort and ability to be within the office, seeing this disperse across the past year with the introduction of Cohorts 3 and 4 to the office has created a thriving space with individuals from various backgrounds and disciplines, set across three new office sections to enable them to flourish within the shared environment, collaboration, quiet and focus.

The influx of new faces has created an ever-evolving ecosystem of ideas and collaborations across our projects. We have been able to attend a variety of conferences across the year with students attending from Hamburg to Pennsylvania to Vancouver. As CHI (the number 1 Human Centered Interaction conference) was in Hamburg this year, a group of students were able to attend together which was wonderful. They enabled us to showcase our research, engage in thought-provoking discussions and connect with different scholars from across the globe. In addition, students were able to attend summer schools in Italy and Germany immersing them into specialised topics and providing the ability to interact with esteemed professors as well as a group Retreat to Amsterdam where we were able to reconnect as a group. Cohort one has had a busy year as we are coming to the end of our PhDs. We began the year with the organisation of the Festival of Ideas which saw a successful 200+ hallmark event.

Within this vibrant gathering we hosted PhD competitions, welcomed keynote speakers, hosted technical demonstrations, and networked with PhD students and industry partners from across the globe. Further in the year we attended a Launchpad Crucible in Cardiff with the esteemed Sam Carrington. We learnt how to stay positive, thrive within teams and learn key skills of personal branding and networking. Not only was this a great event pushing us into the next realm of post PhD it also enabled the Cohort 1 students to reconvene as an 11 and reflect on the past four years together. As I near the end of my student journey, I am grateful for the remarkable experiences and opportunities that have shaped me into moving ahead with my career. I have grown not only as a scholar but also as an individual, developing a deep sense of intellectual curiosity, resilience, and a commitment to making a meaningful difference in the world. This as been my perspective of a year as a Swansea CDT student.



Cohort 2 – Beth Delahaye

Summing up an entire year is quite difficult, but I'll give it a go. This year my time in the CDT has felt quite different than the others. As the first year in which the office has not been affected by any COVID restrictions (something that feels like it happened a lifetime ago) collaborations between students have been able to flourish. This has not been without its issues. Going from very few students to a full office seemingly overnight has at times brought tension. However, overall, the Centre seems to be more relaxed with a growing social as well as work community. Issues raised by students in previous years are being worked on and communication is improving. This year we have had two different course reps. One for the masters' students and one for the PhD students (me). This is something we have been suggesting for a few years and we are happy to see that it's working.

As this year’s course rep, I feel students are more likely to come forward with issues they are having. A sign of the improved communication between students and staff and whilst it hasn’t all been harmonious there seems to be a ready acceptance that sometimes what might have worked in previous years does not work now. As students all seem more engaged in collaborative works such as the impact projects and festival of ideas planning, something I hope will continue next year with Cohorts 3 and 4. It would be remiss of me not to mention that this year saw Cohorts 1 to 3 and one member of 4 go to Amsterdam for a retreat. Despite the issues that arose (mainly the food) it was nice to have most of the Centre together, and we all know it wouldn’t have been possible without the work of Sherryl and Ollie who I’d like to use this opportunity to thank for all the help and support they give. A few students also went on to attend CHI in Hamburg, which was a lovely experience as it allowed us to meet other students and researchers in the field of HCI from across the globe. Something that most likely won’t be possible again for the CDT.

Overall, I’ve felt this year has been one of my best and whilst I cannot predict the future, I believe that if my experience next year is like the one I’m currently having then it will be a pleasant way to end my time at the CDT. Although saying goodbye to Cohort 1 at the end of this year will not be easy, I am excited to meet the final cohort of our Centre in September and discover the new ideas they will bring, which will most likely involve how to better rearrange the office.



Cohort 3 – Saskia Davies

For those of us going into Cohort 3 in 2021, the first all-in-person year of the CDT seems to have been much more communal and collaborative than the previous years impacted by Covid-19.

As well as having a lively shared office space, research retreats and away days have allowed both students and staff to connect and socialise with each other, improving not only our academic skills and ideas to put towards our own research, but also the morale and camaraderie of the Centre’s community.

During our MSc year, CDT events such as industry talks and group meetings were extremely valuable. In particular, the project information sandpits – in which available PhD projects are discussed with their corresponding stakeholders – took a lot of feedback on board from previous cohorts, and the first in-person sandpit was a large success due to its effective organisation. While the project selection process was difficult given various clashes between the cohort’s preferred choices, staff were greatly supportive of our individual needs and, in the end, everyone was happy with their allocated projects. In this way, the majority of challenges experienced in previous years appear to have been vastly improved for our cohort, especially regarding the effectiveness of communication and transparency about our CDT-specific responsibilities going into the PhD. Upon completing our MSc dissertation and welcoming Cohort 4 in the following months, the office has become even livelier again. The most recent research retreat to Amsterdam involved students from all cohorts, and despite the complexity of planning a trip abroad for such a large number of people, it was a great experience that everyone enjoyed and learned a lot from. For most of us, this retreat has been the highlight of our CDT experience so far. With the final cohort arriving in September alongside the PhD thesis submission for Cohort 1, we’re hoping the coming year will be one of celebration and success.

The increasing momentum built up over the last few years is sure to promote further contributions to society and research, advocating the human-centred ethos of the CDT.

New Stakeholders and Projects

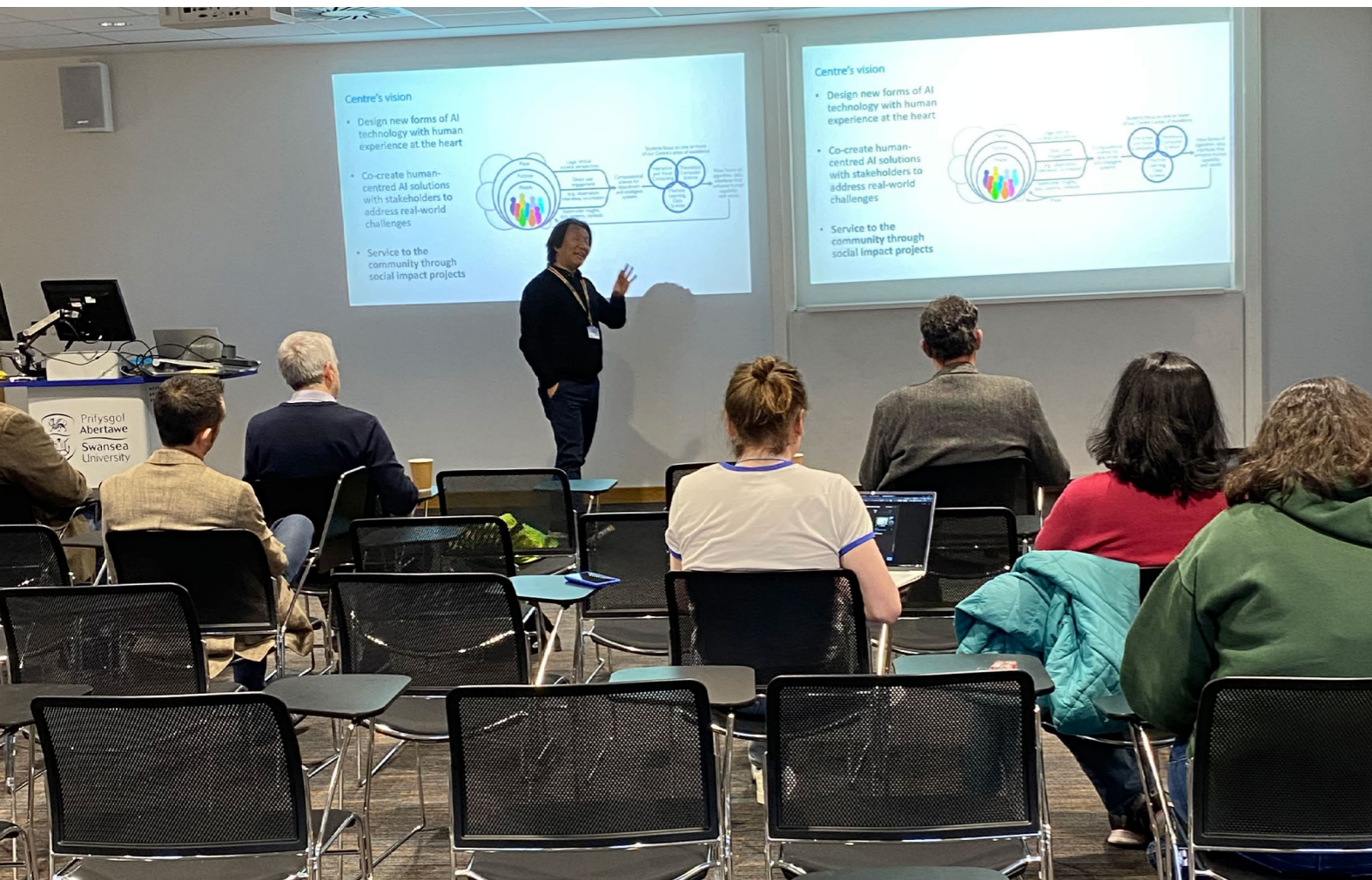
Project allocation for Cohort 4 is as follows:

| Stakeholder | Project Title & PhD Student |
|-----------------------------------|--|
| Amicus Therapeutics | Machine Learning for Medical Decision Making – Matt Ploszajski |
| GSK | User Interfaces, Visualisation and Modelling for Targeting Cancer Treatments – Hannah Ditchburn |
| HSBC | Explainable Deep Models to Empower Economic Growth for Small & Medium Enterprises – Charlie Bramble |
| Hywel Dda University Health Board | Adaptive and Explainable AI for Predicting and Profiling Patients in NHS Emergency Departments – Megan Morgan |
| ITSUS Consulting | Using Human-Centred Approach & ML Techniques to Automate/Visualise Anomaly & Vulnerability Detection in Critical Communication Systems Context – Manal Ghanem |
| Ordnance Survey | Scalable AI-Assisted 3D City Model Reconstruction from Multiple Sourced Systems – Andreas Christodoulides |
| Pearson | Developing Novel Intelligent Approaches to Improve National Assessments, E-Learning, and Student Attainment – Dylan Parry |
| QinetiQ | Towards a Framework to Enable Collaboration between Multi-Agent Robotic Systems – Jaq Robbins |
| Swansea Council | Digital Intervention for Community Cohesion – Rachel Hill |
| TEC Cymru | Enabling Intelligent and Proactive Telecare Services for Older and Vulnerable People – Manjiri Joshi |
| UK AEA (RACE) | Learn From Demonstration (LFD) Framework for Enhancing MASCOT Autonomy to Support Operators’ Needs – Megan Ford |
| Welsh Water | Application of Reinforcement Learning (RL) at Dwr Cymru (Welsh Water) for Decision Support Through an Explainable Artificial Intelligence Paradigm – Daisy Welham |



Looking Ahead to the Cohort 5 Stakeholder Landscape

These include fintech companies such as Lloyds Banking Group, Mastercard, and NatWest; health organisations like AstraZeneca, Bayer, and Cwm Taf Morgannwg University Health Board; safety and environmental organisation like Protium, Celtic Sea Programme, Natural Resource Wales and novel projects from Tata Steel UK; defence and security entities, including DSTL and MOD; and finally, digital economy themed companies such as Booking.com, Bumble, Amazon Swansea, Jaguar Land Rover, DST Innovations, EY, and Reserve Bank of Australia. This extensive and diverse mix of stakeholders will continue to present a range of fresh challenges that will aid us in further advancing our research in human-centred AI.



Social Impact Projects

Expanding the Reach of Biodiversity

Education: Second Collaboration with Down To Earth Charity

Team: Fergus Pick, Matt Hall, Jason Summers, Connor Atkins and Gesu India

The project aims to enhance biodiversity awareness among school children by building an accessible, user-friendly app based on last year's prototype, which supports biodiversity monitoring. In collaboration with the Down To Earth Charity, the project will undertake the development of a mobile application version of the web application prototype designed previously. The process will involve careful study, testing, and feedback incorporation. Additionally, a promotional video showcasing the application's usability and benefits will be produced for marketing purposes. By making the biodiversity monitoring tool accessible through an interactive app, we expect to stimulate children's curiosity and understanding of biodiversity within their school settings. The promotional video will aid in garnering further support and funding from the local government and other external entities, leading to expanded reach and impact on environmental education.

These activities will provide insights into their needs, challenges, and preferences when navigating digital finance platforms. Furthermore, we will also consider digital literacy workshops to empower our users with the necessary skills to successfully navigate these digital tools. We anticipate increased ease of use and understanding of digital finance systems among elderly users, leading to their financial independence and enhanced quality of life.



Enhancing Accessibility: Central Information Platform for Disability Services in Swansea

Team: Aaron Rees, Suz Downie, Tony Zang, and Laura Smith

This project aims to improve the information accessibility of disability clubs and facilities in the Swansea region for individuals with disabilities and their carers. Collaborating with Swansea Council, we will undertake a comprehensive collection and collation of data on local disability resources. This includes mapping all disability clubs and facilities, documenting their services, operational times, and accessibility features. Subsequently, we aim to develop a user-friendly, centralised information platform for easy access and navigation.



Enhancing Digital Finance Accessibility for Elderly Users: A Participatory Approach

Team: Pranjal Jain and Tunte Olatunji

The project aims to bridge the digital divide among the elderly demographic and boost digital finance accessibility for the elderly population through an inclusive, user participatory method, collaborating with AWEN Institute's external partners. We will establish a comprehensive programme involving focus groups, usability testing, and iterative design with the elderly users.

Our project intends to empower the disabled community and their carers in Swansea, making it simpler for them to identify suitable facilities and clubs. We foresee a potential improvement in the quality of life for individuals with disabilities, boosting their social participation and independence. Moreover, this could guide policy-making, helping Swansea Council to identify gaps in service provision and improve disability support infrastructure.

Enhancement and Expansion of AI Games App for STEM Education

Team: Andy Gray, Keneni Tesema, Lydia Channon, Saskia Davies

The project aims to further develop and extend the accessibility of the AI games app in collaboration with Computing At School, with the primary goal of making AI learning enjoyable for school students and promoting interest in STEM fields.

Building upon the success of last year's project, we plan to integrate additional features into the AI games web application based on the teachers feedback.

The refined application will then be deployed at local schools, and concurrently, an app version will be developed to broaden its reach beyond the web platform.

Through these initiatives, we anticipate an improved and broader user experience, fostering a fun and engaging learning environment. The project is expected to ignite student enthusiasm for AI and STEM, equipping them with vital knowledge and potentially influencing their future career paths in these fields.

Stakeholder Perspective

From the outset of HSBC's engagement with the Centre at Swansea University, it was clear and distinct that the Centre is unique. It provides a first-class environment where academic research meets the sociotechnical challenges of society and business. And an energetic environment where those real-world challenges are being tackled head-on with a realist-pragmatist approach that is necessary to keep pace with a fast-moving dynamic research subject matter such as data and artificial Intelligence driven systems.

The urgency to advance human knowledge at a pace that matches the rapid learning capabilities of machines is a paradigm that only a handful of research Centres are currently prioritising. Through our research collaboration with the Centre, we will delve into the factors that contribute to both the stability and growth of Small to Medium Enterprises (SMEs). Our study aims to identify the key characteristics that define these enterprises, as well as uncover the underlying causes and effects that these characteristics have on the broader landscape of SME businesses.

Dr Kevin McLafferty

Head of Data and Analytics, HSBC

We found engaging with the Centre a hugely rewarding experience, with open, collaborative and inspiring conversations. We were impressed with previous projects completed and could see clear benefits of funding a project. Our project with the Centre is motivated by the desire to provide deeper insight to both learners and educators of student performance based on intelligent predictive methods. Potential outcomes from this data-driven and computational project could be improving "real-time" understanding of student attainment as well as providing personalised learning experiences to learners. We look forward to the research journey with the Centre.

Les Hopper (Digital & Product Director)

Berywn Jones (Head of Digital & Assessment)
Pearson

TEC Cymru places great importance on fostering close and collaborative relationships with all its partners. We have thoroughly enjoyed working with the Centre, as their shared values and ethos resonate strongly with ours. Our collaborative PhD research project aims to address the existing data silos within health and care systems, leveraging the power of machine learning and the expertise provided by the Centre. By bridging these data silos, we aim to unlock valuable insights and enhance decision-making processes. This project represents an exciting opportunity for us to work together and deepen our knowledge in the field of AI and data science. We are enthusiastic about the prospects this collaboration holds and the potential impact it can have on advancing healthcare and improving patient outcomes.

Dr Gemma Jones (Head of Research)

Prof Alka Ahuja (National Clinical Lead)
TEC Cymru

Our collaboration with the Centre has been highly positive. As a division of the UK Atomic Energy Authority (UKAEA), Remote Applications in Challenging Environments (RACE) is fully committed to conducting extensive research and development, as well as engaging in commercial activities within the domain of Robotics and Autonomous Systems (RAS). Given the UKAEA's primary mission in fusion, it is of utmost importance for us to explore and develop remotely operated solutions that can effectively operate and maintain fusion devices.

The Centre's approach, which places a strong emphasis on human-centred principles, resonates well with our organisational values. After thorough visits to the UKAEA site and Swansea University, we were delighted to engage with a diverse and multidisciplinary academic team, establishing a clear project scope and defining the desired outcomes. Our research will focus on key objectives: conducting experiments with human operators controlling the MASCOT robotic arm, collecting valuable usage data from JET fusion experiment maintenance. Using learning from demonstration methods, we aim to enable the arm's autonomous or semi-autonomous operation. We'll also explore how this approach minimises workload and improves task efficiency. Lastly, we'll study operator trust in the semi-autonomous MASCOT system over time.

Dr Rob Skilton (Head of Research)

UK Atomic Energy Authority, RACE



The research proposed by GSK this year was for the development of a Pharmacokinetics and Pharmacodynamics Model Visualisation Interface. The project aims to develop human-computer interfaces for mathematical models commonly used in drug research.

I hope to gain a better understanding of how to open up mathematical modelling up to a wider audience in drug discovery and development. I have found engagement with the CDT very productive with a good exchange of ideas and a collaborative development of the project idea.

James Yates (Scientific Director)
PKPD at GSK

Our experience of scoping the project at the Swansea Guildhall and Swansea University was highly productive and a positive experience. We are very much looking forward to being part of the Centre, its human-centred ethos, and working with our PhD student on a challenging but hopefully rewarding and innovative research project.

The PhD research, 'Bridging the Gap: increasing social cohesion and inclusion in communities in Swansea', will explore the role of digital led machine learning approaches in restoring a sense of community, local pride and belonging. The research project will look to explore the challenges faced within communities in Swansea and the role of digital intervention as a method of bridging divisions that may exist in communities within Swansea. We are delighted to be starting our journey together.

Jane Whitmore (Strategic Lead Commissioner)
Paul Thomas (Community Integration & Partnership Manager)
Swansea Council

Throughout our relationship with the Centre, they have proven to be great partners and are a pleasure to work with. Our project will develop a framework which can support the efficient and safe human-robot co-operation, followed by multiple validation studies to quantify improvements in safety, comfort, efficiency and human's trust of the robots. As well as the value delivered directly by the project, our relationship with the Centre allows us to access a large body of academic expertise and a wider ecosystem of entities with whom we can collaborate. We look forward to building even stronger links with the team.

Dr Richard Bryant (Group Head of Academic Engagement)
QinetiQ

We currently have an active project being carried out by a student in the Centre, which is around engaging in social media aspects of extremism. We are delighted to have a new PhD student onboard from the latest cohort. She is currently doing the MSc year of the course and her research is more technically orientated, looking at developing network simulation tools. We are confident that this student will also engage well with the company, and we look forward to her work synergising with other research and ongoing tasks in the company.

Overall, our experience of engaging with the Centre has been very positive and straightforward, allowing us several opportunities to co-create the research scope with the students and guiding us well throughout the onboarding process, which we fully appreciate.

Dr Jonathan Jones (Senior Consultant)
ITSUS Consulting



Our engagement with the Centre has so far been extremely positive. We were able to meet with several academics and Centre members to discuss our idea, and to co-create a feasible project scope. Our project will be exploring the potential for the application of reinforcement learning methods to support optimal decision making for our operations teams. This will include understanding how real-world processes can be modelled within a simulation environment where a reinforcement learning algorithm can learn, through experimentation, how an asset (or components belonging to an asset), can be operated in an optimal way.

Next, the challenge of transferring a trained model into a decision support tool that can be used by our operational colleagues, and the identification of technical approaches that allow model outputs to be fully explainable.

We are really looking forward to discovering how applying reinforcement learning to some of our key business challenges may bring about new benefits such as improved compliance, reduced cost, and greater efficiency. The potential for utilising analytics solutions built upon reinforcement learning methods is relatively unexplored within the water sector, and we look forward to working closely with the Centre on this key project to explore new possibilities and opportunities.

Kevin Parry (*Chief Data Officer*)

Willow Smallbone (*Data & Analytics Manager*)
Dwr Cymru / Welsh Water

The Director's End Note - Into the 5th Year

We will begin the 2023-2024 academic year with our 5th Cohort joining while our 1st Cohort members finish their PhD studies. The 5th Cohort is also the final intake funded through the EPSRC but the beginning of a new phase for our community.

The vision and mission nurtured by our PhD researchers, faculty members and stakeholders is more important now than it was when we first proposed the people-first approach. To complement our "business as usual" — working on diverse projects that are grounded by and driven with human values and perspectives — we will be engaged in many national and international initiatives that resonate with our approach, notably the UKRI's investment in a responsible and trustworthy AI endeavour ([see www.rai.ac.uk](http://www.rai.ac.uk)).

Further, we will work to explore collaborative approaches to enable investments in a diverse range of research and development that amplifies human abilities, fulfilment and joy through innovative interactive systems.

Onward!

Matt Jones



Matt Jones
Director
July 2023



Swansea University
Prifysgol Abertawe

Computational Foundry
Ffowndri Gyfrifiadol