Cores 5 and 6
Evaluation, Training, Education, Outreach and Dissemination

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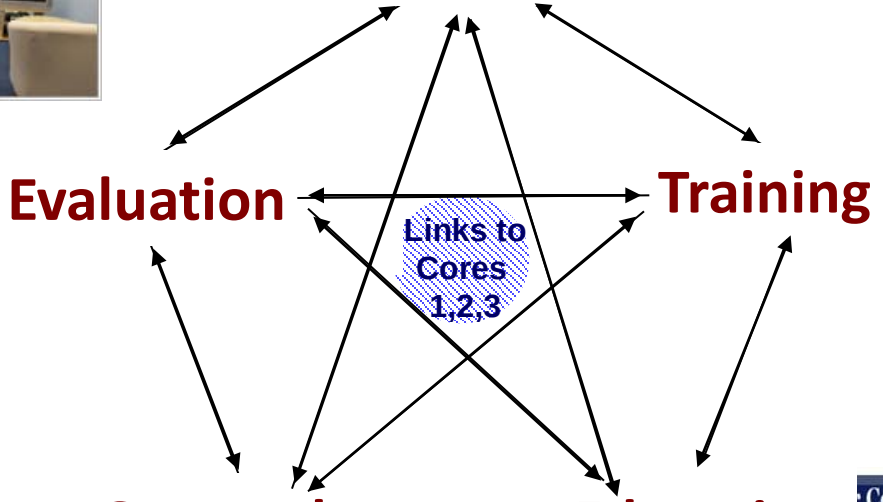
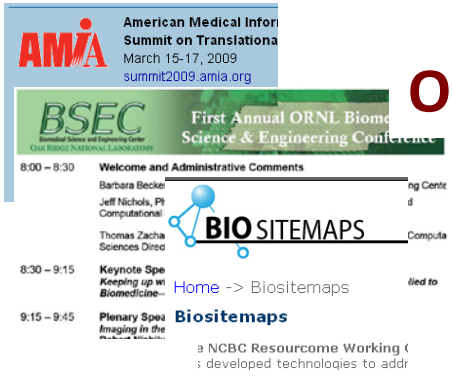
Annual Research Meeting, April 28, 2009

Integrated Bioinformatics: The Public Face





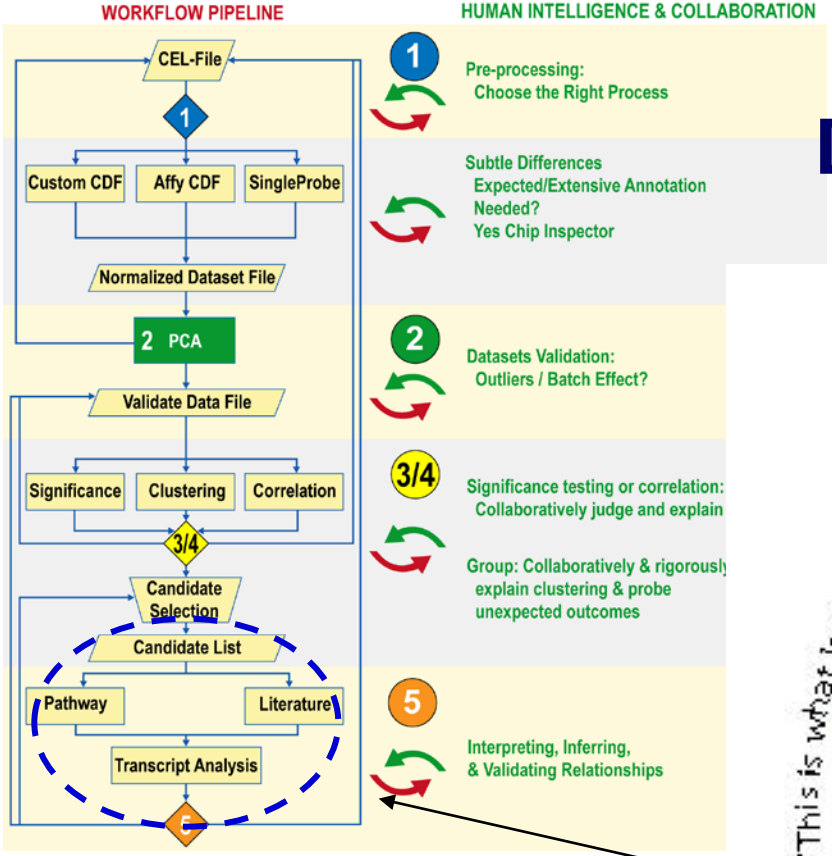
Evaluation and Training

Distinct NCIBI Focus on Optimal Tool-Scientist Fit

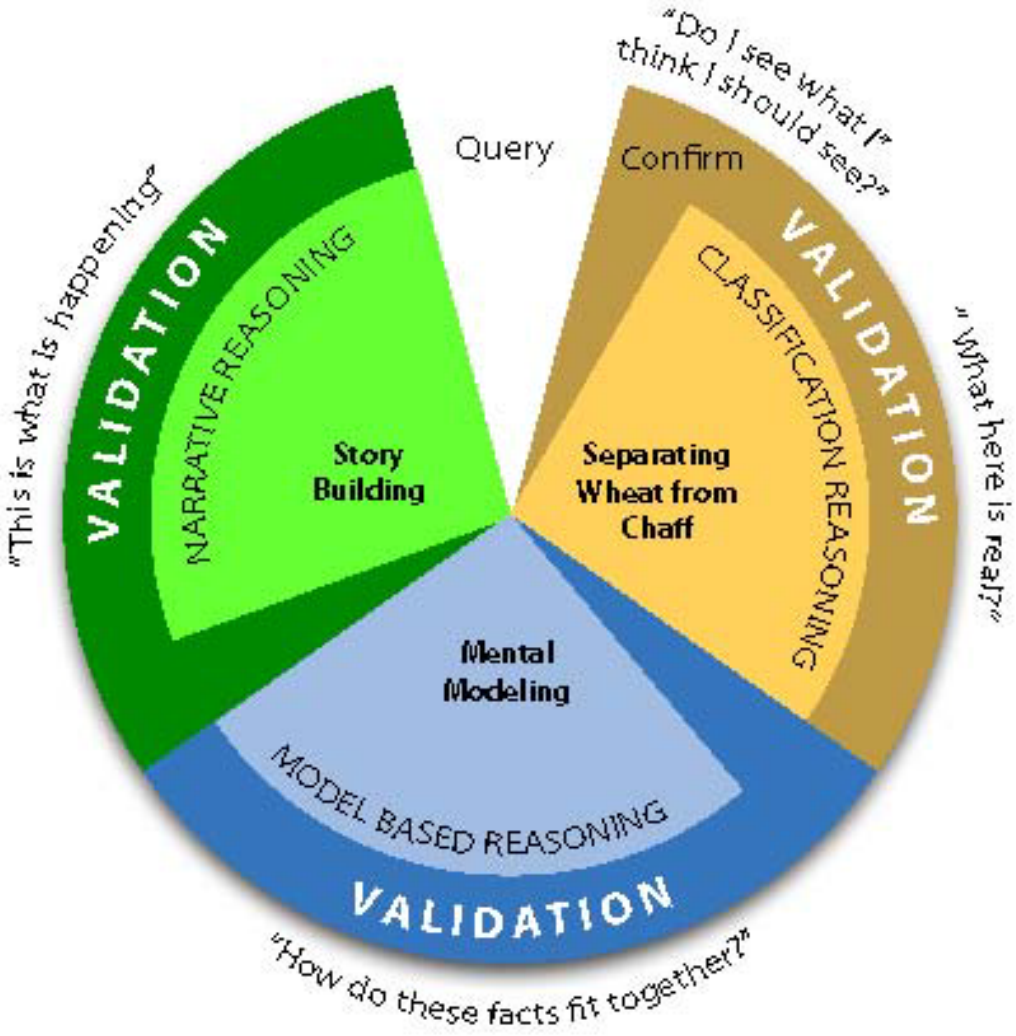
Integrated resources for integrated analysis

1. Useful to scientists' actual analyses
2. Usable based on established UI principles
3. Easy to use and effective for tasks
4. Aids for learning
5. Ease of access to tools and tutorials

Workflow Renal Disease



1. Useful: Discovery-based analysis



Mirel. **Supporting cognition in systems biology analysis**. *J Biomedical Discovery & Collab*, 2009

Mirel, Eichinger,Nair,Kretzler. **Integrating automat workflows, human intelligence and collaboratic** *Proceedings of the AMIA Summit on Translational Bioinformatics,* 2009

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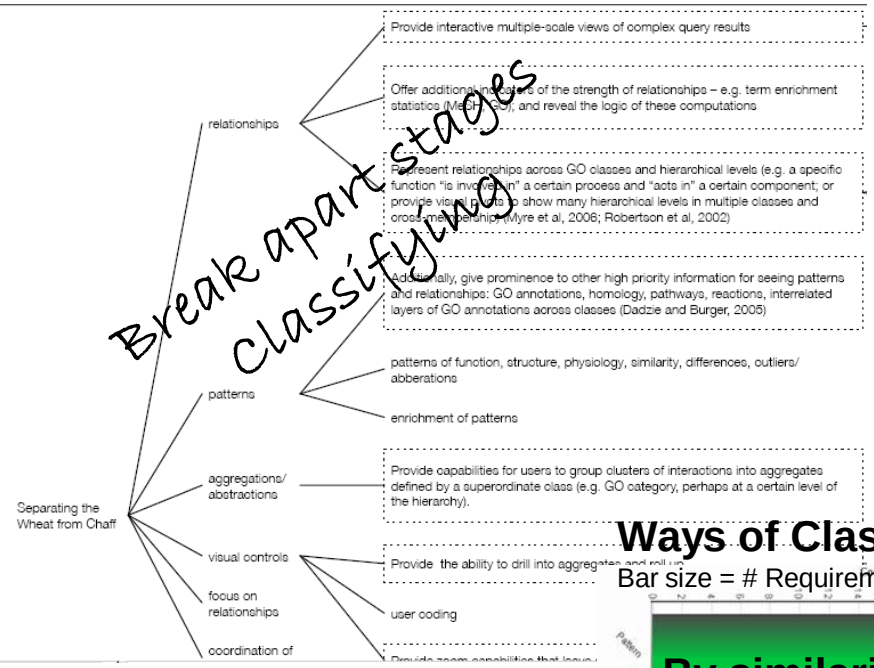
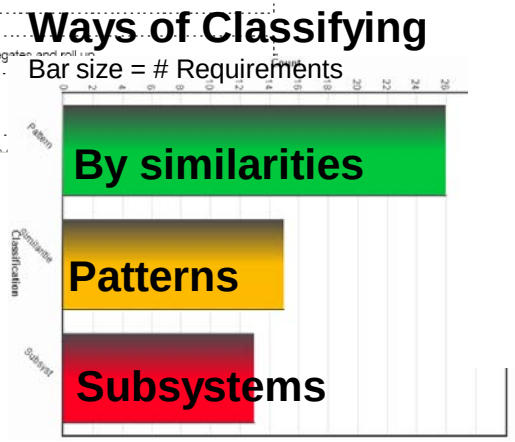
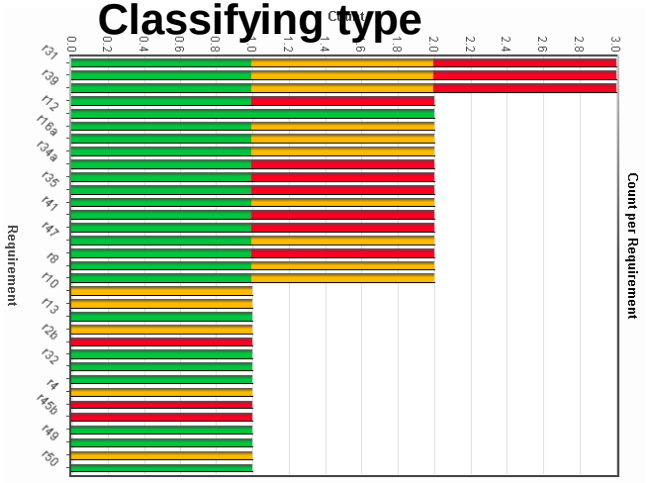
Useful applied to tools: requirements







Required by All 3 ways of classifying:
- Import own data
- Clear indication of the nature of an interaction & type of molecule,
- Visually encode by attribute in networks or pathways

Mirel, Keller, Peleg Altman. **Design of integrated Bioinformatics Systems**. AMIA 2009

	Gestalt principles		Comments
29	Does the default view use **proximity** in its arrangement and layout to suggest relationships between like things? (e.g. clusters are spaced to suggest patterns)	0 1 2 3 4 5 N/A	
30	Do the **organization and layout** of the default view draw users' eyes to specific spots e.g. through putting certain data/relations in the center or highlighting?	0 1 2 3 4 5 N/A	
31	Does the default view automatically use **other visual cues to emphasize single items**?	0 1 2 3 4 5 N/A	
32	Does the default view automatically use **other visual cues to emphasize groups or relationships** (e.g. outlines or hierarchical structures)?	0 1 2 3 4 5 N/A	
33	Does the default include **more than one graphic** to show additional information, such as distribution of values in an important field?	0 1 2 3 4	
34	If **x-y axes or matrices** are used, do default arrangements automatically draw users' eyes to patterns (e.g. increases/decreases, clusters)?	0 1 2 3 4	
35	If default visuals do not provide ready entry points, can users perform operations (e.g. user-defined selections, subsetting, layout, filtering) that quickly allow them to find and entry point or other patterns such as similarities, outliers, trends (2-4 steps)?	0 1 2 3 4	
36	Are users able to manipulate or re-structure visual arrangements to see other patterns/groups?	0 1 2 3 4	
37	Can users **manipulate visual arrangements** efficiently (1-3 steps)?	0 1 2 3 4	

2. Usable user interfaces

Heuristic evaluations applied to tool fixes

Modification Report system: Severity rankings

None - No immediate issue for performance/satisfaction

Minor – Minor slow down in task performance; irritating

Serious - Errors or miscomprehension due to UI features:

Major- Unacceptably time-consuming, unrecoverable errors, dead-end in task performance

Critical- Showstopper; No workarounds possible, cannot complete a given task, possibility of losing data

Failure - Catastrophic error, loss of data, system freezes

3. Easy to use
Effective for tasks

Computer System Usability Questionnaire

Please rate the usability of the system.

1.	Overall, I am satisfied with how easy it is to use this set of tools.	strongly disagree	○	○	○	○	○	○	○ strongly agree
2.	It was simple to interact with this set of tools.	strongly disagree	○	○	○	○	○	○	○ strongly agree
3.	I could find things of interest relevant to the scenario using the tools	strongly disagree	○	○	○	○	○	○	○ strongly agree
4.	I could cor efficiently								
5.	The amour was worth								
6.	I feel comf set of tools								
7.	It was easy MiMI, Mi: Gene2Mes								

Usability testing

10 scientists (4 at NCI)

4 integrated tools

Scripted task scenario

Think alouds

N=10, 1-7 scale, 7 strongly agree

Q Description	Average	Median
PleasantUIsMIIM	6.4	6
LikeUsingUIMiMI	6.4	6
Easy_Learn_MiMI	6.3	7
TimeWorthGain	6.2	6
Overall_EaseUse	6.1	6
ClearlyOrganized	6.1	6
TrustRetrievedINfo	6.1	6
Easy_Understand_MiMI	6	6
Overall_Satis	6	6

Data analysis is in progress

Will translate into improvements

NCIBI

OF HEALTH

4. Aids for learning

ConceptGen (tool)
ConceptGen (tutorial)

Related gene lists to enriched concepts and oth
genes enriched for the given concept.

MetScape Plug in for Cytoscape (tool)
MetScapei Plug in for Cytoscape (tutorial)

Displays interactive networks of compounds, enzymes, reactions.

MiMI Plug in for Cytoscape (via Cytoscape)
Mimi Plug in for Cytoscape (tutorial)

Displays molecular networks in Cytoscape.

MiMI Web (tool)
MiMI Web (tutorial)

Metab2MeSH** (tool)
Metab2MeSH (tutorial)

Relates 1 metabolite to its enriched MeSH terms or 1 MeSH term to its metabolites, and retrieves associated articles

MiSearch (tool)
MiSearch (tutorial)

Ranks orders retrieved articles from PubMed based on a self- customized personal profile.

PubAnatomy(tool)
PubAnatomy (tutorial)

Provides new ways to explore relatio
among anatomical structures, pathop
processes, gene expression levels a
protein interactions in the context of M
literature and experimental data.

PubOnto (tool)
PubOnto (tutorial)

Manuals

Tutorials

Flash demos

YouTube

Classes/HSL

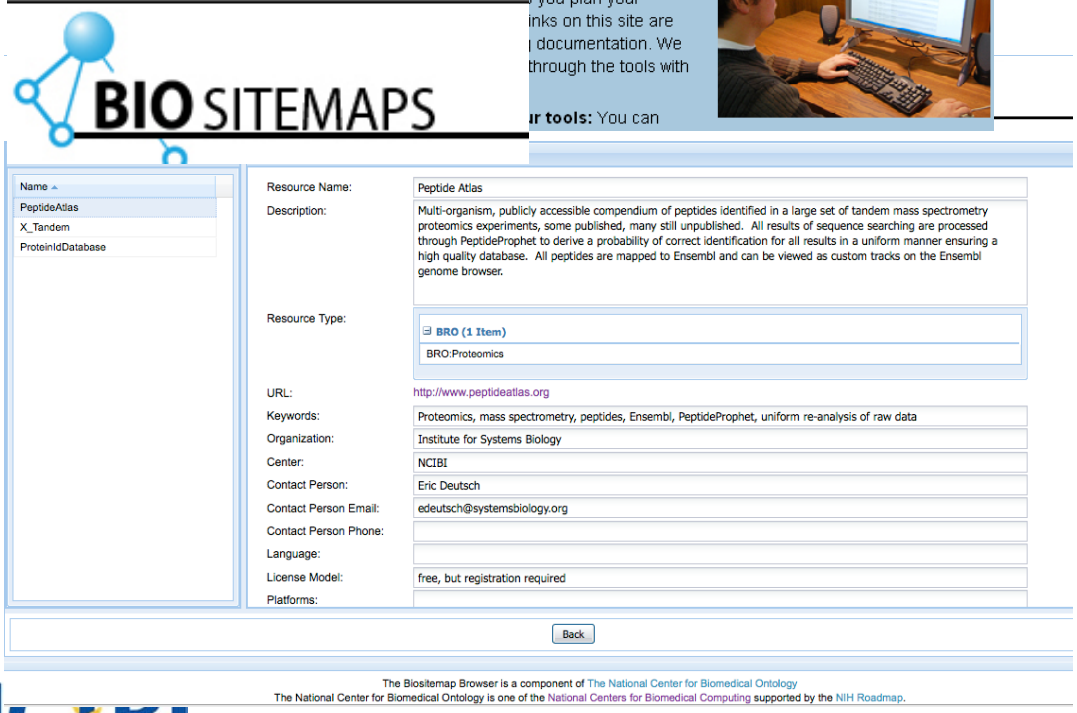
(Including UG)

MiMI-Cytoscape in Chinese part 1

Exploratory exercise – articles supporting genes & schizophrenia

1-7 scale, 7 high	**PubAnatomy** N=15	**PubMed** N=14
Overall satisfaction (5, 6, 7)	10/15	10/14
Helped me think creatively (5, 6, 7)	10/15	8/14
Useful capabilities for exploration (5, 6, 7)	11/15	10/14
Found relevant items (6, 7)	8/15	6/14

5. Ease of access



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PubAnatomy (tutorial)

Provides new ways to explore relationships among anatomical structures, pathophysiological processes, gene expression levels and protein-protein interactions in the context of Medline literature and experimental data.

PubOnto (tool)
PubOnto (tutorial)

Cross-discipline collaborations for integration

Heuristic evaluations

Developers
HCI specialists
Database specialist
Health science librarian
UI developers

Undergrad project

MCDB specialist
Neuroinformatics specialist
Usability/instruction specialist
Health science librarian

Manuals & tutorials

Biomedicine experts
Documentation specialist
Program developers
Project manager
Graphic designers
NCI collaborator
UI developer
Health science librarian
Bioinformatics specialists

Education, Outreach and Dissemination

Jim Cavalcoli