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A Health Sciences Perspective

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A Health Sciences Perspective

Neil Rambo

7 April 2010
eScience + biomedicine = ???
eScience + biomedicine = Informatics?
eScience + biomedicine =

(Production) Informatics?
eScience + biomedicine =

Bioinformatics
Biotechnology
eScience + biomedicine = Bioinformatics / Biotechnology -Omics?
Fig. 1. Omics methods in life sciences
### Table 1. Some examples of the application data crisis

<table>
<thead>
<tr>
<th>Application</th>
<th>Data Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical imaging (fMRI)</td>
<td>~1 GByte per measurement (day)</td>
</tr>
<tr>
<td>Bio-informatics queries</td>
<td>~500 GByte per database</td>
</tr>
<tr>
<td>Satellite world imagery</td>
<td>~5 TByte/year</td>
</tr>
<tr>
<td>Current particle physics</td>
<td>~1 PByte per year</td>
</tr>
<tr>
<td>Future particle physics</td>
<td>~10-30 PByte per year</td>
</tr>
</tbody>
</table>

Figure 2.

Growth of the total number of structures in the RCSB/PDB database (Kouranov et al., 2006). The exponential growth follows the same pattern of Fig. 1.
Figure 1.

"There will be increasing reasons for each of us to have our complete genomes determined and placed in medical files," Collins noted.

"Five years after that, there will be compelling enough evidence that this is good medicine for both prevention and treatment that third parties will cover the cost," Collins said. "Health-care providers will have immediate access to [this information] about you, about what decisions to recommend. It's not one-size-fits-all, but really just about you."

"When I was in training, genetics was a small insignificant subspecialty of pediatrics," Marion noted. "And now pediatrics is a small insignificant subspecialty of genetics."

F. Collins, R. Marion, J.P. Evans, April 1, 2010, Nature
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- Design PCR primers and check them for specificity
- Find the function of a gene or gene product
- Determine conserved syntenic between the genomes of two organisms

See all …
Various data types, such as literature, nucleotide and protein sequences, and three-dimensional structures, are often submitted to public databases independently of each other by different research groups. Yet these data are related through their coverage of the same topic via different research methods. The Structure group contributes to the broader NCBI effort to identify associations among previously disparate data. See an example...
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Roles for HS Libraries/Librarians?

With current skill sets

• Metadata consulting
• Develop data management plans
• ...

Roles for HS Libraries/Librarians?

With current skill sets

- Metadata consulting
- Develop data management plans

With additional/advanced skill sets

- Data design, organization, management
- Data analysis, synthesis, meta-analysis
- Data repurposing
- ...

How do we go forward?

• It’s a tough time to innovate and expand
• Most of us won’t be doing this
• iSchools aren’t responding adequately
  – Exceptions: UIUC, UNC
• Need to draw from other professions/training
  – Biostatistics, research methods, informatics
• Need to forge new, expanded partnerships
Onward. Thank you.