Talk Outline

1. Teaching Research Data Management
2. The “Introducing Research Data” Booklet
3. Evaluation of Approach Taken
4. Conclusions
Teaching Research Data Management

Two parts to our approach:

1. A booklet to give to all first year research students

2. A lecture to introduce basic concepts
The Booklet Layout

Figure 5: Viewing genetic sequence mutation data (Broad Institute, 2012)

Figure 6: Variation in the TSC2 gene, identified as one possible cause for tuberous sclerosis, a genetic disorder that causes tumors in organs around the body

Summary

In this case study, the researcher collects DNA sequence data and, after preparing the data by aligning it, processes it to find regions that differ from a reference data set. Analysis of the data can involve comparing it against genome databases and manipulating in spreadsheet software. Publication will occur when patterns that relate to diseases are identified, which will then help improve the existing genome databases and analysis tools. This case study provided good examples of a wide range of research data including:

- Using reference data (the complete genome reference sequence, and the genome databases);
- Discrete specific data (the FASTQ files containing the DNA sequence reads);
Sections in the Booklet

Section 1:

“Five Ways to Think About Research Data”

Section 2:

Case Studies

Section 3:

Data Management Best Practices
“Five Ways to Think About Research Data”

1. How it is created
   *From* (Research Information Network, 2008)

2. Forms of research
   *Adapted from* (The University of Edinburgh, 2011)

3. Electronic representation of research
   *Adapted from* (The University of Edinburgh, 2011)

4. Size and structure of datasets

5. The data life cycle
Case Studies
Human Genetics Case Study

Variation at position 2058632

Without variation

With variation
Materials Engineering Case Study
Archaeology Case Study
Evaluation of Approach Taken
Evaluation of Approach Taken

Section 1 (“Five ways to think about research data”)

– Useful as part of the booklet, but should be kept brief in a lecture to maintain the students' interest

Section 2 (The case studies)

– Provided perspective and encouraged students to think about data in general

Section 3 (Best practices)

– Most useful reference material and should be expanded in future versions
Feedback From Lectures

<table>
<thead>
<tr>
<th>Question</th>
<th>Lecture 1 (80 students at month 7)</th>
<th>Lecture 2 (30 students at month 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would students change what they were doing as a result of the lecture?</td>
<td>60/80</td>
<td>15/30</td>
</tr>
<tr>
<td>Should the talk be given to future postgraduates?</td>
<td>78/80</td>
<td>20/30</td>
</tr>
<tr>
<td>Did any students feel it was a complete waste of time?</td>
<td>2/80</td>
<td>1/30</td>
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- Majority of feedback was positive
- Feedback was more positive when the lecture was given later in the year in month 7
Conclusions

- The case study approach enables diverse students to engage and relate
- Delivered as part of research student training—and was well received
- Now part of the University’s institutional data management strategy and 10-year road map (University of Southampton, 2012)

*Get people thinking about their data—and its value—EARLY!*
Acknowledgements

• The categorisation of research data collection was defined in *Research Information Network (2008)*

• The forms of research data and categorisation of electronic storage of research data was adapted from *The University of Edinburgh (2011)*

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  – Simon Coles (Chemistry case study)
  – Graeme Earl (Archaeology case study)

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References

• Digital Curation Centre (2010), ‘DCC Curation Lifecycle Model’. URL: http://www.dcc.ac.uk/resources/curation-lifecycle-model


• Research Information Network (2008), ‘Stewardship of digital research data: a framework of principles and guidelines’.


• University of Southampton (2012) ‘Research Data Management web site’ URL: http://www.southampton.ac.uk/library/research/researchdata