The JISC Managing Research Data Programme: Helping UK Universities meet research data challenges and realise benefits

Simon Hodson
JISC Programme Manager, Managing Research Data
JISC Managing Research Data Programme

First some introductions…
Consider the challenges and drivers
Discuss how the JISC MRD Programme is helping UK universities
Emerging solutions and lessons
Mission to support universities and colleges to make effective and efficient use of technology, in teaching, in administration, in research and the management of research.

Infrastructure, services and innovation.

Shared national infrastructure and access to digital resources.

Piloting new technologies and approaches to the use of new technologies.

Efficiency through shared infrastructure.

Innovation through R&D projects which Universities are unwilling to undertake individually.
JISC Core Budget 2010-11

Recurrent

- £3.736m
- £6.737m
- £3.65m
- £3.93m
- £9.928m
- £12.126m
- £6.648m
- £4.147m
- £38.827m

Total: £89.729m
- 30 projects developing, RDM infrastructure and systems, planning tools, advice and guidance, training materials.

- 27 projects, greater emphasis on institutional development, mix of pilots and embedding/transition to ‘service’.

JISC/UMF Shared Service and Cloud Programme: http://www.jisc.ac.uk/whatwedo/programmes/umf.aspx
- Exploring ways of achieving efficiencies and benefits.
- How to provide trusted cloud storage?
- Developing software tools for RDM.
DCC: http://www.dcc.ac.uk/

‘The Digital Curation Centre is the UK’s leading hub of expertise in curating digital research data.’

Regional Data Management Roadshows.

Briefing Papers and How-To Guides.

Data Management Tools.
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Why is this important?

What are the key drivers?

What are the key questions to be addressed?
Challenges: the ‘data deluge’… huge quantities of digital data
  – But it’s not just about addressing storage issues.

Opportunities: data reuse, meta-studies, interdisciplinary grand challenges.
  – Increasing awareness of research data as an asset.
  – Digital research data has reuse value - important to obtain full return on public investment.

Results in policy drivers from funders.
  – Need improved knowledge of how best to realise these policies.

Increasing emphasis on the role of universities and research institutions to provide infrastructure and support for RDM.

- Presents a vision of ‘a scientific e-infrastructure that supports seamless access, use, re-use, and trust of data’, that is in which ‘the data themselves become the infrastructure – a valuable asset, on which science, technology, the economy and society can advance.’

- Presents the ‘wave’ as a challenge AND an opportunity, with benefits.
Volume: the long tail…

- GenBank
- PDB
- UniProt
- Pfam

- ChemSpider
- CATH, SCOP (Protein Structure Classification)

- Spreadsheets, Notebooks
  - Local, Lost

Slide: Carole Goble
Public investment requires that research data should be made available for verification and reuse.

RCUK Common Principles on Data Policy: http://www.rcuk.ac.uk/research/Pages/DataPolicy.aspx

1. **Public good**: Publicly funded research data are produced in the public interest should be made openly available with as few restrictions as possible

2. **Planning for preservation**: Institutional and project specific data management policies and plans needed to ensure valued data remains usable

3. **Discovery**: Metadata should be available and discoverable; Published results should indicate how to access supporting data

4. **Confidentiality**: Research organisation policies and practices to ensure legal, ethical and commercial constraints assessed; research process should not be damaged by inappropriate release

5. **First use**: Provision for a period of exclusive use, to enable research teams to publish results

6. **Recognition**: Data users should acknowledge data sources and terms & conditions of access

7. **Public funding**: Use of public funds for RDM infrastructure is appropriate and must be efficient and cost-effective.

Increasing responsibility for RDM being placed on Universities

Most funders require applicants to submit data management and sharing plans at grant proposal stage.

- **NERC** will require DMP from 2012; introducing notion of a ‘data value checklist’
- **ESRC** require a plan to be submitted electronically with the grant

**EPSRC** places responsibility on institutions to develop a data policy and roadmap

- Research organisations will ensure that EPSRC-funded research data is securely preserved for a minimum of 10-years ... *from last date on which access to the data was requested by a third party*
- Requires research institutions to ‘ensure that effective data curation is provided throughout the full data lifecycle’, with ‘data curation’ and ‘data lifecycle’ being as defined by the Digital Curation Centre’

**Increasing responsibility being placed on Universities.**
Responsibility for Costs

EPSRC recognises that systems and infrastructure appropriate to the storage and management of access to research data have associated costs. **EPSRC believes that where research has been publicly-funded it is reasonable and appropriate to use public funds to also fund the associated data management costs.** EPSRC therefore expects research organisations to make **appropriate provision** from within public research funding received, making use of both direct and indirect funding streams as **appropriate.**
Drivers: Research Funder Policies

Alliance of German Science Organisations, Principles for the Handling of Research Data:
http://www.allianzinitiative.de/en/core_activities/research_data/principles/

- Long-term preservation and open access to data from publicly funded research, with due respect to the interests of researchers and subjects
- Recognises the differences between disciplines
- Importance of recognition and support for 'this additional costly and time-consuming effort'
- Need for training
- Use of standards and best practice
- Need for development of infrastructure: 'a system of discipline specific, internationally networked data repositories for primary research data'
- Will start with series of pilots.
- 'The key element in this process, the sine qua non for its success, is the close cooperation between the scientists and the information providers.'

Supporting role of universities, research institutions?
Data Centres: their use, value and impact

Usage of data centres is high and growing.

- ADS usage tripled between 2005 and 2009 (4M > 12M page downloads per annum)
- ESDS usage quadrupled between 2003 and 2008 (1000 > 5000 downloads per month)

Increasing volume.

- BADC: 20 data sets / 20 terabytes (2002); 130 / 60 terabytes (2007)
- EBI storage: 20 terabytes in 2006, rising to 4.5 petabytes in 2009

Benefits include: research efficiency, and research quality.

Data centre expertise and user support highly valued.

Data centres are a success story and their work should be supported.
Questions Raised by the Data Centres Report

- How do we best support the work of data centres?
- How may we best encourage deposit of new data?
- How can data centres be more effective in outreach and training?
- How can data centres/infrastructure better encourage cross-disciplinary research?
- Should the infrastructure of national data centres be extended to other disciplines, and what cases would need to be made for investment?
- Need to encourage closer cooperation between data centres and universities/research institutions.
- Need to support improved RDM practice in universities, otherwise investment in data centres will have limited impact.
Key Questions to be Addressed?

- How do we turn these principles into action?
  - How do we fund the data infrastructure?
  - How do we best coordinate the stakeholders and agencies?
- What is the role of universities and research organisations in the research data landscape?
  - Important of partnerships with data centres.
  - Roles of universities in RDM ‘upstream’ of data centres.
- **How best to support RDM practice in Universities?**
- How do we demonstrate the benefits, make a case to researchers, institutions and funders?
  - Importance of leading academic champions.
  - Funders and institutions must see a case to invest resources.
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How do we break down the problem and target activity?
Supporting the research data lifecycle
Leadership and policy development
Guidance and training
Data Management Planning
Data Management Infrastructure
Benefits of better research data management
Data assets of research done in Universities often comprises small, labour intensive data.

Storage and curation of data falls, for the most part, falls very far short of good practice.

Key JISC reports:
- Dealing with Data: http://www.ukoln.ac.uk.ukoln/staff/e.j.lyon/reports/dealing_with_data_report-final.pdf
- Keeping Research Data Safe: http://www.jisc.ac.uk/media/documents/publications/keepingresearchdatasafe0408.pdf
- UKRDS Scoping Study: http://www.ukrds.ac.uk/resources/

JISCMRD Requirements Analyses (current practices, researchers attitudes, requirements).
- Oxford, Sudamih: http://sudamih.oucs.ox.ac.uk/
- Cambridge, Incremental: http://www.lib.cam.ac.uk/preservation/incremental/
- Southampton, Institutional Data Management Blueprint: http://www.southamptondata.org/
- Manchester MaDAM: Landscape Review (policies, legal and ethical perspectives); Requirements and gap analysis; Technologies review: http://www.merc.ac.uk/?q=node/2866
What is current practice in UK Universities?

- ‘Departments typically don’t have guidelines or norms for personal back-up and researcher procedure, knowledge and diligence varies tremendously. **Many have experienced moderate to catastrophic data loss.**’
  - Incremental Project Scoping Study and Implementation Plan

- ‘The current environment is such that responsibility for good data management is devolved to individual researchers and in practice PIs set the 'rules' and establish the cultural practices of the research groups and this means there is good data management practice going on in pockets but no consistency across groups. **There is also consequently a high risk of data losses by a number of means**.’
  - MaDAM Project Requirements Analysis
    [http://www.merc.ac.uk/sites/default/files/MaDAM_Requirements%20%20gap%20analysis-v1.4-FINAL.pdf](http://www.merc.ac.uk/sites/default/files/MaDAM_Requirements%20%20gap%20analysis-v1.4-FINAL.pdf)
Supporting the Research Data Lifecycle

Leadership and Policy Development

Publication and Citation Mechanisms

RDM Systems and Infrastructure

Guidance and Training

Support for Data Management Planning

Hand Over?

Store

Annotate

Select

Discard

Access

Discover

Use

Create

Select

Hand Over?
Projects identified need for senior support within the institutional, governance and responsibility to be mapped, to engage with institutional stakeholders

- **MaDAM** Project identified having senior champions as a necessity; established a high level steering group

- Work on policy development, governance and engagement with institutional stakeholders to be taken forward in new programme.
Timeline for Institutional Development

**Near term (up to a year)**
- Get key players from across institution together: Identify objectives for Research Data Management (RDM)
- Raise awareness and make use of existing general training materials e.g. DCC101
- Identify and benchmark existing central provision for RDM, including research information systems, grant costing & staff support services
- Identify, disseminate and develop current exemplars to conduct basic audit of RDM. Seek quick wins with high profile academic champions
- Draw on external expertise, build links with potential partners

**Medium term (1-3 years)**
- Establish a formal University wide Committee to develop & ratify policies on RDM; disseminate benefits & cost savings
- Design and pilot institution-wide and discipline-specific training drawing upon local support and guidance
- Appraise RDM provision & conduct gap analysis to develop business case. Benchmark levels of maturity of RDM infrastructure & support
- Develop portfolio of projects to reuse infrastructure, build RDM capacity in further key groups
- Formalise links to external partners & stakeholders where necessary

**Long term (>3 years)**
- RDM is embedded across faculties & central services, subject to periodic review, ensuring information flow and support is co-ordinated
- Roll out institution-wide and discipline-specific training to all new staff & students. Periodic review and update of materials
- RDM service in place and involving all stakeholders. Periodic benchmarking and target setting
- RDM and Policies developed at faculty level; Key academic groups are engaged; central services in widespread use across the institution
- RDM effectively integrated with shared UK and international services; quality assurance in place

DCC Briefing Paper, ‘Making the Case for research data management’:
http://www.dcc.ac.uk/resources/briefing-papers/making-case-rdm
Seeking win + win + win + win + win + win……

Where do I safely keep my data from my fieldwork, as I travel home?

How can I best keep years worth of research data secure and accessible for when I and others need to re-use it?

How do we ensure we have access to our research data after some of the team have left?

How can our research collaborations share data, and make them available once complete?

How do we ensure compliance to funders’ requirement for several years of open access to data?

LEVEL

PhD student

individual researcher

research team

university

supra-university

Research Integrity, London - Sept 2011
Research Data Management: University of Edinburgh Roadmap

Internal pressure from researchers

External pressure from funders etc

Res comp strategy

RDM WG

RDM Policy

RDM Implementation Plan

RDS WG

RDS Implementation Plan

Research Data Services

Research Integrity, London - Sept 2011 26
University of Edinburgh Research Data Management Policy: Key Elements

- Research data should be managed to the highest standards throughout the research data lifecycle as part of the University's commitment to research excellence.

- The University should provide training, support and advice, as well as mechanisms and services for storage, backup, registration, deposit and retention of research data assets in support of current and future access, during and after completion of research projects.

- Responsibility for research data management through a sound research data management plan during any research project or programme lies primarily with PIs.

- All new research proposals must include research data management plans or protocols that explicitly address data capture, management, integrity, confidentiality, retention, sharing and publication.

- Research data management plans must ensure that research data are available for access and re-use, where appropriate and under appropriate safeguards.

- Research data of future historical interest, and all research data that represent records of the University, including data that substantiate research findings, should be offered and assessed for deposit and retention in an appropriate national or international data service or domain repository, or a University repository. Such research data deposited elsewhere should be registered with the University.
See DCC on institutional data management policies: http://www.dcc.ac.uk/resources/policy-and-legal/institutional-data-policies


- University of Oxford Commitment to Research Data Management: http://www.ict.ox.ac.uk/odit/projects/datamanagement/

- University of Hertfordshire: http://research-data-toolkit.herts.ac.uk/?p=11
Projects identified researchers’ need for guidance, easily accessible information and training

- **Incremental** Project found that researchers 'require clearer, readily available guidance and practical support to manage their data effectively.' The project focused on making guidance accessible and easy to understand. *Incremental final report*
Guidance Materials (JISC MRD Programme)

- Incremental Project, collaboration between Glasgow and Cambridge, concentrated on providing guidance and training materials at an institutional level; focus on arts and humanities, social sciences, archaeology, social anthropology:
  [http://www.lib.cam.ac.uk/preservation/incremental/index.html](http://www.lib.cam.ac.uk/preservation/incremental/index.html)

- Cambridge: [http://www.lib.cam.ac.uk/dataman/](http://www.lib.cam.ac.uk/dataman/)

- Glasgow: [http://www.gla.ac.uk/datamanagement/](http://www.gla.ac.uk/datamanagement/)

- Workshops and Seminars covering ethics, FoI, IPR, new technologies:
  [http://www.lib.cam.ac.uk/preservation/incremental/seminars.html](http://www.lib.cam.ac.uk/preservation/incremental/seminars.html)

- Interviews from Seminars:
  - [http://www.lib.cam.ac.uk/dataman/training.html#Interviews](http://www.lib.cam.ac.uk/dataman/training.html#Interviews)
  - [http://www.gla.ac.uk/services/datamanagement/training/videos/](http://www.gla.ac.uk/services/datamanagement/training/videos/)

Need for subject focussed research data management / curation training, integrated with PG studies

Five projects to design and pilot (reusable) discipline-focussed training units for postgraduate courses: [http://www.jisc.ac.uk/whatwedo/programmes/mrd/rdmtrain.aspx](http://www.jisc.ac.uk/whatwedo/programmes/mrd/rdmtrain.aspx)

Health studies: [http://www.northumbria.ac.uk/sd/academic/ceis/re/isrc/themes/rmarea/datum/](http://www.northumbria.ac.uk/sd/academic/ceis/re/isrc/themes/rmarea/datum/)

Creative arts: [http://www.projectcairo.org/](http://www.projectcairo.org/)

Archaeology, social anthropology: [http://www.lib.cam.ac.uk/preservation/datatrain/](http://www.lib.cam.ac.uk/preservation/datatrain/)

Psychological sciences: [http://www.dmtpsych.york.ac.uk/](http://www.dmtpsych.york.ac.uk/)

Online course built using OS Xerte toolkit.

Sections include:
- DMPs
- Organising Data
- File Formats and Transformation
- Documentation and Metadata
- Storage and Security
- Data Protection
- Preservation, sharing and licensing

Also software practicals for users of SPSS, R, ArcGIS, Nvivo

Research Data MANTRA: [http://datalib.edina.ac.uk/mantra/](http://datalib.edina.ac.uk/mantra/)
DCC How-To Guides: [http://www.dcc.ac.uk/resources/how-guides](http://www.dcc.ac.uk/resources/how-guides)

- Appraise and select research data for curation
- How to license research data
- How to develop a data management and sharing plan
- Hot of the press: How to cite research data!

Further Guides in preparation.
Projects identified need for support with meeting funders requirements for data management plans

- **MaDAM** pilot tool provided 'in-tool' support for development and execution of DMPs, comprising help pages, intelligent functions (automatic review dates) and exchange of information administrative systems allowing pre-population. *MaDAM Benefits Analysis*
DCC DMP Guidance:

- Overview of funder policies: [http://www.dcc.ac.uk/resources/data-management-plans/funders-requirements](http://www.dcc.ac.uk/resources/data-management-plans/funders-requirements)
- DMP Checklist: [http://www.dcc.ac.uk/webfm_send/431](http://www.dcc.ac.uk/webfm_send/431)

DCC DMP Online tool: [http://www.dcc.ac.uk/dmponline](http://www.dcc.ac.uk/dmponline)
Understanding the challenges of meeting funder requirements: DMP-ESRC Project

Projects to understand challenges of meeting funder requirements: Social Sciences, Engineering, Medical Research, Plant Microscopy, Gravitational Wave Astronomy, Interdisciplinary: http://www.jisc.ac.uk/whatwedo/programmes/mrd/rdmp.aspx

- Led by UK Data Archive: http://www.data-archive.ac.uk/create_manage/projects/jisc-dmp
- Study of data management practices in ESRC funded Centres and Programmes.
- Data Management Recommendations: http://www.data-archive.ac.uk/media/257765/ukdadatamanagementrecommendations_centresprogrammes.pdf
  - Clear roles and responsibilities; RDM coordinator; Data Inventory; Data Management Resources Library.
  - Guidelines on anonymisation, security and backup etc.
  - Greater use of collaborative environments; improve usability and training.
- Data Management Costing Tool: http://www.data-archive.ac.uk/media/257647/ukda_jiscdmcosting.pdf
Data Management Planning for engineering and manufacturing research, IdMRC and UKOLN, Bath: http://www.ukoln.ac.uk/projects/erim/

Study of RDM challenges and potential in engineering and manufacturing research.

Data extremely heterogeneous: materials analysis, modeling, interviews; varied conditions of use etc.

Requirements for improved RDM; draft IdMRC Projects Data Management Plan.

Recommendations:
- Data management needs to be supported by appropriate tools/personnel, or balanced by immediate benefits.
- Important role of data manager in research centres needs to be examined closely, resourced if necessary.
- Greater use of collaborative environments.
- Suggested software for mapping information development in engineering projects.
Projects identified need for RDM systems which integrate effectively with existing practice

- **ADMIRAL** 'created tools and services' to improve local RDM, in ways that directly benefit researchers and 'that fit with their normal working practices and that impose as little as possible in terms of cognitive overhead – what we term sheer curation.'

*ADMIRAL Final Report*
Infrastructure Projects: [http://www.jisc.ac.uk/whatwedo/programmes/mrd/rdmi.aspx](http://www.jisc.ac.uk/whatwedo/programmes/mrd/rdmi.aspx)

- Holistic approach to infrastructure.
- Projects focusing on disciplinary requirements.
- Projects piloting systems in institutions.
- MaDAM Project, biomedical research in an institutional context: [http://www.merc.ac.uk/?q=MaDAM](http://www.merc.ac.uk/?q=MaDAM)

**MaDAM Pilot Overview**

- **Aim:** Pilot Research Data Management Solution

- **Data storage hardware**

- **File management software**
  - Tagging, linking, annotation, sharing, access control

- **Data management guidelines/plan**
  - "how to" + standards setting

- **Pilot Research Data Management Solution**

Many angles to cover:
- Research Practice
- Discipline/Domain
- Technical Solution
- Policies/Procedures
- Institutional Settings (Stakeholder & Infrastructure)
- Funding Landscape
- Cost-Benefit Analysis
MaDAM met identified user requirements by:

- providing an accessible and simple platform for the organization and annotation of research data
- providing trusted secure storage to reduce risks of data loss
- providing a mechanism to make metadata visible and searchable
- facilitating easier, more secure owner-controlled data sharing
- reducing redundancy/duplication by making existing resources easier to discover
- maintaining media format accessibility for long-term reuse
- enabling compliance with legal and funder obligations
MiSS (MaDAM into Sustainable Service): [http://www.miss.manchester.ac.uk](http://www.miss.manchester.ac.uk)

Policy, guidance, training, extending infrastructure, ensuring sustainability and transparent costing.

‘I see MiSS as a transitional project (rather than a continuation to MaDAM) – we’re tasked with moving from pilot to service; and I firmly believe it’s our responsibility to do this in full view of the wider community.”
UMF RDM SaaS Applications

- VIDaaS (Virtual Infrastructure for Database as a Service), University of Oxford: [http://vidaas.oucs.ox.ac.uk/](http://vidaas.oucs.ox.ac.uk/)
- DataFlow, University of Oxford: [http://www.dataflow.ox.ac.uk/](http://www.dataflow.ox.ac.uk/)
- Smart Research Framework (chemistry, crystallography), University of Southampton: [http://www.mylabnotebook.ac.uk/](http://www.mylabnotebook.ac.uk/)
- Biomedical Research Infrastructure (BRISSkit), University of Leicester
Projects identified need publication and citation mechanisms in order to help researchers to obtain benefits for data sharing

- ‘There will be little recognition for good practice curation and sharing of research data unless the practice of citing data used is better encouraged and standard formats and mechanisms for data citation developed. ADMIRAL addresses this by working with the British Library to provide for Digital Object Identifiers (DOIs) to be assigned to published datasets.’

- ‘The deposit of a dataset with the repository will fall into three categories, in which increasing levels of benefit are offered to the depositor in return for an increasing willingness to share the dataset. This is thus a “carrot” to encourage openness and data sharing. Measurements of the number of data requests or downloads from each category will provide feedback on the usefulness of this approach.’ FISHnet Project
Data Citation

- DCC How To Cite Datasets and Link to Publications: http://www.dcc.ac.uk/resources/how-guides/cite-datasets
- BL is a founding member of DataCite
- Currently have DataCite user group; will be extending this and working with JISCMRD Projects

This journal requires, as a condition for publication, that data supporting the results in the paper should be archived in an appropriate public archive, such as GenBank, TreeBASE, Dryad, or the Knowledge Network for Biocomplexity.

- Allows **embargos** of up to one year; allows **exceptions** for, e.g., sensitive information such as human subject data or the location of endangered species.
- Data that have an established standard repository, such as DNA sequences, should continue to be archived in the appropriate repository, such as GenBank. For more **idiosyncratic data**, the data can be placed in a more flexible digital data library such as the National Science Foundation-sponsored Dryad archive at [http://datadryad.org.](http://datadryad.org)
Dryad-UK: a repository for supporting research data

Dryad-UK

- Expand the number of journals: BMJ Open, titles from PLoS and BioMed Central:
- Prepare a business model for long term funding of the data repository: supported by payments from journals, in turn recouped from subscription or author-pays OA fees.

Costs

- Estimate costs of archiving (curation and preservation) datasets in Dryad: $25-75 per publication
- Estimate full costs of research and publication per OA article: $2500
- Costs of data archiving in Dryad 1-3% of costs of producing the article.


- Study examined citation history of 85 cancer microarray clinical trial publications, taking into account whether or not research data was publicly available.

- Study found that ‘publicly available data was significantly (p = 0.006) associated with a 69% increase in citations, independently of journal impact factor, date of publication, and author country of origin’.

Early Results: **data archiving increases scientific contribution by more than one third**, [http://researchremix.wordpress.com/2011/02/18/early_results/](http://researchremix.wordpress.com/2011/02/18/early_results/) (citation, reuse of data from Gene Expression Omnibus).

- Makes a strong case for the return on investment for making Public Sector Information freely available and easy to access and reuse.

- Case studies on national statistics, geospatial data and hydrological data.

- For research data individual cases vary greatly, concludes it is difficult to generalise.

- Important to gather evidence and case studies.

- Develop methodologies for understanding economic case in different disciplines.
37% projected saving in staff time and infrastructure costs from moving Oxford Roman Economy Project database to centralised virtual service.

One-day delay cut to 5 minutes: Estimated time saving for crystallography researchers to access results from Diamond synchrotron, by deploying digital processing pipeline & metadata capture system.

Making the Case for RDM, DCC Briefing Paper: [http://www.dcc.ac.uk/resources/briefing-papers/making-case-rdm](http://www.dcc.ac.uk/resources/briefing-papers/making-case-rdm)
Incentives and Benefits

- **Benefits Identified by JISC MRD Projects**
  - Improved organisation and retrieval of data.
  - Secure data storage and backup.
  - Improved awareness of departmental data assets.
  - Platform for data sharing, citation and discovery.
  - Clear and accessible guidance.
  - Improved systems for design and execution of data management plans.
  - Efficiency savings through centralised and coordinated support, hosting.

- **Report on the Benefits from the Infrastructure Projects in the JISC Managing Research Data Programme:**
  [http://www.jisc.ac.uk/whatwedo/programmes/mrd/outputs/benefitsreport.aspx](http://www.jisc.ac.uk/whatwedo/programmes/mrd/outputs/benefitsreport.aspx)

- **Task of the new programme to explore these further, to quantify them where possible and to provide detailed case studies.**
Areas of overlap, interest?

Areas for collaboration, partnership?
First JISC MRD Programme, 2009-11: [http://www.jisc.ac.uk/whatwedo/programmes/mrd.aspx](http://www.jisc.ac.uk/whatwedo/programmes/mrd.aspx)

JISC MRD Outputs Page: [http://www.jisc.ac.uk/whatwedo/programmes/mrd/outputs.aspx](http://www.jisc.ac.uk/whatwedo/programmes/mrd/outputs.aspx)


International discussion list: [RESEARCH-DATAMAN@JISCMAIL.AC.UK](mailto:RESEARCH-DATAMAN@JISCMAIL.AC.UK)

E-mail: [s.hodson@jisc.ac.uk](mailto:s.hodson@jisc.ac.uk)

Twitter: [@simonhodson99](https://twitter.com/simonhodson99)

Programme Hashtag: #jiscmrd