Welcome to the “Green” issue of Connect!
As NYU works toward a more sustainable and environmentally friendly future, many members of the University are finding “green” ways to interact with technology. This Spring/Summer 2008 issue of Connect is a celebration and exploration of the use of information technology for environmental research, as well as earth-conscious considerations for those who are purchasing and disposing of hardware.

Also in this issue are articles detailing ways in which software is becoming as critical to bioinformatics researchers as their lab equipment; reflecting on the experience of teaching filmmaking and digital media using Second Life; providing information about resources for organizing your personal library; and outlining exciting technology developments and ITS services around campus and abroad.

– Alissa Wilkinson

About Connect
Connect: Information Technology at NYU is edited and published by Information Technology Services (ITS). Its scope includes information about computing, networking, and telecommunications across NYU’s various schools, departments, and administrative units, as well as developments in information technology outside the University.

Print copies of Connect are available at the ITS Faculty Technology Services Center, the ITS computer labs, the ITS Client Services Center, the NYU Welcome Center, and most graduate school offices. Copies are mailed to full-time University faculty, staff, administrators, and researchers, based on mailing lists administered by the Human Resources Division. Current and past issues of Connect, as well as a podcast, are also available on the web at www.nyu.edu/its/pubs/connect.

If you are a full-time faculty member and do not receive a copy, please notify your dean’s office; full-time staff should notify their human resources representative. If you are not among these groups but would like a free subscription, please send an email to its.connect@nyu.edu.

We welcome your comments about the articles in this issue, as well as suggestions for future issues. Contributions are invited for consideration by the editor.

Opinions expressed in the articles in this publication are those of the authors and not necessarily those of Information Technology Services or of New York University.

Thanks also to...

David Ackerman, Doug Carlson, Vincent Doogan, Ken Fauerbach, Jeremy Friedman, Jane DelFavero, Marie Gayle, Michael Grey, Norma Kenigsberg, Jackie Loew, Barbra Mack, Ben Maddox, Marilyn McMillan, Cecil Scheib, Eve Simonsen, Heather Stewart, Matthew Zimmerman
A Letter from the NYU Sustainability Task Force
By drawing upon technology, we can respond to environmental challenges more effectively. Lynne P. Brown and Alison Leary

Investing in Green Technology
Small investments in environmentally friendly products can yield big returns for your wallet and the earth. Christopher James

Green Research: Where to Look, and How to Find It!
Conducting environmental research of your own? Here’s how to find what you’re looking for. Paula Feid and Andy Rutkowski

GIS Goes Green
Using mapping and geographic information systems for sustainability research. Jennifer Black, Paula Lazrus, Frank LoPresti, and Ben Winter

Disposing of Technology
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Recycling Surplus Through Asset Management
How NYU recycles and properly disposes of its aging technological equipment. Larry Pender

Did You Know?
Quick facts about sustainability and your computer.

Blackboard Upgrade
Ethan Ehrenberg

Sakai and ALEX: A Brief Look
Ethan Ehrenberg

Q & A with ITS Desktop Support
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Minerva Novero and Margaret Saunders

Organizing a Personal Library
Kara Whatley

Bioinformatics in Molecular Anthropology
Todd Disotell and Anthony Di Fiore

Machinima: Filmmaking in Second Life
Mechthild Schmidt

Reflection: Teaching with Second Life
Kathleen Hulley
As a private university in the public service, NYU has a responsibility to embed environmental sustainability as a core value of its academic mission and administrative operations.

Sustainability is rapidly altering the face of NYU. Though our current effort is a young one relative to the green initiatives of many other major American universities, we are proud of our progress so far.

Through investments in renewable energy and infrastructure, community-wide programming, academic research, and the fostering of a deep understanding of environmental values, NYU is poised to become a leader in urban environmental scholarship and practice.

Technology, and its utilization, has a central role in this story. Short-sighted resource consumption and technological development have driven environmental problems such as global warming and biodiversity loss. At the same time, by thoughtfully drawing upon technologies as diverse as networked information systems and renewable energy, we can respond to these challenges more effectively.

Sustainability means bringing together diverse segments of the NYU community — students, faculty, administrators, staff, parents, alumni, neighbors, and beyond — to solve environmental problems and improve everyone’s quality of life.

We have the collective opportunity to act on many levels — by reducing our direct physical impacts on the environment, by educating our student body about their own ability to enact positive environmental change, and last but not least, by engaging with the research function of our world-class university to develop new tools and ideas for confronting global problems.

To learn more, visit our website at www.nyu.edu/sustainability. We thank you for your help in making NYU a greener place to live, work and learn!

Lynne P. Brown
Co-Chair, Sustainability Task Force; Senior Vice President for University Relations & Public Affairs

Alison Leary
Co-Chair, Sustainability Task Force; Senior Vice President for Operations
As we become more aware of the environmental impact of our work environments and technology products, it’s easy to become overwhelmed. Should I leave my computer and other appliances on overnight, or turn them off when I’m not there? How can I reduce the amount of paper I’m using? Where should I recycle my discarded supplies? As Kermit the Frog once said, “It isn’t easy being green.”

However, investing in green technology is easy! The three products highlighted in this article are designed to maximize resources while simultaneously reducing your office’s waste, thus lowering your carbon footprint. Though many of these products carry a small initial cost premium over more traditional products, they soon pay for themselves with the savings realized from reduced consumption and lowered energy costs.

Managing Printing Waste
Have you ever printed something from a website and ended up with less than a quarter page of text at the end — or even just a line? Want to eliminate that unnecessary page? GreenPrint (currently available for only the Windows platform) is a print driver and PDF creation software application which helps eliminate waste before printing, saving paper, ink, and trees.

The GreenPrint software analyzes each page of every document sent to the printer and identifies typical waste characteristics (e.g. pages with just a URL, banner ad, logo, or legal jargon), then highlights and removes these objects. It also provides the ability to remove images from a page before printing, resulting in significant ink and toner savings. According to company statements, GreenPrint saves the average user over $90 and 1,400 wasted pages per year.

GreenPrint is available to the individual user in two versions — the free GreenPrint World and GreenPrint Home Premium, which costs $35 and features faster previews than the World version, no advertising, email-based technical support, and frequent version updates. There is also an Enterprise edition for companies of any size, which provides insight into waste reduction through a company-wide printing overview and tracks the resulting environmental information, such as the saved tree quantity and CO2 reduction. It also provides an easy way to reuse paper that has already been printed on one side before recycling it.

I began using the software in December 2006, and gave it as Christmas gifts to my family and friends. The interface is easy to use — with a pain-free installation process, it delivers on all its promises, including prompt technical support and product upgrades. My tech-savvy “tree-huggin” little brother has not stopped extolling its virtues, and has kept a running total of his environmental “savings” using the product.

Controlling Ink Waste
While most laser printer cartridges are recyclable — manufacturers often allow the buyer to send used cartridges back for recycling at no cost — they first must be created, packed, and shipped to the consumer, and if recycled, then shipped back to the manufacturer. If you are considering purchasing a new color office printer, and are concerned about the amount of waste that laser toner cartridges create, consider Xerox’s Phaser, a solid-ink technology color printer with the capability to print text and graphics with nearly the speed and quality of a laser printer.

The technology isn’t new — solid-ink printers have been around

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To download the GreenPrint software, visit www.printgreener.com.
in one form or another for over 15 years — but because it’s proprietary to Xerox, it is not well known or widely used, and until recently, there weren’t many printer models to choose from.

Phaser printers use solid sticks of non-toxic ink instead of dry toner or ink-filled cartridges (think of the sticks as the “bouillon cubes” of the printing industry). The reduction in solid waste is dramatic: after 100,000 prints, a color laser can produce 157 pounds of waste, while a solid-ink printer produces only five pounds, according to company documentation.

Solid ink requires less physical packaging, does not need to be returned to the manufacturer for disposal, and is easier to install in the printer. The unique, shape-coded color ink sticks are merely dropped into specified slots on the top of the printer, with nothing to spill; the inks can be replenished at any time, even during printing. Because the printer must remain powered on to have maximum use of the liquefied ink, this technology is best for large organizations with high printing volumes.

Not only is Xerox’s Phaser technology environmentally conscious and easy to use, they have also recently partnered with GreenPrint to bundle a full version of the Enterprise GreenPrint software with Xerox’s Phaser 8560 and 8860 solid-ink color printers. According to GreenPrint’s November 1, 2007 press release, “the collaboration allows Xerox customers to save over 15,000 trees and 50,000 tons of greenhouse gases annually”.2

Power
As part of your environmentally friendly technology upgrades, consider purchasing a “smart” power strip, which helps keep “phantom” power-drawing appliances from sucking power when they are turned off. A “smart” power strip such as a Watt Stopper or Smart Strip Power Strip are intelligent enough to cut the phantom power to your electronics when they’re not in use.

The Watt Stopper’s Isolé IDP-30503 is an energy-saving control system consisting of an eight-outlet power strip and an occupancy sensor, which detects whether the workspace is occupied by a person and connects to the power strip with a cable. Six of the power strip’s outlets are controlled by the occupancy sensor and two are uncontrolled. The IDP-3050 automatically turns all controlled devices on when it senses that the workspace is occupied, and turns them off when the workspace has been unoccupied for the user-defined time delay (between 30 seconds and 30 minutes).

Another “smart” power strip, the Smart Strip,4 monitors power consumption and senses when computers and other devices are on or off. When your computer is turned off, the unit senses the drop in current draw and shuts off the power, eliminating the idle current drawn from it, incurring savings on energy bills in as little as six weeks.

There are many more energy- and environment-saving technical gadgets on the market. Not only do these devices help you contribute to a sustainable lifestyle, but they prompt awareness of your daily consumption in other tasks you perform each day. Just remembering to turn off your office light when you leave or printing on both sides of the paper are small, everyday steps in the right direction!

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2 To read the entire press release, visit www.printgreener.com/press-releases/GreenPrintXeroxPR.html.
3 Costs about $90; available from www.wattstopper.com.
4 Several models are available, with prices ranging from $32 to $45; available at http://catalog.bitsltd.us/power_strips/.
From the NYU Sustainability Task Force to the new Environmental Studies Program within the College of Arts and Science, NYU is developing innovative practices and initiatives focused on sustainability and the environment. The NYU Libraries are eager to help students and faculty plug into the many resources available to them in these increasingly important fields of inquiry.

In addition to Bobst Library’s impressive collection of print material on environmental studies, policy, and sustainable development, a growing collection of online resources is available. This article outlines some of the Library’s new resources and provides some strategies for searching through our “green” collections.

Using BobCat and Library of Congress Subject Headings
Unlike a Google search, which uses a free-form natural language search, library catalog and database searches use designated subject headings or descriptors, also known as “controlled vocabulary”. A great way to quickly get an overview of a particular topic and its official descriptors is to use the Library of Congress Subject Heading (LCSH) search within the BobCat online catalog. This comprehensive thesaurus enables browsing through general subject areas and more specific subcategories.

For example, if you entered “environment” as a subject heading, you’d discover that there are no books associated with this heading, but the LCSH search would advise you to see “ecology”, where you’d find 458 titles. Similarly, “green buildings” is not a subject heading; instead, use “sustainable architecture”.

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Just a few of the other related Library of Congress subject headings include:

- Climatic change
- Energy conservation
- Green products
- Green marketing
- Green technology
- Nature — effect of human beings on
- Political ecology
- Pollution
- Recycling (waste, etc.)
- Renewable energy sources

The subject headings are also an effective tool for searching through other databases and resources because the terms are so broadly accepted.

New Databases
Recently, Bobst Library acquired several databases that specifically focus on the environment.

Columbia Earthscape, developed by Columbia University, is a portal to a wide range of resources and information on earth and environmental science. Its unique features include a multimedia collection of lectures by leading university researchers and NASA scientists, 25 full-text journals, image banks, and streaming videos (such as animations and excerpts from “NOVA” and “Frontline” specials). It also provides syllabi and lesson plans with illustrated lectures for students to use in their own learning or adapt for student teaching.

LexisNexis Academic, which gives access to extensive news coverage, also provides access to a separate environmental database via its homepage. LexisNexis Environmental includes direct access to full-text articles on energy, pollution, land use, biodiversity, sustainable development, and waste management from a diverse selection of sources ranging from familiar journals and trade magazines to harder-to-locate environmental codes and case laws.

E-Books and Other Useful Databases
The NYU Libraries subscribe to ebrary, an expanding compilation of digital books with an excellent selection of recent titles on the environment. It is easy to navigate, fully searchable, and provides InfoTools for highlighting sections, saving citations, and more.

A reliable database with a public policy approach to environmental studies is PAIS, or Public Affairs Information Service. One of PAIS’s particular strengths is a comprehensive thesaurus containing descriptors that narrow and/or expand on a particular subject area. This also helps the user identify the “correct” search term for their needs; for example, someone searching on “sustainable development” would be prompted to try “economic development: environmental aspects”.

Another great thesaurus is the United Nations Bibliographic Information System (UNBIS). Not only is this a multilingual thesaurus, providing references in the six official languages of the UN (Arabic, Chinese, English, French, Russian and Spanish), but it’s also a good place to find search terms for any of the databases or resources associated with the UN, such as the Environmental Programme, Development Programme, and the Food and Agricultural Organization.

Columbia Earthscape is a portal to a wide range of earth and environmental science information resources.
Organizing a personal library is always a challenge, and those of us in academia tend to amass sizable collections. However, unlike a public or academic library, we do not have professional catalogers to help organize our collections. Many of the usual schemes we use to organize our libraries — order of purchase, alphabetically by author’s last name, loosely by subject — break down when challenged by large collections or those containing materials in various formats. Some people create a private database to help them organize their libraries, but this can turn into a tedious and time-consuming task.

Several online tools, some new and others familiar, can help in organizing a personal library. The tool you choose to use for organizing your collection will depend on the format of your library (books, journals, or videos) as well as the contents (personal books and research materials). Any way you mix your library, there are several options available to help you manage it.

RefWorks
One resource that you may already be familiar with is RefWorks, an online bibliographic citation management system available to every member of the NYU community through the Libraries’ website. It provides two levels of organization for a personal library. First, when you add an item to the database, RefWorks assigns it a unique “RefID” number, which can be used to label items in your collection for later retrieval. RefWorks then allows you to categorize your things into folders of your own creation, allowing you to quickly find all the items in your library related to a particular subject.

If your library includes journal articles, RefWorks can free up space for you by linking to the full text version of many articles, and it allows you to attach your own PDF and other types of files to article records. It also allows you to add call numbers to any book records you input, and brings those numbers over when you import records from library catalogs. You can even organize your personal library with the same call number scheme used in your favorite library.

Google Books
Another option for organizing your personal library is available from one of your favorite online search engines, Google Books has a “My Library” feature that is connected to your Google account (which you may use for GMail and other

RefWorks, an online bibliographic citation management system.

1 www.refworks.com
2 http://books.google.com
services), so there is no need to create a new username and password. Just search Google Books for the books in your personal library and click to add them to your “My Library” list. Or you can use the “import” feature to add numerous books at one time using ISBNs.

Once you have books in your library, it’s simple to add “labels” to your books. Labels can be tags or subject headings that you use to organize your books, or they can be call numbers from your local library. After labels are added, they are displayed in your “My Library” list and are searchable.

For now, Google Books libraries are limited to only cataloging books, so if your personal library collection includes other formats such as videos and journals, Google Books may not be the ideal organizational option for you.

**Downloadable Options**

If you would rather use downloadable software than an online resource to organize your personal library collection, several options are available. Two worth mentioning are Delicious Monster3 (for Mac OS X) and MediaMan4 (for Windows 2000/XP/Vista). They each cost about $40, and while neither is a good option for organizing a library that includes journal articles, both handle books, CDs, and DVDs well. They even enable you to scan the barcodes on the items in your library to quickly add them to your catalog; however, only MediaMan allows you to import items into your library via Amazon.com.

Delicious Monster allows you to sync your catalog with your iPod so that you always have your collection information at your fingertips. It also has the look and feel of iTunes, so users will find Delicious

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3 Delicious Monster is available online at www.delicious-monster.com.
4 MediaMan is available online at www.imediaman.com.
Green Research: Where to Look, and How to Find It - continued from page 6

NYU’s Virtual Business Library’s “Marketing” page³ includes Mintel Reports and MarketResearch.com, which provide extensive reports detailing how the “green” movement is impacting the marketplace. These reports give statistical data on new products and trends and offer interesting psychological profiles of consumers and how they interact with this newly emerging market.

More Green at the Libraries

The NYU Libraries also promote awareness about environmental issues through exhibits and guides that highlight helpful reference materials and other resources. A new research guide created by the Coles Science Center⁴ provides a great starting point for anyone developing a “Green Grant” project proposal in conjunction with NYU’s Sustainability Task Force or studying environmental sciences at NYU.

The Real Estate Library has developed a “Green Buildings” research guide⁶ that provides an overview of relevant journals, books, and websites on the topic. The “Sustainability at NYU” exhibit, located at the Business and Government Documents Center on the sixth floor of Bobst Library, offers free New York City Bicycling Maps and Green Maps.

We hope this brief introduction to some “green” resources provides a good overview of some of the many research materials provided by the NYU Libraries. As always, if you have questions, comments, or recommendations for resources that you would like to see, let us know by sending an email to paula.feid@nyu.edu.

³ www.library.nyu.edu/vbl/marketing/
⁴ http://blogs.nyu.edu/library/colessciencecenter/2008/01/nyu_green_grants.html
⁵ www.nyu.edu/sustainability/campus.projects/green.grants.html
⁶ www.nyu.edu/library/rei/WebGuides--PDF/greenbuilding.pdf

Monster easy to use. Both Delicious Monster and MediaMan rely on tagging to organize your collection, but you can incorporate library call numbers into the tags if you choose.

As you can see, there are many choices available for use in organizing a personal library, whether your collection contains mostly journal articles or a mixture of books, videos, and CDs; whether you will always access information from one computer, or need to get it from the web; and whether you prefer inputting items to your inventory by scanning barcodes or entering ISBNs. Different organizational tools offer diverse ways of importing and accessing your collection, and the time and effort required by each of these methods is worth serious consideration. Choose a personal library organizational method that works for you now, and is capable of expanding as your library does.
GIS Goes Green

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Environmental sustainability has been a hot topic around the globe for some time, and researchers are working hard to find ways to understand and protect complex environmental processes. This work requires careful planning, evaluation, and monitoring, some of which relies heavily on the use of Geographic Information Systems (GIS).

GIS enables researchers to link different kinds of information with spatial or geographic data, such as locations on a map, a person’s address, streets, or altitude. Different pieces of information can be layered within the same database to make maps, model spatial processes, or gain a better understanding of how complex data work together. Though GIS tools are often used to make maps, they can also be used to perform sophisticated analyses, build databases, link spatial information, and measure and model relations between different spatial points.

Modeling the Environment

The availability and management of clean water is a key ecological concern being addressed by researchers using GIS tools. Measurements of vegetation ground cover, water depth and flow speed, soil composition, slope, and altitude are gathered continually by satellites and fly-overs and made into “raster layers”. These grids of raster information, in which each square contains a specific measurement (e.g., soil type), create a checkerboard covering a geographic area and are used by various state, national, and international agencies.

Scientists use the data in these layers to model the impact of changes in environmental variables, such as transformations of the slope of hills due to strip mining, which leads to increased erosion. These models become simulation tools in GIS packages. Simulations such as the Water Erosion Prediction Project (WEPP) model allow researchers to predict erosion and mud slides, and then layers of soil, vegetation type, slope data and other factors can be studied to understand their impacts on catastrophic but predictable events.1

Another type of research using GIS tools measures ecological problems by analyzing pollution sites and the profiles of individuals whose health is impacted by the location of these sites. Zvia Naphtali, co-author of “Using GIS to Examine Environmental Injustice in the South Bronx”2 introduces her paper by stating:

“The U.S. Environmental Protection Agency defines environmental justice as "...the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."

Environmental injustice has been defined as the disproportionate exposure of communities of color and poor people, or other vulnerable groups, such as children and the elderly, to environmental risks. As part of an environmental injustice study, GIS can aid in assessing hazardous pollutants surrounding specific sites. For example, “buffers” can be created around specific geographic areas to study the extent of the measurable pollutants near that site. Mappings of poisonous air or water can be overlaid with various types of data, including census measures and demographic data.

1 For more information on the Water Erosion Prediction Project (WEPP), see http://topsoil.nserl.purdue.edu/nserlweb/weppmain/.

2 Available online at www.nyu.edu/its/pubs/connect/spring07/naphtali_gis.html.
Four Examples
Researchers use GIS in interdisciplinary studies to explore possible links among poverty, deforestation, flooding, population growth, industrialization, and government policies. This page and the pages that follow feature several NYU researchers who explore ways that different uses of GIS and mapping can help us better understand our world and our impacts on the environment.

Food and Nutrition – Linking New Yorkers to Local Food
Jennifer Black

Food production often tops a sustainability agenda. How and where food is grown, processed, and transported has serious implications for the environment and the health of the consumer, and eating locally-grown food is one strategy for minimizing environmental impact. Proponents argue that purchasing food grown closer to home supports regional economies, protects small farms and local jobs, promotes sustainable growing practices, and reduces environmental impact by saving on the amount of fuel needed to transport food long distances.

Farmers’ markets are one of the best ways to get fresh, local produce in New York City. The New York Department of Agriculture and Markets maintains a database of farmers’ markets throughout the state.¹ The New York City Coalition Against Hunger (NYCCAH) has created the Poverty & Food Access Map, an ideal example of how GIS technologies can be used in understanding the food system.²

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¹ www.agmkt.state.ny.us/AP/CommunityFarmersMarkets.asp
² www.nyccah.org/node/92

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The New York City Coalition Against Hunger’s Poverty & Food Access Map, an excellent example of how GIS may be used to aggregate poverty rates, population density, demographic information, and other data to better understand the food system in a specific geographic area.
Understanding Landscapes
Paula Lazrus

Though complex, ArcGIS (a GIS software suite used at NYU) provides even a novice with new and stimulating ways to understand the landscape and environmental changes. For example, the ArcGIS tools can assist in the planning of sustainable agricultural projects, help with the evaluation of environmental impacts after natural disasters, and provide insight into the general topography of an area as an aid to creating a thoughtful plan for building new structures.

The images in Figures 1-3 illustrate a first attempt to understand a multifaceted, changing landscape as part of a research project examining landscape and social change in southern Calabria, Italy. By combining aerial photos, archival data (for locality boundaries in Figures 3, at right, and 1, below), topographical maps, and digital contour data, it was possible to create a 3-D model that allows viewers to change position within the landscape and get a sense of its shape and contour.

The elevation data, built from the contour file, is extruded to create the “tin” map (Figure 3, at right) which is then placed beneath the photos, polygons, and maps, where it invisibly “sits” and pushes the appropriate areas “up” in ArcGlobe, part of the ArcGIS suite of software (Figures 1 and 2, below). The vertical distance has been exaggerated by a scale of 1.5 to highlight the changes in the terrain.

In Figure 1, which looks northward toward the town, locality boundaries based on archival data are marked. The large and small concentric boundaries (marked in red arrows) represent the upper town, as well as 1 and 2 km distances from the town. This image can aid in understanding the distance and difficulty of travel for people who cultivate crops in these areas.

Figure 2 reverses the view looking from town to the sea and includes views of the topographical maps, making more evident the position of the town and its territory within the landscape.

Figure 1. View of terrain built over “tin” map.
Figure 2. Alternate view of terrain.
Figure 3. "Tin" map, built on elevation data.
Sustainability and Commuting
Ben Winter

Designing cities that permit residents to commute by foot, bicycle, or public transportation helps to decrease the amount of harmful automobile emissions and reduce impact on the environment. These graduated circle maps easily convey which regions of the United States have better sustainable transportation alternatives, based on data from the 2006 American Community Survey (conducted by the U.S. Census Bureau). Researchers usually convey descriptive data like these with charts and graphs; however, user-friendly GIS software provides an easy way to display the spatial aspect of data.
The maps below show that the greater New York/New Jersey area ranks first in commuters who drive to work; however, the area also ranks first both in commuters using public transportation and those walking to work. The highest number of commuters who take their bicycle to work is found in the Santa Barbara/Santa Maria/Goleta, California region.

Note on the data: Since this survey sampled three million Americans from geographic areas that contain more than 65,000 people, the data are actually estimates of the reported populations. The maps only show data from the 125 most populated CBSAs in the U.S.

1 The term “core based statistical area” (CBSA) refers collectively to metropolitan and micropolitan statistical areas. For more information, visit www.census.gov/population/www/estimates/00-32997.txt.
Global Warming
Frank LoPresti

Global warming as it relates to rising water levels is a prominent concern of environmental scientists. These maps, from a series of maps I’ve created using freely available data around the issue of global warming, show the changes that would occur along the East River with rising water levels.

The New York State GIS Clearinghouse\(^1\) is an archive where the State and its counties deposit and retrieve map data. To create these maps, we used raster altitude data produced and made available by the Clearinghouse. They are housed in the Cornell University Geospatial Information Repository (CUGIR), an active online repository in the National Spatial Data Clearinghouse program. These data and other map datasets are available to researchers.\(^2\) CUGIR provides geospatial data and metadata for New York State, with special emphasis on those natural features relevant to agriculture, ecology, natural resources, and human-environment interactions.

Bytes of the Big Apple,\(^3\) a family of software, data, and geographic base map files for the City of New York available for download from the Department of City Planning, provides street shape map files for New York City’s political and administrative districts. Much of the map data, including the street maps used in this global warming series, is available at no cost.

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1 www.nysgis.state.ny.us
2 Contact data.services@nyu.edu for more information.
Map depicting the East River near Williamsburg after a four-meter rise in sea level.

Present sea level in the East River, near the Williamsburg neighborhood in Brooklyn.
Computer technology is improving at a rapid pace, resulting in a worldwide increase in computer purchasing and disposal. Nearly 269 million computers were sold during 2007; of those, the United States bought over 22 million. In 2006, the International Association of Electronics Recyclers projected that, using the current growth and obsolescence rates of consumer electronics, about three billion units would be scrapped before 2011 — an average of about 400 million units a year. This means that electronic waste currently constitutes between two and five percent of the United States’ municipal solid waste stream, and this number is growing rapidly.

What happens to all the abandoned computers? In the U.S., it is estimated that more than 70 percent of discarded computers end up in landfills, despite an increasing number of state laws. Many computers are donated or sold to developing nations as a way of avoiding recycling costs; an estimated 50 to 80 percent of electronic waste collected in the U.S. for recycling is exported to China, India, Pakistan, and other countries.¹

Computers are sometimes improperly recycled or disposed of in developing nations, threatening the environment and the population’s health. Just one computer may contain hundreds of potentially harmful chemicals, including lead, mercury, cadmium, brominated flame retardants (BFRs), and polyvinyl chloride (PVC). Many of these chemicals are known to cause cancer, respiratory illness, and reproductive problems, and may travel long distances through air and water, accumulating in our bodies and the environment.

Increasing awareness of the health and environmental impacts of computer manufacturing and disposal has prompted many organizations to push for recycling laws mandating that components be extracted for reuse and requiring proper disposal. Today, lawmakers are not only passing laws, but taking these concerns one step further by placing the responsibility of proper product disposal on the manufacturer, a measure often called “product stewardship”. For example, Dell, Inc. now accepts a customer’s old computer upon purchase of a new one, and will recycle the old one properly, “closing the loop” for the customer.

According to the United States Environmental Protection Agency, an estimated 30 to 40 million personal computers will be ready for end of life management in each of the next few years.²

How is New York City responding to these concerns? The city disposes of more than 25,000 tons of electronic waste each year. The New York State Department of Environmental Conservation requires that all businesses and institutions dispose of used electronics through City-approved dismantlers and recyclers.

On February 13, 2008, the New York City Council passed a bill that requires all electronics manufacturers to submit electronic waste recycling plans in 2008 and to begin collecting products in 2009.³ Manufacturers will have

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¹ For more information, see [www.greencitizen.com/ewaste_crisis.php](http://www.greencitizen.com/ewaste_crisis.php).
² [www.pcrecycler.net/news/01-17-08.htm](http://www.pcrecycler.net/news/01-17-08.htm)
to demonstrate that they are collecting and recycling a certain portion of discarded electronics each year, equal to a percentage of their average annual sales, as measured by weight. This bill is currently being reviewed by Mayor Bloomberg for final approval and enforcement.

When a computer needs to be replaced in a department at NYU, the old equipment is first evaluated for its reusability. If the unit is unusable, it is properly and locally recycled. If it can be reused, it will be cycled around the department; if it is not needed, it will be made available to other departments through the University’s Asset Management Office (see sidebar). During the 2006-07 fiscal year, 308 computers were redistributed through Asset Management, and 132 were given to non-profit organizations.

Each of us can help reduce the hazards posed by electronic waste by being conscious of the ways we dispose of it. NYU faculty, staff, and administrators may contact their building managers for proper disposal; outside the University, the City Recycling Program can aid in finding local recyclers or opportunities for reuse.

Remember that dropping off your outdated electronics with a recycling company does not guarantee they will be disposed of safely. Ask about the company’s recycling process and whether they export waste items. Always remember to remove the data on your hard drive before discarding your computer.

Asset Management successfully relocates NYU-purchased surplus items within the University, including computers.

Approximately once a month, open houses are conducted at 383 Lafayette Street (basement level) where departments can view and inspect current University surplus items and select those items they would like to use.

If your department has items to be recycled, fill out an Asset Management “Surplus Form” (www.nyu.edu/asset) and submit it to the Asset Management Office.

In addition to relocating surplus items within the University, Asset Management maintains a database of approximately 150 not-for-profit organizations to which surplus computers and furniture that cannot be recycled within the University are donated.

For additional information regarding Asset Management’s computer surplus and disposals, visit www.nyu.edu/asset/surplus-computer.html.

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4 For more information about the City Recycling Program, visit www.nyc.gov/nycwasteless.

5 For instructions and information about wiping your hard drive, visit www.nyu.edu/its/security/docs/disposal.html.
Bioinformatics in Molecular Anthropology

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ANTHONY DI FIORE
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Researchers at NYU’s Molecular Anthropology Laboratory, part of the Department of Anthropology (Faculty of Arts and Science), use a combination of molecular genetic, bioinformatic, and computational technologies to study a wide array of issues relating to the evolution and behavior of human and non-human primates.

Projects at the Lab headed by Todd Disotell, Clifford Jolly, and Anthony Di Fiore include studies of primate cooperative behavior and mating systems; inference of evolutionary relationships among primate species; investigation of interspecific and intergeneric hybridization; reconstruction of human population histories; inquiries into conservation genetics of threatened and endangered primate species; studies of evolution of the primate immune system; research into the coevolution of the nuclear and mitochondrial genomes; and even identification of feeding sites.

Bioinformatic and computational technologies are key to all of these studies. Genetic databases such as GenBank are used as sources of comparative DNA sequences and to identify and develop new genetic markers. A wide variety of software is employed in analyzing the large volumes of genetic data generated by researchers in the Laboratory. Sophisticated programs are needed to collect, assemble, and align DNA sequences; infer evolutionary relationships among species; estimate the kin relationships among individuals within populations; identify likely interspecific hybrids; look for genetic structure within populations; and search for evidence of natural selection in genes and coevolution among sets of genes and genomes. Currently, Internet connectivity to the various international databases and access to high-performance computing resources are as important as laboratory bench space and instrumentation. In fact, one of the most important pieces of equipment in the Laboratory is an Apple rack-mounted Xserve Cluster with 16 X 2.0GHz dual-processor Xserves and a three-Terabyte disk array, which Dr. Disotell worked with ITS to acquire.

Recent Discoveries at NYU

Over the last several years, new subspecies of gorillas and chimpanzees have been proposed, based upon molecular analyses carried out in conjunction with NYU’s Molecular Anthropology Laboratory. More recent projects using bioinformatic approaches have revealed a number of interesting patterns in primate evolutionary history. Within the guenons, a group of colorful small monkeys that live throughout Africa, an extensive molecular survey of almost all the guenon species has demonstrated a close evolutionary relationship among all terrestrial species, to the exclusion of all arboreal species.

Dr. Disotell is a Professor of Anthropology in the Faculty of Arts and Science. His research is centered upon the theme of primate and human evolution, at all levels from the populational to the supra-ordinal.

Dr. Di Fiore is an Associate Professor of Anthropology in the Faculty of Arts and Science. His research focuses on the comparative socioecology, mating systems, and population genetic structure of primates, particularly of the neotropics.

African Old World monkeys (L-R): olive baboon, blue monkey, and black and white colobus.
This was rather unexpected, since it was thought that it was a relatively easy evolutionary transition to climb down from or up into the trees. Within the same group of African monkeys, we discovered that a “dwarf” species, which maintained many primitive morphological traits, was actually more closely related to a very different group of guenons. Among the groups of baboons, which vary widely in size, shape, coat color, and even behavior, we have discovered extensive hybridization.

**Molecular Anthropology in vitro**

Most molecular studies carried out in the Laboratory begin with either the characterization of the DNA sequence or the determination of the alleles present in an individual primate. Sources of DNA can be blood, tissue, saliva, bones, teeth, hair, and feces, depending upon the project and the availability of primate biomaterials. Once DNA is extracted, the polymerase chain reaction (PCR) is carried out to amplify millions of copies of the region of interest. The amplified products can then be characterized as to the presence or absence of a particular allele, or the sizes of the alleles can be determined via capillary electrophoresis. Capillary electrophoresis involves passing an electrical charge through a gel-like medium inside a capillary, which causes the DNA to migrate at a rate based upon the length of the molecule amplified. Fluorescent dyes attached to the DNA material are excited by a laser, and a CCD camera captures their intensity as they migrate past it in the capillary. Sophisticated computer algorithms are then brought into play to calculate the size and quantity of the migrating DNA molecules. These data are then transformed into individual allele sizes. This information can be used to determine the presence of a particular sequence, such as a SINE or an endogenous retrovirus at a specific spot in the genome. The pattern of allele sizes at multiple loci (specific spots in the genome), called microsatellites, can be used to determine relatedness between individuals or even individual identification, as in forensic contexts.

After sequencing reactions are carried out, similar techniques of capillary electrophoresis can determine the precise sequence of a region of interest. Multiple overlapping sequences can be stitched together into longer regions, even up to the length of the whole genome of an organism. The Laboratory regularly sequences the entire 16,500 base pair mitochondrial genomes of various primate species. All of these data need to be stored, organized, and made easily searchable and comparable.

Hundreds of hours of laboratory work and tens of thousands of dollars in supplies and salaries are saved by applying bioinformatic approaches to the design of experiments and search for informative regions of the genome for characterization before the first reagent is expended. Basic genomic search tools such as BLAST (Basic Local Alignment Search Tool) are used numerous times daily to find similar sequences in an organism’s genome or in other organisms. In the search for microsatellites — highly variable stretches of DNA that can be used to infer relatedness between populations and amongst individuals within a population — the presence of multiple primate genome sequences in the databases can be utilized. A microsatellite is a short segment of DNA composed of a variable number of repetitive stretches usually between two and five bases long. For example, the
sequences ATATATATAT and CGCCGCCGCCGCCGCCGC each consist of five and six tandem repeats of the sequences AT and CGC, respectively. Such sequence patterns or motifs can be quickly scanned by various algorithms to find every location where they exist in a genomic sequence. Unfortunately, many of the primate species studied at NYU are poorly characterized genetically.

**Molecular Anthropology in silico**

The rapidly expanding public databases of DNA sequences now allow us to use a bioinformatic approach to detect microsatellites in species that are closely related to those that need to be characterized. To do so, we use freely available bioinformatic software modules to automatically scan the databases for new informative loci as sequences are deposited in GenBank.

First, all new primate DNA sequences are downloaded to a local server at regular intervals. Each new sequence is then scanned for repeat motifs that characterize microsatellite regions with a program from the EMBOSS (European Molecular Biology Open Software Suite) suite of applications. Then, potentially informative loci are fed into a second application that designs molecular probes to detect and characterize the markers in the laboratory. These molecular probes can then be verified at the bench with real samples. We are currently in the process of automating the process using Perl scripts.

Variable microsatellite loci can then be used to characterize the population variation and structure in order to better inform decisions regarding conservation priorities and degree of effort. In a project in conjunction with researchers from Columbia University, we are using such markers to estimate kin relationships among Kenyan blue monkeys to determine whether the number of kin within a group influences the probability of territorial defense. With researchers from the State University of New York at Stony Brook, we are using similar markers to determine if female kin sometimes migrate together. Alternatively, are they more likely to join groups where kin have already entered, or do females try to avoid their kin when joining new groups? One student, in collaboration with colleagues in Nigeria, is carrying out a census of a shy and rare population of gorillas by repeatedly sampling the DNA in feces left behind in night nests. Individual DNA fingerprints are gathered until no new individuals are found, unobtrusively yielding a complete portrait of the population. Other variable markers are being used to try to determine from which tree in a large territory a monkey has eaten. This is done by sampling the DNA in seeds extracted from the monkey’s feces and comparing it to all of the trees in its feeding territory which have individual DNA signatures.

Another class of bioinformatic-intensive analyses, called phylogenetic analysis, revolves around sequence data used to infer evolutionary relationships and the effects of natural selection on different components of the genome. One of the first steps in carrying out a phylogenetic analysis to infer evolutionary relationships from DNA sequences involves aligning the sequences from multiple individuals or species. Sequences need to be aligned because small to large insertions and deletions of DNA bases occur over evolutionary time. While this is relatively straightforward when only two sequences have to be aligned to each other, when multiple sequences are involved, the computational complexity increases dramatically. Multiple sequence

<table>
<thead>
<tr>
<th>Number of Species</th>
<th>Possible Trees</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
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<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
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<td>5</td>
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<tr>
<td>6</td>
<td>954</td>
</tr>
<tr>
<td>7</td>
<td>10,395</td>
</tr>
<tr>
<td>8</td>
<td>135,135</td>
</tr>
<tr>
<td>9</td>
<td>2,027,025</td>
</tr>
<tr>
<td>10</td>
<td>34,459,425</td>
</tr>
<tr>
<td>50</td>
<td>$3 \times 10^{74}$</td>
</tr>
<tr>
<td>100</td>
<td>$2 \times 10^{182}$</td>
</tr>
</tbody>
</table>

In phylogenetic analyses, the number of rooted evolutionary trees that need to be examined is determined by $N_R = \frac{(2n-3)!}{2^{n-2}(n-2)!}$, where $n$ is the number of species.
alignment, as well as many methods of phylogenetic analysis, are called NP-hard (Nondeterministic Polynomial-time hard) problems. These involve a great amount of computational power, with either long run times on individual processors working in the background or parallelized versions running on a cluster of processors.

Phylogenetic analyses (which involve inferring both the structure of an evolutionary tree and the dates at which different lineages split from each other) have become increasingly complex and computationally time consuming. Parsimony and likelihood approaches often require evaluating tens of millions to billions of possible trees in order to find the one(s) that provide the best fit to various models of evolution. Bayesian methods employing a Markov Chain Monte Carlo (MCMC) approach, while less computationally time consuming than searching through the entire tree-space, nevertheless require long run times. Parallelization of these techniques, however, now allows some of these analyses to be carried out in days, rather than weeks.

Bioinformatics and computational science are also used in the NYU Molecular Anthropology Laboratory to understand the co-evolution of primates and their pathogens. Several software packages (e.g., PAML, HYPHY) are being used to test for evidence of adaptive evolution and natural selection at the DNA level. One project is examining the genes involved in the immune system of African monkeys, to see if they show evidence of adaptation to prolonged exposure to the simian immunodeficiency virus (SIV). Because positive or adaptive selection suggests that some changes are beneficial to the organism, examination of specific amino acids under positive selection observed in these cases may provide genetic evidence of co-evolution between African monkeys and SIV, and explain why some primates are better adapted to SIV infection. Since HIV and SIV are basically the same viruses in humans and our non-human primate relatives, understanding how the latter fend off infection, or at least its effects, may benefit HIV research.

Clearly, the combination of bioinformatic techniques with other analytic approaches, when applied to DNA sequences, has become as critical as the laboratory instrumentation used to collect the data.

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1 http://abacus.gene.ucl.ac.uk/software/paml.html
2 www.hyphy.org/

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Example of a GenBank file containing a microsatellite sequence with the repeat motif “ca” in red. Flanking oligonucleotide primer sites are in purple and blue.
Blackboard, NYU’s most widely used learning management system (LMS), supports nearly 45,000 faculty and students and thousands of course sites each semester. The University’s use of Blackboard has grown substantially since it was first introduced during the Fall 2002 semester; on average, today’s NYU student uses Blackboard in three courses per year, and the system has been integrated with other University applications, including Albert (the online course registration system) and NYUHome. Other higher education institutions also make extensive use of LMS — in 2006, 97 percent of all universities (and 99 percent of universities with Ph.D. programs) employed learning management systems, and on average, 70 percent of faculty used a course management system, primarily to provide supplemental materials for lectures and other classroom instruction.¹

NYU is planning an upgrade of its version of Blackboard for use in the upcoming academic year, on a schedule that will soon be published. The upgrade will result in an LMS with improved performance and greater functionality, while ensuring continued technical support from Blackboard, Inc., the commercial software vendor from which the University licenses the Blackboard software.

Like other vendors, Blackboard, Inc. routinely provides product upgrades intended to improve the system’s technical operation and add some of the features requested by their customers (such as NYU). As Blackboard recently announced, the version currently used at NYU will no longer be supported in the near future, so NYU and a number of other universities must upgrade to a newer version. Such an upgrade will entail a considerable effort on the part of ITS staff and those whose primary responsibility it is

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¹ EDUCAUSE Core Data Service Fiscal Year 2006 Summary Report - www.educause.edu/apps/coredata/reports/2006/

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Ethan Ehrenberg is a Faculty Technology Specialist within ITS Faculty Technology Services.
to support Blackboard, with the principal goal of making the transition to the newer system as smooth and rewarding as possible for NYU faculty and students.

**Assisting You in a Smooth Transition**

ITS plans to augment the in-person support and face-to-face training that it provides for Blackboard use with new and enhanced ways of obtaining help and instruction, and special support to smooth your transition to the new version. This will include streamlining the online Blackboard information and FAQs that ITS has developed over the years, replacing them with updated information that can be conveniently accessed via the searchable “Ask ITS” knowledgebase (located at [http://AskITS.nyu.edu](http://AskITS.nyu.edu)).

ITS is also expanding its Blackboard News and Alerts to keep the Blackboard community aware of important upgrade-related developments, such as scheduled downtimes, known issues, and bug fixes. As part of this effort, ITS recently launched a blog called “Blackboard News” which may be read and commented on by anyone with an NYU NetID. In addition to web access, the blog posts can be delivered via RSS or through the “Blackboard News” email list (visit the blog to sign up). As we go to press, ITS is determining the upgrade schedule, which will be published in the Blackboard News Blog as soon as it is determined.

Under its LMS Liaisons Program, another initiative for enhanced Blackboard support, ITS will seek to identify school-based and departmental staff members who currently provide local support in the use of NYU Blackboard. The program will further empower these “local experts” with customized training, greater and preferred access to Blackboard information and support resources, and an optional system role providing additional access that will enable them to more directly support faculty members’ course sites.

Finally, ITS is initiating a Blackboard users group at NYU. This will be a self-moderated forum, in which people from the NYU community can share ideas and tips about using Blackboard and provide feedback on some of the new features introduced in the upgrade. Those interested in participating in this forum may send email to blackboard.discussion@nyu.edu.

**Improvements, Enhancements, and New Features**

Upgrading a mission-critical LMS — one which is necessary to teaching and learning, can sustain little or no service disruption, and demands a high level of immediate and sustained support — is no trivial task, especially at a university as large as NYU. ITS worked closely with representatives from Blackboard, Inc. to map out a plan for upgrading to a more current version of the software during the 2008-09 academic year, coordinating the many integration points of the NYU Blackboard system, minimizing any impact on those who use the system, and ensuring continued smooth functioning for this vital part of the University’s mission.

Most of the likely changes in this new version will fall into one of three categories: bug fixes (welcome...

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2 The Blackboard news blog is located at www.nyu.edu/blackboard/news/.
news to those who have struggled with some of Blackboard’s known issues in older versions of the software!, incremental enhancements to some familiar areas, and new features and changes to existing tools.

One of the first fixes that those familiar with Blackboard will likely notice in the new version is a working WYSIWYG (“what you see is what you get”) text editor available in most content and tool areas. This text editor exists in the version currently used at NYU, but compatibility problems prevent most people from actually seeing or using it.

The WYSIWYG text editor looks like a miniature word processing program. One can bold, italicize, or underline text; change font type, color, and size; run a spell check before posting; and embed multimedia objects such as video, audio, animation, and images directly in the page. Using the text editor, one can not only customize the appearance and presentation of content pages to a much higher degree, but also easily embed multimedia announcements on the front page of a Blackboard course site — for example, instead of just posting a welcome greeting in text, instructors could now greet their students, give instructions, or deliver an entire lecture as a pre-recorded audio file.

Here are some of the other most noticeable bug fixes and improvements that the upgraded Blackboard system will likely include:

- Interim grade calculations that no longer are skewed by the inclusion of not-yet-submitted assignments to display as zero.
- Course content that retains its previous semester’s order when copied by faculty members to a new semester’s course site.
- Faster and more reliable system performance.

Enhanced functionality is also anticipated for many familiar areas and tools. For example:

- A clearer separation of tools from content areas in the left-hand course menu, including a “Detail” view with an expandable tree structure that reveals all the materials in the course at once, eliminating the need to click through each area.
- In the Announcement tool, a check box allowing people to send an automatic email notification to course participants when posting a new announcement.

- An easier way to directly add tool links to content pages so that, for instance, instructors can initiate new discussion board forums alongside a particular content item such as a course reading or assignment.
- New test question types, some of which include matching, Likert scale, calculated formula, file uploads, and hotspots (which ask users to locate a point on an image such as a map or anatomical diagram), as well as more traditional question types.
- New language sets for use in menus and navigation, enabling instructors to present their Blackboard courses in other languages, such as French, Italian, Arabic, and Japanese, and either require their students to use their Blackboard site in this language or allow students to pick a language of their choice.

New and significantly redesigned functionalities will also likely appear. One possible new area is the “Self and Peer Assessment Builder”, which enables instructors to create assignments requiring students to review each other’s work and optionally to follow a set of criteria or model examples preset by the instructor.

Another new feature that may be available is the concept of “adaptive release”, which enables instructors to make some content visible only when certain tasks have been successfully completed. For example, an instructor could make the reading for Unit Two appear only after students had received a passing grade on the Unit One quiz. In this way, students could progress along a personalized learning path designed by the instructor but managed automatically by the system.

A handy “Syllabus Builder” may also be available in the new version, a step-by-step authoring wizard that enables instructors to build a better-
functioning and more interactive syllabus in the Blackboard interface.

The Discussion Board will undergo major restructuring to provide important new functionality, while retaining much of the previous capabilities for moderated threaded discussions. The restructured Discussion Board will provide an improved interface, as well as the capability for course participants to subscribe to individual forums or threads and receive automatic alerts to new posts. It will also be possible to grade Discussion Board posts.

Most of the familiar activities that faculty and students currently perform in NYU Blackboard will remain consistent in the new version.

What's Not Changing?
Most of the activities that faculty and students perform in NYU Blackboard will remain consistent with the current version, as will those features that are most vital to the smooth functioning of course sections within a Blackboard site.

For instance, one of the great advantages has been the ability to build course content and design cumulatively over time by copying content from a course’s site used in a previous semester into a new site for the current semester. NYU is committed to maintaining this ability and to providing easy access to content from several previous semesters, so that instructors can continue to build on a prior semester’s knowledge, even if the previous site was built in an older version of Blackboard.

You will continue to be able to log into Blackboard through the “Blackboard Classes” channel under the Academics tab in NYUHome using an NYU NetID and pass-

word. Both faculty and students will continue to see all current and past academic course sites, along with any non-academic organizational sites in which they’re enrolled (listed under “Other”). Links to important support information will remain in the channel above the list of classes, providing access to online information and instructions, as well as links through which faculty can activate their course sites.

The ITS Client Services staff will remain available to provide phone, email, and in-person help for Blackboard-related questions, and staff members are already being trained on possible new features and tools, to help troubleshoot any issues that you may encounter.

ITS will also continue to provide automated student enrollment into NYU Blackboard sites associated with a course or section ID number. Instructors can continue to expect updated and accurate student enrollment in any Blackboard site they have activated, and course enrollment will remain accurate and up-to-date throughout the semester, even if students add or drop the course.

The most popular current Blackboard activities will remain largely unchanged. Among other things, instructors and teaching assistants will still be able to post announcements on the front page of their course sites, post a banner image, change the look and feel of a course, send email to the entire class or to selected individuals or groups, add a course syllabus for online viewing or download, check the student roster, organize and annotate a myriad of different content file types and links on one page, customize the course menu and internal course links, create and submit online assignments, make and manage groups, moderate online forum discussions, conduct real-time online classes or chats, and administer online tests, quizzes, and surveys. The familiar Blackboard functionality and tools that the NYU community has used will continue to be available to support teaching and learning.

When and How Will the Upgrade Happen?
ITS has committed to having a new version of NYU Blackboard available during the 2008-09 academic year, with all support and training in place. Successful migration to the newer version will require achieving many individual milestones, which will be set and reached only through close collaboration with our school-based experts and LMS Liaisons.

This will involve a number of technical, support, and training decisions. For example, in a technical decision designed to minimize system-wide downtime and overall service disruption, the Blackboard version upgrade will be completed through a “fresh installation” process. A fresh installation involves setting up the new version on different hardware, making sure it is functioning optimally, and then switching people to this system as the new courses begin to go online.

This is in contrast to an “in-place” upgrade, which requires changing the application software on the same hardware system on which the older version is operating,
which can increase the likelihood of service disruptions. Choosing the fresh installation approach demonstrates ITS’ recognition of NYU Blackboard’s importance as an enterprise LMS, and our efforts toward ensuring a smooth transition.

To provide the best training and support possible, ITS is working with Blackboard, Inc. to schedule initial training for a core group of people. As we go to press, ITS is working to organize training for those in technical support roles within ITS and the Schools. In this way, the University can ensure that support personnel are well prepared to assist faculty and staff members in the effective use of any new or unfamiliar Blackboard features.

The core NYU Blackboard team, made up of staff from ITS as well as some school- and Library-based IT departments, is also developing a number of training workshops for faculty. Slated to begin in May and continue throughout the summer and the following academic year, the workshop titles will likely include focused sessions, such as “What I Need to Know About the Blackboard Upgrade: What’s Changed and What’s New?”, “Effective Use of Content: How to Take Advantage of Library Resources in Your Course Site”, “Making the Most of Discussions: Lessons for the New Discussion Board”, and “Keeping Students on Track: How to Use the Grade Center, Adaptive Release, and the Performance Dashboard to Personalize the Learning Experience”. In addition to “Getting Started” and “Blackboard Basics” training.

One-on-one sessions will continue to be available for faculty members requiring individual support. Clinic hours will also be available at regular times, in which individuals may “walk in” to a designated location and ask a Blackboard expert questions. Along with these in-person training opportunities, ITS also plans to offer expanded online support options, including training videos and online tutorials linked from the Ask ITS knowledgebase (located at http://AskITS.nyu.edu), and will be working with Blackboard, Inc. technical staff to quickly populate online information with support material for a new version.

**Sakai and ALEX**

**A Brief Look**

ETHAN EHRENBERG
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Sakai is a “community source” software product developed by the higher education community to serve as an open source learning management system (LMS) and collaboration suite alternative.

During the past two years, NYU has been carefully tracking the evolution of the higher education LMS market and evaluating the many available options. NYU has been a partner in the Sakai program for several years, and during the 2007-08 academic year ITS closely monitored the activities of the Sakai international community and supported a pilot project for 26 courses on the Washington Square campus using the Sakai product. The NYU School of Medicine also successfully implemented Sakai in its courses in a project known as ALEX (Advanced Learning EXchange).

Preliminary results from the Washington Square pilot suggest that Sakai is not yet ready to perform the features that NYU requires in an LMS. However, as other major research universities become more involved with Sakai (which has many possibilities for group collaboration and support), ITS plans to continue to test and explore possibilities.

For more information on Sakai, visit www.sakaiproject.org. For more information on NYU’s ALEX project, visit www.nyu.edu/its/alex.
Q & A with ITS Desktop Support

VINCENT HOU
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What is ITS Desktop Support?
Desktop Support is a program to which NYU departments may subscribe on an annual fee-per-computer basis. Through the program, ITS offers support services for University-owned Macintosh and Windows computers via phone, email, and on-site visits.

We at Desktop Support install, upgrade, maintain, and repair computer hardware and software. We also facilitate connections to other computing equipment, such as handheld PDAs, printers, and servers.

Who is eligible for Desktop Support?
We cover any NYU department that has a signed Desktop Support Service Level Agreement (SLA) with ITS.

To find out if your department has an SLA, check with your department head or send us email at its.desktop@nyu.edu.

When can I get help with my computer?
We provide support for eligible departments from 9 a.m. until 5 p.m., Monday through Friday (excluding University holidays).

How long will it take for me to get my repairs?
It generally takes between eight and sixteen business hours, depending on the impact of the problem and the terms of your department’s SLA. The response time for on-site support (scheduled by appointment) is outlined in the SLA and based on the priority of the reported problem or request.

These priorities are determined by the impact placed on you, the client. For example, a completely non-functional computer has a priority of one. The SLA specifies that a Desktop Support staff member is normally dispatched for on-site assistance within eight business hours. On the other hand, a minor function or application that is not working falls under priority three, and a staff member is dispatched for on-site assistance within 16 business hours.

I’m interested in Desktop Support for my department. Where should I go for more information?
You can visit our website at www.nyu.edu/its/support/desktop/ to learn more about this service.

Vincent Hou is the Team Leader for ITS Desktop Support.
During Fall 2007, I taught a “Machinima” course through the undergraduate degree-granting Paul McGhee Division within the School of Continuing and Professional Studies. The course was one of several in an interdisciplinary study of virtual environments (such as Second Life) across three disciplines — media production, media studies, and political economy. The study was supported by the 2007-08 Curricular Development Challenge Fund, a program administered by the Center for Teaching Excellence to promote innovative curricular programs and projects at NYU.

The word “machinima” is a fusion of the words “machine” and “cinema”. It refers to a set of filmmaking techniques as well as a genre of film produced in real-time, 3-D interactive engines such as Second Life. My course culminated with an eight-minute machinima based on Shakespeare’s “Macbeth”. Designed and shot in Second Life, the machinima was intended to give students of digital film and animation an introduction to production and communication structures on a virtual, open source platform.

My students collaborated with students in Professor Hulley’s “Media Genres” class (see article on page 34) by participating in joint criticism meetings, supporting students in special assignments such as screenwriting, and attending several of our class and recording sessions. Half of the students in my class were also registered for Professor Anthony Penning’s “Political Economy of Digital Media” course, which included a unit on virtual environments and helped to provide a broader analytical perspective on Second Life than possible through only my production-based course.

In this article, I discuss the technical findings and challenges that I and my students experienced during the machinima course in order to provide organizational and workflow recommendations for future NYU Second Life projects.

**A Brief Introduction to Second Life**

Second Life is a software application that operates across a grid of computers to produce an animated three-dimensional virtual world populated by an international community of seven million “residents”, or members. Founded by Linden Research, Inc. in 2003, Second Life occupies a virtual space which, when scaled to earthly proportions, is about twice the size of the San Francisco Bay area. Each participant has a virtual self (called an avatar) residing in Second Life (or “in-world”), and each avatar may create or purchase assets from other avatars, using the in-world currency, Linden dollars. Residents can communicate with each other in-world via text chat, or voice chat using a headset.

**ITS Space in Second Life**

Approximately 150 educational and cultural institutions own parcels or whole islands in Second Life. These are used for such diverse activities as student advising; classes in literature, architecture, and programming; science simulations; foreign language learning; and — as in our case — instruction in media and economic analysis, as well as many aspects of media production.

Mechthild Schmidt is a Master Teacher for Animation and Visual Effects in the Bachelor of Science degree in Digital Communications and Media (DCoM) at the Paul McGhee Division within NYU’s School of Continuing and Professional Studies.

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1. For more information about machinima, read the Wikipedia article located at www.wikipedia.org/wiki/Machinima.
2. For more information about Second Life, see Vincent Doogan’s article in the Fall/Winter 2007 issue of Connect, available online at www.nyu.edu/its/pubs/connect/fall07/doogan_secondlife.html.
Virtual Storytelling and Design

We intentionally chose to produce a classic text, William Shakespeare’s tragedy “Macbeth”, in this non-traditional production environment. We strove to drive our filmmaking, as much as possible, through this summary of the play’s narrative:

*A flashback at the eve of his final fight leads Macbeth through the vicious cycle of power, betrayal and predictions of fate that brought him to his demise.*

We approximated historical set and costume design for an authentic look without claiming accuracy. We used tools only available in Second Life as stylistic elements to portray the paranormal elements of the story, such as insanity and magic. For example, in the first witch scene, where the “world is turned upside down”, we see the ground outlined and rotating, until Macbeth and Banquo fall to find themselves standing on clouds, looking up at the witches sitting upside down, who are unaffected by the “turn of events”. In post-production, we added lip synching, audio, and various effects to the captured clips.

The fifteen-week course was divided roughly into three phases: pre-production, production, and post-production. Students signed up for a team handling a specific aspect of production during each phase of the course. Each team leader was responsible for meeting deadlines, asking for help, and troubleshooting problems.

As we moved forward, challenges we encountered — such as the distribution of skill sets within the class (many students had a video background, but fewer had experience with 3-D) and technical limitations of Second Life — required us to stay flexible and reshuffle teams, adjust deadlines, and rethink the script. We found that extensive pre-production based on traditional filmmaking did not work in Second Life; instead, we had to jump in and test the limits, and base our shoot on those results.

Technical Considerations

We worked at the SCPS Mac-based G5 labs in the Woolworth Building and the ITS Multimedia Lab, using Second Life, Adobe Photoshop, SculptyPaint (a displacement texture modeling app), Poser, Snapz Pro, CrazyTalk, Pro Tools, Final Cut Pro, Adobe After Effects, Fetch (an FTP client), and iDVD to create our machinima project. We recorded our production to portable hard drives.

Accessing Second Life

Each class member needed an avatar to participate in-world, and we easily created most of the avatars within minutes. There is an in-world self-paced orientation exercise required of new Second Life members that provides an opportunity to practice basic avatar motion skills. Second Life maintains a spam block that prohibits large numbers of spam messages.

Production stills from “Macbeth, a Virtual Study”.

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4 For more information, visit www.nmc.org.
of simultaneous avatar registrations from one IP address, so it might be wise to require students to come to class having already created Second Life accounts from home.

During class sessions, Second Life posed few time delays; however, some students’ home computers did not have the necessary hardware to run the graphic-heavy Second Life client, making in-world meetings held after Woolworth lab hours difficult for some class members to attend.

**Pre-Production**

After outlining the project’s workflow, pre-production teams worked on script development, storyboarding, audio recording, and prop design. One student arranged a recording session with an audio engineer; another student with theatre and film experience served as the director and conducted a few rehearsals in preparation for recording. We scanned our storyboard, combined with a voice-over, into the computer, which served as an audible guide for the shoot.

We found it easy to learn to use the Second Life building tools. Students with a background in 3-D design built Macbeth’s castle by first doing photographic research, then creating sketches, a floor grid, and walls using textures in Photoshop. The props team built furniture, dinnerware, and accessories. Students searched for stores in the Second Life world that sold items we could not build. Costume and make-up design was work-intensive, as the faces and costumes had to be custom built. We chose to use the Poser 3-D modeling and animation software to create our animation sequences, which we then imported into Second Life. The biggest challenge for the animation team was translating timings between Poser and Second Life.

**Production**

Once production began (approximately three weeks later than we had planned), students began working within their production teams, two of which used software available from third-party vendors outside the Second Life platform:

- **Animation:** Second Life provides a number of default animations, but specific character movements have to be custom built. We chose to use the Poser 3-D modeling and animation software to create our animation sequences, which we then imported into Second Life. The biggest challenge for the animation team was translating timings between Poser and Second Life.
- **Lip-synching:** The lip-synching team used a third-party software application from RealLusion, called CrazyTalk. It allowed us to use a still frame and an audio track to animate lips and facial features. Adjusting the parameters took time, but the implementation was very successful.

We had planned to shoot on a tight schedule, but retakes and extra blocking time meant extended class sessions. Scenes requiring participation from all students were shot during class, but alternating groups logged onto Second Life from home and interacted with the camera and main actors in the lab to shoot smaller scenes. We had initially planned to use SCPS’s lab in the Woolworth Building, but because students’ schedules and lab hours did not always align, we were grateful for the opportunity to work in the ITS Multimedia Center when Woolworth was closed.

**Post-Production**

We used a variety of software applications during post-production: one team edited scenes using Final Cut Pro; another set of students were concurrently registered for a Pro Tools Sound Design class, and they assembled sound effects with the support of instructor Bob Schott; a third team worked on the score; and a fourth composited effects, credits, and titles using Adobe After Effects and Photoshop.
The first rough cut was shown at our final class meeting with Professor Hulley’s class for feedback and critique. All final elements were delivered to the student who took on all last minute tweaks and the final sound mix. A polished version is now playing as streaming video within Second Life; residents of Second Life may view the stream at http://slurl.com/secondlife/Outreach/61/72/26e.

**Conclusion**

The course was intensely demanding in time, as well as in student initiative and skill sets. Students needed to work together with continual communication, which grew as the semester progressed and students realized the impact their actions and inactions had on their teammates.

This observation changed my expectations for the project. I moved from a final product-centered approach to a more procedural approach, built on teamwork and communication. With only one semester to explore a very focused use of Second Life, many other areas remained untouched; in a future course, I would like to add to this experience and explore communication and interactivity in Second Life more broadly, with smaller final projects that allow more time for experimentation.

Second Life’s strengths enabled us to produce a video that would have been financially impossible for our class members to achieve in the “real world”, and impossible to create in only one semester in a more conventional, key frame-based 3-D animation environment.

Although using Second Life gave us a measure of freedom in the production of our video, we also learned its limitations. It is not yet feasible in Second Life to recreate intricate human emotion and subtle movements for a narrative production. Considerable computer literacy and access to the appropriate equipment are necessary for a successful Second Life media production; however, a course using Second Life for the study of content, unrelated to production, would face few limitations after the initial set-up and orientation phases.

The McGhee Division hopes to use Second Life as a community platform, termed “McGhee at Midnight”, connecting our off-campus undergraduates with one another. We see great potential for Second Life as a virtual campus for our online students and those at NYU’s global locations.

While virtual platforms and social networks will change, and while they may not become a production environment for most students, collaborative learning, peer-centered virtual communication, and other skills learned in Second Life are important professional assets. It is my hope that students who learn to shape their media environment actively can assume a critical and creative role in analyzing or producing content in the framework of their future professions, and I believe virtual environments like those provided by Second Life can serve as inspiring training grounds for that pedagogical goal.

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**McGhee Machinima Course Project Credits**

- **Tramell D. Caldeyro**
  Architecture, audio effects; “Lord Ross”, “Soldier”

- **Nicholas Coleman**
  Costumes, titles; “Soldier”, “Witch 3”, “Murderer”

- **Michael D’Ercole**
  Architecture, animation, audio effects; “Soldier”, “Lord Lennox”

- **Newton Hinds**
  Machinima testing and recording, 1st camera, editor; “Soldier”, “Fleance”

- **Gene Hughes**
  Director, scene breakdown, 3rd camera; “Macbeth”

- **Uta Knablein**
  Costumes, props, lip-synching, title animation; “Soldier”, “Witch 2”

- **Ken Mercer**
  Animatic, 2nd camera, editor; “MacDuff”, “Narrator”

- **Karrie Myers**
  Script, Photoshop, music, editor; “Soldier”, “Witch 1”

- **Daniel L. Ortiz**
  Lip-synching, audio effects; “Soldier”, “Banquo”

- **John Randall**
  Producer, dialogue recording and editing, audio effects supervision; “Ghost”

- **Brandale Scott**
  Props, animation, effects compositing; “Soldier”, “Lady Macbeth”

- **Mechthild Schmidt**
  Concept, executive producer, creative director; “Gal Friday”
Teaching with Second Life

KATHLEEN HULLEY
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I teach a class called “Media Genres II”, an upper-level course for students from the Media Studies and Literature concentrations in the Liberal Arts program at the Paul McGhee Division of the School of Continuing and Professional Studies. The class focuses on the history and analysis of the formal characteristics of various media (early camera, early film, early radio, TV, the Internet, video games), while reflecting on the birth of new genres of literature in response to the impact of each new medium.

Collaborating with “Machinima”

Mechthild Schmidt, who taught the “Machinima” class, and I brought our respective courses together for collaboration during the Fall 2007 semester. Because Professor Schmidt’s class, part of the Digital Communications and Media program at McGhee, was producing a film of “Macbeth”, the Machinima class project seemed to parallel Media Genres’ focus on literature. I particularly wanted my students to analyze Second Life as a medium for reproducing a theatrical, literary piece as a “virtual film”. Because none of the Media Studies students had formal training in digital design, I hoped they could participate directly in the machinima project by writing the script, becoming the dramaturge, helping with production details, or creating voice-overs.

I had three goals in joining this project:
1. To see whether Second Life could become a platform for student projects and meetings outside of class.
2. To see whether Second Life would be a useful adjunct to online classes.
3. To continue my long interest in developing experimental, interdisciplinary projects.

I encouraged the students who signed up for my course to also sign up for Machinima, but none of them were able to fit it into their schedule, so I invited them to volunteer for the advisory roles I hoped they could fill. Because participation in the machinima project was not mandatory, they did not participate to the degree that I had hoped. Participation was especially difficult for students with inadequate home Internet connections. Furthermore, because my class had its own curriculum, focusing on history and critical analysis, the classwork pulled my students away from full participation in Second Life. I would likely restructure the class next time to allow for fuller participation. (See “Suggestions for Future Projects” for details.)

I also required students to “meet” with me for small group conferences in Second Life. Not all students were able to show up for these “in-world” meetings, but when we did, we found that certain voice-enabled technologies within Second Life — voice chat, for example — allowed for more spontaneous discussion than possible on other remote meeting platforms.

Working Together

Near the beginning of the semester, to facilitate shared projects and ensure that students in both classes were familiar with Second Life, we held one joint session with the Machinima class in a computer lab. With the dedicated help of Professor Schmidt, Robyn Berland, and Robyn’s staff in the ITS Multimedia Center, the Media Studies students’ Second Life

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avatars were soon dancing around and donning wigs and costumes.

Three students volunteered to work with the Machinima class — two on script, and one on production. One of these students discovered that her home Internet connection was insufficient for an adequate connection to Second Life. The other students stayed with the project, working under the able direction of the film’s director and costumes and special effects designer.

Additionally, as a project for the Media Genres class, one student, Sheryl Maynard, chose to analyze the ways the relationship of text, production, and audience in Second Life contrasted with traditional relationships as constructed in theater and film. Her goal was not to evaluate the process, but to explain it by comparing these relationships in Second Life as a medium to those in conventional theater and film. She worked periodically with the Machinima class and produced a strong analysis of the medium of Second Life.

The Machinima and Media Genres students had another plenary meeting at the end of the semester, when the Machinima students presented their amazing production of “Macbeth”. Afterwards, my class discussed their analyses of the process with the students who had made the film.

Visually, the production was sumptuous. The amount of work, creativity, technical skill, bricolage, sweat, commitment, and teamwork of the Machinima students impressed the Media Genres students, many of whom had never had the opportunity to work on such a demanding creative project for a full semester. We could see that one of the most powerful experiences for the Machinima students was learning to work with others to get a creative project completed on time.

in class. In addition, Liberal Arts students need sufficient training to ensure that they can access the Second Life “classroom” outside of class. When a class held in Second Life is made mandatory by the professor, students should be required to attend the class in Second Life.

Using Second Life in Teaching
I believe Second Life could be especially useful as an adjunct to online/on-site hybrid courses in the Liberal Arts. It could also facilitate discussion for any type of course when students are away from the classroom, and can be used for group meetings at any time.

However, such virtual participation works only when students have adequate technology at home. If they have to be on campus to be online, they would rather be

Suggestions for Future Projects
If you want to learn something, read about it. If you want to understand something, write about it. If you want to master something, teach it.
- Yoga philosophy

I believe there are exciting ways to create another interdisciplinary class that would more fully integrate students in different disciplines, such as the McGhee Liberal Arts Digital Communications programs. Here are some suggestions:

• Create a single class with two registration numbers – i.e., one for Digital Communications students, and one for the Liberal Arts students.
• Require students from both classes to attend all classes and participate in all projects.
• All students would engage in both design and analytical projects. For instance, the Digital Communications students could become individual mentors teaching Liberal Arts students basic design skills, while the Liberal Arts students could lead small seminars in critical analysis of the actual creative/technological process with their peers.
• The goal for each group of students would be to work with faculty to formulate strategies for teaching other students new skills. Such a self-reflective class would reinforce both the design and the analytical skills of both groups, and at the same time, create a powerful interdisciplinary model.

An integrated special topics project would likely be more satisfying to the students, particularly in Liberal Arts programs. The teamwork that Professor Schmidt’s project enabled her students to experience showed me that the more responsibility students take for their own processes, the wider the scope of their learning.
Minerva Novero is the Director of Policy Communications and University Training in the Controller’s Division.

Margaret Saunders is the Director of the Accounts Payable Department in the Controller’s Division.

The Controller’s Division (CDV) has recently introduced a new service designed to give University faculty, staff, and administrators a quicker, easier, paperless, and more environmentally friendly way to process reimbursements and cash advances. This new service will also enable University employees to track their submitted reimbursement or cash advance requests on their own at any time. Employees no longer need to check with Accounts Payable (AP) or with their administrative offices to determine the status of requests they have submitted.

This new service is a web-based facility called “AP Workflow”. It was developed by CDV in conjunction with ITS to make the following possible for all University employees:

- **Submit requests for advances and reimbursements from anywhere in the world at any time securely.** AP Workflow is accessible via the Work tab in NYUHome to any University employee with access to an Internet connection, a valid NetID, and a valid password. Paper forms will no longer be necessary, helping to keep personal information safe.

- **Attach supporting documentation.** AP Workflow provides the ability to easily give necessary expense details that previously required separate forms by electronically attaching receipts and other supporting documentation to requests.

- **Confirm budget availability and validate chartfields.** AP Workflow has built-in features to help ensure correct chartfield entry, provide an alert if the budget is insufficient for the request, and prompt for required fields that employees may overlook.

- **Automatic submission of requests to Approvers.** AP Workflow automatically routes requests to appropriate Approvers, along with attached supporting documentation. Approvers are alerted by email of pending requests, and can then review and act on them.

- **Automatic submission of approved requests to AP.** Retrieving approved forms and documentation from Approvers and forwarding them to AP is no longer necessary, as AP Workflow automatically uploads approved requests to the AP financial system.

- **Quick turnaround; 24-hour processing in some instances.** Approved requests that meet certain criteria can be processed within 24 hours. Those on the AP Direct Deposit Program will be able to access their funds more quickly, instead of waiting for checks to be delivered by mail and cleared by their banking institution.

- **Tracking of requests at all stages.** AP Workflow provides status updates as soon as requests are submitted. It also sends notifications when requests are approved and submitted to AP for processing.

- **Effortless record keeping and retrieval.** AP Workflow maintains a record of all transactions and assigns a unique identifier to each one, allowing for easy searching and reviewing of past transactions.

AP Workflow is being introduced in phases across the University. A member of the AP Workflow Team will contact employees for consultation and training before the service is launched in their school or department. Visit [www.nyu.edu/cdv/apworkflow.html](http://www.nyu.edu/cdv/apworkflow.html) for more information about this new service. Send questions, comments, or suggestions to ap.workflow@nyu.edu.
Did You Know?

A standard desktop computer and flat screen display uses over 100 watts. Setting your operating system to hibernate or sleep (instead of remaining on 24/7) will save over 600 kilowatt hours per year — approximately the amount of energy used yearly by a person living in Bangladesh. That’s well over $100 saved in annual energy costs.

A laser printer may use between three and six watts, even when in “standby” mode. Turning the printer off each night could save 25 kilowatt hours per year. That’s about $5 savings per year — enough to pay for a power strip to help you turn your printer and all other electronic devices completely off at the end of the day!

For more facts and information about NYU’s Sustainability Initiatives, visit www.nyu.edu/sustainability.