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“ My creativity has been enriched by the capabilities afforded by Research Technologies' high-end systems. These capabilities have expanded my philosophies around creative thinking, education, and technology for artists, scientists, and students—and in particular women who want to expand their possibilities with technology. They have allowed us to take art all over the world, showing 3D computer graphics on state-of-the-art visualization systems that can be networked in real time. They have also enabled a gallery installation enhanced by interactive tables, so visitors can discover the science behind the art. ”

Margaret Dolinsky

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

Research Technologies

RT is a cyberinfrastructure and service center affiliated with the Indiana University Pervasive Technology Institute.

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Research Technologies

Providing technology services for the arts, the sciences, and everything in between

UITS Research Technologies delivers advanced technology solutions for new possibilities in research, scholarly endeavors, and creative activity at Indiana University and beyond.

We provide services for:

- Fields ranging from astronomy to zoology (A to Z)
- The needs of disciplines like arts, cinema, humanities, and recreation
- Software, computing, and the creation of new software tools

We complement these efforts with educational outreach and technology translation that improve the quality of life for people in Indiana, the nation, and the world.

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Science gateways

Researchers benefit greatly from web interfaces to supercomputers, massive storage, and shared workflows. IU has developed user-friendly gateways for navigation of systems and software:

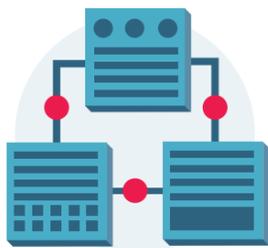
- The IU Cyberinfrastructure Gateway (<https://cybergateway.uits.iu.edu/iugateway/>)
- Others: IUScholarWorks, humanities gateways (Chymistry of Isaac Newton and Ethnographic Video for Instruction and Analysis archive), IU Galaxy, and IU Geographic Information Systems



Data storage

Data comes in many forms. Some researchers need massive capacity, while others simply need quick access, high transaction load databases, or co-located copies of data for security. RT delivers HIPAA-aligned secure file management, data storage, and archiving via:

- Data storage on disk: Data Capacitor II, Data Capacitor WAN II, and Research File System
- Data storage on tape (up to 50 TB): Scholarly Data Archive



Computation

Need to perform fast calculations, advanced simulations, or big data analysis? Centralized resources, plus training and user support, provide this and more:

- Big Red II: Big data research and simulations
- Quarry: Parallel and high-throughput computing
- Mason: Computing jobs with large memory requirements
- Rockhopper: "Cluster as a Service" through Penguin on Demand
- Research Database Complex: Research databases and data applications



Analysis and software delivery and support

Big data and parallel computing have given rise to a need for high performing applications. Services to improve the performance of systems and software include:

- High performance computing software optimization
- Software tools to address challenges in a variety of research domains, including computational fluid dynamics and molecular dynamics
- Genome analysis, particularly genome comparison and assembly
- Analytics and statistical analysis, including R, SPSS, SAS
- Geographical analysis
- Mathematical software, including Matlab and Mathematica



Services for biomedical, biological, and health-related research

Special considerations are required in health-related research because of legal guidelines about privacy of electronic protected health information. RT delivers:

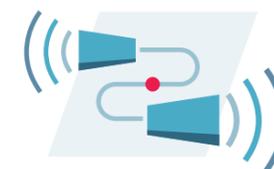
- HIPAA-aligned services for computing and storage, including survey tools, databases, data management tools, and data repositories
- IndianaCTShub – the core collaboration tool for the Indiana Clinical and Translational Sciences Institute
- Genomic science workflows through the National Center for Genome Analysis Support



Visualization facilities and services

Visualization improves comprehension of complex data and supercomputer simulations. The Advanced Visualization Lab (AVL) provides consulting and development services in a range of areas, including:

- Scientific and information visualization and simulation
- Virtual reality and other advanced interface techniques
- 3D data acquisition and computer graphics manipulation services
- Stereoscopic 3D video and ultra-high resolution photography
- Geographic visualizations



Campus bridging: Scaling to local and national cyberinfrastructure

Researchers increasingly need larger resources that are as straightforward as a computer's peripheral devices. RT is focused on providing the IU community with both national and local resources:

- Condominium clusters you own but RT administers in the Data Center
- Cycles from commercial services like Penguin Computing
- Information, training, and tools to help you use national facilities such as:
 - Extreme Science and Engineering Discovery Environment (XSEDE)
 - Open Science Grid (OSG)
 - National Center for Genome Analysis Support (NCGAS)
 - One Degree Imager Telescope (ODI-PPA)



Education and outreach

Not sure which RT services could benefit your research? Let RT help with:

- Giving a workshop or presentation tailored to the needs of your organization
- Leading one-on-one meetings on using the latest IU technology and software
- Partnering to raise K-12 and undergraduate and graduate STEM awareness



Grant support and custom fee-based services

RT can help you determine the best cyberinfrastructure options for a successful grant proposal. In some cases, RT can commit specific resources (such as matching contributions) to your budget. Available support includes:

- Data management plan consulting and templates
- Facilities statement templates and guidance
- Letters of support for IU resource commitment
- Application development and custom programming for a fee (often through a subcontract from a grant award)



Services in support of cyber risk mitigation and IT-28 implementation

Research Technologies offers a variety of services to aid IU researchers and departments with mitigating cyber risks, including:

- Securing copies of your research data in UITS-managed facilities
- Condominium computing – where you own cluster nodes in the Data Center
- Cluster as a service – purchase cluster time from Penguin Computing
- Data and document sharing tools