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
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
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
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
• **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
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