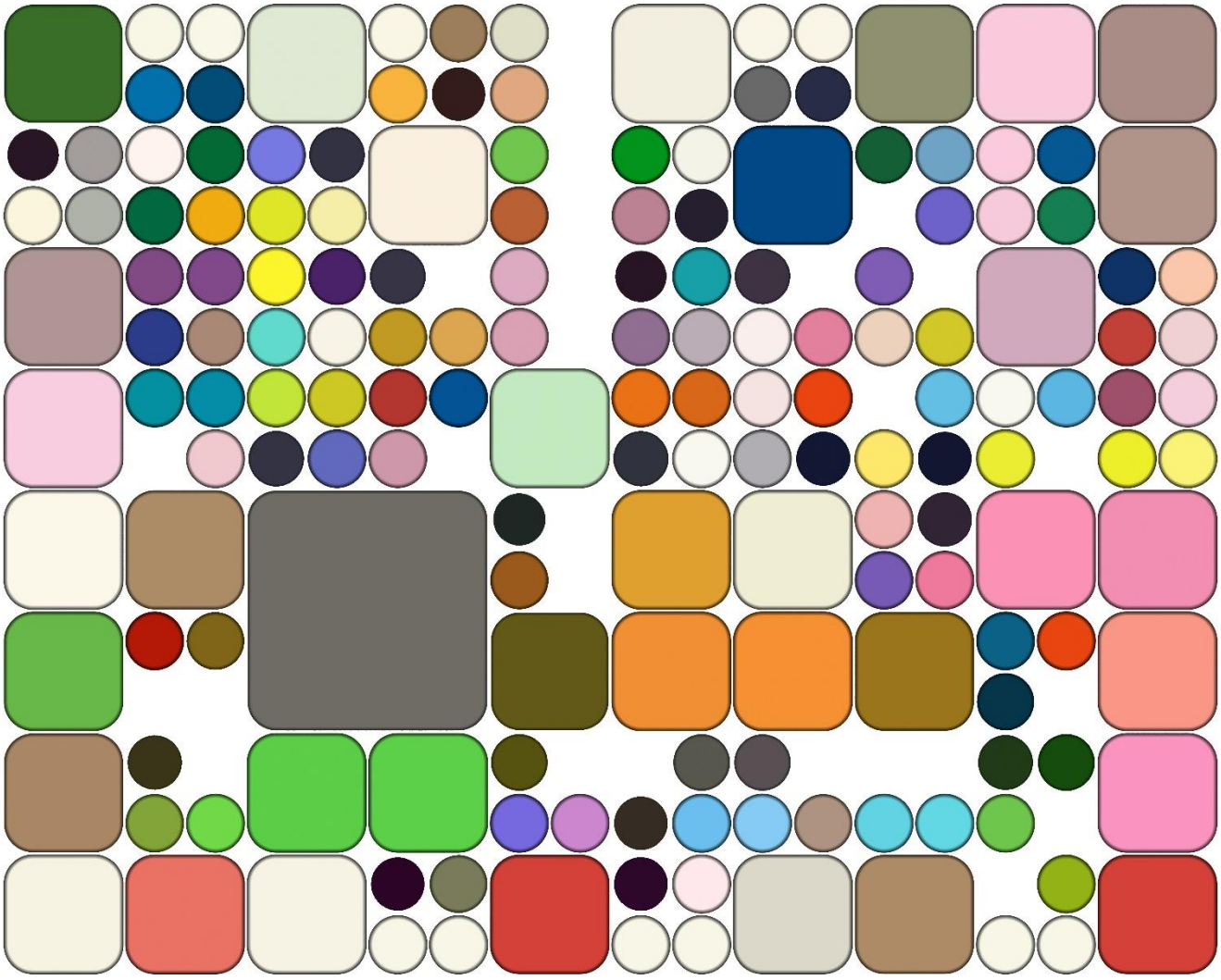
Interdisciplinary Research:

making the most of the opportunities and navigating the challenges for early career researchers



IAD INSTITUTE FOR ACADEMIC DEVELOPMENT

THE UNIVERSITY of EDINBURGH

Contents

Summary

This guide is for early career researchers who identify as interdisciplinary (ID) researchers. It provides an overview of some of the most commonly perceived opportunities and challenges of doing and being an ID researcher, and provides practical advice on how to overcome the challenges in order to make the most of the many opportunities.

The aims of this guide are to help readers to:

- Understand what interdisciplinary research is and what it means to you
- Identify and understand the opportunities and challenges
- Determine what challenges are relevant for you
- Use practical strategies to help navigate those challenges
- Build confidence to pursue interdisciplinary research and make the most of the many opportunities

This guide collates and summarises information and good practice on ID research from several sources, and will point to further guidance and resources provided by the University of Edinburgh and the Institute for Academic Development where possible. There are short activities throughout this guide to help prompt you to think about your own unique research, career trajectory, and the opportunities and challenges that ID research can present.

Defining interdisciplinary research

It is important to define what ID research is, and what it means to you, as different kinds of ID research have different goals and challenges. Understanding what kind of ID researcher you are will help you to determine what is relevant for you and what challenges you may need to consider.

What is interdisciplinary research?

ID research has different typologies, and has been variably described as multi-disciplinary, trans-disciplinary, cross-disciplinary or inter-disciplinary. For the purposes of this guide we will follow the definition of Lyall *et al.* (2011), where interdisciplinary research is defined as research that approaches an issue from a range of disciplinary perspectives, where the contributions from the various disciplines are acknowledged and integrated to provide a holistic or systemic outcome [1]. It builds on knowledge foundations of academic disciplines. This can be further divided into academic and problem oriented ID research.

- Academically oriented ID research: targeted to the solution of academic questions, where disciplines have reached the limits of their methodological capacity and need to bring in insights from other disciplines. It often engages in forging new disciplines or sub-disciplines, building new academic 'homes' for themselves. In the short term, it may create some disruption in academic institutions, but in the end fits into the discipline-based structures of academia. For example, systems biology has combined computational and mathematical modelling with biology to create new collaborative ways of working to solve problems in biology[2].

[1] Lyall et al. (2011). Ch. 2, p.14
[2] Lyall et al (2011), ch.2 p. 14-17

- Problem oriented ID research: addresses issues of social, technical and/or policy relevance where discipline-related outputs are less central to the project design. It aims to bridge gaps in understanding or analysis of practical questions by bringing together insights from more than one discipline. Researchers are likely to find themselves working with different sets of disciplines from one project to the next, and build up expertise on the integration of disciplines and the management, or collaboration with, researchers from different disciplines working together. It can be seen as a more precarious type of ID research as problems don't last or might change, so may not be a new 'home' for researchers[3].

Many ways of doing ID research

There are also many different ways of doing ID research. You might be strongly interdisciplinary in your own right, spanning several disciplines in your own research, or perhaps you may be strongly disciplinary but actively pursuing ID projects or willing to work in ID teams[4]. As quoted from Lyall *et al.* (2011, p.105),

> "Interdisciplinary careers can therefore result in a multitude of different directions and stages: from collaborative interdisciplinarity through to holding multiple disciplinary identities, to a liminal place between disciplines and to individual interdisciplinarity and identification with a newly formed discipline."

Therefore, it is important to understand the different ways of doing ID research, and what type of ID researcher you are, as there may be different challenges to consider.

Activity: Take a moment to consider what type of ID research you pursue (academically or problem oriented), and whether you are an individual who spans multiple disciplines or a disciplinarian who works in ID teams, or somewhere in between? What degree of ID involvement do you prefer?

Use this space to write down your thoughts:

[3] Lyall et al (2011), ch.2 p. 17-18
[4] Short Interdisciplinary Guide 5, available at http://tinyurl.com/idwiki

Opportunities and Challenges

When considering the many opportunities and challenges that ID research might bring it is important to define what these might be, as the ability to anticipate potential opportunities and challenges early may help you to manage ID research successfully and capitalise on the opportunities. The opportunities and challenges discussed here are those that have the potential to affect individuals' research and/or careers. Team or collaborative challenges are discussed elsewhere.

The most commonly identified opportunities and challenges for individual researchers that will be discussed in this guide (identified by other ID researchers[5] and discussed in the literature[6]) are summarised as:

Key Opportunities	Key Challenges
Potential for novel exciting breakthroughs with real-life relevance	Difficulty in maintaining a research identity – risks losing your research focus and trajectory
Diversified portfolio and methodological tools. Wider knowledge base. New perspectives gained. Adaptability.	Fewer outputs due to more time needed for complex research or fewer outlets for ID research – risks decreasing your impact or competitiveness
Increased career opportunities (e.g. private sector). An interdisciplinary market niche.	Evaluation of ID research is harder – risks your competitiveness if your research is not valued as much as other disciplinary research
Larger networks with more colleagues in more fields. More opportunities for collaboration.	Organisational structures or cultures may not favour ID research – can hinder career progression
Interesting, exciting and satisfying work.	Maintaining your well-being – risk of feeling isolated or overwhelmed

These challenges are not trivial, and can particularly be harmful to early career researchers, as they are often in less secure research positions and need to focus on developing their careers. However, the benefits of doing ID research are often the positive sides of the challenges. So how can we ensure that the challenges can be navigated successfully in order to capitalise on the many opportunities?

[5] ISSTI Interdisciplinary Masterclass April 2009. https://www.wiki.ed.ac.uk/display/ISSTIInterdisciplinary/Case+Studies
[6] See resource list at the end of this guide

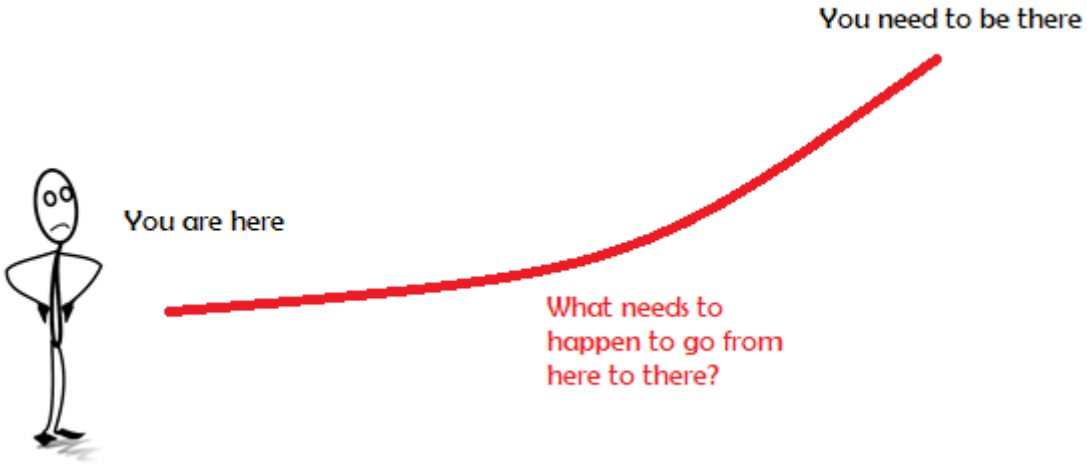
Activity: Take a moment to consider what challenges have the potential to affect you. Consider if there are any other challenges, which are not mentioned here, that you are concerned about. Do you know where you can find further advice on these concerns?

Use this space to make some notes:

Navigating the challenges

Most of the key challenges have the potential to de-rail your career trajectory as an early career researcher, and it is therefore important to first identify and consider what that career trajectory is. Only when you know where you want to go can you determine if your actions or experiences are leading you in the right direction.

Activity: Before we consider the challenges, I want you to think about where you are now as a researcher or in your career, and where you want to be in 5 – 10 years' time. If you start at the end point (thinking ahead 5 -10 years), consider your ideal outcome. What are you researching? Where are you doing your research? Who are you working with? How are you going about it?



By starting at the goal, it is often easier to think back on what needs to happen in order to achieve this goal. What are those challenges that might de-rail your career/research trajectory?

Use this space to make some notes:

Considering the five key challenges identified on page 4, the following provides some practical strategies and advice that can help to overcome these challenges. There is no one solution that fits all and some solutions may not be suitable or may take some effort to implement. It is up to you to decide what you think will be useful for your own unique situation.

1. Maintaining a research identity

When thinking about what kind of ID researcher you are, and how you do ID research, there can be many different kinds of ID identities emerging. Interdisciplinarity has often been portrayed as disciplinary experts contributing to a team (see for instance the cover of the Nature special issue on interdisciplinarity[7]), but what is perhaps becoming more common are those individuals who evolve to encompass multiple skill sets and possibly research identities in themselves.

The key challenge of working in ID research is that it can easily become blurred as to which discipline or disciplines you fit. You may find that you end up becoming more of a generalist having lost sight of your particular research skill set and identity. When working in largely disciplinary academic institutions, this can be problematic if you are not sure where you might fit in. It could also make you less competitive if your research record (e.g. publications list) is too broad, and you may find it difficult to convince others of your expertise on a particular area of research when applying for funding or jobs.

To keep on top of the potential to 'drift', it is important to check-in with yourself on a regular basis as to whether you still have a clear identity and if you are still on track to reaching your career/research goals. You may find that the goal has changed, but if so, are you still working towards where you want to be in your career or your research? The following tips may help you to overcome some of the challenges around maintaining your research identity:

- **What is your research superpower?** Think about what is the particular skill set that you could bring to an interdisciplinary team or apply to a particular research problem. This will help you to develop the narrative around your research. Do you have a clear idea of what that narrative is? Is it consistent or do you need to change it when talking with different audiences/disciplines? It is common for ID researchers to change the narrative depending on the audience, but as long as it is clear in your own mind what your research is ultimately about, it shouldn't matter.
- **Keep one foot in a parent discipline, but maintain interests in others**. If you maintain a core identity linked with one discipline it might help you to navigate the institutional structures and help you to define your particular skill set to others when working in ID teams. This advice largely hinges on the expectation that ID research occurs in disciplinary teams of researchers, and that organisational structures will remain largely disciplinary. However, this is rapidly changing as more funding for ID research will inevitably produce more complex individuals and research that challenges traditional structures (see section on the future of ID research). Therefore, this advice may still be relevant to you but if you feel that things are changing in your favour, this might not be a very useful suggestion as it might hamper your ability to forge new frontiers in research and be at the cutting edge of your research area. It may also not be beneficial if you plan on moving outside of academia, where the job market may value your unique interdisciplinary skill set.

[7] Nature Special Issue (2015) *Interdisciplinarity*. Available at: https://www.nature.com/news/interdisciplinarity-1.18295

- **Determine what model of researcher you are**. In a blog post by a Stanford Academic[8], Veena Srinivasan argues that models of researchers can vary in ID research, and that not all models are conducive to academia. In her blog she describes three models of researchers; the *T*, *pi* (π) and *O* shaped researcher. The traditional advice for researchers in academic institutions is to remain *T* shaped, where you have a well-developed single research niche (the stem of the *T*), but you have breadth (the top of the *T*) where you link your research niche to the wider context to keep it relevant for broader applications. If you are interdisciplinary, you may find that you are more of a *pi* (π) shape, where you have developed expertise in two disciplines (the two legs of the π) and your specific niche involves them both. Note that the two legs of the *pi* are necessarily shorter than the *T* as it's harder to keep up to date in two disciplines. This shape of researcher may favour careers outside of academia as you may have a broader skill set with less depth. The final shape she discusses is the *O* shaped researcher, where two or more disciplines are completely integrated and there are feedbacks between them. This shape of researcher is perhaps more conducive to working outside of academia as well, but may be necessary if you are an academically oriented ID research, where you are attempting to create a completely new discipline or sub-discipline by combining two or more disciplines. Considering what shape of researcher you are may help you determine where your challenges lie, and what opportunities you could make the most of.

2. Maintaining outputs and impact

ID research often arises as a necessary response to complex real-world problems and can involve many different people, concepts, methodologies or ideas. Due to this complexity there is an inherent risk of confusion in ID research, and can therefore take much longer to produce coherent outcomes. The extra time needed has the potential to decrease the number of outputs a researcher might reasonable expect if compared to those working in single disciplines. It may also be harder to find appropriate outlets for the ID work if journals and other publications are still largely disciplinary. You may also find that your publication record becomes too diverse, losing your research track-record along the way. The extra time needed and the potential for a diverse track-record may not be appreciated by other researchers, institutions or funding bodies, and can make you seem less competitive than your peers. This is also linked to how research is currently evaluated, but we will return to this in the next section.

The following strategies may be useful if you are concerned about your outputs in terms of either their number, diversity or impact:

- **Develop a diversified publication portfolio**. You could consider writing both high impact single disciplinary papers as well as interdisciplinary ones. The obvious downside to this advice is that this all takes extra time and effort, but it keeps your options open in terms of maintaining one foothold in a parent discipline (discussed above) and keeping the door open to other interdisciplinary research areas. It may also hamper a truly interdisciplinary effort and therefore risks the potential for novel and exciting breakthroughs with real life relevance.
- **Use ORCID to keep track and get credit for all your work**. ORCID[9] is a unique author ID that you can attach to all of your outputs (publications, datasets, etc). The benefit of using ORCID is that most journals and search engines will recognise this ID and it is well established

[8] Veena Srinivasan. *The t, pi and o models of interdisciplinary PhD research*. Blog post, available at: https://medium.com/@veenas_water/the-t-pi-and-o-models-of-interdisciplinary-phd-research-b81c278aa48d
[9] https://orcid.org

amongst the research community. It allows you to get credit for all your outputs, not just your papers, and makes it easier for others to see how productive you've been. It makes it easier to keep track of the many outputs that ID research can produce, such as co-authored papers. Edinburgh University also uses PURE to keep track of your outputs, and as a researcher at Edinburgh you have an obligation to keep your PURE record up to date[10].

- **Be strategic.** When working in ID research teams the potential to be pulled in all sorts of different directions and contribute to many different outputs is high. Despite the temptation to say yes to as much as possible to increase your outputs it might be worth considering whether any significant demands on your time and resources are well spent. Does contributing to an output fit your specific research narrative or profile? Does it enhance your abilities to progress along your career trajectory? Does it perhaps lead to further beneficial collaborations or networks in future? Does the journal or outlet fit your target audience? You only have a finite number of resources and it is worth considering how expending those resources will benefit you in the end before committing to too much.
- **Decide at the start how publications will be attributed and where to publish.** If you are working in a team or publishing papers with multiple authors, it is very important to ensure that your contribution to that publication will be useful to you, and that there is an agreement at the start how each contribution will be recognised. It might be more useful for each researcher to publish in their own disciplines if there are no suitable outlets for an ID paper that will equally suit everyone. Ensure that authorship rules are decided in advance. Consider whether many authors are detrimental in your field, or if the order of the authors matters. Different disciplines have different conventions, and there may not be one rule that fits all. Again, be strategic about where you spend your time.

3. Evaluation of ID research

Evaluation is probably one of the biggest concerns when undertaking ID research, and underpins many of the challenges discussed in this guide. You may question if your research will be evaluated fairly by peer reviewers of journal articles, by panels when applying for funding, or by your colleagues. Particularly when considering the potential of having fewer outputs or publications with lower impact, being able to compete fairly with other non-interdisciplinary researchers when being evaluated can cause concern.

Top tips for overcoming some of the concerns around evaluation:

- **Look for funding opportunities that specifically invite ID research proposals**. Many of the funding bodies now explicitly invite applications for ID research, and many even have specific panels set up to evaluate ID research proposals fairly[11]. It is worth checking the person specifications for any funding you will be applying for, and checking how your proposal or your track-record might be evaluated.
- **Start thinking about applying for funding and contacting potential funders early on**. ID research applications and proposals can take a while to get together, particularly if several people, ideas or concepts are being integrated. If you have an idea for a proposal, start thinking about what funding opportunities might be suitable early on, before you start writing the proposal in full. Funders are generally happy to give advice on project/person

[10] For more information on PURE follow https://www.ed.ac.uk/information-services/research-support/research-information-management/pure

[11] See for instance the UKRI Future Leaders Fellowships https://www.ukri.org/funding/funding-opportunities/future-leaders-fellowships/

eligibility early on; as it saves receiving proposals that are not suitable further down the line. Save them and yourself the effort and check early!

- **Make the most of any support provided, in either your School or the University**. Many Schools may have internal mock panels that you can test out your ideas on, and many Schools will have internal funding rounds if the number of applications they can submit for funding bids are limited. Check with your local director of research, your supervisor/line manager or the local postdoc society[12] for relevant support and advice. The University also provides support for writing applications and applying for funding through the Edinburgh Research Office[13]. Contact them early on when writing applications or applying for funding for advice on ID research proposals.
- **Identify suitable ID research journals and peer reviewers early on when publishing**. ID research journals are becoming more common and it is becoming easier to find suitable outlets for ID research. It is important you identify which journal you want to submit to before you start writing, as it can have an impact on how you frame your research when writing. When submitting your manuscript to a journal, make sure you suggest suitable reviewers to the editor. Ideally, they would be other researchers who have experience in doing or using ID research who can evaluate the whole and not just disciplinary parts of the submission. Remember that the quality of interdisciplinary work lies in the way that it brings disciplines together[14]. Highlight this to the editor when submitting to emphasise the merits of your ID submission.

4. Organisational structures and cultures

Traditionally, most higher education institutions are structured around disciplines, so there is a department or school within which disciplines typically sit. Accompanying these structures there are also disciplinary norms and cultures, such as what the research output formats are (journal articles, monographs, book chapters, editions, etc.), the number of authors or order of authors on outputs, and the rating of these research outlets (e.g. impact factors). The institutional structures and cultures can be difficult to fit into if you are an ID researcher, and don't quite follow the norms or expectations of a single discipline. This has implications for how your ID research might be evaluated in comparison with your disciplinary peers, and can affect your career progression (Lyall & Meagher, 2019). It can also be difficult to decide which department or school suits your research best, and finding a research 'home' can be tricky. You may already be sitting across several different schools or departments, and moving between them or dividing your time equally can be difficult to manage.

Here are some top tips on how to manage working in institutional structures and cultures, and making the most of it:

- **Find a more senior ID mentor who can help you navigate the system**. Having a mentor is a key element for many early career researchers development, and being an ID researcher I would argue it is even more important. Ideally, you would have a mentor who is themselves ID and who would be able to provide some useful guidance on how to succeed in ID research. Keep in mind that you can have more than one mentor, so don't feel like you only need to choose one. The IAD provide Mentoring Connections through the online resource, Platform One. This resource provides the opportunity for connections to be made far beyond a simple staff mentoring resource, creating a virtual meeting place for staff, students

[12] For more information on postdoc societies at Edinburgh University see our webpages: https://www.ed.ac.uk/institute-academic-development/research-roles/research-only-staff/networks/societies
[13] Edinburgh Research Office, https://www.ed.ac.uk/research-office
[14] British Academy (2016) p. 4

and alumni. This brings together the University community and if you are looking for a mentor, this resource will give you access to over 340 support profiles. There may also be other relevant mentoring networks within your disciplines. Look for mentoring opportunities provided by relevant societies or communities outside of your institutions[15], or contact individuals directly with your request. Remember that mentoring must go two ways, and it would be a good idea to offer to mentor other junior researchers if you can.

- **Keep one foot in a 'parent discipline'**. This advice has been discussed previously, but one that does crop up frequently in the literature. Keeping one foot in a parent discipline might be a suitable way for you to navigate the traditional structures of academia, but it does rely on the traditional view of an ID researcher being largely disciplinary but occasionally contributing to ID research. This may be suitable advice, but check whether this model of an ID researcher suits your ID identity, your research identity and your trajectory. If not, this may not be suitable advice for you.
- **Network widely to open up opportunities and communities, but be strategic**. One of the biggest advantages of ID research is that it opens up wider networks of researchers, communities and groups that you can access. However, be careful not to overstretch yourself, as some networks may not be useful to you. Networks are beneficial if they help you to find relevant information quicker, provide you with opportunities to develop, or connect you with the right people in your area of research. Make sure that any network you join is beneficial to you, and not taking more than it gives back. If you sit in multiple Schools or across disciplines it is worth finding out more about what local events, seminars, journal clubs or other groups might be of relevance to you. Are there any relevant mailing lists you should be on to get relevant information? Being an active part of multiple networks could save you some time by allowing you to keep on top of developments within different disciplines more easily. It also helps you to find other researchers who work in areas similar to yours, which might be useful for collaborations or for feeling part of a group (see the next section on wellbeing).
- **Take control of your online research profile**. If you are working or networking across institutions or disciplines it is worth checking what your online research profile looks like. What comes up when you google yourself? Is it what you want others to see and does it portray your research accurately? Make sure your online profile is up to date showing your recent outputs, you research interests, and what your collaboration interests are. Where can you add value to a collaboration and whom are you looking to collaborate with? Keeping on top of your profile will help others to find out about you more easily, and help you to network more effectively.
- **Check your institutions research strategy and promotion procedures.** Most higher education institutions will have a research strategy, which is openly accessible. It is important to read this strategy, and if you are moving to a new institution, to check that ID research is mentioned as a strategic element. This can give you a clue as to whether the institution values ID research and whether they are open to receiving ID researchers and committed to developing them. The University of Edinburgh specifically includes interdisciplinary research as a key strategic priority[16], and also provide guidance around

[15] For example, the Academy of Medical Sciences has a mentoring scheme and provides some relevant resources that are applicable to other disciplines as well: https://acmedsci.ac.uk/grants-and-schemes/mentoring-and-other-schemes/mentoring-programme

[16] https://www.ed.ac.uk/files/atoms/files/research_strategy_july_2017_final.pdf

interdisciplinarity and team research promotion[17], recognising many of the challenges outlined in this guide[18].

5. Maintaining your wellbeing

When working in ID research, it can be quite easy to feel isolated in your research, and if you don't feel like you fit in the specific School or department you are in this can amplify that feeling. ID research is often very confusing at times, and overcoming that confusion and isolation is key for maintaining your wellbeing when doing your research. Much of what we have talked about in this guide can make ID research look like a risky business, but please remember that the many opportunities and benefits of ID research often outweigh the challenges.

Some top tips to help you maintain your wellbeing are:

- **Remember the positives of ID research.** Though this guide has focused largely on the challenges, there are many opportunities in doing ID research. The opportunity to make real breakthroughs, to benefit society, and to do meaningful interesting work is a huge benefit of pursuing ID research. You may even find that it benefits you when starting to collaborate or when looking for work outside of academia. Remember why you are doing it to begin with!
- **Feel part of a community.** We have already discussed the importance of building networks for purposes of making the most of the opportunities around ID research, but this is also a key element in maintaining your wellbeing. Feeling part of a wider community and having other researchers to discuss and share your ideas with is a key element of any research, but especially useful for maintaining your sense of identity and purpose in your research. Make sure you make connections with local networks as well as more broadly to build that sense of community around your research. There may also be suitable networks of other interdisciplinary researchers you can join.
- **Read about others' experiences.** There are a host of blogs available to read about doing ID research (see resources section). These can be very affirming to read, and can be a useful way to reflect on your own experiences. Take the time to find interesting ID researchers to read about, follow them on twitter or other social media platforms.
- **Review your achievements and progress regularly.** Taking the time to reflect on your achievements and progress can be a very useful way to identify where things are going well and where they may need some extra thought. Reflective writing can be a useful way to encourage this, and many people use blogs or other outlets to share their thoughts with others. You don't need to make this public, but keeping some kind of record of your reflections can be a helpful way to keep track of your progress, and to re-assess if you are heading in the right direction. You can also use these to share with your mentor if you find that a helpful way to communicate. There are also several useful thought experiments on being an ID researcher you can try out (e.g. Lyall *et al*. 2011, ch. 6) that can help you to think deeper about your ID journey and identity.

Future of ID research – the good news

This guide has thus far focused on the challenges that can occur when doing ID research. Though it is important to recognise these, it is equally important to highlight the many opportunities that ID can

[17] See internal document from HR on: https://www.ed.ac.uk/files/atoms/files/guidance_on_interdisciplinary_and_team_research.pdf

[18] See also Lyall & Meagher (2019) for further examples of improving recognition and reward for ID researchers

bring. Indeed, a recent article in Wonkhe[19] on problematising ID research (which I highly recommend you read for a boost!) makes a very relevant point:

"…when we expect multidisciplinary research to be fraught with difficulties we will tend to find more *problems and ignore the benefits that come with, what I would argue is, a completely intrinsic part of the research endeavour".*

ID research is changing rapidly, driven by increasing demands for solutions to societies most complex or tricky problems. In this section we will highlight how the many challenges identified above are changing in favour of ID research, and hopefully make you feel more able and confident to capitalise on the many opportunities that ID research can bring.

- **The value and impacts of ID research are increasingly being recognised**. ID research can generate genuine breakthroughs that are truly novel and pioneering, and is increasingly being seen as a way to solve the worlds many tricky situations. In an article in Nature[20] it was found that the number of papers citing other papers from outside their own discipline and the discourse about interdisciplinarity has been increasing since the 1980's. Furthermore, they show that ID research has more impact over time (in terms of citations). Therefore, though you might have fewer outputs, those outputs have the potential to have higher impact both in terms of citations over time and the value to society.
- **More funding for ID research**. Indeed, the newly formed UK Research and Innovation (UKRI), who are the main funding body for the UK, was created to increase integrative interdisciplinary research, breaking down the barriers between the traditional research councils. They recognised the need for more funding towards ID research if we are to tackle society's tricky problems, and more funding calls for ID research are appearing (e.g. the Global Challenges Research Fund).
- **Research evaluation is changing.** In recent years there has been an increase in good practice and an effort to evaluate ID research fairly in UK universities and more broadly. Indeed, the UKRI and even the Research Excellence Framework (i.e. REF; a system for assessing the quality of research in UK higher education institutions) have interdisciplinary panels so that ID research can be included and evaluated fairly[21]. Further to this, many Universities and funding bodies are becoming increasingly aware of the need to diversify how research is evaluated, and are striving to go beyond using single metrics such as journal impact factors to evaluate the quality and impact of research[22]. This has the potential for ID research to be included and evaluated fairly going forward.
- **University structures are changing**. The British Academy (2016) make a very relevant observation that,

"Any move towards greater emphasis on public funding for ID research will inevitably affect university structures and how researchers forge their career paths,…".

[19] Annette Bramley (2019) Are we addicted to problematizing interdisciplinary research? Article in Wonkhe, available at: https://wonkhe.com/blogs/are-we-addicted-to-problemifying-interdisciplinary-research/

[20] *Nature* **525,** 306–307 (2015) doi:10.1038/525306a. Available at: https://www.nature.com/news/interdisciplinary-research-by-the-numbers-1.18349

[21] https://www.ref.ac.uk/about/ir/

[22] For instance the San Francisco Declaration on Research Assessment (DORA) or the Leiden Manifesto for Research Metrics (Leiden Manifesto).

Many interdisciplinary groups, institutions or centres are already active within Schools, departments and the Universities as a whole. For example, at Edinburgh University the Edinburgh Futures Institute aims to break down boundaries and forge new ways of thinking[23]. There is even a debate that the University of the future will be entirely interdisciplinary[24], and new ID universities are already beginning to form[25]. However, disciplinary structures are likely to still exist, and are necessary to maintain and develop disciplinary expertise, but there might be more space for ID research going forward.

Final thoughts

ID research is hard, frustrating, hair-rippingly difficult at times, but there is also ample opportunity to grow, develop and find real satisfaction and reward in doing ID research. If you don't step out of your 'usual' research at times, you might never move forward. Therefore, I hope this guide has provided you with the tools to navigate any potential challenges of pursuing ID research, and allowed you to realise and make the most of the many opportunities that it can bring.

[23] https://efi.ed.ac.uk/
[24] https://www.theguardian.com/higher-education-network/2018/jan/24/the-university-of-the-future-will-be-interdisciplinary
[25] https://www.londoninterdisciplinaryschool.org/

Resources

British Academy (2016) *Crossing paths: Interdisciplinary institutions, careers, education and applications*. https://www.thebritishacademy.ac.uk/sites/default/files/Crossing%20Paths%20-%20Full%20Report.pdf

Lyall, C., Bruce, A., Tait, J., & Meagher, L. (2011) *Interdisciplinary Research Journeys: Practical Strategies for Capturing Creativity*. London: Bloomsbury Academic. Available at: http://dx.doi.org/10.5040/9781849661782

Lyall, C. & Meagher, L. (2019) *Short Interdisciplinary Guide 11: Exploring Interdisciplinary Careers*. Part of a series of four-page guides to different aspects of interdisciplinary research leadership available to download. Available at: https://www.wiki.ed.ac.uk/display/ISSTIIInterdisciplinary/Interdisciplinary+Briefing+Notes

Lyall, C. & Meagher, L. (2008) *Short Interdisciplinary Guide 5: A Short Guide to Troubleshooting Some Common Interdisciplinary Research Management Challenges*. Part of a series of four-page guides to different aspects of interdisciplinary research leadership available to download. Available at: https://www.wiki.ed.ac.uk/display/ISSTIIInterdisciplinary/Interdisciplinary+Briefing+Notes

Nature Special Issue (2015) *Interdisciplinarity*. Available at: https://www.nature.com/news/interdisciplinarity-1.18295

Strang & McLeish (2015) *Evaluating Interdisciplinary Research: a practical guide*. Institute of Advanced Study, Durham University. Available at: https://www.dur.ac.uk/ias/news/?itemno=25309

Useful Blogs

Athene Donald's Blog (Chair of the REF Interdisciplinary Advisory Panel). http://occamstypewriter.org/athenedonald/category/interdisciplinary-science/

Catherine Lyall – *The power of the interdisciplinary*. https://www.teaching-matters-blog.ed.ac.uk/?p=1380

ESPA - Learning outcomes from a consortium of interdisciplinary research groups on poverty and the environment. https://www.espa.ac.uk/working-across-academic-disciplines

Gabriele Bammer - *Recognising interdisciplinary expertise: is it time we established the integration and implementation sciences*? http://blogs.lse.ac.uk/impactofsocialsciences/2017/12/14/recognising-interdisciplinary-expertise-is-it-time-we-established-the-integration-and-implementation-sciences/

Gianni Lo Lacono (postdoctoral ID researcher). *How multidisciplinary work was made meaningful for me*. http://www.espa.ac.uk/news-blogs/blog/how-multidisciplinary-work-was-made-meaningful-me

Veena Srinivasan - *The T, Pi and O Models of interdisciplinary PhD research*. https://medium.com/@veenas_water/the-t-pi-and-o-models-of-interdisciplinary-phd-research-b81c278aa48d

Author brief

This guide was produce by Emily Woollen, an academic developer within the researcher development team in the Institute for Academic Development, University of Edinburgh. Emily has a background in ecological and environmental sciences, and worked as an interdisciplinary postdoctoral researcher for several years. Her interest in ID research was sparked by this experience, and she has a continuing interest in providing support for other researchers to make the most of their ID research journeys.

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