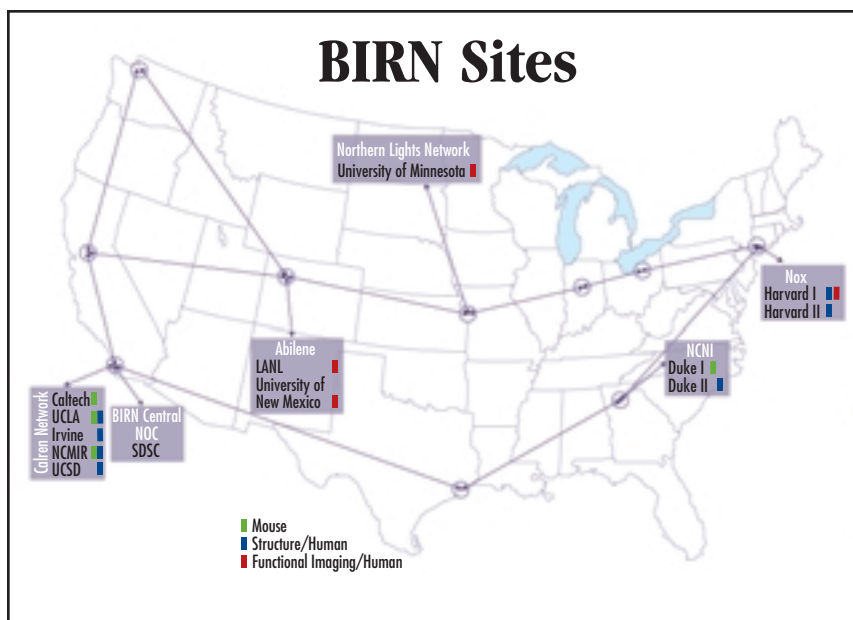




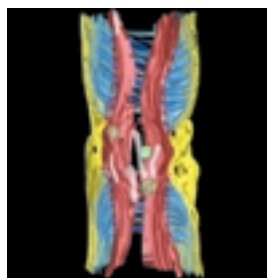
Internet2 health sciences applications in bioscience are pushing the boundaries of collaboration, data storage, sharing, access, and integration of scientific instrumentation with advanced tools such as the Access Grid and high-definition TV. The advanced networking services of Internet2 are playing a key role in keeping researchers and scientists linked and in maximizing productivity in the rapidly evolving arena of bioscience research and collaboration.



## Remote Instrumentation

Telescience Alpha Project  
 National Partnership for Advanced  
 Computational Infrastructure (NPACI)  
 National Center for Microscopy and Imaging Research (NCMIR)

<http://www.npaci.edu/Alpha/Telescience/>  
<http://www-ncmir.ucsd.edu/>



The National Partnership for Advanced Computational Infrastructure's Telescience Alpha Project is focused on end-to-end, web-based solutions to allow scientists to examine biological specimens using instruments and computer resources located at remote sites. The recently

developed Telescience Portal integrates the use of remote imaging instrumentation, distributed parallel computing, federated and distributed databases and image archives, and component-based remote visualization tools to provide an end-to-end solution for performing electron tomography. The portal distances the user from the traditional complexity of managing high-performance computing and distributed storage resources by providing a familiar and easy-to-use point-and-click interface. Internet2 high-speed networking enables simultaneous grid computing over multiple heterogeneous computational domains and is critical in transferring large datasets from remote storage to the user's web browser as well as to computational resources such as workstations, clusters, visualization servers, and supercomputers. Low-latency and high-speed transfers are critical to the experience of direct feedback in applications that have been traditionally hosted on high-powered workstations but are now on remote thin clients.

## Distributed Computing

Biomedical Informatics Research Network (BIRN)  
 University of California at San Diego

<http://www.nbirn.net/>  
<http://birn.ncrr.nih.gov/>

Internet2's high-speed Abilene backbone network will soon link Biomedical Informatics Research Network (BIRN) project sites located at Caltech, UCLA, UCSD's School of Medicine, San Diego Supercomputer Center, Harvard, and Duke. The University of California at San Diego (UCSD) is BIRN's "coordinating center," deploying grid technology to lead the National Center for Research Resources-funded effort in building the first nationwide high-performance computer environment to study diseases of the brain through sharing of digital magnetic resonance images (MRI), advanced 3-D microscope images, and related genomic, structural, and gene expression data. Neuroscientists and medical scientists will be able to cross-correlate data and expertise, while BIRN will provide an environment for developing data repositories, resource centers, and regional core facilities to advance the understanding of brain-related diseases.

Distributed  
 Computing

Remote  
 Instrumentation

Interactive  
 Collaboration

Scientific  
 Visualization

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## Interactive Collaboration

Scientific Collaboration Using the Access Grid  
Johnson & Johnson

<http://www.jnj.com/>



Johnson & Johnson is conducting research to bridge the gap between scientists and advanced computing technologies to find new methods of scientific communication, collaboration, and visualization. Facilitated by Internet2 advanced networks, Johnson & Johnson is researching the integration

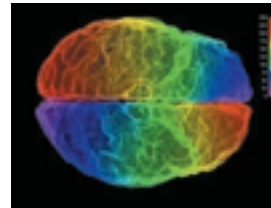
of devices such as laser capture microscopes and other scientific instrumentation into the collaborative space via the Access Grid, a network of distributed computation, application, and collaboration resources. This will allow many scientists to share the output from different scientific instruments. The benefits include real-time, high-quality communication between individuals, teams, or large groups, and enhanced productivity in the drug discovery process. Johnson & Johnson's research in networking, graphics, visualization, databases, real-time systems, media, and human computer interaction is also helping to upgrade the collaborative space to support high-definition TV (HDTV).

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## Scientific Visualization

Digital Brain Atlases  
University of California at Los Angeles

<http://www.loni.ucla.edu/>



At the University of California at Los Angeles Laboratory for Neuro Imaging (LONI), high-resolution brain data is collected from MRI scans, digitized slices of cryosectioned brains, and light microscopes.

The data is then processed to create 3-D datasets that range from 100MB to 10GB. Software recreates a 3-D model of the brain, generates a "road map" that allows a particular brain to be compared against other brains, and allows the development of population-based, digital brain atlases. These atlases store information on how the brain varies across age and gender, across time, in health and diseases such as Alzheimer's, and in large human populations. Internet2 high-performance connectivity will ultimately allow the data to be made available within a superstructure or federation of databases with a common means of access.