

Lessons from equality, diversity, and inclusion: How might interdisciplinary research culture evolve and become equitable?



REPORT

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X-Net Workshop held 30 January 2024, report finalised 24 September 2024

Executive Summary

Aims: Our primary objective was to gather effective equality, diversity and inclusion (EDI) interventions that could empower research organisations to overcome research culture challenges currently hindering interdisciplinary research and careers. Secondary aims were to identify: (i) EDI issues impacting interdisciplinary careers, and (ii) strategies that propagate a collaborative rather than competitive scientific culture, and so provide greater and sustainable support for interdisciplinary researchers.

Participants were drawn from funders, experts on interdisciplinary research practice and academics leading EDI initiatives and research culture change in UK universities.

Findings: Diverse perspectives made for a constructive and wide-ranging discussion with all parties actively acknowledging their roles and responsibilities in leading research culture change. Participants highlighted positive actions that have proved successful in supporting individuals and encouraging inclusion at all levels of the research system. However, major challenges remain. To meet these, research organisations will need to actively foster opportunities for positive change. A sustained focus on collaboration is needed to accelerate discovery and safeguard future UK research and innovation. If all individuals were inspired and enabled to improve their collaborative capability even marginally, then the overall impact would be substantial.

Discussions took place in a 2-hour online round-table meeting, mediated by an independent facilitator and framed around three key questions. Three themes emerged (below), together with action points subsequently reformulated as recommendations by [X-NET](#) for higher education institutions and research institutes on how to accelerate research culture change towards an inclusive collaborative environment that also catalyses interdisciplinary research (**Appendix 1**). Full workshop discussion around each of the below themes and contexts, together with useful initiatives and resources mentioned by participants, are provided in **Appendix 2**.

Theme 1. For interdisciplinary research careers and collaborative research, what additional challenges for EDI need to be considered?

- **We need to talk about ‘Risk’:** Individuals face substantial personal risks (e.g. extended training time and financial, emotional and professional insecurity) when pursuing an interdisciplinary career. These risks are exacerbated for those who have already been marginalised.
- **We need to initiate conversations that may feel ‘difficult’:** Minoritised groups and interdisciplinary researchers can unhelpfully be characterised as being troublesome and ‘difficult’ when they expose underlying problems that others may not perceive and/or wish to address.
- **We need to break the academic ‘mould’:** The archetype of academic leadership needs to be updated and diversified, otherwise ambition and scientific creativity will continue to be stymied.
- **We need to question the assumptions we make with language:** Wording of recruitment, promotion and funding criteria signals how welcoming and inclusive organisations are, and whether they genuinely value diverse experiences.
- **We need to acknowledge differences in how research questions can be addressed:** There are diverse views on what makes a question valid, and how it may be solved. These should be acknowledged, respected and understood.

Theme 2. What approaches improve inclusion and encourage collaborative capabilities?

- **Provide funding** that helps individuals overcome major barriers to interdisciplinary research and careers. These should be both small, low-risk calls and longer funding awards and Fellowships.
- **When recruiting, focus on aptitude for the role over career path to date:** Fair assessment is improved by skill-based recruitment, anonymised CVs and the use of inclusive language in recruitment, promotion and funding criteria.
- **Celebrate diverse paths to leadership:** Widening diversity among those leading research teams and funding bids gives visibility to alternative career paths, career breaks, experiences, and backgrounds.
- **Visibly support marginalised groups:** Open diversity targets and dedicated funding for underrepresented groups encourage those with diverse experience and backgrounds to apply and feel supported within organisations.

Theme 3. How can we help interdisciplinary researchers to navigate the research system while creating a collaborative research culture that is inclusive of diverse perspectives and enables mobility?

- **Be generous:** Create a trusting and supportive environment that values generosity and hospitality and in which people can be adventurous without risking humiliation, and can acknowledge and pass on their privilege.
- **Combat apathy:** Provide leadership training and coaching for all individuals (not just interdisciplinary researchers) to renew their perspectives, confidence, resilience, transferable skills and accountability.
- **Implement system changes:** Ensure proportionate representation of interdisciplinary researchers on decision-making boards; enable and encourage opportunities for collaboration at early career stages.
- **Encourage and support external engagement:** Collaboration does not come naturally as a skill to many researchers. Help researchers gain perspectives from outside of the academic sector, by encouraging project co-design with individuals with lived experience, and by using external coaches to broaden perspectives and facilitators to navigate difficult conversations.

Appendix 1 Recommendations for Research Institutions

Based on the workshop discussions, X-NET recommends 17 interventions for higher education institutions and research institutes seeking an accelerated change towards an inclusive collaborative research culture that catalyses interdisciplinary research. We encourage organisations to lead by example in terms of practices and inclusivity, with fast, bold and more centrally implemented changes, and to not wait for instructions from funders. **Change will require synergy and active engagement among leadership teams, research professionals, HR and academics to create psychologically safe spaces for true inclusivity.**

To promote mobility across disciplines and sectors, research institutions should:

- Provide opportunities for collaborative working and funding for all researchers, including post-graduate and post-doctoral researchers.
- Challenge the narrow view of a 'research team', its leadership and hierarchy. Acknowledge all who contribute to research, including those with lived experience, and research adjacent and technical professionals who enable project and research progress.
- Facilitate flexible working opportunities, such as flexible start times, condensed hours and remote/hybrid working.
- Introduce challenge-led themes to catalyse conversation and collaboration across disciplines.
- Teach collaboration skills to widen perspectives and respect transferable skills.

To enable a nurturing environment, research institutions should:

- Support employees to acknowledge their privileges and understand the diverse risks (and their impact) faced by individuals along different career paths.
- Provide seed funds for interdisciplinary researchers' additional training or workshop expenses.
- Include the 'inclusion and development of others and maintenance of effective working relationships' in promotion and recruitment criteria, in line with the requirements for narrative CVs.
- Cultivate psychologically safe teams. The more difficult conversations often can be the most impactful. Provide psychologically safe environments in which open conversations can be initiated with groups who feel marginalised. Safe spaces are required if employees are to raise serious issues without the risk of being humiliated or dismissed.
- Rather than follow a narrow, more traditional prototype of the research leader, create visible and diverse routes to leadership positions that recognise aptitude for roles, include non-traditional career routes and allow for career breaks.
- To ensure inclusivity, revise and co-design language used in recruitment, award and promotion criteria with diverse sets of researchers.
- Provide inclusive leadership training for employees across career stages that focuses on navigating different boundaries.

To ensure equitable evaluation and opportunity, research institutions should:

- Ensure interdisciplinary researchers' extended training periods, collaborative working and non-traditional outputs are recognised and accounted for in recruitment and reward criteria.
- Include representatives of interdisciplinary researchers, faculties, research centres, institutes and similar in all decision-making (promotion, recruitment and governance) panels.
- Use aptitude and skills-based recruitment and promotion criteria to increase the breadth of experience that can be considered for roles, and anonymise identifying features within applications.
- Articulate and celebrate the value of 'calculated risks', 'intelligent failures', negative results and alternative outputs in promotion and recruitment criteria.
- State in promotion and recruitment criteria that those with non-traditional career paths and career breaks are especially encouraged to apply, including examples.

Appendix 2. Full Workshop Report

Workshop: Lessons from equality, diversity and inclusion: How might interdisciplinary research culture evolve and be strengthened?

Introduction

Workshop Purpose

A supportive interdisciplinary research environment requires a major cultural change towards a collaborative, rather than competitive, research culture that embraces diversity of thought. The aims of the meeting were to:

- a) Identify additional equality, diversity and inclusion (EDI) challenges faced by interdisciplinary researchers.
- b) Learn about practical interventions that have had positive effects on shifting inclusion and research culture that might be adapted to enable research organisations to overcome research culture issues experienced by interdisciplinary scientists.
- c) Identify mechanisms that improve support to interdisciplinary researchers and enable the creation of a collaborative rather than competitive scientific culture.

Attendees and Structure

Panel members were representatives of different stakeholder groups who are implementing shifts to EDI and/or interdisciplinary research culture. These included representatives of research culture and EDI initiatives from UK funding bodies, researchers implementing EDI initiatives within UK universities, and academic experts on interdisciplinary challenges. As they were unable to attend the workshop, an expert in industry/academic culture change was interviewed subsequently. X-NET steering group members were present as Observers. An independent facilitator led the workshop.

The 2-hour workshop was held online under Chatham House rules. The workshop started with a short overview of the X-NET project (summarised below) followed by two approximately 45 minutes discussion sessions on:

- 1. What challenges of EDI need consideration when adopting interdisciplinary and collaborative 'team science', and what approaches might better embed and develop interdisciplinary collaboration?**
- 2. What initiatives are you aware of that can promote inclusive attitudes and behaviours to support the development of a research culture that supports interdisciplinary researchers to navigate the systems, processes, language and culture that we have created?**

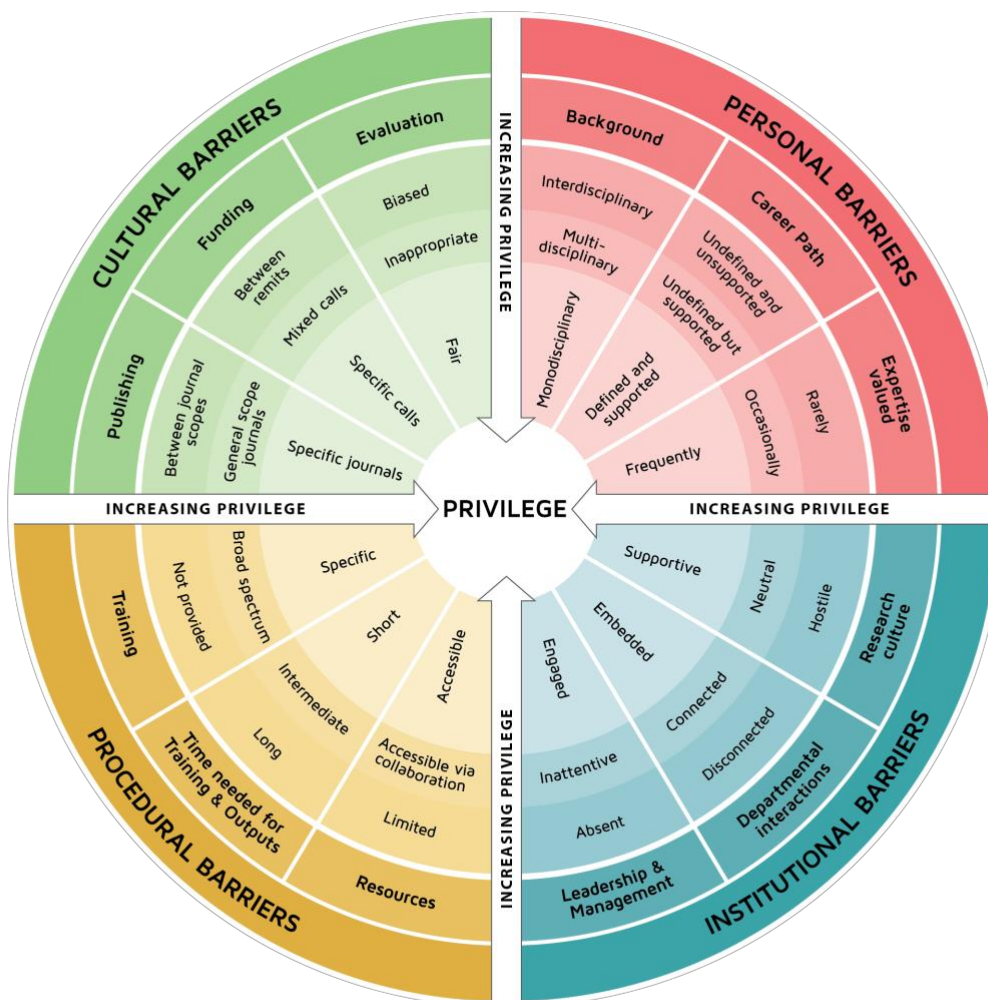
Attendees were invited to raise any points both verbally and in the meeting chat. Finally, the session ended with comments from the X-NET Director, Prof Chris Ponting, on the pain that interdisciplinary researchers had felt and the network's intentions to write this report for circulation among panel attendees for review before this is made openly available.

X-NET and interdisciplinary career barriers

[X-NET](#)¹ is a collaborative project team of technical experts, research adjacent professionals and computational biology researchers from different career stages from the Universities of Aberdeen, Dundee, Edinburgh and Oxford. The network has been investigating the career barriers facing interdisciplinary scientists working in biomedicine. Throughout 2022-24, X-NET gathered evidence

¹ XNET: Cross disciplinary research network. Available at www.x-net.bio

through [interviews](#)², a [survey](#) and [workshops](#)³ from interdisciplinary researchers at various career stages, focusing on the barriers facing interdisciplinary researchers. Whilst most evidence was gathered from researchers at the intersection between biomedicine and computational and mathematical fields, interdisciplinary experts have advised that these issues are pertinent across other interdisciplinary spaces. Numerous challenges were shared with X-NET. To illustrate the barriers faced by interdisciplinary researchers in academia the network created an 'Interdisciplinary wheel of privilege' (Figure 1). Barriers are grouped into four main themes and encompass issues that also intersect with other EDI concerns.



Adapted from Sylvia Duckworth (Wheel of Power/Privilege) Elsherif et al., 2022 (Academic Wheel of Privilege) and ccrweb.ca

Figure 1: Interdisciplinary Wheel of Privilege. Barriers to interdisciplinary research gathered by X-NET through workshops, surveys and interviews. Barriers are grouped into four main themes: quadrants detailed in the outermost ring: Personal (red), Institutional (blue), Procedural (yellow) and Cultural (green). Each segment of the wheel represents a barrier faced by researchers which is labelled in the second-most outer ring. Working from the outside towards the centre the three inner rings indicate the positions in which researchers might find themselves. Positions nearer to the centre of the wheel are the most supported and privileged. Positions towards the wheel's perimeter (third ring from the centre) are less supported. Arrows indicate the closer you are to the centre, the more privilege (and often power) you have. Interdisciplinary researchers often report being in situations that would place them towards the perimeter. Whilst evidence for barriers was primarily based on evidence from quantitative biomedical researchers, consultation with interdisciplinary experts suggests the wheel reflects the broad

² XNET: YouTube channel: https://www.youtube.com/channel/UC2_AwjjiqeyNg17SIJtMN0dA

³ Davies P., et al (2023). Overcoming Barriers to Cross-Disciplinary Research. <http://dx.doi.org/10.7488/era/2588>

challenges faced by those pursuing interdisciplinary research across any research field. This wheel is adapted from Sylvia Duckworth's [Wheel of Power/Privilege](#) (originally adapted from [ccrweb.ca](#)) and was also influenced by the [Academic Wheel of Privilege](#)⁴. High resolution version of image available online.

Notable issues captured by the Wheel that are likely compounded by wider EDI issues include:

- 1) Personal barriers: Career paths of interdisciplinary researchers are more poorly defined than those of their single-discipline counterparts. The expertise of interdisciplinary researchers is less often understood and thus is commonly under-valued.
- 2) Institutional barriers: Hostility towards, and 'othering' of, interdisciplinary researchers by those with more traditional backgrounds.
- 3) Procedural barriers: Less account is taken for the extended timeframes needed for training and development of interdisciplinary researchers, and longer project durations.
- 4) Research cultural barriers: Interdisciplinary researchers are disadvantaged by how their career trajectories and outputs are evaluated and recognised.

Although a top-down approach from funders is important, X-NET recognises that change within research environments and institutions can be slow and may be met with resistance or apathy. Hence, to discuss their experience of what works well and how we can drive and accelerate change, X-NET convened this workshop's panel of experts and practitioners. These are individuals who are pioneering improvements to inclusivity, diversity, and culture, and who have diverse perspectives on these challenging issues.

Discussion

To maintain the purpose of the conversations and avoid misinterpretation of the discussions, the text of the discussion points has been kept as close as possible to the original phrasing. Minor edits have been made to remove identifying details or to improve clarity where necessary.

Theme 1: For interdisciplinary research careers and collaborative research, what additional challenges for EDI need to be considered?

1. We need to talk about risk: It is vital that we emphasise the language of **risk** alongside **privilege** when we support the participation of groups that are already excluded, and remind ourselves of an individual's circumstances when formulating and implementing our policies.

- **The risk that changing disciplines is not successful:** This is an important consideration for those who are already experiencing other risks (such as financial instability and job insecurity) when they embark on this career path.
- **Time bites:** Time is a big barrier to progression. Interdisciplinary research slows down progress within an academic career. This especially bites when the individual is from an underrepresented group or if they have caring responsibilities. Crossing disciplines extends the period of uncertainty, and those who have more privilege and have less need of job security can weather uncertain times for longer.
- **Organisations are risk averse and there needs to be space for 'failure':** Large funding awards are very risk averse and favour the 'confident' researcher. There needs to be space

⁴ Elsherif, M. M., Middleton, S. L., Phan, J. M., Azevedo, F., Iley, B. J., Grose-Hodge, M., ... Dokovova, M. (2022, June 20). Bridging Neurodiversity and Open Scholarship: How Shared Values Can Guide Best Practices for Research Integrity, Social Justice, and Principled Education. <https://doi.org/10.31222/osf.io/k7a9p>

given for smaller, more 'high-risk', exploratory research that can test ideas, and also for allowance to be given for 'negative results' whose value deserves greater recognition.

2. We need to initiate difficult conversations: Being open to engaging with marginalised groups and interdisciplinary researchers who some see as difficult can expose issues that others or organisations do not necessarily wish to be made visible. For change to occur these conversations need to be had, and not brushed aside.

- **Need to disrupt the status quo to enable equality:** By its nature, interdisciplinary research subverts the existing status quo. Those who are risk averse seek to maintain the status quo, thereby preserving social and political structures. True equality requires rattling the status quo and redistributing power differently thus disrupting established power relations. More conservative colleagues will avoid risks and will criticise.
- **Research does not only involve researchers:** When we discuss interdisciplinary research the focus is usually placed on the individual researcher. However, many roles such as research adjacent professionals, technicians, and patient-participants are needed for project success. Further, not all innovations come from researchers. Widening the diversity of roles in the research process will naturally improve interdisciplinarity. The broader research community should be brought together before funding applications, during projects and when disseminating outputs.
- **Be the change you wish to see:** We all need to question the motivations, behaviours and incentives we each have created, and how bold we wish to be when challenging them. This is made more difficult by those holding positions of power having succeeded in the systems that might require change.
- **There is huge value to projects that come from the wider 'non-scientific' community:** Including lived experience provides opportunities for beneficiaries of research to speak 'truth to power', especially to those whose principal aim is to build their own careers. Whilst co-production and public and patient involvement (PPI) are integral to funders' plans, central, faster and explicit implementation would create a substantial impact.

3. We need to break the academic 'mould': To train a truly diverse workforce and enable career mobility, the 'mould' of the traditional research background needs to be broken. This will require us to change our understanding of what leadership and leaders 'look' like.

- **Exclusion occurs early in education:** There is a profound lack of socioeconomic diversity within the academic system. The tendency to specialise in disciplines early in UK education greatly restricts career choices later in life. These constructs need to be tackled early within the school education system.
- **Assumptions of what leaders 'look like' need to be challenged:** Diversity and gender parity in research leadership within projects is still lacking. There are many unacknowledged assumptions regarding what 'research leadership' looks like. In addition, there is a disparity in the status of STEM (Science, Technology, Engineering and Mathematics) versus arts and humanities disciplines. Whereas STEM scientists are often proposed to lead collaborations, social scientists are invited as contributors. We need first to dig deeper to bring to light existing power relations, gendered assumptions and political ecology, before then openly discussing how to improve how leaders are chosen.
- **Change comes from the core and not from superficial efforts:** Organisations need to involve their people and EDI functions more when asking: "How friendly is the organisation to incoming people, and what is their long-term future?" to ensure that this does not become a box-ticking exercise. To recognise the true value and talent that others bring requires an organisation to be self-perceptive. Good HR policies and training are insufficient. Attitudes need to be challenged if the workforce is to be empowered to make the required changes.

4. Language is important, and we all need to question its accompanying assumptions:

Organisations and individuals need to question their own assumptions regarding the language they employ and how they might unintentionally create barriers that exclude.

- **Need for broader recruitment/promotion criteria encouraging aptitude over experience:** Potential applicants who perceive exclusionary criteria in promotion and recruitment criteria will be more likely to give up on their application if you are already disadvantaged by the research system. If committees do not understand or under-value their research area then they will be further disadvantaged. Some applicants may excel in the role after a short period of training despite entering a research area from a different discipline.
- **Spell it out strongly and honestly:** It is essential, in funding calls, for terms such as 'reciprocity', 'integration' and 'not bolted on' to be included to avoid team members, especially junior colleagues, being taken advantage of, for example by being positioned as 'bolted on' to applications and not being involved from project inception.
- **Need to broaden the definition of research value:** Funding is not the principal outcome of a research collaboration, and so does not fully represent research value. When done well, a collaboration's consequences are varied and the emergent value is often unintended, for example, cowriting teaching modules or other outputs, not just funding applications.
- **Pursuit of 'science' is no excuse:** In "Team Science" the emphasis is on the "Science" being pre-eminent. However, this can exclude those from different spaces and cultural understandings.

5. We need to acknowledge differences in how questions can be addressed: Differences can go beyond domain-specific language and jargon, which might be resolved by training. We need to respect different views on what constitutes knowledge (epistemologies) and how differently people think across cultures and disciplines.

- **Respect that there are different ways to solve a research problem:** Rarely is it acknowledged that there are different understandings of "What is a question?", "What is a finding?" and "What is a reasonable line of enquiry?". Without this acknowledgement, many projects might claim to be interdisciplinary but without there being a genuine exchange of knowledge. Discussions focusing on equality are also often helpful at the start of each project.
- **First focus on methods:** Starting interdisciplinary workshops or sandpits with conversations about methodological approaches can be a 'light bulb' moment. This enables an open discussion on 'How do you do your research?', allowing people to suddenly see links, commonality and complementarity to reinforce ways of working together.
- **Meta questions enable integration:** Interdisciplinarity requires a shared 'Meta research question' that links the various questions that different disciplines might ask.
- **Recognise there can be spaces of beneficial mutual exchange:** Peter Galison's "[trading zones](#)"⁵ metaphor describes how different communities with different practices can exchange resources and negotiate a joint enterprise, despite lacking the same language or culture. This encompasses shared rules of exchange beyond just language, including 1. negotiation of meaning, 2. overlap of practice, 3. cultural intermediaries, 4. creation of new knowledge, and 5. dynamic and evolving exchange.

⁵ Galison, Peter. "Trading Zone: Coordinating Action and Belief (1998 abridgment)." In *The Science Studies Reader*, edited by Mario Biagioli, 137-160. Routledge, 1999

Theme 2: What approaches improve inclusion and encourage collaborative capabilities?

Active initiatives that have driven change:

- **Small pots make a large difference:** Small, low-risk funding pots provide opportunity for those with additional needs to equal the playing field, for example the [British Academy Additional Needs Fund](https://www.thebritishacademy.ac.uk/funding/additional-needs/)⁶ supports carers so they are not further disadvantaged by having to pay for associated costs that would otherwise come from their research budgets and further disadvantage them.
- **Longer funding time frames for interdisciplinary research projects:** Be candid that interdisciplinary projects take longer and create funding schemes to facilitate them, for example the UKRI [Future Leaders Fellowships](https://www.ukri.org/what-we-do/developing-people-and-skills/future-leaders-fellowships/)⁷ which enables 7 years of funding.
- **Use aptitude-based recruitment with anonymised background information:** When a potential applicant does not match the cultural norm, this raises a barrier to application. Initial questions, such as 'Where do you come from?', 'What did you study?', 'What university were you at?' and 'Who do you know?' are not relevant to the job role and are often ageist, classist and rule out a large section of society at entry point. Health Data Research UK⁸ (HDR UK) have successfully focused on a skills-based recruitment, anonymising name, university, and address on applications. This has resulted in a diverse workforce, with increased numbers of appointees from underrepresented groups, including people with disabilities.
- **Open diversity targets:** Enabling specific funds and stating publicly intentions of who you want to see applying for roles have had multiple surprising and unintended benefits. They increase applications from the targeted community, but also encourage other minoritised or reluctant applicants, signalling that the organisation is welcoming and supportive to those who do not fit the traditional mould. An example is the [Edinburgh Chancellor's Fellowship scheme](https://www.ed.ac.uk/human-resources/job/chancellors-fellowships)⁹ that encouraged 50% female applicants and 25% ethnic minorities.
- **Diversify our understanding of leadership by making visible diverse career paths:** Leaders are made via not just one route. Technical experts, post-doctoral researchers and other professionals who are not tenured academics have leadership roles. Funders are already allowing people in more diverse roles to be recognised as investigators and institutions should signpost these routes also.
- **Direct language in funding calls improves research practise:** Including direct and plain language in funding calls has improved the quality of submissions and expectations for researchers. An example is the use of 'reciprocity', 'integration' and 'bolted on' in UKRI funding calls which is preventing people from being added to applications as a tick box exercise and not being involved from project inception.
- **Dedicated Support:** As with open diversity targets (above), dedicated fellowships to specific groups encourage confidence in those from different backgrounds, often eliciting diverse representation among applicants in addition to the targeted group. For example, the [Daphne Jackson Trust](https://daphnejackson.org/)¹⁰ enables returners from caring responsibilities. A large number of applicants often use the opportunity to switch career paths. The [HDR UK Black Internship Programme](https://www.hdr.ac.uk/study-and-train/about-the-training-team/impact-and-partnerships/an-internship-programme-to-help-talented-black-health-data-scientists-flourish-in-stem-careers/)¹¹ in partnership with the 10,000 Black Interns Foundation has been hugely successful and oversubscribed. It has encouraged applications from many diverse backgrounds. It has engaged a wide range of host institutions and partnerships, and a large number of applicants were women and those changing careers. Its success has opened doors to partner

⁶ <https://www.thebritishacademy.ac.uk/funding/additional-needs/>

⁷ <https://www.ukri.org/what-we-do/developing-people-and-skills/future-leaders-fellowships/>

⁸ <https://www.hdr.ac.uk/>

⁹ <https://www.ed.ac.uk/human-resources/job/chancellors-fellowships>

¹⁰ <https://daphnejackson.org/>

¹¹ <https://www.hdr.ac.uk/study-and-train/about-the-training-team/impact-and-partnerships/an-internship-programme-to-help-talented-black-health-data-scientists-flourish-in-stem-careers/>

organisations, challenging their practice, and is now expanding to encourage applications from those with disabilities.

Activities that need further encouragement:

- **Reform of the education sector to avoid early specialisation:** Remove the premature restriction of subject choices within the education system.
- **Leaders in research institutions should acknowledge to all employees that there are problems of the current system that we have all created:** By openly and actively addressing and including employees in this conversation, this would signal the acknowledgement of these problems and the need for active (not reactive) improvement.
- **Need for synergy and cohesion across HR, people, EDI and research functions that empower all employees to actively make positive culture change:** Without such synergy any conversations and activities that improve inclusion risk being restricted to the EDI / research culture forum, and hence not permeating into research practice.
- **Need to enable more flexible working arrangements:** More active change is needed to enable flexible working. Parental care is enabled to some extent but is by no means solved and there is an impending burden of tertiary care that requires much consideration. In addition, flexible or sandwich careers will soon be making a huge proportion of the workforce and this will require institutional encouragement and structure to be facilitated.

Theme 3: How can we help interdisciplinary researchers to navigate the research system while creating a collaborative research culture that is inclusive of diverse perspectives and enables mobility?

Interdisciplinary researchers have described their journey crossing disciplines as “*feeling like an outsider*” and how researchers from that single discipline “*make you feel like you are not part of that group*”.

1. **Generosity and hospitality are essential** to create a space in which interdisciplinary ideas are supported. This space is where people can place ‘wild’ ideas on the table, be adventurous and not be humiliated.
 - **Mutual transformation is required of all parties:** Interdisciplinary working can’t be inviting people in because then someone is always an outsider and implies they may also be ejected if they ask problematic questions. Co-creation requires a process of ‘mutual transformation’ which is enriching for both. Mutual change can be uncomfortable but everyone involved needs to give up a bit of their comfort zone and feel discomfort at times.
 - **Encourage the acceptance of privilege and being generous with it:** A societal shift is needed to recognise that we have privilege and influence, and we can, and should, do something powerful with it. Training is needed to help people understand privilege in a non-political sense, enabling them to be comfortable with it and be happy to give it away. We need to say: “We aren’t taking this powerful position away from you, there are a whole group of other people that need a leg up and imagine how great your institution would be for having those people in it. It would only add to it, and not take anything away”.
 - **Trust is vital:** We need to enable trust to have open debates about difficult subjects. Lived experience and co-design are powerful but for this you need people to feel comfortable to contribute otherwise valuable insights will be lost.
 - **Challenge-led contexts provide unity:** Policy in practice communities do not get hung up on disciplines, rather focusing on those who effect change. Placing people in challenge-led and mission-focused contexts shifts the boundaries in subtle ways, binds external communities together and enables the curation of different ways of being

together, working across disciplines and having interdisciplinary conversations without necessarily realising that this is so.

2. **Structures are enacted by human beings, and individuals can be empowered to make change:** Even within organisations, individuals may have the opportunity and power to effect change and influence their surroundings; apathy is the enemy of change.
 - **Inclusive leadership training enables structural shifts:** Inclusive leadership training has the biggest potential for improvements at the intersection of systems and people. Training is needed at all levels: those who are already leaders and those who will be so in the future.
 - **Build resilience for crossing barriers in the structures we operate in:** Leadership training should centre on individuals' values, communication and how to cross boundaries, relating to discipline, background or other challenges. Training of academics needs to focus on how to positively lead in the structures in which they operate. Acknowledge that often academic leadership is accidental leadership.
 - **Interdisciplinary research is a skill set that can be taught:** Interdisciplinary skills can be learnt by early career researchers. Doctoral training should engage with other disciplinary perspectives to provide them with the skills and confidence needed to foresee diverse future career avenues. There are very different cultures across and within universities and labs. It is important, therefore, if they are to thrive in different environments, that they build their confidence and resilience.
 - **If equality is outlined then all parties can thrive:** Interdisciplinary centres created with the ethos that disciplines are equal can work brilliantly. However, it still takes effort to maintain that parity.
 - **Coaching supports individuals to recognise their worth and value in their differences:** Job descriptions and roles in academia are overly narrow and people feel out-of-place and unwanted. Interdisciplinary post-doctoral researchers can become disenfranchised when they fail to fit the mould of those around them, struggling to know their role and where their work is going. Coaching helps and enables individuals to reframe their outlook, and to realise their job role is to interconnect the team and collaborate with others.

3. **Structural changes are essential to enable opportunities for integration and collaboration within the academic system.** Systemic issues often arise from structural issues and there is scope to successfully alter these within the current system.
 - **Encourage opportunities for collaborative funding at early career levels:** Funding for early career stage researchers is focused on the individual rather than how a researcher works with others. Senior leaders have opportunities to grant more collaborative funding for those at earlier career levels.
 - **Enable democratic representation on decision-making boards in research organisations:** Interdisciplinary centres and institutes are often marginalised structurally by not being part of faculty structures. This is sometimes advantageous because they have a degree of independence, but it can be precarious because they have no representation in decision-making committees. Those outside of disciplinary structures, senate and committees then have no voice in decision-making. Interdisciplinary centres and structures need to be fully integrated within the decision-making committees in a truly democratic process. Interdisciplinary faculty structures have been created at Aalborg University (Denmark) as an experiment. Wide representation on the committee that awards professional titles is also important. One or more people advocating for those with non-traditional roles, career paths, career breaks and interdisciplinary careers on panels are essential.
 - **Ask how mobility for individuals is assured:** We need to think about the structural barriers raised in research assessments, and funding and promotion criteria. 'Mobility' and 'boundary spanning' are often better and more physically descriptive terms than

'interdisciplinarity' and it is easier to grasp how this is not enabled by university and school structures. We also need to question how grant application mechanisms (short applications and interpretation by committees) limit the mobility of people from different backgrounds.

- **Organisations need to take risks:** Appropriate spaces are required to support new and dynamic thinking, yet universities and funders are too often averse to doing so. Individuals often take risks only when they feel safe enough to do so.

4. **'External' support and perspectives are often widely beneficial and should be encouraged.**

Seeking support from professionals or those with lived experience is enriching and can alter perspectives and enable difficult conversations that would otherwise limit outcomes and opportunity.

- **Around half of all researchers are not naturally collaborative:** Individuals need to learn how to be flexible and create an environment where people are trusting. Feedback and coaching can help with this. Group coaching is very beneficial in large part because scientists are evidence-based so convening researchers to see common issues through personal evidence works well. This can be achieved remotely and is very inclusive.
- **Participatory approaches are not sufficient, instead co-design and co-creation should be encouraged:** Participatory approaches in research need to go further to utilise participatory design. To ensure success, it is advised that this is done with colleagues whose expertise is in the curation and facilitation of spaces for co-creation and co-development. Researchers need to think more about the spaces that we create to enable engagement yet often do not call upon our institutions' existing expertise of colleagues from other disciplines, departments and those in research adjacent roles.
- **Facilitation enables difficult conversations:** Collaborative projects may not work because values, morals, and work ethic are entirely different, even opposing. Sitting and having those conversations openly and honestly is tricky and may require a skilled facilitator.
- **Mindsets of early and mid-career researchers can be broadened:** An individual's perception of risk is a personal mindset that can be broadened and altered through coaching. Risk often needs to be seen in the context of their geography and ambition, and individuals often need additional help identifying what they need training in.
- **Different engagement approaches suit different individuals:** Collaboration is needed to drive innovation and academics need to understand the challenges of industry. There are different ways to engage with industry that suit different personalities. For example, some will go out and speak to people, and some will be more comfortable inviting people in to speak or hold a workshop.

Conclusions

The balance of perspectives from funders to academics made for a highly constructive and wide-ranging discussion. The workshop highlighted the positive action that is being taken to support individuals and encourage inclusion at all levels of the research system. However, it became clear that substantial challenges remain and more active development will be required if a truly collaborative culture that values diversity of thought is to be created.

The workshop highlighted and explored significant additional EDI considerations and their implications in interdisciplinary careers and collaborative research. These include an acute need to appreciate an individual's risk when following an academic career path; how we should be seeking out candid and challenging conversations; and that our reactions to such challenges should also acknowledge the power imbalance of those who challenge the status quo. It emphasised how open communication, respect for different approaches to problems, challenge to assumptions of what 'leaders look like', and

that being astutely considered and encouraging in the language used for recruitment, promotion and funding criteria are all critical for creating an inclusive, hospitable and thriving research environment.

Promisingly, many strategies exist that have actively challenged ingrained research culture and have positively embedded inclusive and collaborative practices in research organisations that, for some, have given specific consideration to interdisciplinarians. Such interventions are to date 'more the exception than the cultural rule' across higher education and more can be done to scale and embed organisational cultures that optimise the benefits of diversity of thought. Organisations should take risks to create spaces for researchers that enable trust and generosity and allow individuals to feel safe enough to be adventurous both in their research and support of others. Specific leadership training for senior leaders, coaching of those early in their careers and routine involvement of "external/different" viewpoints would all contribute to active change. These, in tandem with structural changes to ensure all individuals have the opportunity to have a voice in decision-making processes and the embedding of collaborative working at early career stages, have the power to elevate mobility and reduce marginalisation. By implementing these approaches, actively acknowledging the challenges experienced by less privileged researchers (including interdisciplinarians) and intentionally demonstrating person-focused approaches, the UK research system can help organisations not to be disingenuous when espousing inclusivity, collaboration, and interdisciplinarity and we can create legitimate trust and confidence, allowing collaborative research to flourish through diverse perspectives.

Notable Resources and Schemes Improving EDI, Research Culture and Fostering Interdisciplinary Research in the UK:

During the workshop a number of schemes, initiatives and resources were referred to that support or have led to positive changes in EDI, research culture and/or fostering interdisciplinary exchange in the UK. These resources are listed alphabetically below:

- [10,000 Interns Foundation](#): Paid internships for black students and graduates and disabled students and graduates of all ethnicities across a range of UK industries.
- [Crucible Programme](#), University of Leeds: Programme for early career academics to develop collaborative and interdisciplinary working skills.
- [Daphne Jackson Trust](#): [Blog posts on overcoming various career challenges and barriers](#) by Dr Andy Clempson for research returners that would be useful to interdisciplinary researchers.
- [Future Leaders Fellows \(FLF\) Development Network](#): Development network for UKRI funded FLFs with many materials and resources on leadership and best practices openly available.
- [HDRUK Health Data Science Black Internship Programme](#): 8-week paid internships enabling opportunities across sectors in health data along with training activities, mentoring and community and alumni networks.
- [Horizons Institute](#), University of Leeds: Research environment bringing together and facilitating interdisciplinary and cross-sectional collaborations to tackle global challenges.
- [Inclusive leadership programme](#), Wellcome Centre Integrative Neuroimaging University of Oxford. Leadership training programme developed to nurture leadership skills for fostering inclusive and equitable environments.
- [InFrame Project](#): An inclusive framework for research leadership from universities of Glasgow, Edinburgh and St Andrew on how to foster, recognise and reward collegiality and expand the definition of who can be viewed as a research leader.
- Leonard Cheshire, [Change 100 internships](#): Paid summer work placements, professional development and mentoring for university students and recent graduates with any disability or long-term condition.
- [Narrative CVs](#): A flexible framework for qualitatively documenting experience, achievements being adopted by funders and developed by the Joint Funders Group
- National Centre for Universities and Business, [Career Mobility Taskforce](#): Taskforce reporting and recommending steps the UK research sector should take to ensure exchange of knowledge and skills across sectors.
- Shift Insight, UK Reproducibility Network & Vitae. [Research Culture Initiatives in the UK, 2024](#): UK research and Innovation (UKRI) commissioned report to map research culture activities across the UK.
- Strang V. & McLeish T. (2015) "Evaluating Interdisciplinary Research: a practical guide." Institute of Advanced Study, Durham University": Generosity and hospitality are essential for fostering interdisciplinary research cultures.
- The [British Academy's Additional Needs Fund](#): Enabling researchers with additional caring or support costs to access small funding sums that enable accessibility and inclusion of those that would otherwise come from research budgets.
- The [British Academy's Innovation Fellowships](#): Fellowships enabling early and mid-career researchers in the humanities or social sciences to partners with external organisations including policy makers to enable innovative approaches and solutions relative to the UK.
- [The British Academy's Talent Development Awards](#): Enable funding of up to £10,000 for researchers to acquire new skills in data science, digital humanities and languages.
- [THRIVE](#), University of Liverpool: Project redefining how research teams focusing on encouraging greater diversity and inclusivity and developing a new model for team-based working.

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