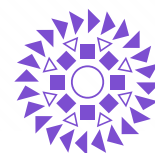# SOUTH WEST CREATIVE TECHNOLOGY NETWORK:
Interim Report - September 2020

Co-Creating Ethical, Inclusive and Sustainable Futures

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and the SWCTN Network

SOUTH WEST
CREATIVE
TECHNOLOGY
NETWORK

INTRODUCTION

The South West Creative Technology Network (SWCTN) is a £6.6 million project to link research to development by expanding the use of creative technologies and supporting business growth across the South West region of the UK. SWCTN is funded by Research England's Connecting Capabilities Fund, which supports knowledge exchange and commercialisation of products made through increased collaboration between universities and industry. SWCTN is a regional partnership between UWE Bristol, Bath Spa University, Falmouth University, the University of Plymouth, Watershed (Bristol) and Kaleider (Exeter).

Established in 2018, SWCTN has supported research and development in emerging technologies. Exploring the themes of IMMERSION, DATA and AUTOMATION, SWCTN's programming includes three Fellowship cohorts, Prototype commissions, Microgrant opportunities, knowledge exchange, business development and ongoing mentorship. The SWCTN network is currently made up of 583 members, a rich mix of established and developing researchers, artists, technologists, businesses and practitioners from across the region, representing multiple disciplines and industries.

SWCTN is underpinned by the concept and practice of 'cultural ecology', cultivating and connecting diverse networks of people, places, communities and resources across the region. By creating opportunities for knowledge exchange and collaboration, we explore the challenges and possibilities of creative technologies, prototype ideas and support new businesses committed to triple bottom line impacts: social, economic and environmental. Drawing together expertise in creative producing, knowledge exchange, business development and creative economy research, SWCTN is strengthening regional productivity, innovation and resilience.

In this Interim report we begin to share our learning and highlight the diversity of impacts that the South West Creative Technology Network has had on building the breadth, connectivity and capacity of the creative technology sector in the South West UK, as well as growing its international reach.

> " I think it's been an absolutely brilliant programme. I think the diversity of approaches and opinions and backgrounds has been invaluable."

AUTOMATION FELLOW

Photo credit: Jon Aitken

> " I'm remapping how I see myself in the ecosystem of Plymouth actually. Because I'm just doing different things from what people know me to be."

IMMERSION FELLOW

NAVIGATION

SECTION 1 - Overview, pages 1-3, we give an overview of the scope of the Network, creating a picture of its members, industries and sectors involved, and the types of outputs and impacts we are producing.

SECTION 2 - Our Approach, pages 6-15, looks in-depth at our approach, outlining the critical and interconnected roles of Creative Producing, Knowledge Exchange, and Business Development Support that underpins SWCTN programming and its support for Fellows, prototype teams and wider members.

SECTIONS 3-5 - Themes, pages 16-31, takes each of our cohorts as its focus, sharing case studies of learning and successes.

SECTION 3 - Immersion, pages 17-22, highlighting IMMERSION Fellows and prototype teams, discusses how SWCTN is supporting the development of more inclusive and transformative immersive experiences through critical research, interdisciplinary cultural production and innovative tools. Further, by facilitating the sharing of expertise and brokering connections, SWCTN is leading the way for developing new models of increased resilience in the creative and cultural sectors.

SECTION 4 - Automation, pages 23-28, focuses on AUTOMATION and discusses the impact our methodologies and creative technologies have on different industries including construction, agriculture, health and well-being. Specifically, the section highlights how our approach to R&D is distinct from conventional models of 'knowledge exchange' by sparking innovation through cross-disciplinary collaborations between artists, researchers and other industry practitioners.
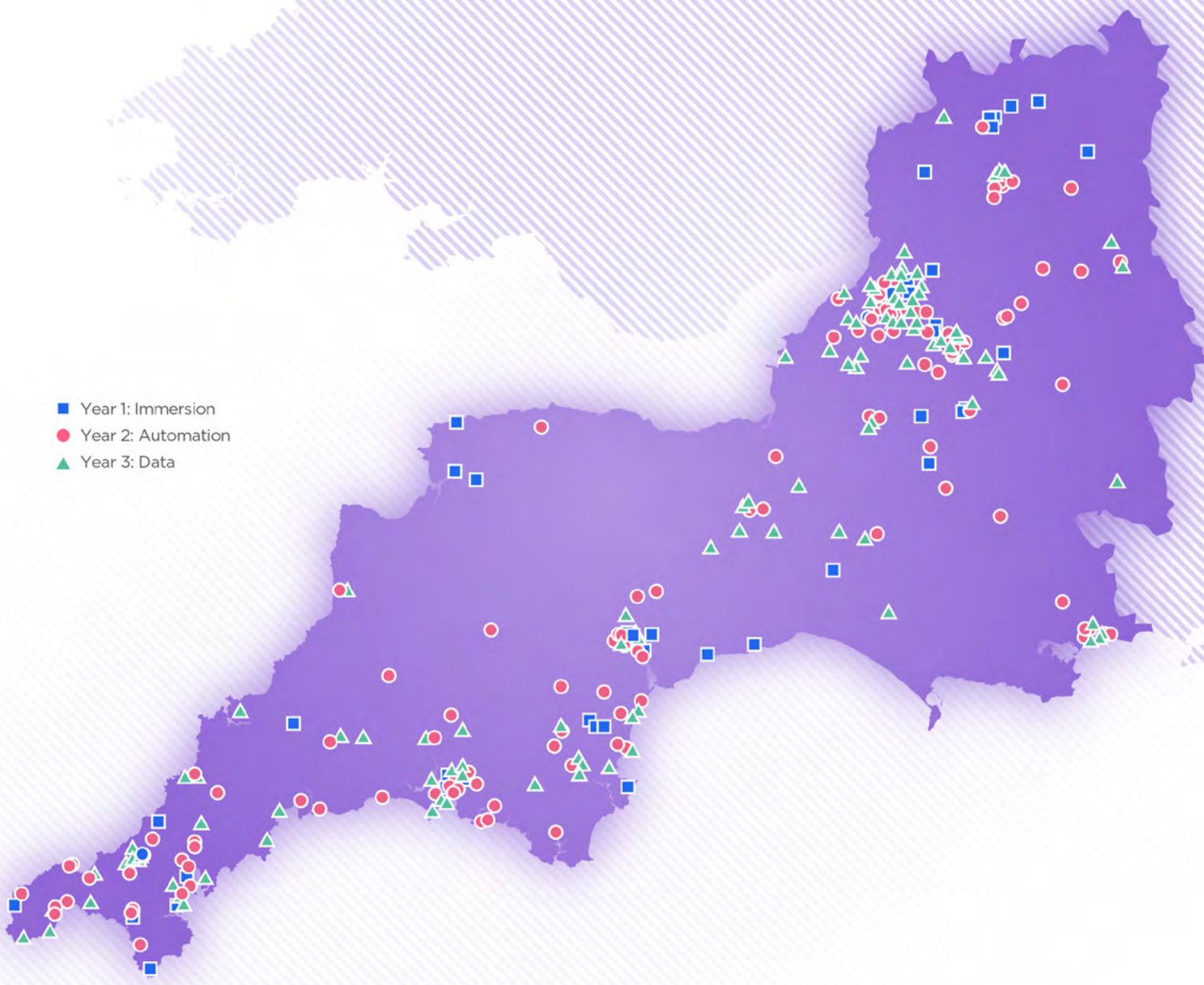
SECTION 5 - Data, pages 29-31, reflects on the social impacts of SWCTN through a discussion of our Fellows' research in DATA. Specifically, we will discuss how our Data cohort is developing, identifying common themes and practices emerging through our virtual workshops. It also maps our learning, changing methods of delivery and early successes, as we deal with the ongoing COVID-19 crisis.

SECTION 6 - Network Impacts, pages 32-34, looks at the geographical spread of the network by linking together local hubs, regional connections and global impacts. Specifically, we tell the story of how new and existing creative technology hubs have strengthened across the region through participation in the network.
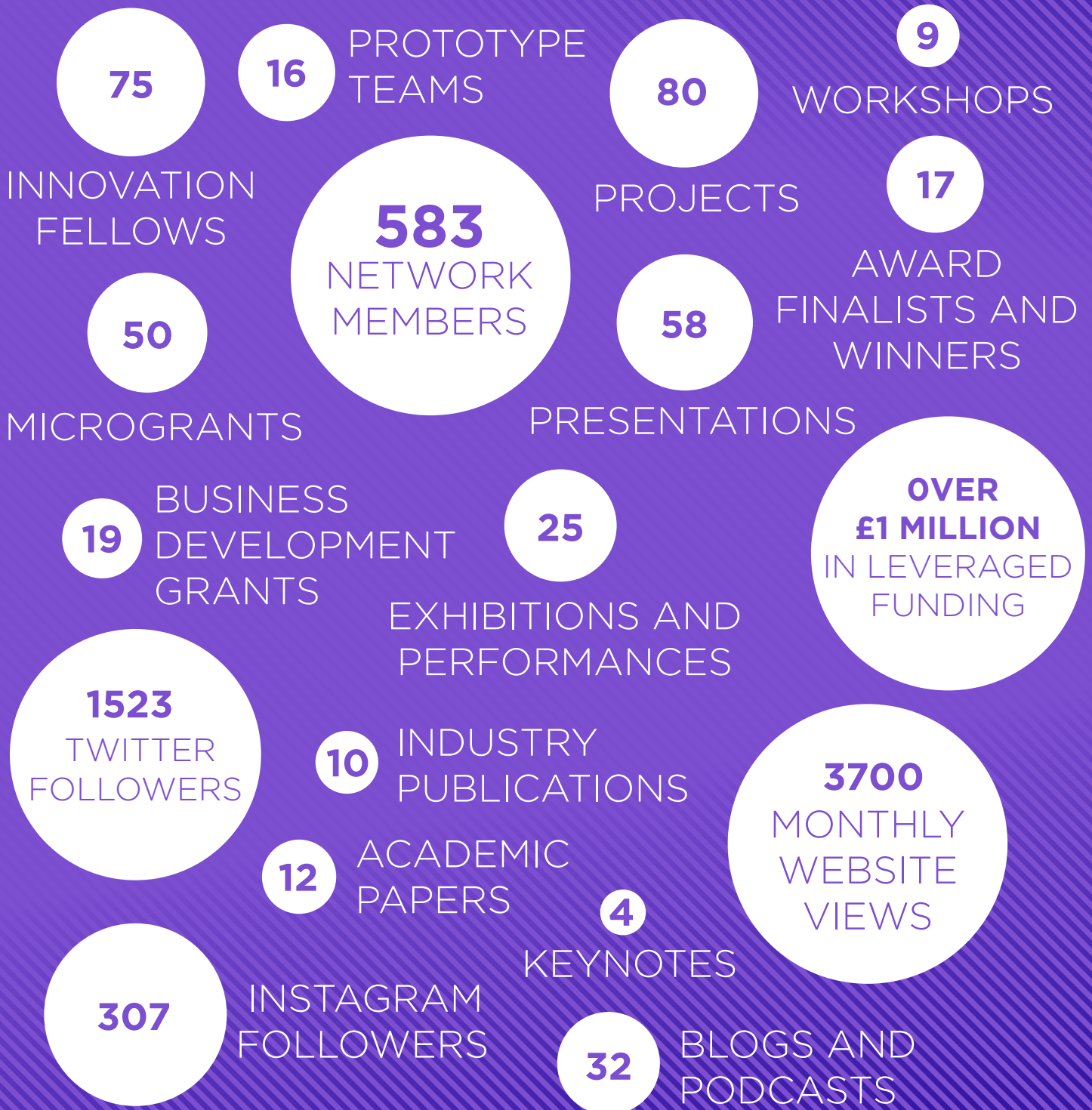
SECTION 7 - Learning and Legacy, pages 35–37, considers the learning and legacy of the Network, and where this work takes us next, for example by focussing more explicitly on the role creative technologies will play in creating more inclusive and sustainable futures.

NETWORK

Year 1: Immersion
Year 2: Automation
Year 3: Data

HIGHLIGHTS

75 INNOVATION FELLOWS

16 PROTOTYPE TEAMS

80 PROJECTS

9 WORKSHOPS

17 AWARD FINALISTS AND WINNERS

583 NETWORK MEMBERS

50 MICROGRANTS

58 PRESENTATIONS

19 BUSINESS DEVELOPMENT GRANTS

25 EXHIBITIONS AND PERFORMANCES

OVER £1 MILLION IN LEVERAGED FUNDING

1523 TWITTER FOLLOWERS

10 INDUSTRY PUBLICATIONS

3700 MONTHLY WEBSITE VIEWS

12 ACADEMIC PAPERS

4 KEYNOTES

307 INSTAGRAM FOLLOWERS

**32** BLOGS AND PODCASTS

OUR APPROACH

SWCTN creates innovative responses to pressing challenges and strengthens regional resilience through a unique approach to research and development. Grounded in an understanding and practice of cultural ecology, we integrate knowledge exchange, creative production and business development, facilitate connections and create spaces for experienced and new talent researchers in the creative industries, digital technologies and a range of sectors, to share skills, collaborate and co-create.

By *cultural ecology*[1] we mean recognising the interdependencies between artists, academics, technologists, funders and other actors who participate in cultural production and innovation. Building on a long history of strong networked activity across creative and cultural sectors in the South West, this approach has been further articulated through projects such as REACT and other longstanding R&D relationships between Watershed, Kaleider, UWE's Digital Cultures Research Centre, and Bath Spa University's Centre for Cultural and Creative Industries who have connected through projects emerging out of the Pervasive Media Studio, a creative technology and cultural hub in Bristol[2].

Learning from these past projects, SWCTN puts *cultural ecology* into practice by expanding, strengthening and activating regional networks through a particular approach to creative R&D. Specifically, SWCTN forms a new partnership, effectively connecting Bristol and Bath's expertise in creative R&D with other regional hubs such as Plymouth's i-Dat Research Lab, Kaleider Studios in Exeter and Falmouth's Games Academy and Launchpad. By connecting networks between Bristol, Bath, Exeter, Falmouth and Plymouth, SWCTN draws together expertise not only in the creative and digital industries such as performance, robotics, virtual reality, and gaming, but also creates opportunities to innovate with other industry sectors such as architecture, climate science, health and well-being, and manufacturing. Our network is underpinned by a methodology linking creative production, knowledge exchange and business support, which leverages the power of the arts and humanities to support value exchange across a rich and diverse regional ecosystem. Our approach not only sparks innovation but also extends the impact of R&D by supporting the development of sustainable business models that are both appropriate for the creative sector and are committed to triple bottom line impacts - social, economic and environmental.

NETWORK ECOLOGY OF IMMERSION FELLOWS

LEGEND

- 🔵 Internet
- 🔴 Creative
- 🟣 Tech
- ⚫ Edu
- 🟢 Fellow
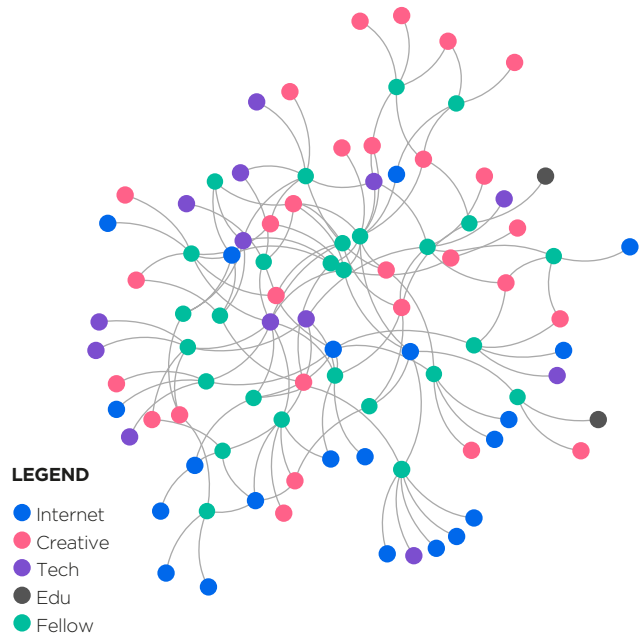
> **"** **The network is probably one of the most valuable things, really, meeting all these people, doing interesting stuff and giving some of those relationships a bit of sustainability beyond the timeframe of the project."**
>
> Automation Fellow

[1] *Dovey, Jonathan, Simon Moreton, Sarah Sparke, and Bill Sharpe. 2016. 'The Practice of Cultural Ecology: Network Connectivity in the Creative Economy'. Cultural Trends 25 (2): 87–103. https://doi.org/10.1080/09548963.2016.1170922*

[2] *Graham Leicester, and Bill Sharpe. 2010. 'Producing the Future: Understanding Watershed's Role in Ecosystems of Cultural Innovation'. International Futures Forum. https://www.watershed.co.uk/news/producing-future-understanding-watersheds-role-ecosystems-cultural-innovation*

CREATIVE KNOWLEDGE EXCHANGE

Our understanding of Knowledge Exchange (KE) is distinct from other approaches which often define KE as extending the social impact of university research by sharing knowledge with non-academic communities and sectors. Traditionally KE tends to align more with Knowledge Transfer, which presumes innovation happens by commercialising university IP, spinning out new companies, engaging in consultancy and "disrupting" industries through the adoption of new tools or practices. We approach KE by focussing on authentic forms of exchange and the co-production of ideas, products and services, by engaging the expertise of both academic and practice-led researchers. We recognise that R&D is not only the domain of universities. Rather individuals, businesses, organisations and communities are often engaged in research and actively developing new methods, tools, products and services in real-world settings. However, long standing assumptions regarding the role of universities have tended to privilege particular forms of knowledge, research methods and participants.

With this in mind, we have refined our approach to Knowledge Exchange, which we define as Creative KE. Grounded in cultural ecology, our values include reciprocity, trust, and non-hierarchical methods to ensure diverse voices, perspectives and practices are included and empowered through processes of innovation outlined in our KE Principles co-produced by the team. Each University partner supports Creative KE through dedicated KE Managers that work 1: 1 with network members to increase the impact of their research, prepare funding applications, and broker connections between network members and university researchers and resources. KE managers also design and facilitate programming for members to share research and identify appropriate routes to investment and funding for their ideas and businesses.

Our Creative KE Principles:

- **If knowledge is power, Knowledge Exchange is sharing power.**

- **Knowledge Exchange is about expanding opportunities for people to participate in creating and storytelling.**

- **Knowledge Exchange generates new value through the exchange of different values.**

- **Knowledge Exchange should challenge inequitable or exclusionary innovation.**

- **Knowledge Exchange is relational and reciprocal, not transactional.**

- **Knowledge Exchange is about fulfilling potential**

- **Knowledge Exchange is about growing and expanding trust.**

- **Knowledge Exchange allows people to see themselves differently.**

- **Knowledge Exchange is about people before it is about products**

> **Rachel's great. I really enjoy and appreciate her and what she does... She's helped me with a prototype application process. We spent time exploring. We had quite a long conversation about outputs, what, if I was going to talk about outputs in my application, would be valuable in that. We've had a number of conversations about that and she's read through documents and commented so that's really been helpful."**

Automation Fellow

CREATIVE PRODUCING

At the heart of SWCTN is a curatorial, intentional and responsive approach to supporting the Fellows and wider network. A Creative Producer heads up each thematic cohort, working with our Fellows individually, providing a critical and challenging perspective, as well as occupying a pastoral and supportive role throughout the R&D process. Creative Producers also operate at a Programme level, coordinating the day-to-day operations of the network, by designing Fellows' workshops and showcase events, and participating in strategic decisions. Creative Producers are creative professionals who act as brokers, forging collaborations and relationships, connecting parts of the network together, putting people in touch with resources, strengthening members' ambitions and confidence, practice and capabilities, and identifying advantageous development routes for creative people through existing sectors as well as emerging or new markets.[3]

Photo credit: Jon Aitken

> **"So, now I've got the confidence, I'm able to find people to work with even if I can't do it myself, I can gradually build up my skill set in terms of audio production and stuff like that, so I feel much more confident about going on and producing this kind of thing in the future."**
>
> Automation Fellow

Creative Producers frequently translate between different parts of the Network where professional languages, values and approaches to work differ, which is key to ensuring non-hierarchical approaches to collaboration and knowledge exchange. The job of the Creative Producer might be understood as:

…to 'catch the sparks that fly' in interdisciplinary collisions, and to ensure that they grow into a healthy creative blaze.[4]

> **"[Creative producers] are like creatives who are administering but know what the reality is, who are supporting creatives to come and do it, and go, 'Actually, let's just get out of their way, support them, here's the stuff, go and do your thing."**
>
> Automation Fellow

[3] *Network for Creative Enterprise: Final Report (November 2019). Available at: https://www.watershed.co.uk/sites/default/files/publications/2019-12-09/nfce_final_report_web.pdf*

[4] *REACT Report 2012-2016 (2016) Available at: https://www.watershed.co.uk/sites/default/files/publications/2018-10-08/reactreport.pdf*

BUSINESS DEVELOPMENT

In addition to Creative KE and Creative Producing, SWCTN focuses on bespoke and design-led business development methods appropriate for creative micro-businesses and SMEs. Building on learning from REACT and other creative R&D projects, it is clear conventional business development and investment strategies are often ill-suited for micro businesses, creative businesses and other companies committed to triple bottom line impacts. The creative tech sector largely consists of a fluid network of freelancers and micro-businesses who collaborate with SMEs and large companies through project-based work. However, much of the sector's economic growth is captured by larger firms and a smaller portion of SMEs. When microbusinesses and SMEs benefit from this type of growth, it is often through buy-out by larger companies, leaving practitioners to restart the process of creating new products, services, and start-ups. Although project-based work may offer practitioners more autonomy, these working practices also create a precarious environment limiting who can participate, much less thrive, in the sector.

In response, SWCTN's business development programme includes 1:1 mentoring, workshops, spearheading the development of an ethical investment network for the South West, and establishing a pot of £65,000 annually for micro grants in business development to cover the gaps left by traditional funding for R&D in the Creative Industries. Our business advisor and KE managers work with network businesses to develop sustainable business plans, identify audiences and users, conduct user testing, diversify funding sources, and deepen their knowledge of IP, public relations, public speaking and pitching skills. Our business advisor is also developing stronger relationships with funding bodies and investors to understand proposed funding calls and priorities to effectively prepare network members for success.

> " ... if I wanted to go on the commercial aspect, I didn't have any idea how to set up a business or do anything like this, but through the network and through the IP training and the business stuff we've been doing, I feel like I know the places to go to get that knowledge."
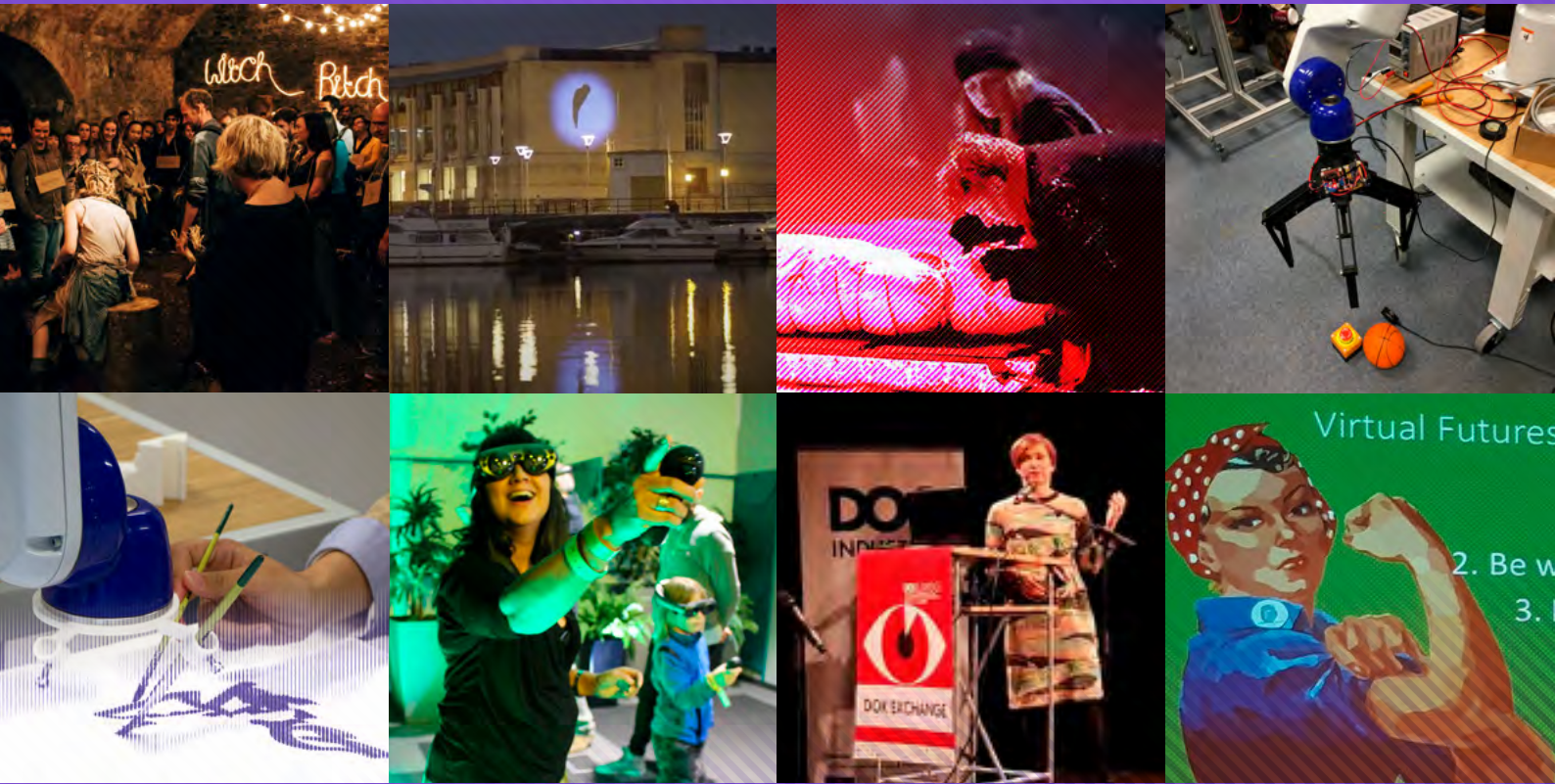>
> Immersion Fellow

> "[Business development] funding [...] feels like a privilege and also an urgent necessity. Take the time offered to enlist professional peers who can collaborate with you on analysing where your business has been, where it is now and what you want it to be in three years' time. In the arts, we often find ourselves running between one funding pot to another in order to simply get our work made and put in front of an audience. Actually what is vital to our success is to stop and assess."
>
> Immersion Fellow

Our methodology of creative producing, knowledge exchange and business development, supported by research and creative technology expertise, enables network participants to take risks, learn new skills, disrupt assumptions and increase the confidence and capabilities needed to forge new collaborations, create high impact work and develop values-led business models to sustain research and development.

OUR PROGRAMME

OUR PROCESS

CALL OUT FOR FELLOWS

MONTHS 1-3

FELLOWS SELECTED

24-27 FELLOWS

Academia
New talent
Industry

DEEP THINKING

SERIES OF COLLABORATIVE WORKSHOPS

SUPPORT FROM PRODUCERS + CREATIVE TECHNOLOGISTS

INDEPENDENT RESEARCH

MONTH 3

OPEN TO ALL: Network events

CO-CREATED PROTOTYPE BRIEF

MONTH 4

OPEN CALL

MONTH 5

SHARE INTERNALLY WITH FELLOWS

SHARE EXTERNALLY WITH THE WORLD

PROTOTYPES

Produced by teams of makers (could be fellows, could be others) fellows remain critical friends

MONTHS 6-8

£250K PROTOTYPE INVESTMENT

INDUSTRY SHOWCASE

MONTH 9

Sharing prototypes with the industry and the world

SWCTN Immersion Cohort, Photo credit: Jon Aitken

THE FELLOWSHIP

Each year, the SWCTN team curated a cohort of Industry, Academic and New Talent Fellows representing diverse industries from across the region to collectively explore what is new, challenging and possible across the themes of Immersion, Automation and Data. In addition to pursuing individual practice-led research projects, Fellows participated in workshop activities where they were encouraged to challenge one another, share skills, collaborate, and co-create. Fellows shared their learning with one another and externally through a public showcase, exhibitions, publications and conferences highlighting the ethics, politics, exclusions and possibilities of emerging technologies across sectors. Fellows also applied their learning to co-design a brief for prototype commissions.

> **The Fellowship has been a brilliant opportunity to build new networks and do really deep thinking and research. It's definitely informed how I will move forward."**
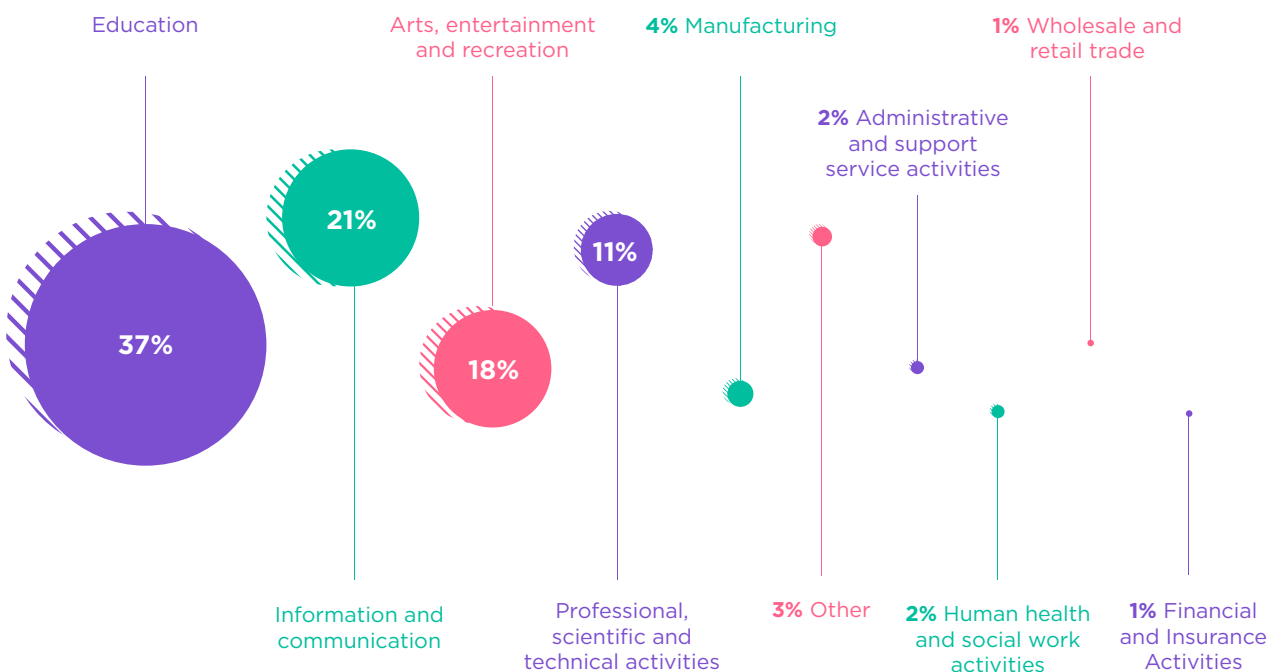>
> Automation Fellow

PROTOTYPE COMMISSIONS

The prototype commissioning brief was an open call inviting teams to apply for funding to develop new products and services with commercial potential addressing industrial, societal, cultural and environmental challenges. Taking a values-led approach, prototype teams were encouraged to reflect on how diversity, interdisciplinarity, cross-regional collaboration, ethical innovation, and sustainability existed in their proposals and how they might address any gaps and exclusions in their team, processes, and users.

16 prototype teams are now developing a range of products, services and experiences including: innovative tools for VR game developers and cultural producers; multi-sensory immersive experiences; a health and well-being programme integrating motion capture technology and dance; computer apps using augmented reality to increase learning and sustainable behaviours; automated construction methods that democratise planning and development processes.

INDUSTRY SECTORS REPRESENTED ACROSS SWCTN PROGRAMME

Education — **37%**

Arts, entertainment and recreation — **21%**

4% Manufacturing

1% Wholesale and retail trade

2% Administrative and support service activities

18%

11%

Information and communication

Professional, scientific and technical activities

3% Other

2% Human health and social work activities

1% Financial and Insurance Activities

MICROGRANTS

In the first year of SWCTN, Bristol-based creative and cultural businesses were overrepresented in fellowship and prototype applications. This is not surprising considering Bristol is home to the largest creative cluster in the network. However, the outcome did present a challenge in realising the cross-regional and cross-disciplinary aims of the project. In response, SWCTN dedicated resources to each of the partners to support local network development and early stage projects. These smaller grants of £500 to £5000 have focused on connecting and expanding local expertise in creative technologies, prototype development and new artistic work, generating impact for businesses, audiences and students. Funding has supported the use of immersive and automative technologies by theatre companies, urban planners, filmmakers, writers, manufacturers, and academics. SWCTN is also in the process of funding small R&D grants focused on creative responses to the COVID-19 crisis as part of the 'Lessons from Now' programme.

In Bath Spa, projects have included the use of VR in urban planning and development, opportunities for students to create work for Boomtown Festival, an immersive writing installation for the Bath Literature Festival and a prototype for sensory textile products. Falmouth has focused funding on projects that strengthen the university's relationships with other cultural and creative hubs such as Creative Kernow, Screen Cornwall, Porthmeor Studios and Cornubian Arts & Science Trust (CAST). Kaleider has funded arts and tech R&D projects that not only produce new cultural experiences, but also positively impact sustainability, health and educational outcomes through collaborations with partners such as the NHS and Libraries Unlimited. Plymouth's microgrants are expanding and diversifying the use of creative technologies through participatory experiences and innovative tools with applications not only for the creative sector, but also higher education and sustainable agriculture. Finally, UWE and Watershed microgrants have supported the development of new prototypes including a 3D scanner for heritage organisations and the use of VR in hospitals to aid diagnosis of movement disorders.

WORKSHOPS AND EVENTS

In addition to annual showcases connecting investors, academics, industry experts with Immersion and Automation Fellows' research and prototype teams, SWCTN hosts a range of workshops and events across the region to support networking, skill development, and business development with the wider network. Kaleider coordinates a Talent Development Programme which has included workshops on how to facilitate creative work online, introduction to virtual reality and creative technologies for young people. The 'Prototyping the Business' seven-part programme with experts and practical workshops ensures that teams gain a clearer sense of appropriate business models which will enable them to bring their products or services into the world, thereby increasing their resilience in an increasingly uncertain environment. SWCTN's 'Routes to Investment' fund, led by the University of Plymouth KE Team, connects members with financial and legal experts to learn about intellectual property, accountancy services and access to finance. SWCTN also regularly hosts networking events at Watershed and The Studio at Palace Yard Mews in Bath.

Photo credit: Jon Aitken

> **Here are some workshops. They're compulsory. You need to come along, because actually we're going to smash you with some ideas and we're going to work with a whole bunch of different things. We want you to be successful. We're going to support you in doing this."**
>
> Immersion Fellow

THEMES

IMMERSION
AUTOMATION
DATA

16

IMMERSION

From spatialised sound to augmented reality, emerging immersive technologies give developers, creatives and performers new ways to blend physical and virtual worlds. Our first cohort of Fellows and prototype teams, focused on the theme of Immersion, sought to explore immersive experiences from multiple perspectives and in different domains. While significant investment has been made in a range of platforms to deliver immersive experiences, our goal was to build on this existing potential by enabling bold, interdisciplinary thinking around future content, tools, services and applications to really expand the sector. Bridging between arts and digital technology, marketplace and research, we sought to realise the full potential of immersion in new markets and emergent forms of cultural experience.

Immersion Fellows came from a wide range of sub-sectors within the creative industries and digital sectors, from conservation filmmaking to haptic technologies. The cohort's interests in immersive work was also wide-ranging, inclusive of VR, AR, Mixed Reality, full dome, projection mapping, ambient technologies, sound, performance and other creative and exploratory approaches. Some developed interest in immersive experiences outside of the creative industries, for example in health and heritage. This diversity in skill sets and backgrounds created an environment for Fellows to share expertise, experiment, and disrupt assumptions regarding the challenges and possibilities related to immersive technologies. Specifically, through structured workshops and their own research agendas, we asked Fellows to explore questions around:

- What new understandings of immersion do we need?

- What blueprints do we need to ensure that immersive applications create convincing and accessible experiences?

- What technical challenges need solutions to support such experiences?

- What modes of storytelling are required?

- How can social, multi-user immersive experiences be created?

Photo credit: Jon Aitken

Immersion Fellows roundly challenged the claim that immersive tech = immersion. As experts in theatre, dance, fine art, cinema, gaming, music and literature, many Fellows explored the role technologies might play in cultural practices that have long immersed participants into new worlds and experiences by drawing together spaces, bodies, and stories in novel and powerful ways. Immersive technologies such as Virtual Reality, Augmented Reality, Mixed Reality, 3D film, and haptic technologies, therefore, do not necessarily create immersive experiences, but rather can add value to existing cultural forms as well as generate novel cultural experiences. Building on these discussions, Fellows also explored how other sectors such as health and education, would benefit from engaging with the arts and humanities to tell better stories, ensure care and ethical use, and engender more collective, less solipsistic experiences when using immersive technologies.

The Stick House, Photo credit: Jack Offord

CASE STUDY ONE

Sharon Clark an academic SWCTN Immersion Fellow explored how creative digital technology might deliver anticipation and recall for an audience in an immersive theatre narrative. Through her theatre company, Raucous, Sharon has long experimented with creative technologies in theatre,

"...because, as a playwright, it gives me a toolbox by which I can tell stories in totally different ways. I can whisper in your ear - it's just me and you in a room with me telling you a story the old-school way, around a campfire. That's what it is. I can show you the dragon, I can stand next to you and talk to you. I can make you feel much more readily in immersion... Heightened emotional response, for me, is visceral and vital as a playwright."

This expertise has proved incredibly valuable to other Fellows, especially those who came from outside of the performing arts. As Sharon explains,

"People seemed to be keen on why such an old form was looking at technology for its new storytelling modes [and asking] 'How do I use narrative with digital technology? What things should we think about? What are the considerations?' [...] I talked a lot about the early thinking around Raucous and my practice in how technology and narrative are built at the same time, together... The way to make it is in total collaboration with your digital technologist, so that he/she is embedded in that story with you and you're embedded in their work. This feels so urgent and I have spoken a lot about that with different practitioners."

Alongside sharing her expertise, the fellowship enabled Sharon to develop relationships with technologists allowing her to deepen her understanding of the specificities, technicalities and affordances enabled by VR/MR/AR and other technologies. New Talent Fellows, Harry Willmott, a VR filmmaker in the health sector, and Dom Brown, a recent PhD graduate who specialises in haptic technologies and music, were especially influential.

"Harry and Dom taught me, through one of their presentations, about how they think about technology and how they begin to design a piece of technology, in such a clear and beautifully concise way that it took away a lot of fear for me. Their willingness and openness to share their process in a very clear and concise way, where curiosity drove it - not academia or practitionership [...] that was joyous. Them saying, 'Let me take you by the hand and show you, I think this is what you need to make this work. It works this way.' Breaking it down so that the mystique of it was removed. I think they had a massive impact on my practice. What they taught me was about how I should communicate around this stuff with my collaborators and my colleagues."

Ice Road, Photo credit: Jack Offord

CASE STUDY ONE

SWCTN also connected Sharon with Immersion Fellow Coral Manton, a creative technologist also based at Bath Spa University, who is now collaborating with Sharon on Raucous' next immersive theatre production, The Undrowned.

"Coral and I have a very open and equitable knowledge exchange system between us.... We support each other, and we believe in each other's visions. We believe in each other's ambitions as well. I think we really do want to be on the journey together around us being seen as a couple of women who make beautiful work."

Building on SWCTN research, Sharon was awarded a fellowship with Magic Leap and the Royal Shakespeare Company (RSC) to work with other Fellows to create an immersive interpretation of A Midsummer Night's Dream. She was invited to present the work at SXSW in March 2020 and a longer version at the RSC in Stratford later in 2020. Sharon has also presented her research at Zipscene in Budapest and the Arts, Culture, and Digital Transformation Summit at the Banff Centre for Arts and Creativity in Canada.

Although the fellowship proved challenging in balancing the demands of academic and practitioner roles, the experience has bolstered Sharon's confidence as a practice-based researcher and made her expertise much more legible to academic audiences.

"I think the biggest thing I learned was that I know my subject. It's provided me with confidence, both academically and as a practitioner. It quelled, a little bit, the imposter syndrome. [...] The fellowship has given me a career step up in terms of academia and how my university views my practice and research."

One critical theme emerging out of the Immersion cohort focused on the concept of entanglement - how technologies, bodies, eco-systems, cities, spaces and stories are already inextricably connected, and what that means in terms of responding to climate uncertainty, health, inequality and social connection. As Immersion Fellow and UWE academic researcher Julia Scott Stevenson discusses in "Virtual Futures: A Manifesto for Immersive Experiences"[5], immersive technologies may be well suited for making these complex relationships visible, disrupting assumptions and imagining possible worlds.

"Climate armageddon, the rise of the far right, the arrival of our machine overlords — it's easy to imagine that the future is an unsalvageable hot mess. But what if I told you that an immersive experience such as VR might help us find a way out? Let me explain.

I know, it sounds like I might be about to join the cacophony of grand claims around immersive media technologies, such as those relating to behaviour change, empathy development, and bias reduction. Meanwhile, a commonly heard concern is that digital media technologies distract us, take us out of the "here and now"— affixing our attention to a mobile phone perhaps, or isolating us behind a head mounted display. [...]

Many future narratives, though, across multiple screen media forms, tend to be dystopian in flavour. Instead, I'm interested in what might be termed "preferred" futures — what is a future we want to get to? What is the world we want to make?"

Julia's Manifesto, developed through her fellowship research, was featured in Immerse News, presented at DOK Leipzig in Germany and forms the basis of a chapter in the recently published book, Handbook of Research on the Global Impacts and Roles of Immersive Media (2019).

Other Immersion Fellows, critically engaging with these themes, developed tools for makers and artists to experiment with immersive technologies to imagine and perform more inclusive, sustainable and ethical futures. For example, in No Vantage Point[6], Immersion Fellow Duncan Speakman introduces a series of reflections and provocations intended for artists and makers to explore 'immersion', not as an emerging form of individualistic technologically-mediated cultural experiences, but rather as an ethico-political lens for making work in the anthropocene. As Duncan explains,

"I want to try unpacking this word immersion, which recently seems to have become a short-hand for specific forms of media and performance, immersion as some kind of cultural signifier, of immersion as a noun, or as a verb.

It feels that everyone is leaning towards the act of immersing as a kind of cocooning, immersive media as a thing that wraps around us.

*Instead, I want to think a little about immersion as something that already exists
Something we live with all the time
Immersion as the way of describing the way we exist deep inside complex tangled ecologies.*

And around this word, beyond it, underneath it, even woven within it, maybe we'll find agendas of care, of attending to the environments we inhabit.

Immersion meaning there is no vantage point."

Provocations emerging from Immersion Fellows' research shaped our call for immersion prototype commissions which aimed to support "immersive experiences [that] can empower and inspire; producing wonder and bewilderment, enabling human connectivity and attuning us to our complex environments"[7]. Further we prioritized projects that addressed urgent real world issues through interdisciplinary and sustainable approaches, engaged with underrepresented audiences and users, and fully engaged with ethical considerations of their projects. As a result, SWCTN funded 8 prototypes[8] such as: Where is the Bird, an Augmented Reality (AR) book which introduces parents and carers to British Sign Language as a way to interact and communicate with pre-verbal children; Responsive Content Generation Tools that will enable game developers to generate VR worlds specific to a player's device, location, physical and mental abilities; and Renaissance, a falls prevention programme designed for vulnerable older people living in Sheltered Accommodation that draws on expertise from dance, the health sector and motion capture technology.

[5] Scott-Stevenson, Julia. 2019. 'Virtual Futures: A Manifesto'. Immerse, 8 March 2019. https://immerse.news/virtual-futures-a-manifesto-for-immersive-experiences-ffb9d3980f0f

[6] https://duncanspeakman.net/projects/novantagepoint/

[7] https://www.swctn.org.uk/immersion-prototype-invitation-to-apply/

[8] See https://www.swctn.org.uk/immersion/ to read about all immersion prototypes.

CASE STUDY TWO

Industry Fellow and award-winning conservation and wildlife filmmaker **Mitch Turnbull** explored the question of how immersive technology can influence opinion and change behaviour when used in conservation and humanitarian advocacy and campaign content. To answer this question, Mitch conducted research including surveying audiences from Marshmallow Laser Feast's "We Live in an Ocean of Air" at the Saatchi Gallery, learning from sound ecologists and Stanford's Human Virtual Reality Interaction Lab, and working with researchers from Exeter University and the European Centre for Environment and Human Health Research. As a result, Mitch developed an understanding of the potential impact immersive technologies may have on human behaviour, and subsequently, the ethical responsibilities artists and content creators have to their audiences when producing immersive experiences.

"My passion is to connect people with the natural world in the most effective way possible, help them care, and hopefully encourage them to make changes in their behaviour that will benefit our natural environment.

When I first came across immersive technology in 2015, I immediately realised its potential to engage. A creative practitioner has the capacity to create a deeply meditative experience. On the other end of the spectrum, there is the possibility to create something incredibly visceral that can be painful to experience. That is the power of immersive technology.

And so when it comes to conservation or the environment, you need to carefully consider which approach to take, which story to tell, and which form of immersive technology to employ [...] As content makers, we're at this extraordinarily powerful point of engagement with an audience; they are still in a place of wonder with the medium. But we need to remain mindful of the power that tool yields - we don't fully understand the psychology behind it. So if you're planning to use immersive content to advocate and change behaviour - go carefully."

Integrating this research, Mitch was successful in receiving SWCTN Prototype funding for the project EarthSongs, a beguiling interactive audio-visual mixed reality app that explores natural soundscapes through play, experimentation and creation. Designed for the Magic Leap, individual unique sounds from nature are represented by beautiful, visual interactive motifs. Multiple layers within the app allow players to discover different natural habitats as well as different ways to interact and play with natural sounds, including spatially placing them in a room. The app also allows players to make recordings, enabling the creation of personalised natural soundscapes and symphonies.

CASE STUDY TWO

The EarthSongs mixed reality prototype was developed in collaboration with All Seeing Eye, a Gloucestershire-based creative technology firm, and UWE academic Immersion Fellow Luke Reed who leads on sound design and implementation. EarthSongs has been selected to showcase at Immerse UK's 'Audience of the Future' programme and 'Creative XR Market', Simple Things Musical Festival, NYC Climate Week and the 2020 Sundance Film Festival. Over 500 people have experienced the EarthSongs prototype at public events in the UK and US, where it's received overwhelmingly positive feedback.[9] Prior to the coronavirus lockdown, the prototype was due to showcase at Tate Modern, i-Docs, EarthX Film Festival (Dallas) and Bath's Forest of Imagination Festival. In response to the pandemic, Mitch has pivoted the EarthSongs mixed reality development to focus on a large-scale projection and immersive sound experience as well as a mobile AR app.

In addition to developing EarthSongs, Mitch has also set up Bramble Media Ltd, with support from SWCTN's business development advisor.

"A thoughtful, joyous and evocative use of technology to create a really vibrant connection to the natural world.

"A beautiful experience."

"Magical!"

"By far the best Magic Leap experience I have tried! The first time I finally feel like I understand what Magic Leap is all about."
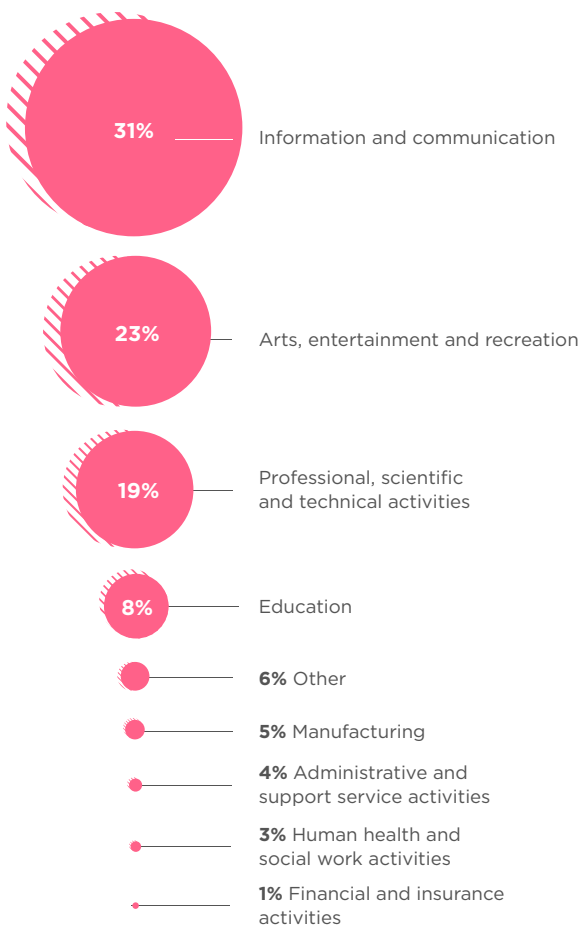
"Very lyrical and fun"

[9] *85% rated the prototype experience as very good or excellent; 52% thought the experience was suitable for all ages and 70% would buy a ticket if the prototype was offered as a paid experience.*

AUTOMATION

Algorithms, machine learning systems, AI and robots are some of the ways automation is changing the way we live, impacting all sectors of society. Emerging automative technologies give developers, creatives and performers new ways to create work, engage audiences and develop relationships across disciplines. Our cohort is building on the already ground-breaking Automation work coming out of the South West to grow new relationships and innovation in new areas.

Our Automation Fellows constituted a more diverse cohort than Immersion, representing not only the creative industries including fine art, music, and craft, but also sustainable agriculture, health, intellectual property, architecture and manufacturing. Further, Fellows had expertise in AI, robotics, programming, coding, deep learning and co-design.

INDUSTRY SECTORS REPRESENTED ACROSS AUTOMATION

31% Information and communication

23% Arts, entertainment and recreation

19% Professional, scientific and technical activities

8% Education

6% Other

5% Manufacturing

4% Administrative and support service activities

3% Human health and social work activities

1% Financial and insurance activities

One critical theme has focused on critiquing and opening up the black box of automative technologies. Several Fellows explored how particular gendered, ethnic and racial identities, as well as political and economic agendas are embedded within algorithmic codes, potentially exacerbating inequality and marginalisation. To further address these challenges, Fellows explored how to engender more equitable and sustainable outcomes by democratising automotive technologies. For example, Birgitte Aga, Rosie Brave, Rachel Smith, and others pursued practice-based research that included workshops introducing AI, robotics and automated wearables to diverse audiences including artists, young people and community groups.

Another dominant theme wrestled with the role automative technologies play in creative practices. On the one hand, these technologies potentially threaten and displace certain kinds of work. On the other hand, they may enable new forms of expression, innovate working practices and create new markets. For example, Ron Herrema, an Academic Fellow based at Bath Spa University, writes computer algorithms as part of his artistic practice in musical composition. Drawing on his practice and posthumanism theoretical framework, Ron argues in 'Code as Prosthesis', that surrendering some creative control to algorithmic codes results in a greater sense of embodiment and self-expression[10]. Similarly, industry fellow Tariq Rashid participated in planning the exhibition, *Algorithmic Art* at the Royal Cornwall Museum which explores how 'the speed and untiring precision of a computer opens up creative opportunities not possible with a human hand'.[11] Fellows Patrick Crogan, Associate Professor

[10] https://www.creativemediaresearch.org/post/code-as-prosthesis
[11] https://www.royalcornwallmuseum.org.uk/exhibition/ algorithmic-art-season

of Digital Cultures at UWE-Bristol and Mollie Claypool, Co-Director of Design Computation Lab at The Bartlett School of Architecture, UCL, are building on these themes in an upcoming co-edited book, *Creativity in the Automatic Society*.

These critical themes regarding the un-blackboxing and democratisation of automative technologies and their role in creative processes, generated not only academic impacts and social value, but were also key to developing unusual collaborations and innovative outcomes for a wide range of sectors through the SWCTN automation call.

As the automation prototype projects and the following case studies suggest, our approach to R&D goes beyond what Markusen and Scrock describe as the 'artistic dividend',[12] the added value creative industries generate for other industries through the application of innovative methods and services. Rather, our automation cohort shows how reciprocal exchange between sectors sparks critical thinking, innovative practices and outcomes, as well as more inclusive models for business development. By facilitating knowledge *exchange*, as opposed to knowledge *transfer*, Automation Fellows' diverse skill sets, disciplines and industries generated notable creative spillovers through collaborations fusing industry and academia, creativity and technology.

Robot with gripping end of arm tools using computer vision to grasp objects (Research & Innovation Festival 2020, University of Plymouth)

[12] *Markusen, Ann, and Greg Schrock. 2006. 'The Artistic Dividend: Urban Artistic Specialisation and Economic Development Implications'. Urban Studies 43 (10): 1661–86.*

AUTOMATION PROTOTYPES

AIM (Agroecological Information Model) is an intelligent software tool that uses AI and machine learning to help communities, developers, and city planners to design human-scaled, sustainable food systems. The team includes contemporary artist Paul Chaney, who explores post-collapse food systems using digital technology and public participation, Adam Russell, a software developer and AI specialist and economic botanist Dr Andrew Omerod.

Air Giants bring large-scale soft robotics to life. Whether with towering tortoises or pneumatics newts, this project aims to bring a sense of joy and wonder to large audiences. In addition to developing prototypes, Air Giants is strengthening their business offering as an expert in co-creation with academics to make research more publicly accessible and engaging. The team includes artist Emma Powell, roboticists Richard Sewell and Robert Nixdorf, producer Jazlyn Pinckney will join the team to lead user-testing, and Andrew Bachelor who provides modelling and analytical support.

Little Lost Robot, a new CIC founded by artists and Automation Fellows, Ruby Jennings and Joseph Wilk, is exploring the way automation can create more welcoming, inclusive and sustainable public spaces. Soft robotics will be used to create malleable and versatile street furniture such as benches that can give shade, fold and unfold, collect rainwater and host vertical gardens, providing a home for O2 producing plant life. Since founding Little Lost Robot Ruby and Joseph have secured additional Arts Council Funding to further develop the prototypes.

The Collaborative Construction Platform uses Augmented Reality (AR) and industrial robots to develop a platform-based application for automated construction which will preserve, not displace, traditional skills and techniques as well as enhance the skills, capacity and quality of design outputs available to workers in the building trades. Led by Automation Fellow Mollie Claypool, Director of Automated Architecture, the prototype is being developed In collaboration with community arts organisation, Knowle West Media Centre, and architecture practice Millar Howard Workshop.

Beech Design, a specialist computer aided design company, Yeti Tool, a CNC developer and manufacturer and Reprap Ltd, a R&D team, specialising in 3D printing are collaborating to create The Environment Scanner - a device which takes thousands of measurements – using a line generator and a number of cameras – and then stitches all of the measurements together to create a drawing or model, which can then be used in virtually every CAD system. Using non-proprietary components where possible, the team aims to bring laser scanning to users who would not previously have access to such a technology.

The Re+Collective is a design activist community who work together to advocate, upskill, and create opportunities for women, trans, non-binary, and genderqueer people in creative technology. They deliver projects and workshops to challenge the development and impact of new technologies (on society, the environment and the individual).

Looking for the Cloud is a Re+Collective project that aims to make visible the technology and environmental impact of The Internet. Working in partnership with The Eden Project, Looking for the Cloud is a prototype children's book, augmented with proof-of-concept chatbot. It is accompanied by a series of co-designing workshops to engage children and young people.

CASE STUDY ONE

Interdisciplinary Robots and the Alchemy of Art

Academic Fellow Alejandro Reyes and Industry Fellow Tom Duggan formed a collaboration around exploratory 3D clay printing through the fellowship which has built significant momentum and created stronger links between Plymouth and Cornwall. Using Tom's expertise in automated fabrication techniques and sculpture, and Alejandro's expertise with material science and programming, they have developed a system in collaboration with KUKA robotics, IMERYS and Plymouth University to build and optimise an additive printing process of sustainable, locally sourced materials. Through the collaboration, Tom also produced work which has been exhibited at Tate St Ives. *The Alchemy of Art* exhibition attracted over 2500 people and raised questions regarding the sustainability of resources.

Their collaborative process has been characterised by playful and collaborative experimentation with technology, rather than defined by any particular discipline. As a result of their open-ended approach to innovation, their work is impacting a wide range of sectors including arts and engineering, which diversifies revenue sources and potentially creates a more sustainable approach to R&D. As Alejandro explains,

"Well, it was quite straightforward in the sense that Tom has access to a robot that he got from KUKA Robotics. [...] We have in-house experience in programming those types of robots, which was me, so we teamed up. We started by bringing his robot to our university for two or three weeks to start playing around with that.

[...The collaboration] grew a bit organically, if you ask me. It wasn't something planned [...] We spent two or three weeks over summer just working around this machine and 3D printing stuff, seeing what came out from it. Yes, I would say it grew a little bit organically. It was a good match in that sense.

So far, we have these pieces that are going on to the Tate. We were also successful in securing a micro-commission from The Box at Plymouth Museum as part of their Covid-19 response call. This work builds upon previous 3D printing experiments by speculating on different media (e.g. architectural visualisation, model making) and their potential uses and spaces associated to robotic clay 3D printing."

*Human-Robot interaction for the production of creative outputs*

Robotic reproduction of human sketches through in-house developed contouring, computer vision and trajectory planning software

During the fellowship Alejandro has continued this line of research, with additional support by EPSRC funding ("Computing Craft" project with Cardiff University), published "Negotiated matter: A robotic approach to craft-driven innovation" in Architectural Science Review, and is engaged with the development of a new Digital Fabrication Laboratory at the University of Plymouth. He has initiated a research group with mobile robotics researchers, supported by a provision of robotic arms from EPSON Robotic Solutions (Germany). In addition to the Alchemy in Art exhibition at Tate St. Ives, Tom was profiled in the national magazine UKSPA's Breakthrough: "The team at AeroSpace Cornwall recognise that, with their unique perspectives, artists add real value to the research and development process"[13].

[13] *The United Kingdom Science Park Association. 2019. 'The Art of Space'. Breakthrough, Summer 2019. https://issuu.com/open-box/docs/ukspa_issue_8_hi-res/30*
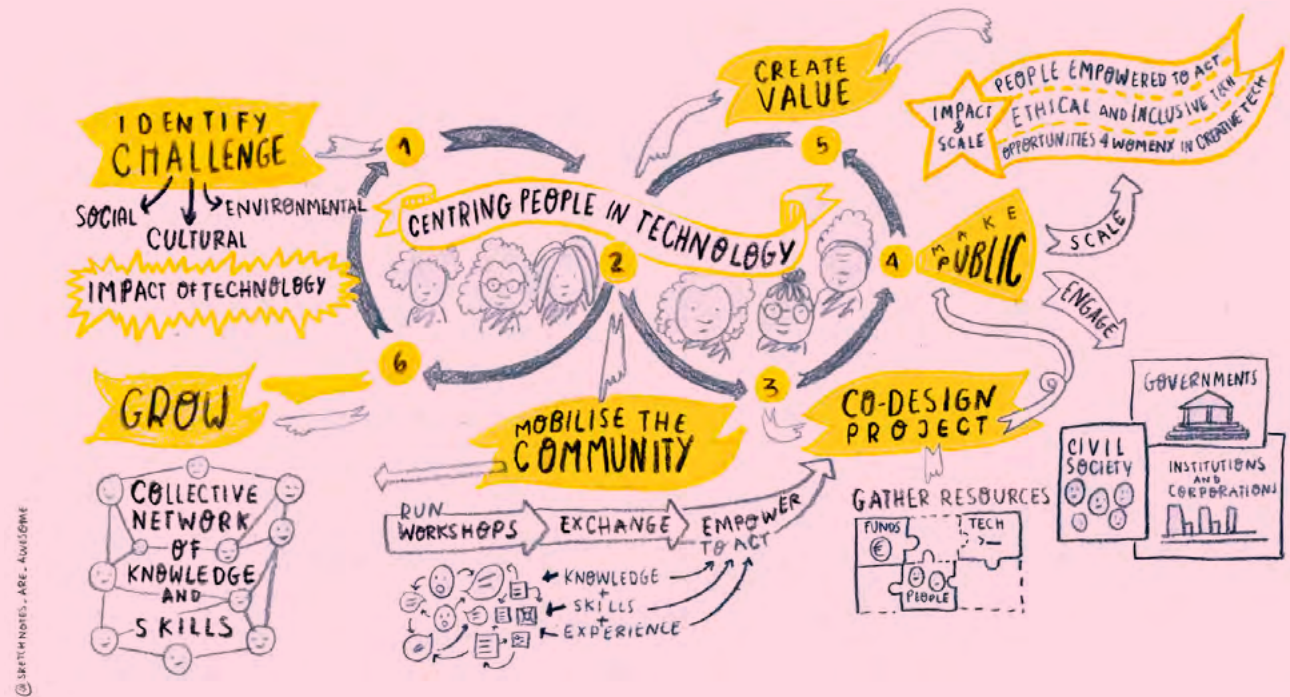
CASE STUDY TWO

The Re+Collective, set-up through the SWCTN prototype funding, is a design activist community who work together to advocate, upskill, and create opportunities for women, trans, non-binary, and genderqueer people in creative technology development, bringing something very different to the South West.

The project is inspired by the work of artist-technologists Dr Birgitte Aga and Coral Manton. In 2018 they co-founded Women Reclaiming AI, an activist community of 100+ women (re)claiming conversational AI systems as a medium for protest by co-creating a feminist voice assistant using women's language and personality.

This year, the Re+Collective has brought together a team of SWCTN Fellows, producers and creative technologists which include Dr Birgitte Aga, Ellie Foreman, Nema Hart, Sam Howey Nunn, Coral Manton, Rachel Smith, and Elvia Vasconcelos.

The Re+Collective has emerged as a direct response to the lack of participation and gender diversity in technology development. As the team described:

**RE
+COLLECTIVE**

"We have all been working in quite a lot of male-dominated environments, and with technologies that lack diversity in their development teams. So we were really interested in thinking about, "How can we use the prototype not only to make a prototype of something and generate some income, but really how we can constitute and set something up that creates opportunities for diversity in technology development and that is women-led?

All of us in the team and women in our networks have lots of different types of work and projects and services that they can offer, but we did not have a collective brand we could come together under. So we started off asking "How do we actually want to work? What are the challenges and barriers for women innovating with creative technologies? And how can we change that? What can we set up? What kind of alternative and inclusive structure that supports more women to take part? What value could this create and distribute?" Our response to this is the Re+Collective – a community where we work together under one shared and distributed heading."

CASE STUDY TWO

Re+Collective proactively creates spaces for women to access, create and experiment with emergent technologies. They consider the great opportunities technological innovation can have in creating new experiences and products that have a cultural, social, environmental impact.

To combat the negative impact of technology designed without diversity, the Re+Collective apply an inclusive approach to technology development. They aim to activate people through workshops and co-designed creative technology projects that share skills, encourage discussion, and create opportunities for people to access current and future technologies. In doing so they create opportunities for people to take part and have a say in the current and future impact of technology (on society, the environment, and the individual).

The first project of the Re+Collective is the Looking For The Cloud (LFTC) prototype, in partnership with The Eden Project, which addresses the challenges presented by cloud computing and the increasing energy demands of the internet. Using terminology like 'The Cloud' stops users of online services thinking about the materiality and energy usage of the internet. The aim of the project is to encourage users of online services to think about how the internet uses power - and therefore has a carbon impact. Through the LFTC prototype the Re+Collective raises awareness and promotes a more sustainable future for the internet and 'The Cloud". Simultaneously this pilot project generates opportunities for women to experiment and work with creative technologies.

The Re+Collective have plans to use their flagship pilot to generate interest and opportunities for future projects, products and creative technology collaborations in the public sector, culture and heritage, conservation, and technology sectors, created with more representative technology development teams. The group is seizing the opportunity that the heritage and cultural sectors have to lead in ethical, public driven conversational systems for civic good.

LOOKING FOR THE CLOUD

DATA

Data is "powerful matter"; it can be extracted and abstracted from almost anything and everywhere. Once collected, we can mould and compute it into various representational forms. Spun in multiple ways, it reveals patterns that can provide insights and enable change, monitor behaviours, as well as control, regulate and suppress actions.

Since April 2020, 24 Data Fellows from across the South West of England have been developing their ideas around data, discussing, sharing and debating what data means within today's contemporary societies. So far, our thinking has led us to conclude:

- Data is never neutral. How it is collected, combined, stored and redistributed can animate and reproduce existing inequalities.

- No single data point can ever tell the subtleties of complexities of the story.

- Data is power. When aggregated and contextualised, data increasingly governs the ways in which we construct information and generate claims about knowledge.

As our conversations and thinking unfolded, the first wave of the COVID-19 pandemic swept across the UK, resulting in a global debate on data. Issues relating to contact tracing, virus profiling, and disease management came to the fore, as questions around data security, including who collects data, where and how is it stored, and with whom it is shared became everyday topics.

With a mass amount of health data being gathered, shocking racial disparities within the UK and US revealed ingrained structural racism with a disproportionate number of people from BAME communities suffering and dying from COVID-19. Adding to this, the fragility of unknown futures and economic uncertainty, and police brutalities within the US, has led to civil unrest, increasing an already volatile situation.

Within this context of living in and witnessing interesting data times, we shifted our workshop programming online where our conversations have manifested in various ways from data legacies and inheritance, errors, deaths and dead ends, haunted

Photo credit: Jon Aitken

and grotesque data, the maintenance and reliability of data and the economic models that could allow for more transparent interactions, from block chains to data markets, to regional data cooperatives and collectives.

Mapping inspirations and influences across our distributed cohort, we have considered the significance of what it means to build capacities for regional data initiatives and shared ideas on the ecological impact of data and how light, landscape and water might be traced and combined so that our experiences of the world can open up new pathways for communication, poetry, therapy and exchange.

We have looked into tactics and strategies that can block, stem or resist the reduction of life to a quantitative point, voiced concerns about systemic biases and the extractive, colonising nature of data, and shared emerging ideas on how trauma, violence and pain can become embodied in data and what this means for different communities.

In addressing data ethics, we have begun to re-think existing systems of value and the paradoxes of optimization that data so often promises. Considering the transition and passage points between what gets lost when an object, item, memory, sense or affect is translated into the digital, we have looked to such tensions, boundaries and gaps, thinking through possibilities of triangulation, subversion and mitigation.

Ideas are still forming, changing, and mutating but six strong themes have been emerging across the work:

1. Inclusion
2. Literacy
3. Rights
4. Ecology
5. Accountability
6. Subversion

We are excited about how each Fellow's research continues to develop - as well as how this learning shapes applications to the Data Prototype call, as we search for new, commercially viable and socially just and impactful prototypes around data. In addition to themes such as inclusive data, data literacy and rights, our prototype call aims to fund projects directly addressing climate change, health and well-being and digital citizenship. We will also use our learning from adapting our fellowship programme to an online environment to better understand and support virtual knowledge exchange networks.

DATA MAP
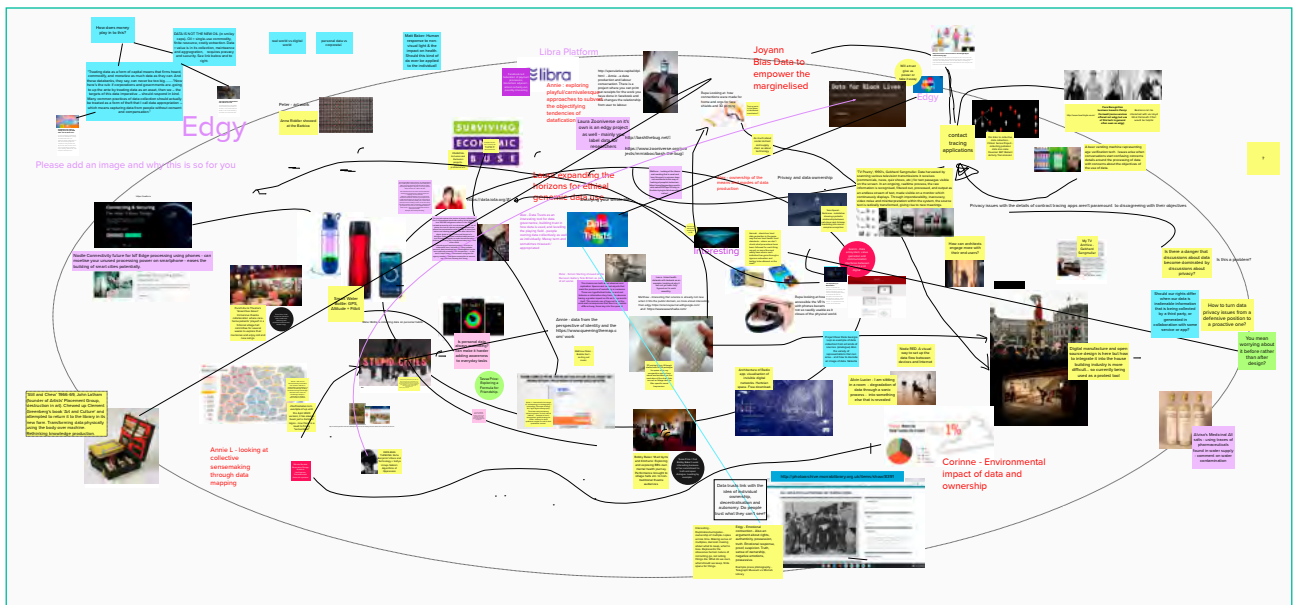
Data Map from a workshop with SWCTN Data Fellows led by Gill Wildman: a collective visual mapping session exploring the landscape of their research, emerging themes and findings (zoom in for detail).

NETWORK IMPACTS: LOCAL HUBS, REGIONAL CONNECTIONS AND GLOBAL REACH

One of the main goals of SWCTN is to "connect capabilities" [15] between university and partner networks, linking distinct fields of expertise in order to spark innovation and develop new products, services and businesses on a regional scale. Over the course of two years, SWCTN has been successful in supporting new cross-disciplinary and cross-regional collaborations leading to prototypes, exhibitions and other projects. In addition, SWCTN continues to evidence the importance of local creative hubs and promoted a South West regional identity around creative technologies at a global scale.

Local Hubs

Mapping the membership of SWCTN reveals that networks continue to cluster around local anchors and cultural hubs, which form a significant physical and social infrastructure for supporting cross-disciplinary creative work. Throughout the process of planning and delivering SWCTN, it became clear that strengthening relationships within universities as well as between local universities, freelancers and organisations would prove vital to building capacity for the region's creative tech ecosystem.

UWE & Watershed: Strengthening Critical Research into Creative Economies

UWE and Watershed have enjoyed a longstanding partnership through the co-founding of the Pervasive Media Studio, alongside the University of Bristol. Researchers from UWE's Digital Cultures Research Centre (DCRC) and members of Watershed's research and creative producing team have collaborated on multiple projects such as REACT, an AHRC-funded Knowledge Exchange Hub for the Creative Economy, and the Network for Creative Enterprise, a programme supporting sustainable business development in the creative sector, funded by European Regional Development Fund (EDRF) and Arts Council England. UWE's Creative Economies Lab (CEL) emerged out of these projects, beginning as an informal research group hosted by the DCRC in the Pervasive Media Studio. As a result of SWCTN, this relationship has continued to expand with the addition of nine new members, increasing its research, knowledge exchange, administrative and communications capacity. The CEL is now a long-term tenant of Watershed's newly developed co-working space, Studio 5. This added capacity has enabled the CEL to develop stronger links with the Bristol Robotics Lab,

Photo credit: Jon Aitken

incubation centres including UWE's The Foundry and Engine Shed, as well as public agencies such as West of England Combined Authority. The group has since developed a strategic plan which includes the development of a new vision statement, several funding bids including the successful UKRI's Strength in Places and the EDRF and WECA funded Creative Workforce for the Future projects, as well as bi-annual conferences critically exploring the relationship between creativity, cities and universities.

Bath Spa University and the Studio at Palace Yard Mews

In Bath, a brand new creative technology focused incubation space has gained University support thanks to momentum provided by SWCTN. The Studio at Palace Yard Mews is Bath Spa's first step into providing space for enterprise and innovation, mixing free and paid-for desk space for students, graduates, researchers, freelancers and SMEs working on creative technologies projects. As a cultural hub for SWCTN, Bristol+Bath Creative R+D (part of the Creative Industries Clusters Programme) and Paper Nations (a creative writing incubator), the building

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[15] https://re.ukri.org/funding/our-funds-overview/the-connecting-capability-fund-ccf/

hosts regular meet-ups and events. With SWCTN Fellows, microgrant recipients and associates among the first residents, it provides development space for new businesses emerging from the Network.

One of the first resident businesses is Little Lost Robot, a new collaboration between Automation Fellows Ruby Jennings and Joseph Wilk, who have become a tour de force in the South West creative technology community. Ruby leads on Playable Spaces for Urban Places, a SWCTN funded prototype which will use soft robotics to create malleable and versatile street furniture to make urban spaces more inclusive and welcoming. Ruby is working with Joe on another prototype, Stupid Cities, funded through Bristol+Bath Creative R+D. This prototype stems from his fellowship work, exploring the use of sensor boxes attached to wheelchairs along with other user-generated content like photographs to create an interactive digital map focusing on accessibility.

Their new company, Little Lost Robot, will deliver the prototypes and the Arts Council funded project, Leviathan, a partially crocheted giant robotic octopus for community engagement. The Studio at Palace Yard Mews had also become home to Creative Coding, a monthly meet-up that Joseph runs to explore poetic computation. The COVID-19 crisis delayed Palace Yard Mews' official opening, however Bath Spa is maintaining this momentum through online activities for residents to connect and support one another.

Falmouth University
SWCTN has helped expand the use of digital technologies across Cornwall's cultural and heritage sectors through the Wave Immersive project. In collaboration with Cornwall Museum Partnership, the Local Enterprise Partnership, Falmouth University received £700k to develop immersive experiences in five regional museums: Bude Heritage Centre, Looe Museum, Porthcurno Telegraph Museum, Isles of Scilly Museum and St Agnes Museum. Without this funding, and the collective expertise of the delivery team, these museums would not have been able to leverage immersive technologies to engage their visitors with their collections in new ways. SWCTN has also supported Porthmeor Studios in St Ives, Cornwall to take its first steps into the realm of digital-based art. Since 1938 the Studio has been an iconic creative space for artists and students focused around traditional fine art painting and printing. A partnership between SWCTN, Porthmeor and Falmouth University funded three digital art residencies at the Studios.

Two recipients of these funded residencies have applied for follow-on funding to develop the work that they had begun during the residencies. The residencies have shown other residents, students and visitors, the creative potential and uses of new immersive and digital technologies within a fine art context.

In addition, SWCTN played a key role in two new large investments in Cornwall. Since being involved with the SWCTN, Falmouth University, in partnership with Exeter University, have been awarded ERDF funding to deliver a £2m Immersive Business project in Cornwall. SWCTN's Immersion theme highlighted potential development themes that now underpin this follow-on project. The Immersive Business programme will support more than seventy Cornish businesses - from art-based micros to SMEs - engaging with the programme's newly created Immersive Lab in Penryn.

University of Plymouth
The University of Plymouth is home to i-DAT, an Open Research Lab for playful experimentation with creative technology. In addition to critical and practice-based research pursued by artists, technologists and academics, i-DAT manages the Immersive Vision Theatre, delivering shows, productions and research in immersive media using Virtual Reality and Fulldome technologies. Further, the city of Plymouth will be the new home of Market Hall, Europe's largest state of the art immersive dome. Plymouth's participation with SWCTN has been able to raise the profile of the South West as a world leader in creative technology by connecting SWCTN, i-DAT and global networks. SWCTN Co-Investigator, Mike Phillips led a delegation of South West creatives, curators and commissioners including several Immersion Fellows and a Creative Producer to attend the IX Symposium in Montreal, sponsored by SAT (Society of Arts & Technology). The symposium's theme, Immersion: Digital Immersive Cultural Experiences, attracted delegates from around the world to engage in critical conversations and to develop new collaborative relationships. To ensure the South West continues to lead in creative technologies and interdisciplinary, challenge-led innovation, the University of Plymouth has also launched a New Digital Fabrication Lab and Immersive Visualisation Lab. These labs will develop skills, resources and programmes for students, industry and cultural partners to catalyze innovation not only in the creative industries, but also digital fabrication and manufacturing.

Watershed and Kaleider: Expanding Creative Production in the Southwest

Links between cultural hubs have also been strengthened through SWCTN activity, with SWCTN providing a platform for various activities across the region to come together. A mutually supportive relationship has grown between Kaleider and Watershed, the two organisations responsible for the Creative Producing on the programme. The teams worked in tandem to create a unique producing partnership which supported all the fellowships and prototyping strands. Kaleider commissioned three Producer Fellows to explore how to support creative producing outside of strong creative clusters, such as in rural areas. As a result, Watershed learnt a great deal about Creative Production in a different creative, geographical and economic settings, while Kaleider strengthened its producer offering as a creative hub in Exeter, and was able to attract further funding as a result.

One major impact of SWCTN is enabling Kaleider to increase its organisational capacity and cultural offering through newly acquired space in Exeter. Kaleider is now able to host workshops, events, and expand its residency programme. SWCTN Fellows alongside other artists, makers and technologists based in Devon and the surrounding area now have a cultural hub to network, develop and share new work. Mikrofest celebrated Kaleider's new space which featured several Immersion Fellows as well as collaborative work between resident artists and the University of Exeter. Kaleider has since funded a Talent Development Programme - a series of workshops that brought together experts and members of the public including young people around topics like Live Coding, AI and VR as an Artform, and How to Creatively Facilitate Your Work Online, in response to the challenges related to Covid 19.

Kaleider is also one of the producing partners for the New Creatives talent development programme, funded by Arts Council England and BBC Arts, which supports emerging artists, ages 16 to 30, to develop new ideas in film, audio and interactive media for BBC platforms. Several SWCTN Immersion Fellows have served as mentors for programme participants, including two of our New Talent Fellows, Dom Brown and Vincent Baidoo-Lowe. Through hosting SWCTN Fellows as residents and awarding SWCTN micro grants at the local level, Kaleider is having a significant impact in Exeter building a network, boosting skills and confidence, and providing a platform for wider reach.

Extending the network's global reach

Participating in the Network has enabled Fellows to attend international conferences that they otherwise could not, which has been critical to reach niche tech expertise and key innovators, resulting in new collaborations, and building after Fellows' confidence as industry peers and equals in international settings. Fellowships also allowed existing international partnerships to deepen and develop into commercial opportunities.

Fellows have been exhibiting Internationally as well, with Immersion and Automation Fellows invited to attend South by Southwest Festival in Texas, New York City's Climate Week, Ars Electronica in Austria, Zipscene in Budapest, OK Leipzig, Germany, Arts, Culture, and Digital Transformation Summit in Canada, ISEA 2020 (Inter-Society for the Electronic Arts) in Korea and at the upcoming 2020 Dutch Design Week in Eindhoven. Immersion Fellows Duncan Speakman and Luke Reed have both used their fellowship to widen the international reach of their work. Luke Reed took his sound research to Osaka, Japan as part of the Future of Audio in VR[16] workshop. Sound artist and composer Duncan Speakman's work has been shared widely, most recently in Immerse online magazine[17] and at the IDFA DocLab in the Netherlands where his work Only Expansion won the Special Jury Award for Creative Technology in Immersive Non-Fiction, which has also been named as one of the top XR experiences of 2019[18].

Social media and the online presence of SWCTN has also had a significant impact on several of the Fellows and their ability to work internationally, with Automation Fellows noting how Twitter and Instagram 'takeovers' found them new audiences, collaborations and research opportunities. Being part of the SWCTN brand could give a stamp of approval to self-employed creative technologists for international audiences who could be associated with a recognizable Network linked to prestigious organisations.

[16] https://favr2019.github.io/

[17] Speakman, Duncan. 2020. 'No Vantage Point'. Medium: Immerse. 1 May 2020. https://immerse.news/no-vantage-point-b6a4da415584

[18] https://www.forbes.com/sites/jessedamiani/2020/02/19/the-top-35-xr-installations-of-2019/#385f1bdfca08

LEARNING AND LEGACY

As with the development of any large programme, the SWCTN Executive Board and Delivery Team experienced challenges - from learning how to work across a large geographical region to responding to the crisis posed by COVID-19. As a result, SWCTN has become an incredibly collaborative and resilient network, ready to tackle social, cultural and economic challenges and envision more inclusive and sustainable futures, through distinctive interdisciplinary approaches to innovation and creative technology.

CHALLENGES AND LEARNING

Distinct and Complementary Roles in the Innovation Ecosystem

At the beginning of the project, Knowledge Exchange managers, Creative Producers and the Business Development advisor expressed a lack of clarity regarding their roles and areas of responsibility. SWCTN team members often provided similar services to network members including 1:1 mentoring and brokering relationships. Through opportunities such as staff development workshops, delivery team meetings, and away days, the team have clarified their distinct yet complementary roles, which have culminated in team outputs such as our Creative KE Principles and Prototyping the Business programme.

Bridging the Creative and Commercial

During the immersion fellowship cohort, some creative collaborations struggled to understand their research and artistic projects as social or commercial business propositions. As a result, we have articulated a clearer position on business support in our funding calls. We are also developing a bespoke model of business development for micros and SMEs, emphasising a values-led and ethical approach to enterprise centered in values such as social impact, environmental sustainability, diversity and resilience.

Geography matters

Despite SWCTN's focus on building a cross-disciplinary and cross-regional network, the gravitational pull of Bristol proved challenging with many applications and collaborations emerging from Bristol's strong creative cluster. The SWCTN team responded by dedicating

Photo credit: Jon Aitken

funds and attention to strengthening local hubs and anchor relationships whilst connecting corridors of expertise between partner networks. Also, the team has identified that regional industrial expertise such as climate science, digital fabrication and aerospace, has yet to be fully engaged in the programme. As one team member explained, "we're only scratching the surface of what is possible in terms of 'HE-production-industry clusters'". We are learning how online programming is in some ways removing geographical barriers for collaboration. Individually, as partner organisations, as well as collectively, we will integrate the best of this learning into future programming.

COVID-19

Shortly after announcing our data cohort fellowship, the COVID-19 global pandemic took hold of the world, profoundly impacting people's everyday lives in terms of their livelihoods, relationships with their families and communities, physical health and mental well-being. The team responded quickly by creating and adopting a risk register, adapting the fellowship programme and Prototyping the Business workshops to a virtual format, and developing an emergency R&D fund, Lessons from Now, which makes grants up to £2500 available for network members to address and creatively respond to the present crisis.

COVID-19 lays bare challenges many of our network members are already wrestling with such as the impacts related to economic and social inequalities, isolation and connectivity, health and well-being, food security, digital spaces and identities. The experience also enabled the team to further explore knowledge exchange and creative collaboration in virtual environments, which will likely be necessary as we continue to grapple with the pandemic. At this moment in time, we are uncertain as to the full impact of COVID-19 will have on freelancers, micro businesses and SMEs, especially those in the creative and cultural sectors. However, it is clear that we have reached a critical moment where we must create a more inclusive, sustainable and resilient economy.

Inclusion in the Creative Tech Sector

The creative and technology sectors continue to struggle with inclusion. As one of our Fellows commented, "As a female, particularly a black female, I never saw myself reflected in the kind of technological world. […] So it just felt like, oh all that stuff is not for me". Other participants have described their experience in the cultural sector as an "outsider looking in". In response, SWCTN has continually prioritized diversity in funding calls, supporting women-led business, prototypes increasing access to cultural experiences for disabled audiences, research focused on racial discrimination and bias, as well as talent development of young people. However, the COVID crisis and global Black Lives Matter movements made clear the ways in which we operate within a context of structural inequality that discriminates against people along the intersecting lines of race, gender, sexuality, ability and class. COVID disproportionately affected those among us with disabilities, those who are socio-economically deprived and/or those from black or ethnic minority backgrounds within our network. In response, members of our Executive Board and Delivery Team are drafting a working paper to be shared publicly, which details a set of programme changes aimed at developing a more inclusive and anti-racist network. Based on this work, SWCTN has already employed an Inclusion Producer to work with the network during the final year. Other upcoming actions include working with an independent expert on inclusion to review SWCTN's programming and advise the team on how to improve, diversify the Executive Board and include alumni representation, provide inclusion training for the team and the broader network, ensure any events, panels, showcases that we produce or support are diverse in their representation.

Photo credit: Jon Aitken

THE FUTURE

The biggest challenges of the next decade centre on the climate crisis and sustainable economic development. With industry expertise in emerging creative technologies, climate science, advanced manufacturing and agriculture, this is a field where the South West is poised to lead. These shifts will inevitably produce challenges as well as new opportunities for innovation and enterprise.

The role of our network will be to produce the regional capacity to shape and respond to this new future through creative technologies and business development for a post-carbon world. The crisis of COVID-19 demonstrated the precariousness, adaptability and resilience of the creative industries in the face of such threats. The creative qualities of adaptability and resilience will be key to building sustainable futures.

Drawing on our unique partnership integrating creative producing, knowledge exchange and business development, we have the capacity within our network to develop new languages of value and growth to support creative and cultural business development and increase resilience. The alumni network of researchers, New Talent Fellows, and start-ups create the seedbed for the future capacity that will enable us to begin prototyping inclusive and sustainable economies.

Specifically, we will explore the following research questions:

- What is the role of creative technology in helping to build a post carbon economy?

- How can creative technologies support sustainability in the most inclusive way possible in order that their impacts are widely shared by their beneficiaries?

- What kinds of creative business models, funding mechanisms, innovation spaces development support, production and distribution methods will be required for the creative sector to thrive in a post carbon economy?

- How do we assemble creative networks around 'matters of concern' across regions where the 'cluster' is not an appropriate framework for economic development ?

- What are different measures of Creative Industry sector health and impact beyond economic productivity such as resilience, well-being, inclusion?

- How can we support and evidence progress towards making these impacts using appropriate measures for the Creative Industries?

With this broad remit we will work across different areas where creative industry practices fruitfully intersect with other industrial sectors to develop insights, talent, products and services for the urgent needs of a future sustainable and inclusive economy. Drawing on the expertise of our regional network, we will critically explore issues such as the role of mediation and the ecological debate in a post truth era, the ethics of AI, and the development of circular economies through creative methodologies such as design fiction and speculation. We will also experiment and create with diverse technologies such as synthetic biology and new materials, new AR/VR and photogrammetry visioning systems, 5G & IoT, and data.

Building on the success of SWCTN, the programme will consist of fellowships, commissioned prototypes, skills development and training opportunities, and business development support. We will also respond to challenges that emerged in SWCTN through more strategic approaches to increasing inclusion in creative innovation by addressing the impact of social and cultural capital differences, cultivating a language of diverse economies, and exploring alternative business models, structures and investment frameworks that ensure triple bottom line outcomes.

The Network will support both regional and localised programming by developing methodologies for devolving investment and responsibility across its different partner city regions in order to better leverage area industry strengths and maximize local impact.

Our collaboration has identified a unique capacity across the partnership that creates innovation across sectors and increases regional resilience through knowledge exchange, creative production and business development. By facilitating connections, brokering relationships and holding spaces for researchers and practitioners to share skills and collaborate, we believe the South West will be a leader in co-creating more inclusive and sustainable futures.

SOUTH WEST CREATIVE TECHNOLOGY NETWORK:

Co-Creating Ethical, Inclusive and Sustainable Futures

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