

Realizing the University of the Future: Building UC San Diego's Integrated Digital Infrastructure

UC San Diego

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IDI

Integrated Digital Infrastructure for UCSD: 5 Partner Organizations

- **Academic Computing and Media Services**
- **Administrative Computing & Telecommunications**
- **Calit2/Qualcomm Institute**
- **UCSD Library**
- **San Diego Supercomputer Center**

UC San Diego: Premier Digital Infrastructure

SDSC



**Administrative Computing &
Telecommunications (ACT)**

- **High-performance compute facilities**
- **State-of-the-art visualization facilities**
- **Energy-efficient colocation facility**
- **Dual 10G production backbone**
- **1G standard, 10G available to the wall**
- **40G experimental connections via Prism@UCSD**
- **Over 150Gbps in Internet connectivity**
- **Advanced Library curation facility**
- **Learning Management System for instruction**

IDI

What's needed? Integration!

Make clear to faculty, researchers and students:

- **What IT services are available on campus**
- **Where to get them**
- **How to use them**
- **How to get access to high-end technology**

Faculty and researchers need:

- **Less time on phone; faster and easier ways to find help**
- **Not to be passed from person/dept to person/dept**

Students need:

- **To learn to use our industry-standard technology**
- **Access to exciting new tech at UCSD**

What's Needed?

Maximizing Impact of Digital Infrastructure

UCSD research data and results should be:

- **Made accessible to other researchers, including students, for reuse, citation and analysis**
- **Shared across the University to leverage new discoveries and build increased collaboration**
- **Preserved as critical intellectual property**

UCSD computational advances should:

- **Improve UCSD's own IT infrastructure**
- **Propagate useful workflow models**
- **Be a primary offering to the community as a leading service-oriented public university**

Integrated Digital Infrastructure for UCSD

- **Integration** of best practices IT offerings available at UCSD, including streamlining, simplifying and clarifying access, featuring a new tech advisory service for faculty
- **Instruction** on new research technologies, new data handling and data management techniques
- **Research Data Library** robustly and securely curates UCSD's digital intellectual property assets, making them straightforward to both preserve and access
- **Push the technology envelope** — annual transformational projects will be funded to encourage and enable the use of novel technology in research and instruction applications, leading the way and establishing best workflows
- **Supporting infrastructure** with availability and improved accessibility of advanced campus-wide IT infrastructure

Integrative Goals

- **Visibility, clarity, and quality of service of IT offerings and services across providers**
- **IT on-boarding services for new faculty and lab personnel**
- **Broker existing campus and cloud services, technical integration, support of solutions to meet expressed faculty IT needs**
- **Information compilation about commodity cloud services that meet campus needs, and assistance in access and cost and risk assessments**
- **Coordination among campus IT providers to reduce duplication of effort, improve interaction/communication**
- **Recommendations and boilerplate language to assist in building campus IT services into grant proposals**

Instruction

- **Provide students opportunities to use leading edge technologies in classroom and lab**
- **Library classes for students, faculty and staff on Data Management Plan construction, data handling, and data management techniques**
- **Assist faculty in obtaining and training REU student support for data management**

Research Data Library

- **A UCSD digital asset management system**
 - curated data and metadata
 - specialized front end to facilitate upload, searching, retrieval, and download of data
- **State-of-the-art long-term preservation using Chronopolis**
 - distribution over three geographic locations and IT platforms
 - curatorial audit reporting
 - appropriate preservation metadata
 - UCSD custom front end to ease workflow & data transmission
- **Ongoing and comprehensive training on data management for faculty, research staff and students**
- **Curation consultation and assistance**
- **Partnership with efforts to create a campus-wide Faculty Profile System**

New Technology in Research/Instruction

Annual program of one-time early adopter grants with the goal of exploring the application of new technologies in research & instruction

- **Offered in cooperation with programs offered by QI (CSRO) & ACMS (ICP)**
- **Reviewed by the Faculty Steering Committee and IDI Implementation and Management Teams**
- **Support Strategic Plan goals & Grand Research Themes**
- **Employ groundbreaking technologies**
- **Meaningful student engagement**
- **Mixture of Big Data and long-tail projects**

2014-15 Transformational Projects Include

- Research data curation instruction/ experience for students
- CSE Mobile/Cloud Apps Lab
- Interactive computing for live music/theatre
- Student access to big displays/ HMDs
- Twitter big data project
- CERN very-high-bandwidth data access
- 50-yr climate data projections using high-speed networking
- High-speed access, data curation for Center for Aerosol Impacts on Climate
- Store/analyze low-level acoustic noise data
- Link 1st responders, public to wildfire data
- Support Health Sci HIPAA cloud
- Advance multi-omic integration of the human microbiome
- Create scalable visualization for graphing gene & cellular networks
- Support rational drug design in SDSC clusters with high-speed networking
- Electronic Lab Notebook (ELN) technology for early-adopter labs and classrooms
- Brain-Inspired Processors lab
- Curate 3D archaeological images
- Big data text analysis in classroom
- Mesa-wide scientific instrument access
- Networked science to crack the living cell nucleus

Meeting Project Goals

- **Faculty Technical Services Advisor meets with researcher to understand research goals & IT needs**
- **Faculty Technical Services Advisor and IDI Implementation team determine best combination of campus, cloud, and novel services to meet researcher needs and budget**
- **IDI Technical Expertise and appropriate Partner Institution resources are scheduled & then deployed to enact project plan, including support with advanced telecommunications, data transmission/storage/management, cloud integration and brokering, visualization and analysis, etc.**
- **End-of-year IDI project showcase/workshop**

Integrated Digital Infrastructure Transformational Projects

2014/15 projects rely on:

- **Campus Colocation facility at SDSC**
 - 1G-connected racks (10x commercial standard 100MB)
 - 10G & 40G available (100x-400x commercial standard 100MB)
 - 24/7 monitoring
 - Meets regulatory and funding agency requirements
 - Options including locking cages, backup power
- **Triton Shared Computing Cluster**
 - Compute power with less electrical and cooling needs
 - On-demand high performance computing
 - Served by experienced IT staff

Integrated Digital Infrastructure Transformational Projects

2014/15 projects will also rely on:

- **Individual consultation, coordination, & service brokering**
- **Advanced (10G/40G/100G) networking**
- **Tailored high performance personal computing**
- **Cloud computing, storage and disaster recovery**
- **Big data analysis and visualization partnerships**
- **Student access to leading-edge technology**
- **Electronic lab notebooks for faculty and students**
- **Advanced data curation & preservation facilities**
- **Mesa-wide scientific instrument Prism connection**
- **HIPAA-compliant compute and storage**

For More Information

- Idi-info@ucsd.edu
- Website (under construction) <http://idi.ucsd.edu>