



**IT COMMITTEE  
19 November 2015**

**Research IT 10 Year Planning**

**Description of paper**

1. This paper present the initial planning for a comprehensive and integrated Research IT Service.

**Action requested**

2. ITC is asked to consider and comment on this plan.

**Recommendation**

3. There is no recommendation associated with this paper.

**Background and context**

4. The University currently provides a range of research IT services, with services been operated by local research groups, through school and college services, to institutional services provided by support groups, and access to national providers. The University has benefited from EPCC hosting national facilities, and we should fully capitalise on the opportunities such facilities can offer. There is a perception that the range of services on offer are not fully utilised.
5. The number of different providers of research IT services, and the lack of integration between those services, presents a confusing picture for our researchers. This complex range of stakeholders involved in providing existing services can be bewildering for researchers. It is often unclear who should be contacted for support and what is available to whom.
6. Research is becoming more computational and data-intensive, and this trend will continue. Simulation and data analysis are augmenting and replacing traditional experimental techniques and this requires underpinning digital services.
7. Through ongoing dialogue with the University's research community, and building on work done over the summer to better understand the current landscape, we have identified that there are a number of gaps in service provision. The report on a Research IT workshop facilitated by the Digital Curation Centre is included in Appendix A as further background.

**Discussion**

**The Vision**

8. The vision is to provide a fully integrated Research IT Service that is leading edge and world class to support all aspects of Edinburgh's research IT needs including: computational services; research datasets; research data management; research software development and best practice; data



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analytics support & tools; research publication and knowledge exchange;  
research administration & research collaboration.

9. By integrating our research IT services, we will facilitate cross disciplinary and collaborative research; enable industrial partnerships and commercialisation; and provide a base for increasing, driving and broadening participation across all fields in computational research, data science, research collaboration and the collaborative use and exploitation of research data.
10. A key outcome will be to accelerate the research lifecycle: improved research administration and collaboration services accelerating preparation and exploitation of research – with the active phase of research accelerated by our computational and data services.
11. Our services should support researchers at every phase of their journey, from initial concept development, funding bid and project initiation; through the active phase of research; to publication and output management; and to exploitation to achieve its widest impact.
12. Our services should support our industry partnerships and wider collaborations, through secure and easily accessible services.

### **Achieving the Vision**

13. To achieve this vision we need to:
  - present and support our services more coherently. This will simplify the researcher journey and increase uptake of research IT services, regardless of who is providing the service. This will require investment in support services, specifically in research facilitators to guide our researchers, and consultants to understand the researcher's challenges and provide digital pipelines to enact their investigation.
  - address the gaps in service: provide the underlying e-infrastructure capacity to drive our digital research and a full range of services to support the researcher at each stage of their journey.

14. In mapping out the services required to deliver this vision we have categorised them as:

**Research Analysis and Simulation Platforms:** the e-infrastructure, tools and services to deliver computational research including high throughput and performance compute services; flexible cloud services; packaged analysis software; reproducible research environments.

**Research Data Service Platforms:** services to manage our research data and to perform data driven research, such as underlying data storage and archiving services; secure data services/data safe havens; electronic lab notebooks and laboratory information systems; a data visualisation suite; crowd sourcing platforms.

**Research Collaboration:** services to raise the external visibility of our



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research, and to establish internal and external partnerships, such as researcher blogging tools and improvements to researcher profile services

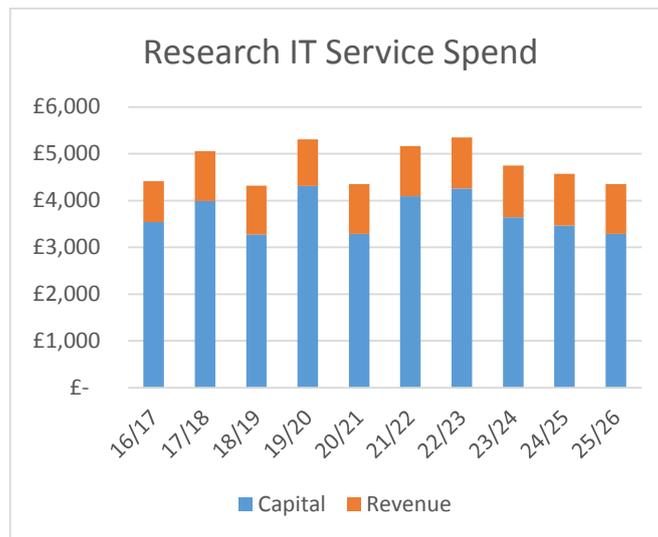
**Research Outreach:** the people-driven support services such as: research facilitators to guide our researchers to appropriate services; comprehensive consultancy services; training in computational methods, programming languages, analysis packages, data analytics and data management.

**Research Service Innovation:** such as a general 3D printing service.

15. Our approach would be to deliver sustained yearly investment to ensure the platforms and services remain current and to capitalise on latest technologies.

**Resource Implications**

16. Initial project planning estimates a yearly spend of approx. £5M per year, with a current profile of spend presented as:



This indicates the level of spend required to achieve our vision, but the expected balance of IS investment, central University estimate, and direct cost recovery from grants is still being worked through.

**Risk Management**

17. With the research process becoming ever more reliant on digital services across the full phase of the research journey, a failure to invest in this area will increase the risk of falling behind our competitors. Conversely, investment will support our industry and translational partners, improve the research process and provide a quicker path to discovery.

**Equality & Diversity**

18. There are no equality or diversity implications from this paper.



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**Next steps/implications**

19. This paper presents our early planning and further work is required to refine content, costings and pace of spend. Further engagement with the research community is required to confirm our direction of travel.

**Further information**

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**Freedom of Information**

21. This paper is open.



# Towards a comprehensive and integrated suite of research IT services at the University of Edinburgh

*A report on a workshop moderated by the Digital Curation Centre*

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*Sarah Jones*

*August 2015*



## Executive summary

Information Services (IS) has embarked on a programme of work to create a comprehensive and integrated suite of research IT services to underpin and transform research at the University of Edinburgh. This report summarises the outcomes of a workshop convened to map the current service landscape, identify gaps and prioritise where future posts and resources should be placed.

The current research environment at the University of Edinburgh offers a substantial range of research IT services. The University benefits from hosting a number of national services, whose expertise and infrastructure enhance the provision that Edinburgh researchers can access locally, which is beyond that typically available in most other universities. However, there was a perception that existing services are underused and the University is failing to capitalise fully on its strengths. Specific challenges need to be addressed in two key areas:

1. The University should present what support is available more coherently to simplify the researcher journey and increase the uptake of research IT services. Improving co-ordination and integrating services is key.
2. The University should address critical gaps in the infrastructure in the short-term and aim to support more discipline-specific platforms in the long-term to accelerate research. A sustainable business model and steady stream on investment will be critical to maintain and enhance research IT services.

The complex range of stakeholders involved in providing existing services can be bewildering for researchers. It is often unclear who should be contacted for support and what is available to whom. Two of the recommendations from the workshop deal specifically with this issue: existing services should be joined up and gaps filled to present an integrated suite of research IT services; and a coherent front-end web presence should be developed that presents the services as a unit.

A more coherent presentation and join up of services will go some way to alleviating the issues faced by researchers. A new research facilitator role was also envisaged to recommend relevant services for each specific context and promote uptake. This will be critical as services are currently underused and many researchers purchase and run their own technology rather than looking to the University to provide support. Researchers may not always be aware of how technology could enhance their work, or how different IT services are of relevance to them. Facilitators would have an in-depth knowledge of IS services and act as a broker to increase the uptake of services and ensure researchers access support.

Communication was highlighted as a key area for improvement. The University would benefit from a unified, public-facing profile to improve external communications and increase research visibility. Internal communications could also be improved, particularly during the research planning phase to help researchers identify and make the most of opportunities. A social-networking style platform was envisaged to help researchers make connections and build on existing work to develop



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proposals. Both of these ideas require a comprehensive record of research activity. Existing databases should be developed further to create an explorable registry of Edinburgh research, covering existing research projects, resources, data assets and expertise.

Although the University already has many services in place, there are clearly still gaps that should be filled. Several additional services were proposed to address specific needs across the research project lifecycle. Some of these reflect more generic user needs and are recommended as the initial focus since they will benefit multiple research communities. Top priorities amongst these are a Trustworthy Research Environment (TRE) and an Edinburgh Git service. In addition the University should be providing e-lab notebook software (ELN), a crowdsourcing platform and an Edinburgh cloud service. The gaps are proposed as the short-term focus. However, if the University truly wants to accelerate research, more comprehensive platforms tailored to the needs of specific research communities should be considered thereafter. These should support the management and use of data throughout the full lifecycle and be designed in collaboration with research communities. Lessons on this approach can be drawn from Monash University.

The outcomes from this workshop provide some initial recommendations to shape research IT services at the University of Edinburgh. These recommendations should be developed further by agreeing a more formal, prioritised roadmap of research IT services to address the various gaps and issues identified. This should be accompanied by a governance model for investment in services to ensure that provision meets researcher needs. Lessons could be learned from the University College London (UCL) approach in which each service area was governed by a committee of academics. The long-term maintenance and development of services also needs to be addressed: a group should be convened to explore funding models and develop a sustainability plan.

## Background

This report is based on a workshop held on Friday 5<sup>th</sup> June 2015 at the University of Edinburgh. Gavin McLachlan, the Chief Information Officer and University Librarian, convened a group of IS service managers and other interested parties to discuss research IT services at Edinburgh. A full list of participants and their affiliations is available in Appendix A.

The goals of the workshop were:

1. To understand and discuss the high-level goals and objectives of the future service
2. To establish an understanding of which services are currently in place and which are missing
3. To prioritise where future resources and posts should be placed to address any gaps

The overall objective is to create a comprehensive and integrated suite of research IT services to underpin and transform research at the University of Edinburgh.

Gavin gave a presentation on the concept, principles and objectives of a research IT service to frame discussion, and also used the example of University College London (UCL) as a comparator. The main activity during the workshop was to identify existing services and gaps in provision. Participants



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worked in pairs to brainstorm ideas before discussing results and agreeing priorities in the round. The workshop was moderated by Sarah Jones from the Digital Curation Centre.

All of the materials from the workshop are available in the appendices.

## Existing services

The discussion demonstrated that there is a rich research environment at Edinburgh and a wealth of existing services for researchers to draw on. Significant investment has already been made in the technical and human support infrastructure, and an IS-led group has been actively working on delivering Research Data Management services for the past three years. Amongst other things, this activity has included delivering higher-quantities of robust data storage, data repository services, data management planning support, advocacy and training. Further details are available in the Research Data Management Roadmap.<sup>1</sup>

In addition, the University benefits from hosting a number of national services. These include: EPCC, which provides a range of high performance computing services; EDINA, which delivers online reference services, multimedia support, mapping tools and data services; the Digital Curation Centre, which support the Higher Education sector with Research Data Management; and the Software Sustainability Institute, which aims to cultivate better, more sustainable, research software. Each of these services contributes to the delivery of research IT at Edinburgh.

Despite these strengths, there was a concern that existing services are underused. Researchers aren't always aware of what support is available and may provide their own data storage and equipment. In schools and departments with better local support this is probably set up more robustly, but in many cases, valuable research data are likely to be stored on insecure and unresilient local devices. This practice not only exposes the University to risk, it is an inefficient use of resource and detracts from the benefits that high-quality research IT services can offer.

Questions were raised about whether the University can join up local and school provision, such as the GPU cluster in informatics and UV large memory in EPCC. A research equipment register was also proposed to drive efficiencies by promoting the reuse of existing resources rather than purchase of new ones, especially since many only get used a small percentage of the time. UCL employed staff to visit departments and record any equipment over a certain threshold to ensure others were aware of and used existing facilities. The University of Edinburgh should explore similar models to join up and increase usage of existing provision.

Figure 1 (overleaf) provides a mapping of existing services on to a typical research lifecycle. This is based on suggestions made during the workshop and is not intended to be exhaustive. This diagram highlights the broad coverage of support that is currently available and notes the different service providers, where applicable.

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<sup>1</sup> <http://www.ed.ac.uk/schools-departments/information-services/about/strategy-planning/rdm-roadmap>



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One potential issue to emerge is the overlap of overarching services. The University has a few systems that play a key role across various stages of the lifecycle, most notably RMAS & PURE. Different opinions were expressed in discussion groups about where each system is positioned and the overlap in functionality could cause confusion for researchers about what should be used for what and when. System integration is already underway, but emphasis should be placed on the seamless transfer of information so that data entered into any of these systems is shared across all. Existing or desired integrations with other services such as Inteum and DMPonline were also flagged.

The division of responsibility between IS Apps and other University services when delivering major systems also warrants further clarification. Both parties are typically involved in procurement and development, but it is not always clear exactly who is responsible for what thereafter. Knowing what will be provided as part of Research IT Services and what falls to the other service partner to provide allows everyone to put sufficient resources in place.

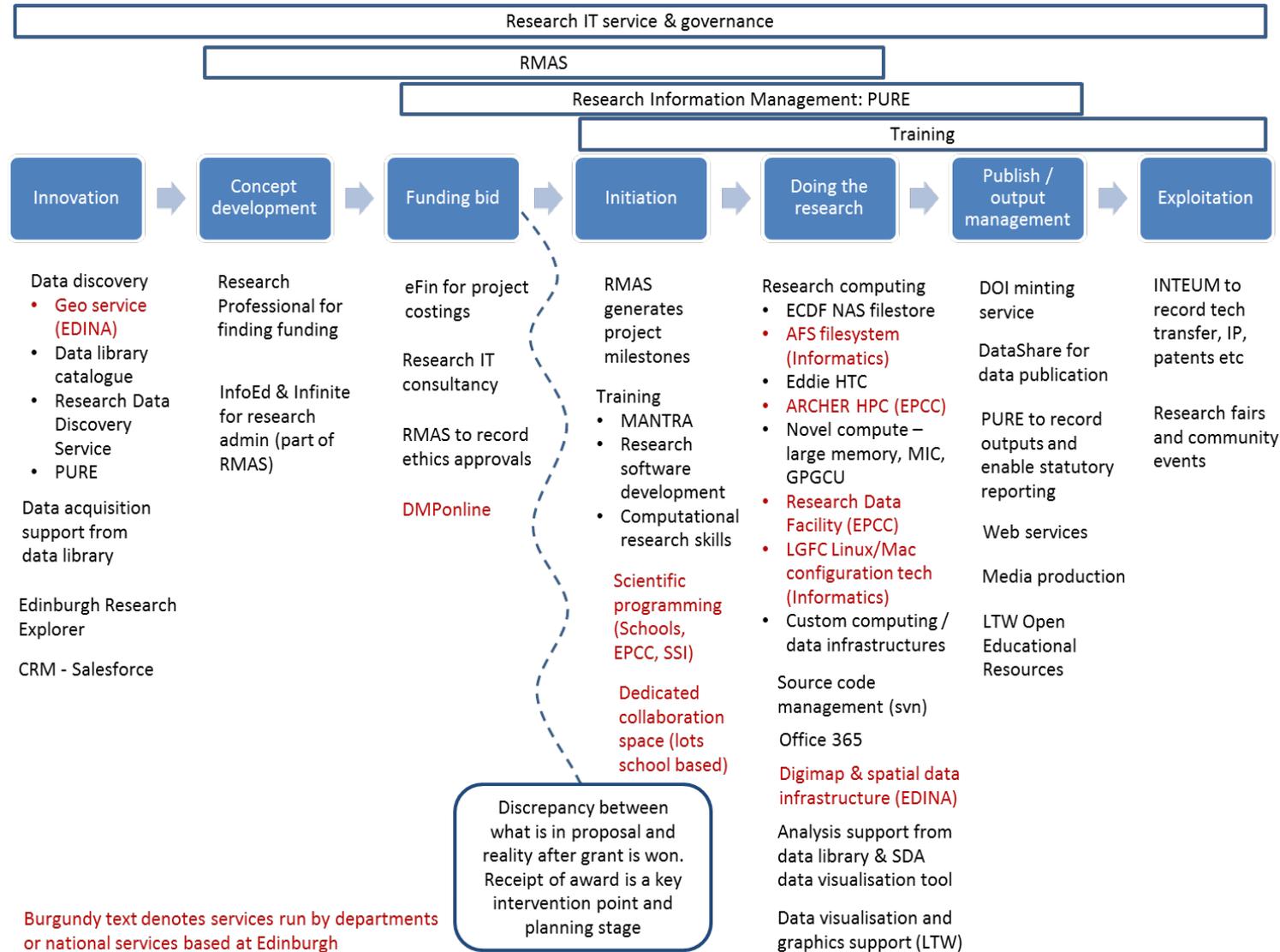


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**Figure 1: Existing services mapped on to a typical research lifecycle**





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## Research planning

One particular point that arose when discussing the lifecycle was the discrepancy between what happens during the initial project management focused stages, and the reality of delivering projects post-award. The initial, pre-award plans are likely to be compliance-driven whereas the more accurate, detailed project planning is done on initiation. The receipt of awards should therefore be a key intervention point for IS to engage with and support researchers.

Moreover it can be difficult to get researchers' attention pre-award when they are working to tight deadlines. Requests for support with Data Management Plans rarely come with sufficient time to provide detailed assistance. In Informatics, they have also experienced a reticence to share information about draft bids as researchers don't want others to know about them in case they are unsuccessful. At UCL all of the success rates were published, which encouraged researchers to solicit support to improve their chances and increase personal ratings.

Gavin noted the model used at the University of Manchester: they require a very basic outline Data Management Plan pre-award which acts as a research IT request. A few questions are asked about the nature of the data that will be created and associated storage requirements. The completion of this information generates a reference number that is needed to complete the research proposal process. This has proven a useful way of enforcing uptake and allows the University to gather information about projects to help with future curation and compliance checking.

The University of Edinburgh should revise its approach to data management planning in light of this discussion. The current Research Data Management policy mandates DMPs for every research proposal and expects a broad range of topics to be covered. Given the issues highlighted, it is inadvisable to ask for such a detailed plan at this stage. A shorter set of basic details should be captured pre-award to assist in planning research IT support and estimate costs to be included in proposals. These details would ideally be machine-readable rather than long, free text responses to enable analysis and transfer into other systems more readily. The information collected at this stage could also feed into any plans required by funders. The main effort to engage with researchers and agree an implementable DMP should be focused at the outset of the project instead. This would be a sensible intervention point for research facilitators.

## Gaps in provision

Although a number of gaps in provision were identified, the key issue that arose was the difficulty researchers' face in knowing what services are available and how to access support. A number of points of confusion emerge:

- Who is eligible to use the services – University staff only, industry, non-HE partners?
- What is provided as part of the core service?
- What is chargeable and to whom?
- Who provides the services?
- Who should be contacted for support?



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These issues are exacerbated by the complex range of stakeholders involved in the provision of research IT services at Edinburgh. The meeting attendees were in consensus that the University should present a more unified picture to simplify the researcher journey and marked this as a top priority. However, this aim ought to be balanced with the need to give recognition and credit to the national services for their input, since each of these parties needs to demonstrate impact to external funders. Gathering the services together into a single offering to aid researchers should be done in a way that allows users to still understand how their support has been delivered.

A number of gaps were identified and additional services proposed. For ease of navigation, these have been grouped under several themes in a mind map (see Figure 2). Several ideas were raised multiple times; these have been emboldened.

### Facilitation

A research facilitator role was proposed by Gavin and gained traction amongst the workshop participants. The facilitator's role would be to liaise with researchers and recommend a basket of services based on an understanding of their specific needs. The facilitators would have an in-depth knowledge of IS services and act as a broker to help researchers access and use relevant services. All of the research facilitators at UCL were former researchers or postgraduates. This background was felt to be essential so they could speak researcher to researcher. A broad range of discipline-specific knowledge will also be pertinent given the variety of subjects supported at Edinburgh.

Discussion in the groups picked up on similar ideas. There was a request for people to talk to about how technology can facilitate research, as researchers aren't always aware of what can be done. It was also felt that lessons could be drawn from the Learning and Teaching experience of introducing e-learning technologists; a parallel research technologist role was envisaged.

### Consultancy services

Consultancy services were suggested in a number of areas, including statistics, web design, information security and software configuration. In addition, projects frequently request the ability to contract in a fraction of a developer. It is recommended that the University employs additional developers on the basis that their costs will be recouped, so these support requests can be facilitated more easily. Given the expertise in centres such as the Software Sustainability Institute and EPCC, the University is well placed to provide support that help projects to overcome the issue of 'gradware' when core software is developed by students who move on.

A comprehensive consultancy service, in which IS would act as a bridging role between technology and research to design bespoke research solutions for specific contexts, was also proposed. This kind of support has been provided on occasion in the past, but there is insufficient resource to second staff to such roles regularly. To make the greatest impact on the actual research environment, such platforms are invaluable and the University should aim to support more of this work in future.



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Lessons could be drawn from the model implemented by the Monash eResearch Centre<sup>2</sup>. They partner research teams to develop solutions that fit in with local practice, instrumentation, tools and culture. This approach has been rewarded by greater levels of uptake and better sustainability. Since the platforms are tailored to a given community's needs, their relevance extends across organisational boundaries and applies to a global network. Groups have been known to seek further

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<sup>2</sup> For further information see section 5 on RDM platforms in *Bringing it all together: a case study on the improvement of research data management at Monash University*, available at:  
<http://www.dcc.ac.uk/sites/default/files/documents/publications/case-studies/Monash-case-study.pdf>



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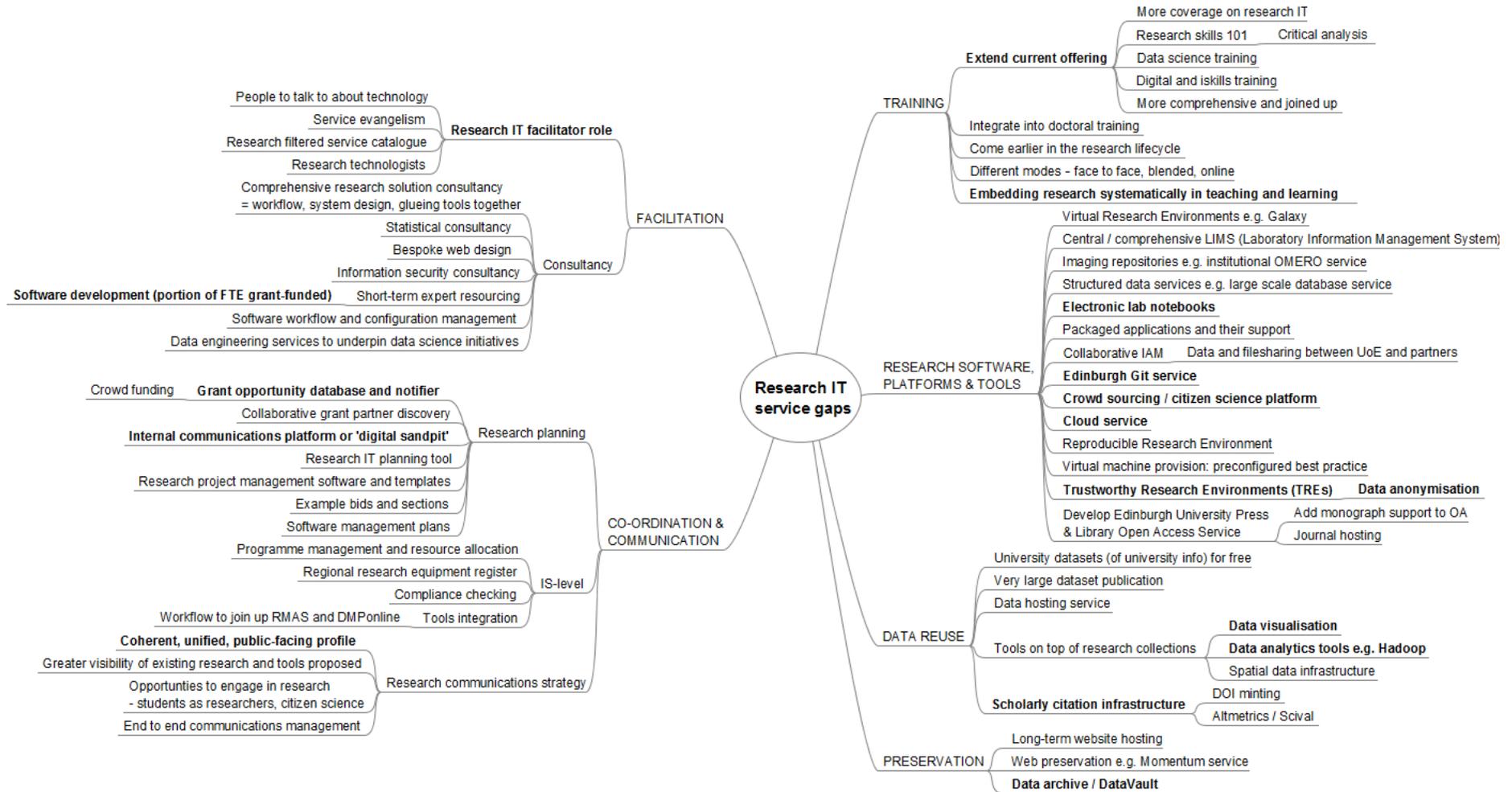
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**Figure 2: Service gaps identified by workshop participants**

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investment to maintain the service, lessening the pressure on the institution. One example from Monash is based on OMERO. The University of Edinburgh has research strengths in medical imaging and Professor Jason Swedlow, a co-founder of the Open Microscopy Environment is based locally at the University of Dundee, so this may be a useful initial pilot to explore the relative value of more discipline-specific platforms.

### **Co-ordination and communication**

There were a number of suggestions regarding improved co-ordination and communication, particularly in the research planning phase. Several people commented on the need for a central grant opportunities database so it is easier for researchers to find out about potential funding streams and be notified of schemes relevant to them. There was also discussion about some form of internal communications platform, social networking or 'dating' tool to help researchers find potential partners, share ideas and collaborate to develop proposals. As knowledge of existing research across the University is weak, such a platform could usefully connect to or encompass an explorable registry of existing research projects, resources, data assets and expertise. This data could act as an input to seed new collaborations. Other suggestions called for more templates and examples, which could easily be added to existing provision, and a research IT planning tool.

Some of the gaps identified may be addressed in the forthcoming RMAS system or other work that is currently underway. Research Professional already helps with identifying funding opportunities and other services are in development, for example the academic blogging service which will increase research visibility. Third-party tools were also suggested such as Pirus for research collaborations and Unity for scratching project ideas. The suggestions to improve research visibility and communications in the research planning phase should be reviewed once the new services are up and running to identify whether they are perceived or actual gaps, and where provision needs to be extended.

More co-ordination was proposed at an IS-level too, specifically to manage and allocate resources across a programme of projects. The tools used in the Roslin Institute may provide useful insight here. An equipment register and more join up of existing provision would help to improve efficiency, as noted earlier. Tools integration was also flagged as an area needing further work, and this is particularly important from an end user perspective. Since the University is committed to simplifying the researcher journey, the various systems need to integrate effectively. One area of concern here is the lack of control the University may have over some proprietary systems such as PURE. Care should be taken to develop clear workflows between systems, for example it should be trivial for researchers to reuse metadata from an existing entry in the Research Data Registry Service when they choose to deposit data in the DataVault or DataShare repository.

The other aspect perceived to be a serious gap was external research visibility. The University does not have a coherent, public-facing profile to promote research at Edinburgh, which is a big disadvantage competitively. It makes it difficult for others to learn about existing research or find opportunities for engagement. It also makes it more challenging for the University to promote research impact. The concerns about external visibility parallel points raised about internal



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communications. Both issues are hindered by a lack of knowledge of existing research and would be alleviated by comprehensive registers of research projects, data and capabilities. These issues could be addressed by a single system, though different front-ends would be necessary to support the distinct aims of internal and external users. However University policy might dictate that separate databases or systems are used to manage internal and external data.

Developing a clear communications strategy is recommended as the starting point. It seems that some of the gaps identified may already be addressed or underway, so a more comprehensive review is needed to confirm needs and set priorities. This should incorporate researcher viewpoints too, as they may be different to IS perceptions. A broad-based group should be convened to scope out the issues related to internal and external research visibility and co-ordination so a detailed plan and strategy can be formulated to address these.

### Training

A range of training courses are already provided, but it was felt that these could be more comprehensive and joined up. Several suggestions were made for extending coverage. These included broadening courses out to include research skills and critical analysis in collaboration with schools, providing digital and iskills training, more coverage on research IT, and data science courses. It was felt that existing provision should be integrated into doctoral training more, and that training should come earlier in the lifecycle, as it is often too late when projects are already starting. Further collaboration with schools and departments such as Education and the Institute for Academic Development should be pursued to extend and embed training. A range of modes should also be available, including face-to-face workshops, blended learning and online modules. Formative online courses such as MANTRA could provide a basic scaffolding that is extended in a range of additional options.

The other key theme to arise in discussion was the need for more research-led teaching. Often the two are seen as discrete activities and lecturers do not always value teaching as highly as their research. There was a desire to embed research systematically into teaching and learning. Using datasets within taught courses and providing opportunities for students to participate in research projects would ensure every student gets some research experience. This could be a real strength to differentiate Edinburgh degrees from others, and would help to start research careers off on a good footing. Many RDM training initiatives have found that educating PhD students and Early Career Researchers has a greater impact as they are still forming their working practices so are open to new ideas. Extending these concepts into undergraduate courses should benefit from the same effects.

### Research software, platforms and tools

A wide variety of suggestions were made as to additional research platforms and tools that could be provided. These included Virtual Research Environments such as Galaxy, comprehensive Laboratory Information Management Systems and imaging repositories such as OMERO. As noted earlier, the University should aim to provide more discipline-specific platforms in the future. Naturally, such an approach is more resource intensive, but the enhanced levels of user satisfaction, buy-in and sustainability that ensue merit further consideration. There are various criteria by which priorities



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can be set. The basis of the recommendations in this report has focused on natural starting points and levels of demand. In the medium term, the University should determine and refine priorities by measuring uptake and impact, or considering the potential transformative effect of new services and how they will accelerate and enhance research. Although addressing the needs of a smaller cohort, customised solutions will deliver a greater benefit to research so should be planned for in the future.

Several suggestions that tend to reflect more generic user needs were made multiple times and are recommended as the initial focus. Top priority amongst these was to provide a Trustworthy Research Environment or data safe haven to enable researchers to handle and share sensitive data securely. As a related concern, support on data anonymisation was also mentioned multiple times. The other services that were seen as a priority were an Edinburgh Git service to extend the existing svn provision, electronic lab notebooks, an Edinburgh cloud service and a crowdsourcing or citizen science platform. While some of these services will be quick wins, such as an Edinburgh Git service, others will be more complicated to implement. There is doubt for example whether a single ELN provider can really meet the diverse needs of all types of research. Here the University would be best to focus on one or two research areas initially or build on existing successes.

### Data reuse

The perception of research data as working capital was put forward in the meeting. Data should be viewed as an asset and several suggestions were made about services and tools to support reuse. Primary among these were tools to help with data visualisation and advanced analytics techniques. Some data visualisation support is available through EDINA and Learning Teaching and Web services (LTW) that could be built on. Given the Open Data agenda being pushed by the European Commission and various research funders worldwide, it is an opportune time to emphasise the University's track record in the area. More should be made of having one of the first data repositories at a UK university and the institution's commitment to supporting data sharing.

The need to provide acknowledgement via citation and to support an infrastructure that tracks research metrics and assigns credit was also felt to be key. Suggestions here included extending services for DOI registration and monitoring research impact via bibliometrics tools such as Altmetric and Scival. This is a key driver for researchers and a way to demonstrate the impact of Edinburgh research, so will generate several returns for the University.

### Preservation

The importance of data curation and archiving also emerged as a topic. The University is currently developing a DataVault service to ensure integrity and long term retention of golden copy research data. The DataVault is planned to provide safe, private, storage of data that is only accessible by the data creator or their representative. Having such a service was flagged as a priority by several groups and is necessary for compliance with research funder policies. Web preservation and long-term website hosting were also put forward as desirable services.



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### **Summary of gaps and recommendations**

A summary of the main recommendations based on this gap analysis is noted in the table overleaf. Many more suggestions were made, but it is recommended to start with these. Nine have been highlighted as priority concerns to work on initially. This is either based on the level of demand or as they are natural starting points to help progress other recommendations. The priority recommendations are split between the two main areas of concern: 1) improving co-ordination and uptake of services, and 2) addressing key service gaps.



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No.	Suggestion	Recommendation	Notes
1	Research facilitators	Introduce and staff a new role that acts as a liaison between IS services and researchers to increase awareness and uptake of support. A research background is essential and the University should aim to represent a broad range of discipline-specific expertise to serve the diverse research community at Edinburgh.	Can learn from UCL and e-learning technologist models. Consult with USD
2	Consultancy services	Extend provision, focusing initially on developer resource that can be bought out by research projects	Consult with IT and EPCC
3	Communications strategy	Establish a team to explore gaps in detail and develop a research communications strategy to address these	Will feed into recommendations 4, 5, 6 & 7
4	Record of research activity	Build on existing databases to create a comprehensive register of research activity at Edinburgh	Will be partly addressed by RDDS, RMAS, PURE and other systems. Can act as an input for 5 & 6
5	Internal communications platform	Develop a service to help researchers find potential partners, share ideas and collaborate to develop proposals	Could be informed by third-party tools such as Piirus
6	External research visibility	Develop a clear, public-facing research profile	Will draw on information from 4
7	Grant opportunities database	Explore Research Professional to establish whether this is a real or perceived gap, and whether the existing service needs to be extended	
8	Programme co-ordination	Introduce tools to manage and allocate resources across a programme of projects	Explore what the Roslin Institute uses
9	Training	Expand and join up existing provision, initially by exploring further collaboration with Schools and DTCs to embed and integrate training	
10	Research and teaching agenda	Embed research systematically into teaching and learning	Needs analysis underway in LTW
11	Secure data services	Establish a Trustworthy Research Environment and provide associated support and guidance on data anonymisation	Engage with the UK Data Archive to provide guidance on anonymization and data handling
12	Electronic lab notebooks	Provide and support electronic lab notebook software in one or two pilot areas	Lessons can be drawn from the UK researchdataman community
13	Edinburgh Git service	Establish an Edinburgh Git service for software management	
14	Crowdsourcing	Establish a platform to facilitate crowdsourcing and citizen science projects	
15	Cloud service	Provide an Edinburgh cloud service and guidance on local implementations	
16	Customised solutions	Pilot more discipline-specific solutions such as OMERO, tailoring where needed to support the research workflows and context in given areas	Lessons can be drawn from the Monash eResearch Centre approach
17	Data reuse	Provide tools and support for data visualisation and analysis	Some existing support to build on e.g. SDA visualisation tool and LTW support



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18	Scholarly citation infrastructure	Enhance existing provision by extending the DOI registration service and tracking impact with tools such as Altmetric and Scival	
19	Data preservation	Establish a service to allow researchers to preserve their data long-term	Work is already in progress on a DataVault service



## Implementation and governance

A number of recommendations have been made in this report. These should be considered further and ratified with other groups, most notably the research community. A prioritised roadmap should be developed as a result to clarify who will be responsible for addressing each element and in what timeframe.

The University already has successful models for researcher engagement and governance. The leadership that Professor Peter Clarke and College representatives give to the Research Data Management activities is held up as a model for other institutions to emulate. Academic engagement and leadership will be critical in the development of research IT services too to ensure they meet identified needs and are fit for purpose.

Consideration should be given to how the University will judge impact and uptake of these services, including variation across schools and departments. The metrics reported to the RDM Steering Group could be explored as an initial starting point. Service delivery should be refined and future priorities set on the basis of this.

A group should also be convened to address long-term sustainability. The University is aiming for services being free at the point of use, but charges will inevitably need to be applied for some more resource-intensive and customised services. Different models should be explored for recovering costs from grant funding and ensuring regular investment to maintain, enhance and add new services. The sustainability group will need broad input including representation from ERI and Finance.

## Priorities

A wide variety of gaps were identified, both in terms of specific infrastructure and services, as well as overarching issues such as coherent communications and facilitation. A few priorities were agreed on during the workshop. These were ratified and extended upon when participants provided feedback on workshop notes:

1. Join up the existing, disparate services and develop new ones where gaps have been identified to present an integrated suite of research IT services at Edinburgh. Investment needs to cover staff training to deliver the services as well as the infrastructure.
2. Develop a coherent front-end web presence that presents the services as a unit. Multiple narratives and case studies should be provided to connect with and engage researchers in different contexts. Where support is delivered by national services hosted at Edinburgh, the mode of presentation should give recognition to these units so they can demonstrate impact.
3. Provide research facilitators – people with a research background who understand user needs and are aware of the range of services offered at Edinburgh. Their role is to recommend relevant services for each specific context and promote uptake.



4. Develop a prioritised roadmap of research IT services to address identified gaps. The gap analysis and priorities identified at the workshop will provide an initial input to this. In association with this, establish a governance model for investment in research IT services that ensures services are built to researcher needs.
5. Make the case for additional, sustained investment in research IT services, aiming for the principle of all services being free at the point of use. Recognising that charges need to be applied at some point, also explore models for recovering costs via grant income.

In terms of staff resource, establishing a new facilitator role is the priority. The facilitators could be tasked with joining up existing services and presenting a coherent front end web presence to assist in their liaison role. Revisions should be made to the University's approach to Data Management Planning / Research IT planning, and the project initiation phase should be a key intervention point for research facilitators to engage with researchers. The other key area where early recruitment would be beneficial is in terms of securing additional developer resource that can be bought out to contribute to research projects. Staff should be employed in such roles on the basis that their salary will be recouped.

Several issues were flagged in terms of research communication, both internally and externally. Lots of gaps were identified but some of these may be addressed by existing or forthcoming services. The University should establish a team to explore the gaps in more detail and develop a research communications strategy to guide work in this area. Addressing the gaps in knowledge about research at Edinburgh is a key priority as this will be a necessary input to services that support internal communications and increase external research visibility.

A number of specific infrastructure gaps were identified. Some of these are already being addressed, for example a data preservation service, and others will build on existing provision such as training, data visualisation and citation tools. Five new services were mentioned multiple times and are recommended as the priority, namely a Trustworthy Research Environment, Edinburgh Git service, support for e-lab notebooks, a cloud service and crowdsourcing platform. In the medium term, priority should shift to more customised, discipline-specific applications.

The University is well-placed to provide a world-leading integrated suite of research IT services. There is a very strong team within IS and many existing services to build on. The recommendations from this report should form the basis of a more focused workplan that addresses the two key challenges faced: namely to provide more co-ordination and join up of services, and fill the key gaps in provision that were identified.

Success Stories - May 16

**New Awards**

Worktribe No.	PI	Co -i	School	Sponsor	Project Name	Partners	Award Date	Start Date	End Date	Indirect Budget	Direct Budget	Total Award	Institute
2848287	Barbara Webb		Informatics	Australian Research Council	Robocrab	University of West Australia	30/10/2015	01/01/2016	31/12/2019	£0	AUD 11,740	AUD 11,740	IPAB
	N/A	Boris Grot	Informatics	Oracle	Scale-Out NUMA Interconnect	EPFL	11/05/2016	N/A	N/A	£0	£69,000	£69,000	ICSA
1883734	Myungjin Lee		Informatics	EPSRC	NMaas	University of Glasgow	16/05/2016	01/09/2016	31/08/2019	£114,229	£231,992	£346,221	ICSA
Donation	Shay Cohen		Informatics	Bloomberg	Latent-Variable Spectral Learning Kernelization for NLP		20/04/2016				\$60,000	\$60,000	ILCC
Donation	Kenneth Heafeld		Informatics	Facebook	Area of decoding methods for spelling correction and synonym generation		21/04/2016				\$50,000	\$50,000	ILCC
	Claire Grover		Informatics	PTAS	Yik Yak		26/04/2016	01/09/2016	31/08/2017		£4,037	£4,037	ILCC
38902	Mark van Rossum		Informatics	BBSRC	FOCIA: Fast, open, cellular imaging analysis toolbox		17/05/2016	01/10/2016	31/03/2018	£91,218	£74,196	£165,414	ANC

**Changes to end dates of existing grants**

InfoEd no	PI	Sponsor	Project name	New end date	Additional budget awarded?	New Indirect budget	New Direct Budget	New total award amount
	Alex Lascarides	ERC	STAC	31/05/2017	No			

2016 Combined

Institute	Deposit			Open Access				Overall					
	Compliant	Non Compliant In Scope	Out of Scope	Unknown	Compliant	Non Compliant In Scope	Out of Scope	Unknown	Compliant	Non Compliant In Scope		Out of Scope	Unknown
ANC	29	0	10	0	33	0	4	2	28	0	10	1	39
CISA	18	0	4	0	21	0	0	1	18	0	4	0	22
ICSA	19	0	13	0	27	0	5	0	19	0	13	0	32
ILCC	55	0	14	1	63	0	2	5	54	0	15	1	70
IPAB	11	0	8	2	18	0	1	2	12	0	7	1	21
LFCS	53	0	19	1	65	0	5	3	51	0	19	3	51
School	182	0	60	4	222	0	16	11	178	0	64	6	248

<b>Overall Compliance</b>	71.77%
<b>As Yet Unknown</b>	2.42%
<b>Non Compliant</b>	25.81%
ISBN	37
problem	27 10.98%

Institute	Deposit			Open Access				Overall					
	Compliant	Non Compliant In Scope	Out of Scope	Unknown	Compliant	Non Compliant In Scope	Out of Scope	Unknown	Compliant	Non Compliant In Scope	Out of Scope		Unknown
ANC	1	-	-	-	1	-	-	-	1	-	-	-	1
CISA	3	-	-	-	3	-	-	-	3	-	-	-	3
ICSA	4	-	-	-	4	-	-	-	4	-	-	-	4
ILCC	12	-	4	1	15	-	-	2	12	-	5	-	17
IPAB	4	-	3	2	7	-	-	2	4	-	4	1	9
LFCS	21	-	5	1	25	-	-	2	20	-	5	2	27
School	44	0	12	4	54	0	0	6	43	0	13	3	59

**Monthly Compliance** 72.88%  
**As Yet Unknown** 5.08%  
**Non Compliant** 22.03%  
 ISBN 7  
 problem 8 13.56%

**Non Compliant Out of Scope**

24995301	When owl:sameAs isn't the Same Redux: Towards a Theory of Identity, Context, and Infe	ILCC	Thompson	conference with ISBN	19/07/2015
25046629	Improved Algorithms for Sparse MAX-SAT and MAX-k-CSP	LFCS	both now left UoE	conference with ISBN	28/06/2015
25046753	Completeness via Canonicity for Distributive Substructural Logics: A Coalgebraic Perspec	LFCS	Dahlqvist	conference with ISBN	05/06/2015
25122197	LifeCLEF 2015: Multimedia Life Species Identification Challenges	IPAB	Fisher	conference with ISBN	15/06/2015
25046584	Satisfiability on Mixed Instances	LFCS	both now left UoE	conference with ISBN	20/10/2015
25038283	Optimal Control of Multi-phase Movements with Learned Dynamics	IPAB	Nakanishi, Vijayakuma	conference with ISBN	26/04/2015
24987644	Navigation-specific neural coding in the visual system of Drosophila	IPAB	Wystrach	pre 1/4/16 acceptance	26/07/2015
25127785	Cell-Division Behavior in a Heterogeneous Swarm Environment	IPAB	Herrmann	pre 1/4/16 acceptance	unknown, pre Nov 16
25159180	The Museum as a Memory Institution	ILCC	Alexandru, Wolters	pre 1/4/16 acceptance	01/07/2015
25141230	Separating representation, reasoning, and implementation for interaction management	ILCC	now left UoE	pre 1/4/16 acceptance	31/10/2015
25071686	A Survey on Decidable Equivalence Problems for Tree Transducers	LFCS	Maneth	pre 1/4/16 acceptance	12/07/2015
24975035	Parser Adaptation to the Biomedical Domain without Re-Training	ILCC	Steedman	pre 1/4/16 acceptance	28/07/2015
25089370	Learning Join Queries from User Examples	LFCS	Staworko	pre 1/4/16 acceptance	01/08/2015
24974880	HMM-Based Voice Separation of MIDI Performance	ILCC	Steedman	pre 1/4/16 acceptance	21/12/2015

**Unknown Deposit**

25127695	Local Autoencoding for Parameter Estimation in a Hidden Potts-Markov Random Field	IPAB	Herrmann	no pdf - deadline 11/06/16
25119344	Fast Algorithms for Segmented Regression	LFCS	Diakonikolas	no pdf - deadline 23/07/16

**Unknown OA**

24760058	Availability Modeling of Generalized k-out-of-n: G Warm Standby Systems with PEPA	LFCS		paper in PURE
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# The Impact of informatics@edinburgh

stems from a central commitment to a double thesis:

- the design of computing systems can only properly succeed if it is well grounded in theory,
- the important concepts in a theory can only emerge through protracted exposure to application

*Robin Milner 1986*

# Creating and Identifying Impact

- Culture  
interactions with industry and society  
are key drivers for world-class research.
- Data collection  
generate stories  
identify opportunities
- Curation  
identify existing and potential evidence of impact.  
identify existing and potential 2\*+ outputs.

# The impact of Impact

- Four outputs per FTE
- $(N + 15) \% 10$  impact cases, (N is FTE total)
- submission of 105 FTE
  - 420 outputs - 65%
  - 12 impact cases - 20%
- 1 impact case  $\sim 10.8$  outputs

# medical applications of wearable sensors

- Monitoring Chronic Obstructive Pulmonary Disease
- Recording respiratory rate and flow  
wireless of data upload  
data analysis
- Patent protected
- Working with NIH for FDA approval in US market
- WHO 65m people have moderate to severe COPD  
predicted to be 3rd biggest cause of death by 2030

# medical applications of machine vision

- Screening for melanomas
- research contribution is the development of an algorithm for the accurate recognition of potentially malignant lesions
- an application allows the end user to take a picture of a skin lesion which is compared with a database of lesions
- licensed to Simedics, a commercial operator providing digital innovation in healthcare for UK
- needs attention to ensure exploitation and address other markets.

# applications of speech recognition

- Real-time and off-line subtitles
- Machine-generated subtitles can be real-time, which benefits those with hearing difficulties.
- Engagement with BBC and Ericsson (who currently perform human subtitling for BBC and Channel 4)

# applications of speech synthesis

- Motor Neurone Disease sufferers often lose their voices
- We can offer these patients a way to ‘build’ a synthetic version of their own voice.
- Need further engagement to maximise impact.

# A world-leading microprocessor

- Designed by Nigel Topham as a research tool
- Licensed to Synopsys - who sublicense to OEMs
- Out-performs ARM for size, power and speed
- Sublicences under NDA
- How do we quantify impact?

# Understanding Pictures

- Google is re-implementing a technique developed in Edinburgh  
training object class detectors with minimal human supervision  
more powerful image understanding abilities  
better search in personal photo collections
- How do we quantify impact without Google's cooperation?

# MCMC algorithms

- Successive researchers in algorithms and complexity have made major advances in Edinburgh that underpin much current work in Markov Chain MonteCarlo methods — most now departed
- Les Valiant [...1979] Alistair Sinclair[...1990]
- Mark Jerrum [...2008]  
Amin Coja-Oghlan [...2009]  
Martin Grohe [...2008]
- Kousha Etessami [Still here!]
- Can we make an impact case ????

### General Comments

- We need an actual impact plan that covers encouraging impact and raising the profile of impact rather than just collating what we already have.
- Should we be using PURE at this early stage – with direct researcher interaction – for recording evidence?
- For interdisciplinary cases consider carefully what the expected Informatics aim and impact are.
- For impacts with global reach, it may be easier to evidence a less ambitious intermediary impact. Geosciences example – we influenced these policies on deforestation in these countries rather than we reduced deforestation worldwide.
- For NDAs – Engineering have had success in getting senior staff here with good contacts in companies to talk directly and allow some kind of support. Letters have said things like: “your contribution was very useful” rather than direct citing.
- For new commercial agreements, ask for permission to use evidence for REF purposes. Might not get permission, but at least it’s on the table – and may be easier to get at an earlier stage.
- Might be useful (though time consuming) to work up a network connections map showing who has industry contacts where – there may be multiple links with one company that researchers and the company may not be aware of. This could be a critical mass in terms of impact.
- Schemes like the Math’s “Impact Time” prompt people to sit down and think about impact can be very useful even if the people don’t get the funding/time off/etc.
- The profile of impact needs to be raised. Possible suggestions were impact events, including talks on successful impact, for researchers and also PhDs – looking at cultural change on the long lead rather than just the next REF.

### Arvind’s COPD work

- Need to make sure there are relevant research publications from Edinburgh.
- What is the Informatics aim for the research – can the impact be shown based on that? I.e. something like novel use of sensors/monitoring/etc rather than the medical impact of fewer deaths from COPD/increased quality of life for COPD patients.
- What’s the likely timing on things like FDA approval? If this would mean 2-3 years, plus then 2-3 years of clinical use, may not yet be mature enough for the this REF.
- From medical standpoint, would need to have several years of use to show any medical impact and wouldn’t be mature enough for them.

### Bob’s melanoma work

- Follow up Simedics license – what’s happening here? What are the terms of the license?

- Could other markets be exploited? E.g. other countries with higher melanoma rates?
- Similar comments as above – what’s the timeline for likely license by another company and then actual use? What’s the Informatics related goal/aim/result?
- One avenue on impact could be the impact of the license on the company who hold it – i.e. they have a huge profit/employ more people/open up new markets.
- SkinVision app (<https://www.skinvision.com/>) may have got there first. Might feed into conversations with Simedics?

#### Speech Synthesis for MND

- Look at psychological impact on patients and their family and friends of having their own voices? Impact will not be large number of patients, so need to look at the scale of the impact on individuals.
- Is voice recording at an early stage of the disease recommended by clinicians? Is there anything on the policy side?
- Could/is the technology be used for people who lose their voices for other reasons? Might this increase reach?

#### Vitto’s Google image work

- Evidence based on Vitto’s time at Google? E.g., he worked there on these dates, this new feature was release during/shortly after that time?
- What’s the actual impact? Won’t be able to get Google saying this makes their site/software/etc work better.
- Look at what the image search/recognition is used for? Find use cases and then show how the change at Google (if this happens) affects these?

*Pim Totterdell*  
28/04/16

## **REF Steering Group**

**Proposal:** form a REF steering group to start looking advance planning for REF202X. Group to initially comprise of Director of Research, REF Co-ordinator, Director of Professional Services and Knowledge Manager.

**Remit:** advance REF planning initially looking at staff selection, monitoring of REF Open Access, REF impact planning. Development of longer term REF plan as and when rules and timings of the next REF become clear.

**First priorities:** Along with the impact planning, staff selection is likely to be the first priority particularly for staff who are currently on the cusp of eligibility, or who look like having fewer than the required number of papers. If we wish to include these staff, they should be approached sooner rather than later.

It has been suggested that we will have to submit all eligible staff, so eligible staff with fewer than the required number of papers could mean unclassified scores for the research outputs component.

It is possible that the end date for publications will be 31<sup>st</sup> October in the year of submission rather than the end of that year.

For each research active staff member, a decision needs to be made about:

- If they are REF eligible
- If they have/are likely to have enough papers (assuming 4 are required) that are eligible
- If they should be included in the submission
- If any extenuating circumstances apply in regard to number of papers (and if we need to apply any reduction)
- Which UoA they should be submitted to

For most staff, these are trivial, but it would be good to have a decision on each recorded for all staff.

*Pim Totterdell*  
26/5/16