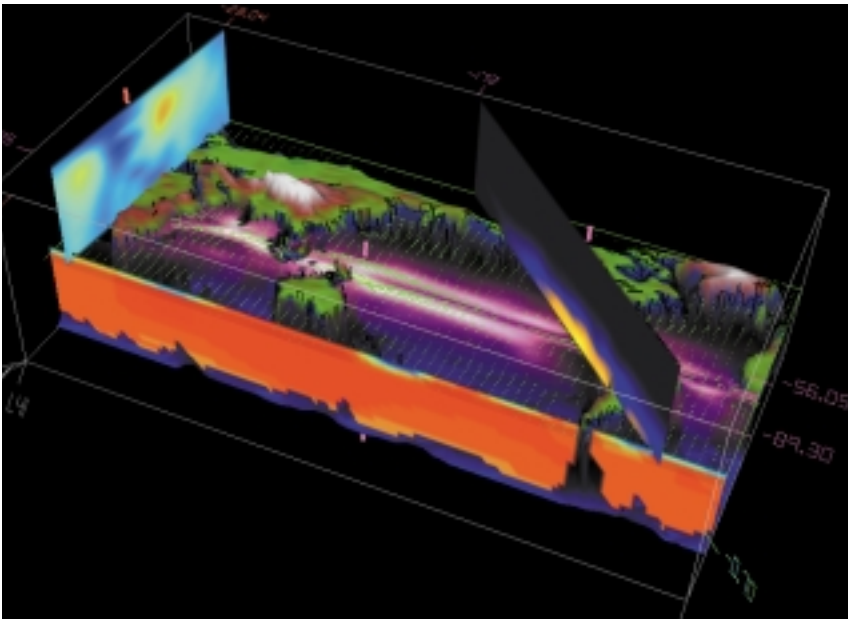




Leading-edge Internet2 applications are helping instructors develop new teaching techniques that enhance the learning experience for their students. By removing barriers to information and data retrieval, making resources available anywhere and anytime, reaching minority students, and bringing together learning communities, Internet2 applications are changing the way we learn and teach.



Blues Legacies
University of Wisconsin-Madison

<http://144.92.94.181/itblues/>



The University of Wisconsin-Madison Division of Information Technology used H.323 videoconferencing over Internet2 high-performance networks to help bring noted Chicago blues harmonica player and educator Billy Branch

to Prof. Ron Radano's "Blues Legacies" class. Radano's class met in Luther's Blues, a music club in Madison, which was linked via H.323 videoconferencing to the University of Chicago where Mr. Branch performed. A wireless connection from University of Wisconsin's Computer Science building to the off-campus music club enabled the videoconference to take place. Radano and the students of Music 497 were able to hear history lessons, share reminiscences, and listen to Mr. Branch's legendary music. This class was also exemplary because Radano, who did not previously use technology extensively in his teaching, is now exploring innovative uses of technology for his future projects.

Undergraduate Education

Undergraduate Education

Introduction to Weather and Climate
University of Wisconsin-Madison

<http://cimss.ssec.wisc.edu/wxwise/class/aos100.html>

Distance Learning

Prof. Steve Ackerman teaches a large introductory course on weather and climate at the University of Wisconsin-Madison. In addition to the basics of atmospheric science, students in this large, lecture format course learn how scientists view the world and how they use the Internet for lab work. The lab section teaches students how to read weather maps and make forecasts. Ackerman uses VISITView and Vis5d; both are free and easy to use. VISITview is a web-based teletraining and real-time collaboration tool developed for the National Weather Service. It provides image animations, zooming, and colorizing, and allows multiple collaborators to manipulate shared images. Vis5d is a software system, developed by the University of Wisconsin Space Science and Engineering Center, for visualizing data made by numerical weather models and similar sources. VISITView and Vis5d collect data from multiple datasets across Internet2 high performance networks in order to create weather visualizations.

Collaboration Tools

Remote Instrumentation

Psychology 110
Northwestern University

<http://www.northwestern.edu/it/UCIT/digitalmedia/uttal.aspx>



Prof. David Uttal teaches an Introduction to Psychology lecture course at Northwestern University. In a large lecture teaching environment, students aren't able to interact with instructors and materials as much as they'd like; Uttal is using technology to address those limitations. A Blackboard web page for Introductory

Psychology not only features a broad range of resources for students—from the syllabus to the final grades—but also provides 24-hour access to videos used in the lectures. Students use the VideoCharger player to view the MPEG-1 video files, which are streamed over Internet2 networks. This example shows an image from a video about a man coping with amnesia.

Collaboration Tools

E-Quad: Advanced Collaboration Environment
University of Illinois at Urbana-Champaign

<http://tek13.spcomm.uiuc.edu/contractor/eqquad.pdf>



High-bandwidth videoconferencing, web-based Internet technologies, and collaboration software provide a powerful array of teaching tools capable of spanning time, place and institutions. The University of

Illinois, Purdue University, University of Southern California, University of Pennsylvania, and University of California at Santa Barbara are using these tools to create a distributed cooperative learning and teaching environment. The faculty on these campuses are part of an ongoing, multi-university experiment called Electronic-Quad (E-Quad), an advanced collaboration environment initiated at the University of Illinois at Urbana-Champaign. The faculty work together in an interdisciplinary team-teaching environment and bring different areas of expertise (for example, political, cultural, technological, and economic) to the students in their graduate seminar courses on globalization and other topics. The courses use streaming video delivered across Internet2 high-performance networks and web-based instructional tools to create "virtual" work groups among students and faculty.

Distance Learning

Transpacific Interactive Distance Education
Kyoto University, Japan
University of California, Los Angeles

<http://www.cdi.ucla.edu/partners/kyoto/kyotoclass.html>



Kyoto University and the University of California, Los Angeles (UCLA) are using MPEG-2 videoconferencing to offer courses taught simultaneously on both sides of the Pacific. The Transpacific Interactive Distance Education initiative allows professors in

Los Angeles and Kyoto to appear live before the students on their home campuses and simultaneously appear on video screens in a classroom across the Pacific. Students at either location not only ask questions and receive immediate answers from the professors, but they can also interact with students at the other campus. Using a series of high-performance networks, including the Abilene network, allows not just the simultaneous transmission of the lecturers talking, but also provides additional high-bandwidth content such as demonstrations, graphics, video, sound, and computer simulations to supplement the course curriculum.

Distributed Rap Sessions
Northwestern University
Northeastern University

<http://www.npaci.edu/Outreach/CDC>
<http://www.northwestern.edu/it/UCIT/digitalmedia/taylor.aspx>



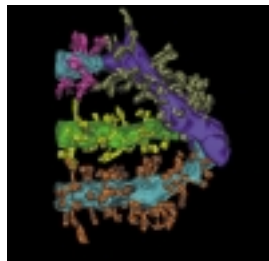
The Coalition to Diversify Computing is organizing a series of distributed Rap Sessions to bring together minority undergraduate and graduate students in computing at Internet2 member

universities and other campuses, including Northwestern University, Boston University, Northeastern University, Dartmouth, Howard University, University of Illinois, and University of New Mexico. The Access Grid, a network of distributed computation, application, and collaboration resources, is being used to support these distributed Rap Sessions and to bring together geographically dispersed participants in order to form "virtual communities" of minority undergraduate and graduate students. The Rap Sessions have facilitated discussions on issues of isolation in a research group, establishing good relations with faculty, and life after graduate school. A collection of audio recordings from each Rap Session is stored for use by Motorola Labs to study how the Access Grid supports informal interactions.

Remote Instrumentation

Telescience for Advanced Tomography Applications
National Center for Microscopy and Imaging Research
University of California, San Diego

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



The Telescience project is developing an end-to-end, web-based solution to allow scientists to perform research on biological specimens using remote imaging instrumentation, distributed heterogeneous parallel computing, distributed databases and image archives, and component-based remote

visualization tools. High-performance networking allows scientists and students in any location to take advantage of these advanced capabilities. The Telescience project was a Network Challenge Award outstanding runner-up at the SC2000 conference, where scientists demonstrated remote collaborative use of NCMIR's high-voltage transmission electron microscope for K-12 teaching purposes. At this demo, high school students could control the instrument remotely from New Orleans while collaborating online with neuroscientists in San Diego and computer scientists in Dallas. The system continues to be heavily used as a classroom teaching tool to remotely train K-12 and undergraduate students in neuroscience, electron microscopy, and computer science curricula.