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Apr 7th, 12:00 AM

## A Health Sciences Perspective

Neil Rambo  
*University of Washington*

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University of Massachusetts and  
New England Area Librarian *E-  
Science Symposium*

A Health Sciences Perspective

Neil Rambo

7 April 2010

eScience + biomedicine =

**???**

eScience + biomedicine =

**Informatics?**

eScience + biomedicine =

**(Production) Informatics?**

eScience + biomedicine =

**Bioinformatics**

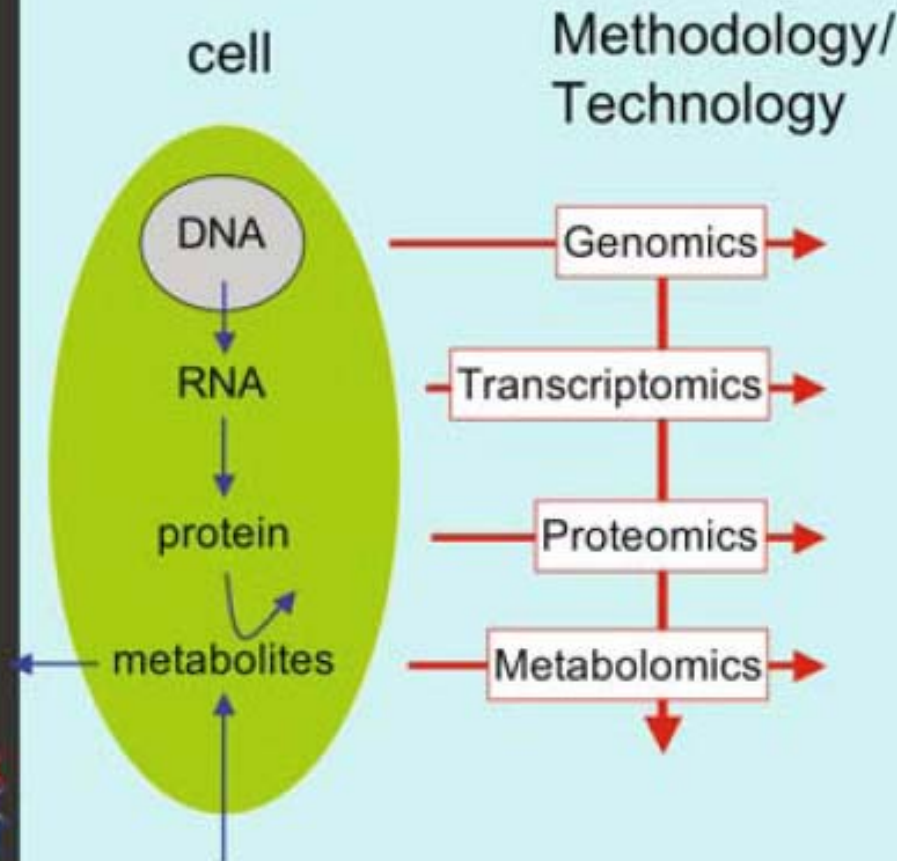
**Biotechnology**

eScience + biomedicine =

**Bioinformatics / Biotechnology**

**-Omics?**

# New technologies in Life Sciences research



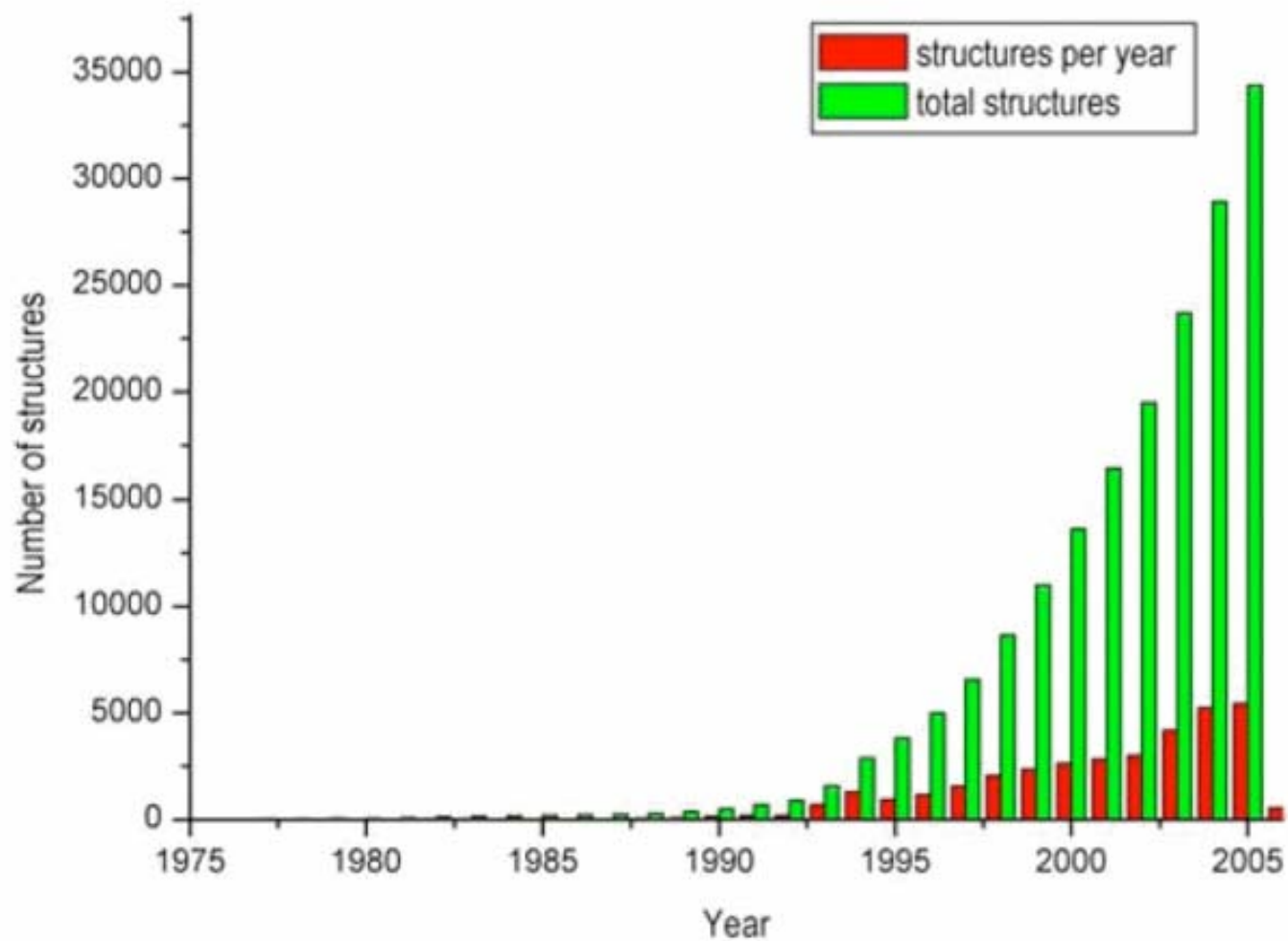
University of Amsterdam

**Fig. 1.** Omics methods in life sciences



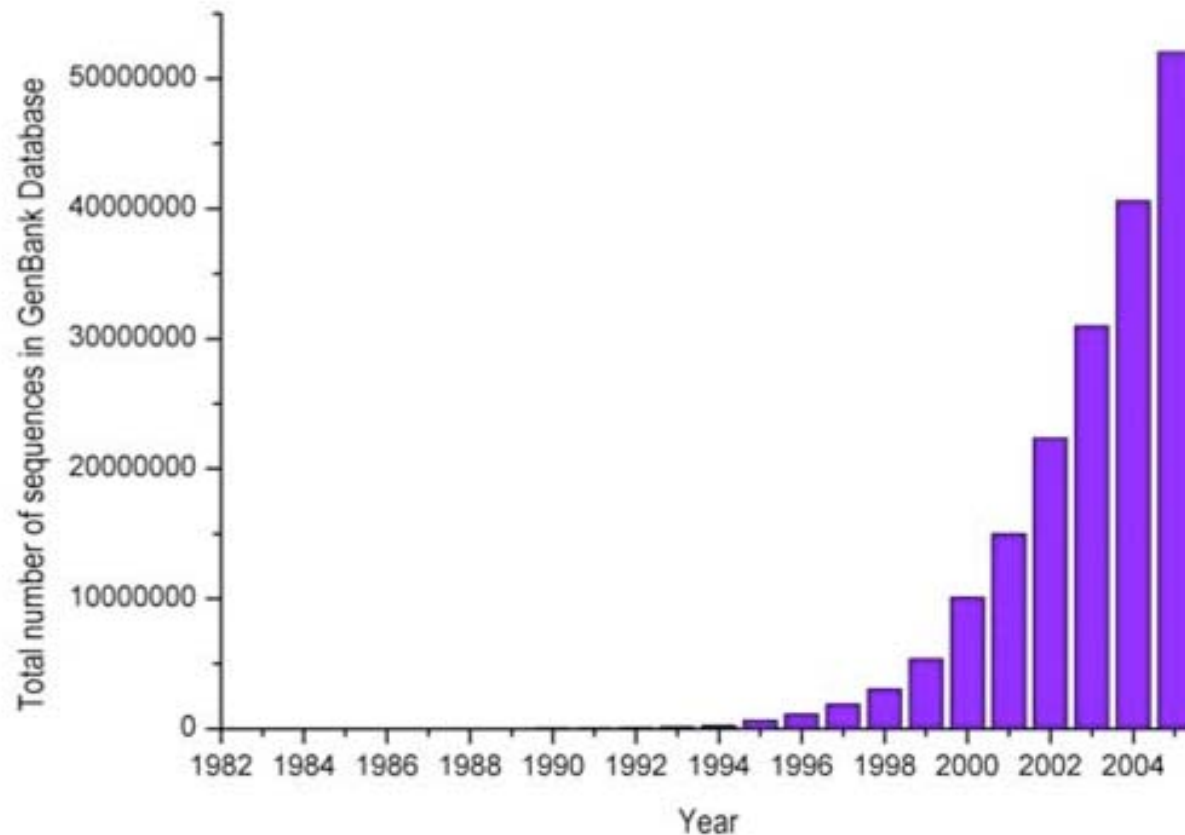
**Table 1.** Some examples of the application data crisis

medical imaging (fMRI):	~ <b>1 GByte</b> per measurement (day)
Bio-informatics queries:	~ <b>500 GByte</b> per database
Satellite world imagery:	~ <b>5 TByte/year</b>
Current particle physics:	~ <b>1 PByte</b> per year
Future particle physics):	~ <b>10-30 PByte</b> per year



**Figure 2.**

Growth of the total number of structures in the RCSB/PDB data base (Kouranov et al., 2006). The exponential growth follows the same pattern of [Fig 1](#).



**Figure 1.**

Number of sequences available in the GenBank as of December 15, 2005. The biological data explosion in mid 90's can be easily seen with the exponential growth from 1995. For a detailed description of the complete data set, please see <http://www.ncbi.nlm.nih.gov/Genbank/genbankstats.html>.

**"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."**



National Center for  
Biotechnology Information

Search

Search

Clear

## Resources

NCBI Home

All Resources (A-Z)

Literature

DNA & RNA

Proteins

Sequence Analysis

Genes & Expression

Genomes & Maps

Domains & Structures

Genetics & Medicine

Taxonomy

Data & Software

Training & Tutorials

Homology

Small Molecules

Variation

## Welcome to NCBI

The National Center for Biotechnology Information advances science and health by providing access to biomedical and genomic information.

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### PubMed Central

Free Full Text. Over 1,500,000 articles from over 450 journals. Linked to PubMed and fully searchable.



|| 1 2 3 4

### How To...

- [Obtain the full text of an article](#)
- [Retrieve all sequences for an organism or taxon](#)
- [Find a homolog for a gene in another organism](#)
- [Find genes associated with a phenotype or disease](#)
- [Design PCR primers and check them for specificity](#)
- [Find the function of a gene or gene product](#)
- [Determine conserved synteny between the genomes of two organisms](#)

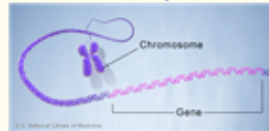
[See all ...](#)

**Discover associations  
among previously disparate data**

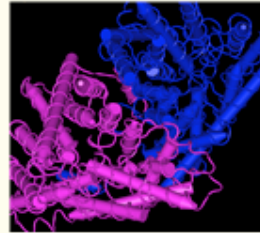
PubMed Literature



Entrez Nucleotide and  
Protein Sequences



Entrez Structures



and more...

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...](#)

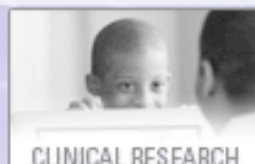


The caBIG® Story

caBIG® Capabilities

caBIG® In Action

## Linking Research and Care



CLINICAL RESEARCH

DISCOVERY &  
DEVELOPMENTHEALTH CARE  
DELIVERY

### caBIG® and DISCOVERY & DEVELOPMENT

Study ID	Study Name	Study Type	Study Status	Study Location	Study Date	Study Contact
1000000001	1000000001	1000000001	1000000001	1000000001	1000000001	1000000001
1000000002	1000000002	1000000002	1000000002	1000000002	1000000002	1000000002
1000000003	1000000003	1000000003	1000000003	1000000003	1000000003	1000000003

Online CMA portal gives access to clinical and genomic information to help speed cancer research. [View](#)

#### Benefits

- Manage biospecimen information
- Obtain access to microarray data
- Accelerate analysis of results
- Access data across multiple studies
- Facilitate integration of diverse data types

#### Showcased Capability

Genome-wide data management system allows researchers to integrate, query, report... [More](#)

▲ See what else caBIG® can do

## The BIG Idea

caBIG® is the network that will transform biomedicine by connecting **research** and **clinical care**. [Learn More](#)

## Featured Resources

- [Read the caBIG® LINKS Online Newsletter.](#)

### Sage Vision:

Create an open access,  
integrative bionetwork  
evolved by contributor  
scientists working to  
eliminate human disease

Sage Bionetworks is a new, not-for-profit medical research organization established in 2009 to revolutionize how researchers approach the complexity of human biological information and the treatment of disease. Sage's objectives are:

- to build and support an open access platform and databases for building innovative new dynamic disease models
- to interconnect scientists as contributors to evolving, integrated networks of biological data

Sage Bionetworks - 1100 Fairview Ave. N. - Seattle WA 98109



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### Sage News Briefs

**Sage and Merck** begin cardiovascular and metabolic disease collaboration -[Media Release](#) -

**NPR interview with Stephen Friend** -[Link](#)-

**Sage Commons Congress details** on [sagecongress.org](http://sagecongress.org)

**Sage Awarded New NCI Center for Cancer Systems Biology** -[details](#)-

**Pilot Repository Program** testing open access to datasets and network models. -[more](#)-

**Sage and Pfizer** sign oncology partnership. -[more](#)-

**Nature Reviews** cites Sage as new R&D trend -[more](#) -

**Sage President** article on disruptive technologies. - [more](#) -

**Sage Founders** profiled in Forbes.com -[more](#) -

**Quintiles** has made a major donation to Sage. - [more](#) -





# Institute for Health Metrics and Evaluation

Who we are

What we do

What you can do

Information Resources

## MAP THE DATA



## IHME'S GIS TOOL

### Latest Publications:

#### [PLoS Medicine - Mar. 10](#)

The Promise of Prevention:  
The Effects of Four  
Preventable Risk Factors on  
National Life Expectancy and  
Life Expectancy Disparities by  
Race and County in the United  
States

#### [The New England Journal of Medicine - Jan. 10](#)

Ranking 37th – Measuring the  
Performance of the U.S. Health  
Care System

#### [The Lancet - Nov. 09](#)

Sceptical optimism: a new take  
on global health data

## The Promise of Prevention

Thousands of lives could be saved in  
the US by addressing just four risk  
factors

[Learn more](#)



**The Institute for Health Metrics and Evaluation (IHME)** is an independent research center at the University of Washington rigorously measuring the world's most pressing health issues and providing scientific evaluations of health system and health program performance in order to guide health policy and accelerate global health progress.

### Research Areas:

#### [Health Outcomes](#)

IHME is generating scientifically sound methods and systematic estimates of health outcomes – including mortality, causes of death, and overall burden of disease, injuries, and risk factors.

#### [Health Services](#)

We study how health services contribute to improving health outcomes by measuring the crude coverage of specific health interventions, as well as estimating the effectiveness of those interventions by integrating the concepts of need, utilization, and quality.

## The Data Spot

PICK A SPOT - SAMPLE OUR STATS



# 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.