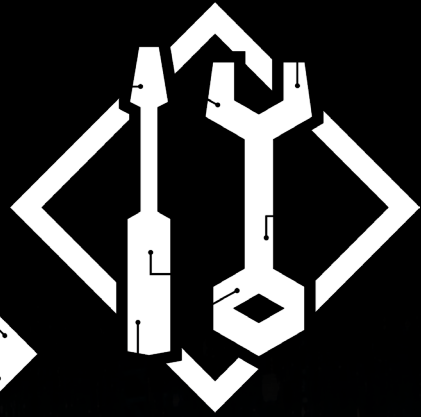




# Fixing the Future



# FIXING THE FUTURE

ANNUAL REPORT: 2024



# Director Statement

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Welcome to our first annual Report for the Engineering and Physical Sciences research Council funded 'Fixing the Future' project. We are looking at the complex challenges of how to transcend towards more sustainable Internet of Things devices (e.g. smart watches, phones, speakers). It has been an exciting first year for us since we started officially on 1st October 2022. This annual report captures a snapshot of the range of research activities our team has been up to from Oct 2022 -late 2023, across the Universities of Edinburgh, Nottingham, Napier, and Lancaster.

We are beginning to see a range of academic outputs coming out of our research, across computing, law, and design venues. This includes papers in Computer Law and Security Review, Ubicomp, Design Research Society, NORDICHI, CHI, PLATE. There are many more interdisciplinary papers in the pipeline too.

We have been talking about our research to many different communities including the British and Irish Law and Technology Association, Sustainable AI conference, Scottish Law and Innovation Network, and the International Association of Societies of Design Research Congress, to name a few. The team has been engaging with repair café communities and local events around the country too such as at The Restart Project's FixFest 2023.

There has been extensive public engagement too, from running repair experiences at festivals such as at ESRC Festival of Science 2023, The National Festival of Making, BlueDot Festival or talking about legal aspects of the right to repair for IoT at library spaces in Scotland.

As a team, we have held a launch event in September 2022, with quarterly all hands meetings at Lancaster, Nottingham, Edinburgh since. Our team has been growing too, with 14 early career intern research assistants and postdoctoral researchers joining us in our programme of work.

We are also generating a range of exciting new tools to help translate our research

beyond academic audiences. For example, we have a new Right to Repair board game to playfully learn about the challenges of the circular economy and repair for IoT; the novel Repair Shop 2049 pop-up repair experiences for citizens to try their hand at soldering smart badges and fixing broken IoT devices; and a deck of Right to Repair cards to help manufacturers learn about the range of laws targeting building of more sustainable internet of things.

There is much more planned from the Fixing the Future project team in the coming year. This includes Edu-Kits for repair, more public engagement workshops including with our exciting pop-up touring caravan, policy briefings to shape governance in this area, and more academic papers.



**Project Lead**

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University of Edinburgh.  
Contact: [Lachlan.urquhart@ed.ac.uk](mailto:Lachlan.urquhart@ed.ac.uk)

## Project Overview

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**Fixing the Future** is an interdisciplinary project investigating how the lack of repairability and longevity in the consumer Internet of Things (IoT) will adversely impact equity, inclusion, and sustainability in the digital economy.

'Fixing the Future: The Right to Repair and Equal-IoT' is a 2-year, £1.25 million research project funded by the [UK Engineering and Physical Sciences Research Council \(EPSRC\)](#).

IoT products are becoming the default, with wireless connectivity and automation bundled into mundane household items like TVs, energy meters, toys and phones. Whilst the IoT can still be a consumer choice now, its growth means citizens may see it imposed on them in the future.

Using theory and methodologies from Human-Computer Interaction (HCI), Design and Law, the project aims to anticipate future impacts of a digital divide caused by redundant IoT devices, particularly for lower income households. It will envision how to build more equitable IoT devices and avoid future inequalities posed by the poor long-term cybersecurity, exploitative uses of data and lacking environmental sustainability that define the current IoT.

Additionally, some citizens can afford to replace broken devices but others cannot and require support to repair them or face the impacts. The project will examine how equality issues from IoT arise across society, generations and geographies, and investigate how to create more repairable devices that respect citizens legal rights, provide long-term cybersecurity, minimise eWaste, and are supported by local community repairability networks.

The project draws together expertise in human computer interaction, design research, technology law, ethics, and digital humanities to investigate how to build more equitable IoT devices that enable inclusive participation in the digital economy. This will be achieved through an exciting programme of work, which includes:



- Mapping the changing legal and ethical landscape, particularly around shifting current IoT design practices and examining the role of the right to repair in supporting citizen needs.
- Exploring how to create the IoT Repair Shop installation with the Making Rooms Blackburn to understand issues faced by local citizens and to understand practical challenges of repairing IoT devices in the community.
- Creating blueprint prototypes and user experiences that demonstrate how to design for repairability, to support IoT manufacturers to change current practices;
- Designing a toolkit that will practically support development of more equitable futures when living with IoT by targeting needs of different citizen, government, and industry stakeholders.

This includes asking questions such as:

What is the current and emerging legal landscape around repair and prolonging the lifespan of consumer Internet of Things Devices? How do manufacturer practices need to change to shift away from current models of planned obsolescence (which further growth of eWaste)? What role can community repair play in supporting emergence of sustainable IoT? How can we effectively translate insights from our work for different stakeholder groups?

Our Project Website: <https://ftf.wp.horizon.ac.uk/about/>



**LEGAL &  
ETHICAL  
RESEARCH  
WORK  
STREAM**









# Key Insights

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- **Law as a key driver of change:** Laws are a key factor in changing the landscape towards a right to repair and shifting what is required of Internet of Things (IoT) manufacturers. There are differences in approaches taken within legal frameworks to usher in this change by establishing different rights, responsibilities around design of IoT and associated services. However, this is not in a vacuum. Community repair & social advocacy is arising in the face of slow pace of policy/law change by finding alternative routes to support repair and longevity of consumer electronics too e.g. repair cafés.
- **Targeting Different Stages of the IoT Lifecycle:** Broadly we observe rules targeting pre-sale components shaping the design and manufacturing stages of products through to dealing with post sale and end of life with repair, recycling, and requiring access to spare parts. This impacts different actors across the IOT supply chain too, from manufacturers to distributors, consumers and recycling and repair communities. This allows us to create different layers of responses, potential changes or fixes, which can impact different critical points in the life cycle, and associated stakeholders, in different ways. This pushes us to consider where best to target regulatory or design efforts in the lifecycle and supply chain. It encourages ensuring flexibility of policy and legal responses to targeting these different stages, whilst appreciating the bigger picture of the wider supply chain, where there may be different dependencies or limitations on what is feasible.
- **Motivating Change in Industry:** Regulation to facilitate repair and improve longevity of IoT devices is focused on design practices and establishing appropriate requirements. Whilst new laws establish what best practice requires, there is need to consider how to motivate change in current design practices on the ground. Moving away from planned obsolescence towards longevity is more difficult due to an absence of incentives to shift away from current business models. Legal and ethical analysis should not only be about what is possible in design or what law requires, but account for what business realities will allow. Our work shows product designers believe they could design more 'sustainable products' but are often not asked to do so due to time/cost/competition pressures.
- **Opportunities for Repair:** Laws are shifting to mandate even greater standardisation in the design of IoT and wider electronic products e.g. recent rules around harmonised use of USB-C ports. This could have important implications for what is possible in terms of repair. With companies building IoT devices in more homogenous ways, it requires greater questioning of what common issues could arise and go wrong with devices, and what needs to be refined in the



design to mitigate these. Thus, there is need to understand the links between what law is requiring of design, and how design practice responds, and if the design changes are achieving the desired outcome (e.g in Europe of creating more sustainable products).

- **What does repair entail?** There is a large diversity of legal frameworks shaping routes to prolonging life and repair of devices. This includes ecodesign laws, cybersecurity, data protection and consumer laws, to mention a few. Repair is central to many of these discussions but is a comparatively minor part of the larger legal landscape around design of products, where wider rules on environmental sustainability, regulation of chemicals, energy and materials regulation is far more prevalent. There is a transition occurring in thought between whether the goal should be to make products “repairable” or to advance to a new longevity, upcycling or pure circularity model. Whilst what this looks like for the EU/UK/US differs significantly, as mentioned below.
- **Impact of Geopolitical Landscape:** There is a different socio-political climate in the United States and European Union which shapes the emergence of the Right to Repair movement. In the EU, there is more focus on addressing environmental impacts around redundant devices and moving towards more collective approaches to mitigate these. In the US, there is more emphasis on intellectual property protection and a more individualistic approach to protecting interests. Further, China’s impact on Europe’s eWaste (Climate Plan) has shown the external geopolitical influences of other markets on sustainability policies in other parts of the world. This is something that will have escalating effects with time, particularly around global supply chains for electronics.



# Outputs

## COMPLETED

### Paper 1

Boniface, C. Urquhart, L. and Terras, M. "Towards a Right to Repair for the Internet of Things: A Review of Legal and Policy Aspects". Computer Law and Security Review. 2024 Published Open Access. Link to [<https://www.sciencedirect.com/science/article/pii/>]

### Book 1

"Governing IoT Life Cycles" - legal aspects of governing lifecycles of IoT paper –Boniface, Urquhart, Terras, and Lechelt.

### Paper 3

S Lechelt, K Gorkovenko, and C. Speed, "On Disused Connected Devices: Understanding Disuse, 'Holding On' and Barriers to Circularity" – Forthcoming.



## ACTIVITIES COMPLETED

- Mapping of legal analysis on landscape around repair – will be transformed into a 'current situation' briefing document in 2024. This can be found in Paper 1 and Book 1.
- Literature review of conceptual aspects of the right to repair with law and ethics. In the process of transforming into a form which can be presented on the website.
- Interview studies with businesses and manufacturers – 10 done – will undergo data analysis during the end of the year, and prepare any subsequent outputs in early 2024.
- Workshops in rural and urban libraries around Scotland – already one run in Dec 23, further in 2024.



## WORK IN PROGRESS / NEW

### Paper 4

Conceptions of repair and what they mean.

### Paper 5

Interviews with manufacturers data.

### Paper 6

Workshop with citizens data.

### Paper 7

Fixing the Future cards Paper.



### ACTIVITIES PLANNED / IN PROGRESS (INCLUDING TIMELINE)

- Development of Fixing the Future Ideation Cards – for release in early 2024, following period of evaluation conducted with c30 participants in Jan 2024. there will be an academic paper presenting insights from this work.
- Running workshops at law and design academic conferences to share our work.
- Running workshops with manufacturers using the Right to Repair cards
- Archiving of Repair manuals URLs work – being led by MT with Ash Charlton
- Ash looking at archiving of digital user manuals material to British Library – ensure they are retained long term – e.g. if companies go bust.
- Other topics to consider: interoperability in IoT; role of online platforms in supporting repair and potential for harm (e.g. in disseminating harmful products or hosting videos that would lead to danger). New rules in DSA around content liability; or in GPSR around takedown of unsafe products/ datascraping. How infrastructures develop underpinning IoT



# Dissemination / Engagement

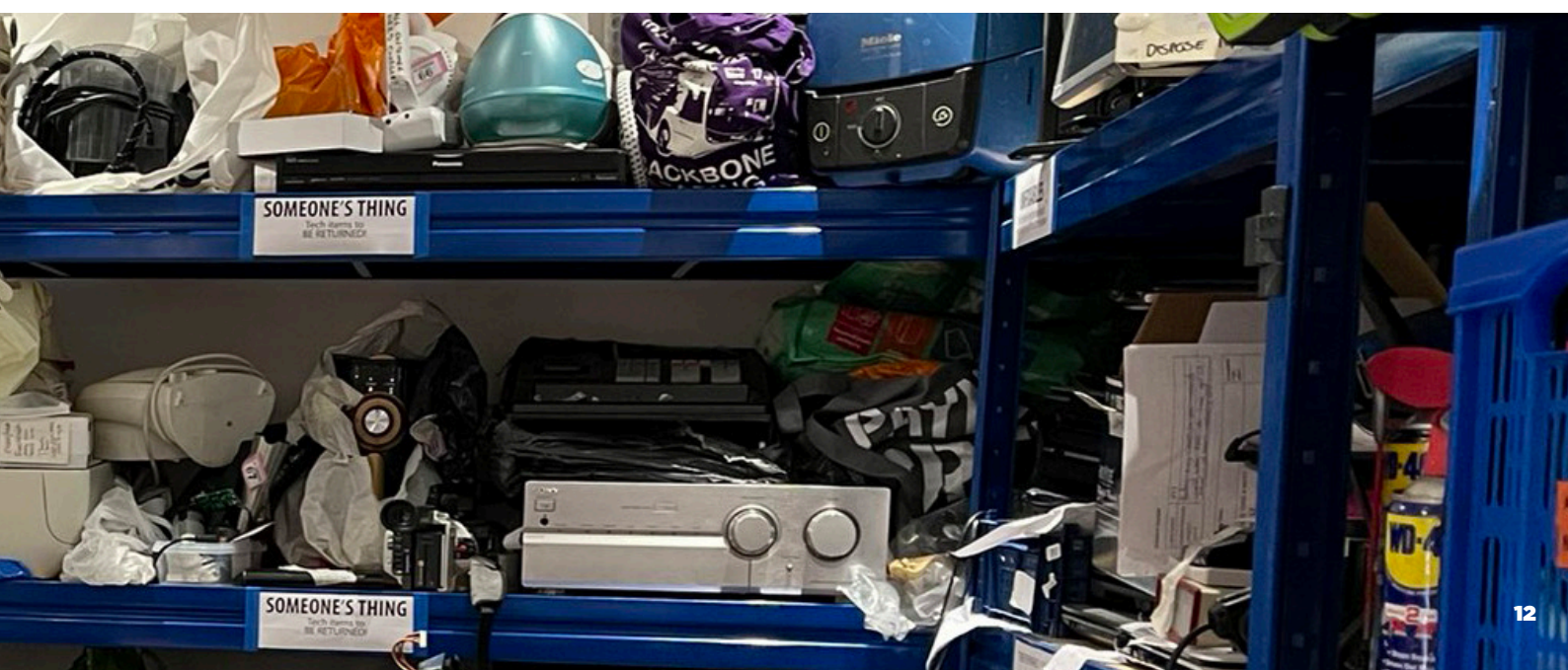
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- L Urquhart, D McAuley and L Edwards, 'Ron's Gone Wrong and So Will Other Robots', Gikii 2022, Reykjavik. [July 2022]
- S Lechelt invited poster presentation for UoE Provost's visit to the School of Informatics, Oct 2022.
- L Urquhart. Talk on Interface of Design and Law at Design Informatics Seminar Series, Oct 2022.
- L Urquhart and S Lechelt. Circular Economy Festival (Institute of Waste Management) 29 Nov 2022.
- L Urquhart. How do you Solve a Problem Like Alexa? IRISS, Salzburg, 23-25 Feb 2023 - Won top 10 paper for conference. [blog link - <https://blogs.ed.ac.uk/radlab/2023/03/03/how-do-you-solve-a-problem-like-alexa/> ]
- L Urquhart and C Boniface Fixing the Future: Right to Repair and Consumer Internet of Things SCOTLIN, Aberdeen, 27-28 March 2023 - [blog link <https://blogs.ed.ac.uk/radlab/2023/04/11/fixing-the-future-presentation-at-scotlin-conference/> ]
- L Urquhart and C Boniface. Legal Aspects of the Right to Repair for Consumer Internet of Things BILETA, Amsterdam, 13-14 April 2023.
- L Urquhart and C Boniface. Towards a More Sustainable Internet of Things? Exploring the Role of the Right to Repair. Sustainable AI, Bonn, 1 June 2023 – [blog link <https://blogs.ed.ac.uk/radlab/2023/08/29/presentation-at-sustainable-ai-conference/>]





- L Urquhart– hosted talk from Rob Collins, Umea University “Repairing Interactions: everything is broken and that is Okay” 1 Jun 2023 [blog link <https://blogs.ed.ac.uk/radlab/2023/05/26/rad-lab-external-talk/> ]
- L Urquhart. Charing talk from IASH Fellow Dr Dipali Mathur on Rematerialising Digital Technology, Nov 23.
- L Urquhart. Presentation on project at UoE Law School Research Celebration Day, Jun 2023,
- L Urquhart. DCODE Summer Doctoral Training School at Umea University (part of Hackathon, training for PhD students etc). May 2023.
- A Rezk, N Dubey, and C Boniface. Research Byte on Fixing the Future Ideation Cards, Design Informatics 4 Oct 2023.
- L Urquhart. Talk for Ethics, AI series “No Harm Done” run between Design Informatics and Nile Design Consultancy, 4 Oct 2023, Urquhart (Blog Link) [ <https://blogs.ed.ac.uk/radlab/2023/10/05/no-harm-done-ai-ethics-and-design-talk/> ]
- L Urquhart Talk for University of New South Wales on Clever Computing through Accountable Design. 1st Feb 2024







**DESIGN  
RESEARCH  
WORK  
STREAM**



Workshops with industry, policy and communities found...

- **The Difficulties of Repair:** Participants discussed how devices' warranties often become void if repair work is attempted by anybody other than the original manufacturer. This annulment can often be triggered even through initial diagnostics to ascertain the root of the problem. Third party repairers were therefore determined to be risk – and therefore repair – averse due to the fears of evoking liability and negating customer warranties. Interestingly, there was also growing concern that should devices become more easily repairable, they could consequently become less reliable and durable due to changes or even deterioration in their physical and digital specifications.
- **Changing Attitudes:** Participants felt changing environmental attitudes are likely the result of increased public awareness surrounding the global challenges that modern societies currently face. The prospect of the broadening EU their R2R legislation to include IoT devices was also raised and could lead to reduced e-waste. It was also posited that such a move could also force the hand of the UK government to follow suit and make similar amendments.
- **Opportunities for Education:** The participants felt there is potential to improve repair knowledge and education particularly across UK STEM subject curriculums (Science, Technology, Engineering and Mathematics).
- **Distrust in the System:** Participants displayed an evident 'distrust in the system' regards both IoT manufacturers' ongoing unsustainable practices, and the lack of local IoT repair infrastructures. They feared the wider introduction of restrictive software by manufacturers to artificially impinge upon – or 'throttle' – their devices' capabilities and consequently limit their hardware and battery lifespan over time. There was also disappointment regards poor local e-waste collection, as well as anger towards the nefarious practices of privileged Global North nations who offset e-waste figures by shipping it to Global South countries rather than improving repair practices.
- **Friction:** describes the barriers faced when trying to dispose of their e-waste in a sustainably appropriate manner. There is a collective 'want to do the right thing' but it was often unclear what this positive move could or should be and how they might initiate such a shift. They argued improving public awareness would better equip UK communities with basic knowledge for understanding both their repair rights and how to discern if an IoT device is likely to be repairable or requires further investigation from expert repairers.

- **Local Solutions:** Collecting e-waste from residents and/or refuse centres for refurbishment and materials and components recovery was posited. Renewed devices might be sold in charity shops, while harvested parts could be dispersed for reuse or recycling. This network could run in conjunction with existing local council and charity networks.
- Value in co-creating repair futures through workshops with industry, policy and community.
- Intersection of repair with wider sustainability and circularity agendas across community ecosystems
- Conflicts between local free repair services and commercial repair services
- Free services e.g. repair cafés are legal and health and safety minefield
- LED badge soldering activity – this has given insights not just about right to repair but capability to repair and need for educational component e.g. around soldering, maintenance and materials recovery.
- Helped reflect on what is accessibility and capacity of repair and what is needed practically to improve and widen R2R.
- Teach how to fix – fix vs fixable – different forms of empowerment.



## ACTIVITIES COMPLETED

- The Repair Shop 2049 LED Badge Soldering Kit/experience







## RESEARCH PLANNED / IN PROGRESS (INCLUDING TIMELINE)

- Repair Pop-up Caravan Experience (in process of completion).
- Workshops with industry, policy, community stakeholders (Nov/Dec 2023)
- Education angle alongside edu-kit development – not enough capacity to repair in communities – need to improve awareness, understanding and skillset. This will become a White Paper on Skills.
- Engagement with professional repairers – interest in looking at phone repair, hacks and informal economies around this e.g., illicit repair
- Engagement with gaming communities – games consoles and repair culture around old consoles as these are original IoT (software/hardware combos) and products-services with community and manufacturer driven support e.g. historic examples in law of Nintendo case. Understanding lack of community around IoT – why people care about games vs smartphone – is it about function/efficiency with IoT vs experience with gaming? This will link with WP 4 work on meaningful IoT.
- Complete caravan R2R experience
- Impact and Engagement events – bringing together artefacts (edu-kit, interactive game, caravan etc) (Spring/Summer 2024)





# Outputs

## COMPLETED

### Paper 1

Stead, M., & Coulton, P. (2022). A More-than-Human Right-to-Repair. In DRS2022 Bilbao: Design Research Society Conference 2022 Article 29 Design Research Society. <https://doi.org/10.21606/drs.2022.718>

### Paper 3

Stead, M., Pilling, M., Macpherson-Pope, T., & Coulton, P. (2023). The Repair Shop 2049: Co-Designing Sustainable and Equitable Transitions for Smart Device Repair with and for Local Communities. In 5th Product Lifetimes And The Environment Conference Proceedings: PLATE 2023.

### Paper 5

Pilling, M., Stead, M. & Coulton, P. (2023). Fixing the Future: Cultivating a Capacity to Repair IoT Devices through Experiential Futures. IASDR 2023: International Association of Societies of Design Research Congress: Life-Changing Design.

### Paper 2

Stead, M., & Coulton, P. (2022). Sustainable Technological Futures: Moving beyond a One-World-World perspective. In NordiCHI 2022: Nordic Human-Computer Interaction Conference Article 97 ACM. <https://doi.org/10.1145/3546155.3547283>

### Paper 4

Stead, M. (2023). Sustainable Transitions for HCI: Technologies, Fictions and Futures. Paper presented at 2023 ACM CHI Conference on Human Factors in Computing Systems, Hamburg, Hamburg, Germany.

## WORK IN PROGRESS / NEW

### Article 1

Stead, M., & Coulton, P. (2022). 'Liberate the tractors': the right to repair movement that's regaining control of our devices, 2022, Web publication/site, The Conversation. <https://theconversation.com/liberate-the-tractors-the-right-to-repair-movement-thats-regaining-control-of-our-devices-188954>

### Policy Evidence

Stead, M., Coulton, P., Lindley, J., and Others. (2022). "Connected tech: smart or sinister?", Response to DCMS Call for Evidence [June 2022]. See also D McAuley, L Urquhart and Others response to the same call [here]

### Artefact

Stead, M., Pilling, M., & Macpherson-Pope, T. (2023). The Repair Shop 2049 LED Badge Soldering Kit.

### Article 2

Stead, M., Macpherson-Pope, T., & Coulton, P. (2022). The Repair Shop 2049: Mending Things and Mobilising the Solarpunk Aesthetic. Branch (EIT Climate KIC, Mozilla Foundation, Climate Action Tech, and the Green Web Foundation), (4). <https://branch.climateaction.tech/issues/issue-4/the-repair-shop-2049-mending-things-and-mobilising-the-solarpunk-aesthetic/rg/10.1145/3546155.354728>

- Finishing off caravan Repair experience from WP2
- Interactive Game from WP2
- Interactive Repair Edu-Kit from WP2 (expanding original soldering kit)
- Repair Principles from WP2
- In planning for other work to completed with new RA
- Papers in development





# Dissemination / Engagement

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- Designing Sustainable Technological Futures: The Repair Shop 2049 & Other Adventures. Invited talk at UoE Design Informatics Seminar Series, Oct 2022 – Stead
- The Repair Shop 2049: Building Local Repair Communities to Make Smart Tech Smarter. Invited talk at AHRC/Future Observatory/Design Museum Adapting Together Symposium, Nov 2022 – Stead
- How Smart Are Our Smart Devices If We Cannot Repair and Reuse Them? The Repair Shop 2049 at ESRC Festival of Social Science, Nov 2022 – Stead, Coulton, Macpherson-Pope & Pilling.
- Designing A More Sustainable Internet of Things. Invited talk at Aarhus University, Denmark, Feb 2023 – Stead
- The Repair Shop 2049 (LED Badge Soldering + engagement activities) at The National Festival of Making, July 2023, Stead, Macpherson-Pope & Pilling. c. 100 participants.
- The Repair Shop 2049 (LED Badge Soldering + engagement activities), BlueDot Festival, July 2023, <https://www.lancaster.ac.uk/arts-and-social-sciences/news/fixing-the-future-for-smart-devices-the-repair-shop-2049-team-at-bluedot> + <https://www.discoverthebluedot.com/profile/the-repair-shop/>, Stead, Owen, Macpherson-Pope & Pilling. c. 300 participants.



# **HUMAN COMPUTER INTERACTION WORK STREAM**



# Key Insights

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- Understanding community repair approaches within different repair cafés and insights into IoT specific challenges.
  - Repair café structure and processes means time constraints cause filtering of IoT items due to general assumptions (e.g. difficult to obtain parts, overly complex to repair due to microelectronics and software elements).
- Insights into the stages of repair (occasioning, diagnosing, fixing and testing) specific IoT challenges exist at each of these stages.
  - Occasioning – Impact on value models when deciding whether to undertake a repair (e.g. to preserve personal data) complications with identification of the point of failure and removing items from an ecosystem to take to a repair centre.
  - Diagnosing – multifaceted nature of IoT means diagnosis may require and incorporate multiple touch points (e.g. apps), adds complication and time to diagnose.
  - Fixing – microelectronics, lack of parts, cheap parts used and poor construction leads to difficulty when attempting hardware fixes.
  - Testing – Lack of access to wider ecosystem when fixing out of context, at repair cafés
- Insights into stakeholders of repair:
  - Repairers – applying general assumptions when taking on repairs, concerns around security risks and impacts of official support (or lack thereof).
  - Bringers - Expectation that newer devices are less repairable and have lower life expectancy. Value models around personal data and cheap to replace.
  - Designers - service models as an alternative option so device ownership remains with producer. Concerns over product types and tampering prevention (e.g. for energy meters); perceptions of user skills and motivations as not aligned to repair. Motivations for circularity beyond repair with products being returned and recycled back into the production process.
- Insights into understanding motivations of users to engage with repair - key drivers in repair decision making – cost, availability, age of device; future of repair and expectations.





### COMPLETED RESEARCH ACTIVITIES

- Ethnography Study of 8 repair cafes with users, repairers, and manufacturers, supported by interviews with repairers (12) and bringers (10).
- Design of 8 scenarios and facilitation of 20 individual participatory sessions with participants with no active investment in repair (e.g., not bringers at repair cafes, just users of technology).
- HCI and wider (circular economy, IoT, sustainability) Literature Review looking at the process, barriers and contexts of repair.
- Interviews with IoT designers on IoT design and manufacture – considering repair – ways to increase sensitivity to repair – design of next product so repair is done.



### PLANNED / ONGOING RESEARCH ACTIVITIES (INCLUDING TIMELINE)

- Development of Prototype for understanding how to build for repair and how this fits in with triaging at repair spaces e.g. IoT gets turned away – software is a problem or assume hardware is not modular or fixable. Law can play a role here too in decisions to repair (links to WP1?)
- Developing and evaluating Board Game. Game idea development with support from Coulton (collaborative game around repair and maintenance of devices) - Kinga Lewandowska.
- Development of scenarios to probe users around software aspects of smart device repair. Design of participatory sessions to collect user response to the designed scenarios – Tanvi Vats.



# Outputs

## COMPLETED

### Paper 1

Paper 1 – “The impact a fail-fast approach on smart device repair at repair cafés”

Castle-Green, Sailaja.  
(Abstract Accepted, Paper Under Review).

### Paper 2

“Ubifix”: Tackling Repairability Challenges in Smart Devices, ACM Ubicomp '23

Sailaja, Castle-Green, Lindley, Coulton, Stead, Urquhart, Darzentas.

[Link <https://dl.acm.org/doi/pdf/10.1145/3594739.3605113> ]

### Paper 1

Planned Designing Interactive Systems Paper on the bringer and repairer perspectives on device repair (focus on challenges), T Castle-Green, and N Sailaja.



## Dissemination / Engagement

- Panelist and workshop session chair for “Connecting repair to the community”, FixFest 2023, Cardiff, Oct 2023. Sailaja.
- Chaired the Smart Device Table at Repair Conference 2023, University of Creative Arts, Surrey. Sailaja.
- Horizon Impact Brochure: <https://t.co/mJBP1vra>. Sailaja.
- Talk at Mixed Reality Laboratory “Fixing the Future: Right to Repair and Equal IoT”, T Castle Green and N Sailaja.
- Talk at the Horizon Digital Economy Research Hub, “Fixing the Future: Right to Repair and Equal IoT”, T Castle Green.
- Talk at the Horizon Digital Economy Research, “Research around Repair”, N Sailaja.
- Study International Press. Sailaja [here <https://www.studyinternational.com/news/the-university-of-nottingham-inside-the-epicentre-of-computer-science-innovation/> ]

## WORK IN PROGRESS / NEW

### Paper 2

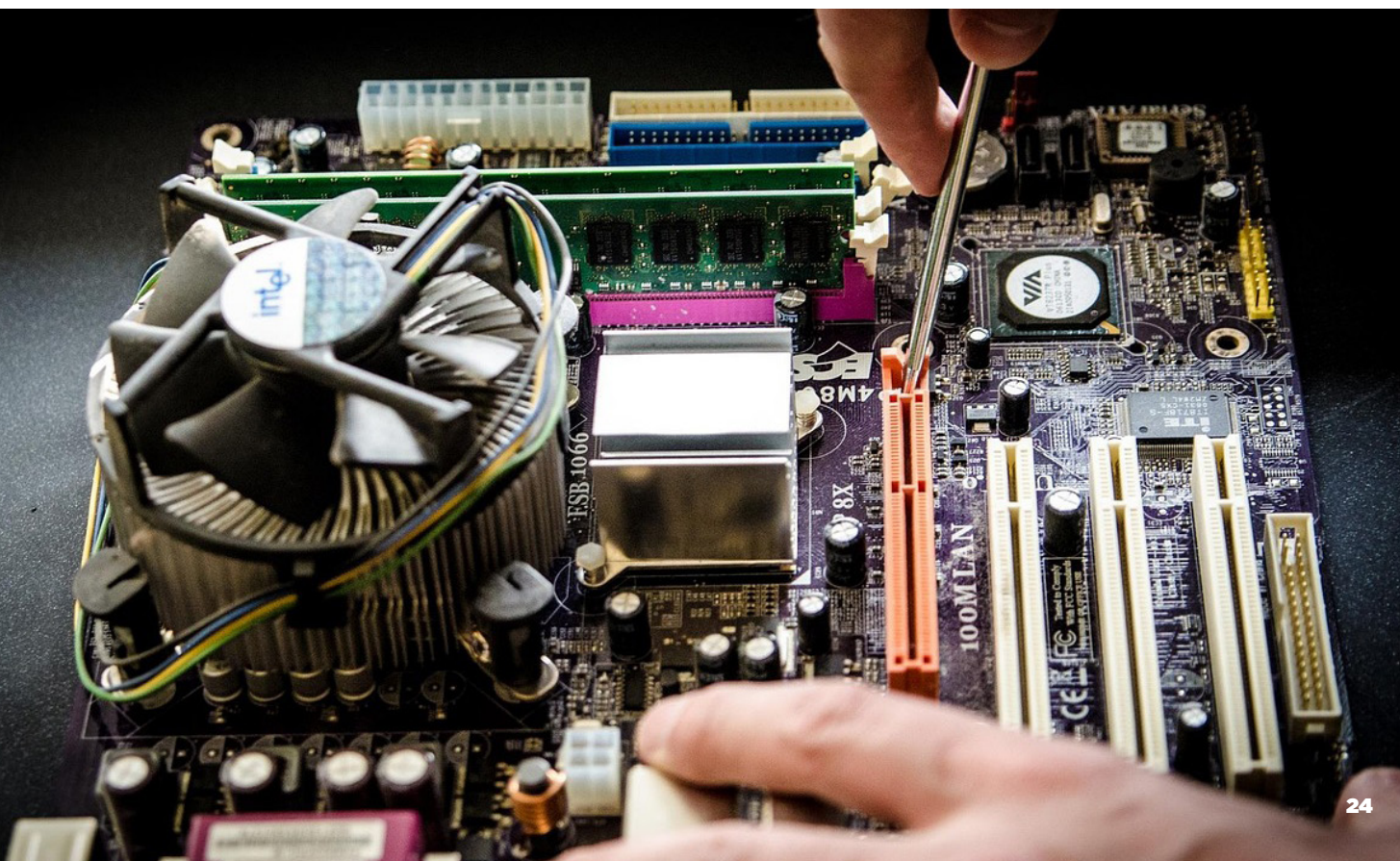
Planned CSCW Paper that reports bringer, repairer and manufacturer perspectives: a dialogue between the three through the research findings, to show how these three parties should collaborate to enable repairability of IoT. T Castle-Green, and N Sailaja.

### Paper 3

Planned HCI International Paper reporting the user challenges, processes and expectations around repair of IoT devices. D Kilic and N Sailaja.

### Paper 4

Planned CHI Late Breaking Work reporting the literature around users and repair and the research design employed to probe user challenges, processes and expectations around IoT device repair.







**CROSS  
CUTTING  
TOOLKIT  
DEVELOPMENT  
WORK STREAM**



## COMPLETED RESEARCH ACTIVITIES

- Obtained additional funding for Frankie Graham for 3 months (summer 2023) with ENU starter grant.
- Literature Review on motivations for repair and personal attaching objects to things

## PLANNED / ONGOING RESEARCH ACTIVITIES (INCLUDING TIMELINE)

- Developing repository for capturing knowledge from project - initially collating into a Miro board (September 2023 onwards)
- Collating insights from across WPs and developing toolkit. This will involve considering what stakeholders should be targeted with different insights.
- Comic books of repair scenarios for disseminating findings to varied stakeholders. Capture findings from across work packages with scope to translate comics into animated videos.
- Design Fiction scenarios and speculative concepts that investigate motivations for repair among different types of repairers. A series of concepts that capture the socio-economic aspects of IoT repair with focus on inequality.
- Concept for a digital database of broken objects. This includes concepts for digital scanning of broken objects as a way to preserve and attach memories, focusing on the emotional aspects of repair.



## Outputs

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### WORK IN PROGRESS / PLANNED ...

Paper collating findings from across WPs into a toolkit for IoT repair

Paper or Pictorial on speculative designs/ comic books for types of repair and inequality (plan for DIS 2025/ NordiCHI )



## Dissemination / Engagement

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- Blog post on attending FixFest 2023, Cardiff, Primlani <https://ftf.wp.horizon.ac.uk/2023/10/02/fixfest-uk-2023-cardiff/>





## Staffing

The original team of investigators remains in place, namely:

UoE / WP1 - Lachlan Urquhart (PI and Edinburgh Lead), Melissa Terras, Susan Lechelt, Ewa Luger.

LU WP2 - Mike Stead (Lancaster Lead), Paul Coulton, Joe Lindley.

ENU WP3 - Dimitrios Darzentas (Napier Lead)

UoN WP4 - Neelima Sailaja (Nottingham Lead) and Derek McAuley.

Our project has grown to include numerous early career researchers. Since beginning in Sept 2022, we have hired and appointed 6 Research Fellows:

- UoE - Christopher Boniface.
- UoN - Teresa Castle-Green and Damla Kilic.
- LU - Violet Owen (Summer 2023-Present), New RA (Dec 2023/Jan 2024), and Matt Pilling (Autumn 2022-Summer 2023 – now a Lecturer in Architecture).
- ENU - Namrata Primlani.

We also have appointed 7 research assistant interns/working on shorter term sub-projects:

- Fixing the Future Ideation Cards, (Design) UoE - Nidhi Dubey and Anna Rezk.
- Fixing the Future Ideation Cards, (Evaluation) UoE – Haili Wu
- Archiving Instruction Manuals, UoE – Ashleigh Charlton
- Fixing the Future Board Game, UoN - Kinga Lewandowska
- Meaning of Objects, ENU – Kirsten Graham
- Summer Intern. UoE - Zehuan Wang
- LU not recruiting interns as limited PhDs in dept now and hard to attract new staff to short-term, low pay Grade 5 contracts. Consolidating interns into an 8 month RA post.
- Study on software aspects of IoT and repair - Tanvi Vats and Fabiana Anselmo



## Press Release

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Numerous Press launches at each University and university pages too e.g.

- <https://www.nottingham.ac.uk/news/funding-for-project-to-fix-the-sustainable-future-of-smart-devices>
- <https://www.law.ed.ac.uk/research/research-projects/fixing-the-future#:~:text=%27Fixing%20the%20Future%27%20is%20an,sustainability%20in%20the%20digital%20economy>
- <https://imagination.lancaster.ac.uk/update/fixing-the-future/>
- <https://www.horizon.ac.uk/project/the-right-to-repair-and-equal-iot/>
- <https://www.law.ed.ac.uk/news-events/news/ps12m-project-fixing-future-right-repair-and-equal-iot-funded-uk-epsrc>



## Management

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We have held quarterly in person All Hands Meetings including:

- Launch Event in Sept 22 at UoE.
- UoN in Dec 22.
- LU in May 23.
- UoE in Sept 23.
- UoN in Dec 23.
- LU in April/May 24

In addition, we have monthly all hands calls online, and weekly WP meetings. Across the project, we have had periodic calls/meetings with project partners for input during the first year from Which?, NCC Group, The Making Rooms, Rachel Jacobs, BBC R+D, and Canadian Government. We have engagement with new contacts too e.g. Restart Project, Repair.Ed, Lend and Mend Hub.

# Acknowledgement

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