

# UITS Research Technologies Cyberinfrastructure for IU

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Robert Ping, Abhinav Thota, Chris Eller, Scott Michael  
UITS Research Technologies, Cyberinfrastructure and Service Center  
Indiana University Pervasive Technology Institute



Science  
Gateways



Storage



Computation



Analysis/  
Software



Bio/Health



Visualization



Campus  
Bridging



Education/  
Outreach



Grant  
Support



CyberDH

# What is Cyberinfrastructure (CI)?

- “Cyberinfrastructure” as a technological and sociological solution to the problem of efficiently connecting laboratories, data, computers, and people with the goal of enabling and enhancing research and creative activity
- Consists of environments that support advanced data acquisition, storage, management, integration, analytics, visualization and other computing and information processing services distributed over the network within a single institution (local CI) or beyond (global CI)



# (Inter)National Cyberinfrastructure

A SPECIAL REPORT

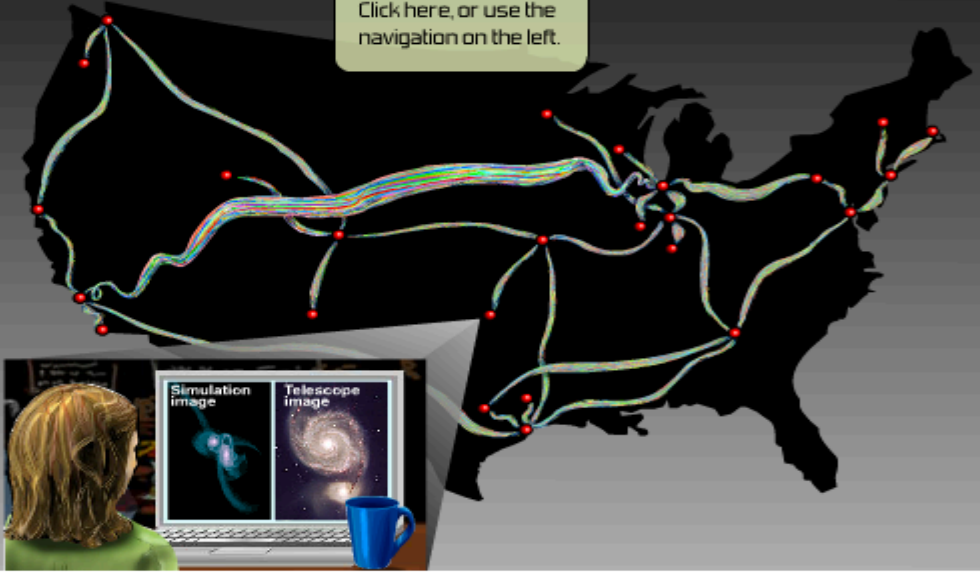
## Cyberinfrastructure

*To Read More...*  
Click here, or use the navigation on the left.

*A Grand Convergence*

*Essential Not Optional*

*Discovery, Learning and Leadership*



\*National Science Foundation, "A Special Report". [http://www.nsf.gov/news/special\\_reports/cyber/](http://www.nsf.gov/news/special_reports/cyber/).

Accessed March 31, 2014.

# IU's Research Cyberinfrastructure

- Provided by UITS Research Technologies (RT)  
<http://researchtech.iu.edu>
- Dedicated to supporting research & creative activity,  
*from art to science and everything in between*
- Strives to support research, publications, grant support with a focus on your success





**Margaret Dolinsky**, Associate Professor and Research Scientist  
H.R. Hope School of Fine Arts, Indiana University Bloomington

**UIITS Research  
Technologies at  
IST Conference**  
March 6, 2015



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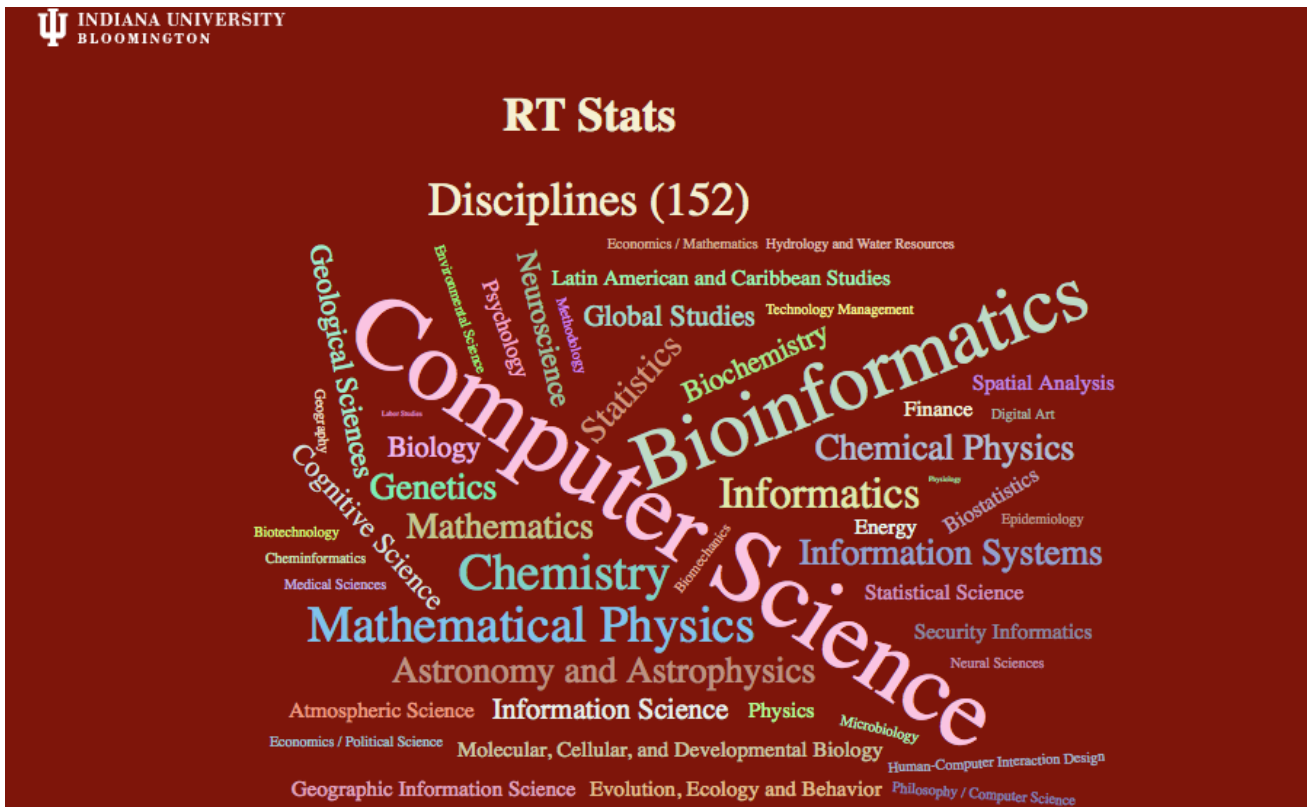


Grant  
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# Over 150 disciplines use supercomputing



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Science Gateways



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# RT Services – Visualization facilities and services

Understanding advanced simulations and big data

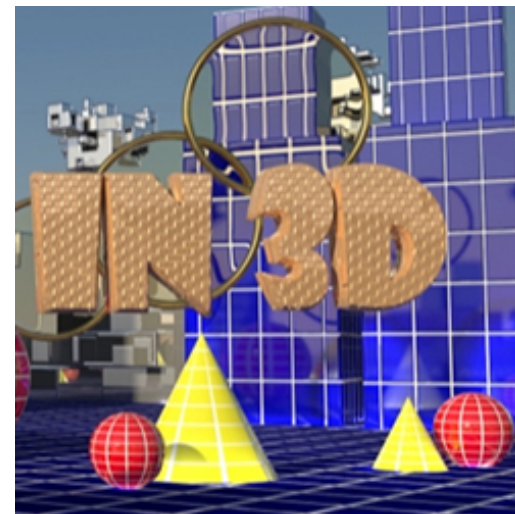
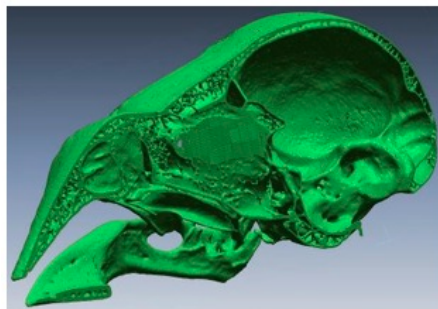
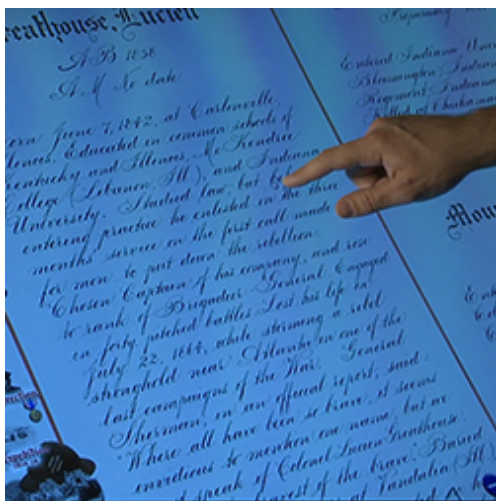
- Project consultation
  - Test and demonstrate new technologies and procedures
  - Tours of IU visualization facilities
  - Facility reservations
    - Vis & Collaboration Theater
    - Virtual Reality Theater
    - Science on a Sphere
- 
- IQ-Series - Wall/Tilt/Table
  - Digitization & 3D
  - Advanced Media Capture
  - Haptic Interface Systems



# RT Services – Visualization facilities and services

Examples:

- *Digital Golden Book*
- *3D scanning, analysis, and printing*
- *Generating Interest in STEM using 3D*







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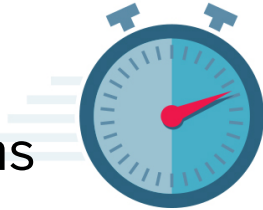


CyberDH

# RT Services – Analysis and software delivery and support

Tools for analytics and big data research

- Software and application consulting – long term and short term
- Technical support
- Software packages like GIS and remote sensing software
- Purchase software
- Software licensing
- Benchmark and evaluate HPC systems
- Tutorials/Documentation
- Public software availability
- Application tuning



# RT Services – Education and Outreach

Can help you figure out which RT services might benefit your research and will help with planning events regarding IU Cyberinfrastructure

- In-person classes and workshops
- InfoShares tailored to your campus, department, class
- Tours of facilities like the Data Center or Science on a Sphere
- On-line tutorials and workshops
- Represent IU at conferences and within HPC organizations



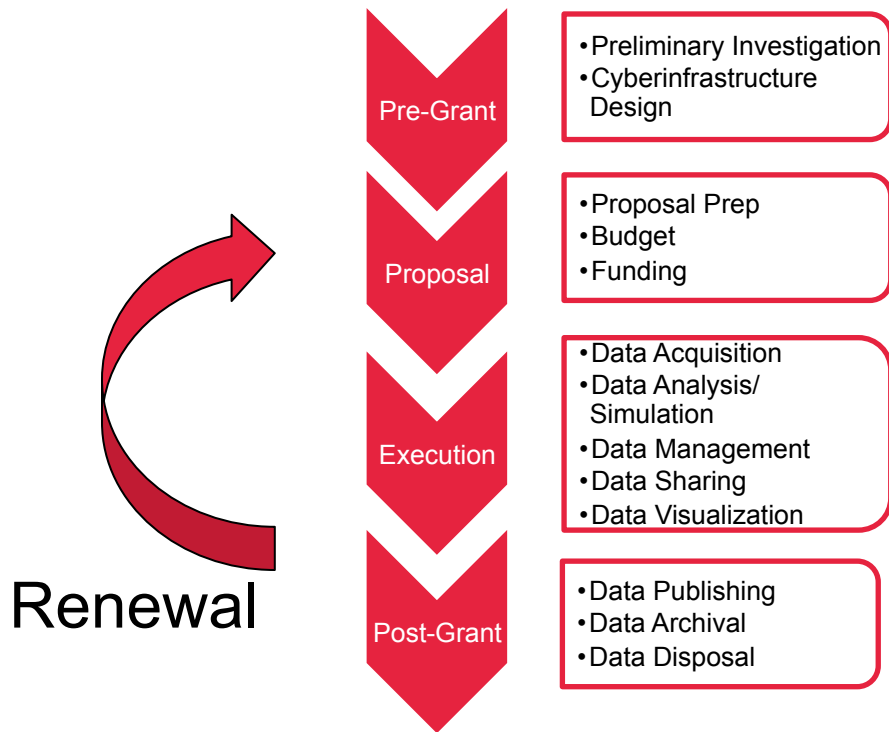
# RT Services – Grant support and custom fee-based services

Helps with proposals that require cyberinfrastructure.  
Application development and custom programming for a fee.

- Data Management Plans
- Facilities Statements
- Letters of Support
- Application Development
- Custom programming



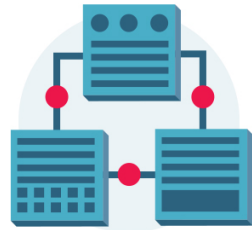
# The Grant/Data Life Cycle



# RT Services – Computation

Fast calculations, advanced simulations, and big data analysis

- **Big Red II** – IU's main system for high-performance parallel computing
  - Owned solely by IU
  - 1 petaFLOPS
  - CPUs/GPUs
  - 3.5 PB of scratch



- Available through [itaccounts.iu.edu](http://itaccounts.iu.edu)
- Support/consulting available
- Tours available

# RT Services – Computation

Fast calculations, advanced simulations, and big data analysis

- **Research Database Complex** – research databases and data applications

- Supports oracle and MySQL Databases
- Strictly devoted to research
- Runs Red Hat Enterprise Linux



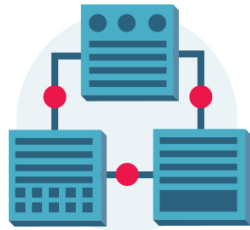
- Examples of research projects currently supported
  - Collaborative Initiative on Fetal Alcohol Spectrum Disorders
  - Indiana Spatial Data Service
  - National Gene Vector Biorepository



# RT Services – Computation

Fast calculations, advanced simulations, and big data analysis

- **Karst**– IU’s primary Linux cluster computing environment
  - For research and research instruction use
  - Serves as condominium cluster
  - Runs Red Hat Enterprise Linux
  - Accounts available via the Account Management Service (AMS)



# RT Services – Computation

Fast calculations, advanced simulations, and big data analysis

- **Mason** – large memory computer cluster
  - Supports data-intensive, high-performance computing tasks
  - Specifically for genome researchers
  - Uses include genome assembly software, large-scale phylogenetic software, and other genome applications



# RT Services – Computation in 2014

2014

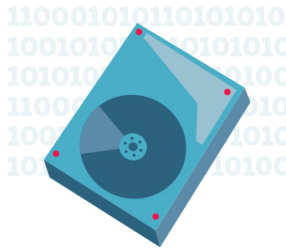
Cluster	Jobs	Users	Core Hours
Big Red II	366,060	449	129,997,242.7
Karst	17,105	61	361,095.4
Mason	62,534	241	3,004,781.4
Quarry	4,227,369	336	9,764,040.0
<b>Total</b>	<b>4,673,068</b>	<b>809</b>	<b>143,127,159.5</b>

# RT Services – Data Storage

High-quality storage services for fast access or large data sets

- **Research File System (RFS)**

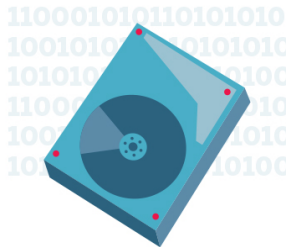
- Centralized disk storage designed to support researchers
- Backed up regularly – 2 copies (IUB and IUPUI)
- Open to IU community – undergrads/non-IU must have sponsor
  - 100 GB of disk storage
  - Can utilize project areas in file system
  - HIPAA-aligned (does not encrypt stored data – individual users responsible)



# RT Services – Data Storage

High-quality storage services for fast access or large data sets

- **Scholarly Data Archive (SDA)**
  - Distributed tape storage for large-scale archival/near-line storage
  - Mirrored– 2 copies (IUB and IUPUI)
  - Open to IU community – undergrads/non-IU must have sponsor
    - 42 PB of tape storage
    - Supports SFTP, HSI, HPSS API
    - HIPAA-aligned (does not encrypt stored data – individual users responsible)



# Benefits

- Including RT in grant proposals could enhance funding prospects
- A faster research workflow allows you to accomplish more and to think bigger
- You don't need local hardware or system administration resources
- RT solutions are built professionally and for production use
- Systems and services in research technologies provide high security for your data – we've done the hard work to align with HIPAA and to help mitigate cyber risks

# Costs

- Nearly all of the RT services described here (supercomputers, storage, visualization resources, training, short-term consulting) are provided free of charge to any IU researcher
- Projects that require significant RT resource commitment, for instance software development, system administration, etc., are provided at cost, which is usually low and/or are have RT written into grants to cover them
- Consulting up to a reasonable limit, especially in preliminary phases to help you attract funding, is free





# Contact us ...

... even if you do not need us yet!

- It establishes a relationship
- We learn about you, what you are doing, and can anticipate what you might need in the future
- You learn about us and what we can do for you
- Sign-up for the CI Newsletter



# Contact Information

Email: [researchtech@iu.edu](mailto:researchtech@iu.edu)

Contact:

Robert Ping

Education and Outreach Manager

[robbing@iu.edu](mailto:robbing@iu.edu)

