Inside the Minds of Lemurs
With GPS & GIS

Lectures via Podcasts
iTunesU at the NYU College of Dentistry & the NYU School of Medicine

High Performance Computing
Innovative Research Using the NYU General Cluster

Student Technology Centers
Transformation & Change at the ITS Computer Labs
Welcome to the Spring/Summer 2009 Connect!

Within our large and diverse University, astounding achievements are occurring in an array of disciplines, reaching from the Washington Square campus to across the globe. And innovations in technology are happening everywhere at NYU, throughout our schools, colleges, programs, departments, and centers, and in Information Technology Services (ITS).

This issue of Connect offers a look at some of the fascinating work taking place every day at NYU, and the innovative ways in which information technology (IT) is being used to accomplish it. Our contributors — researchers and administrators from many different fields and Schools, as well as ITS — represent a wide range of responsibilities. Their articles demonstrate the remarkable extent to which IT has become a strategic asset at NYU, benefiting every member of our University community, advancing research and learning, supporting administrative efficiencies, and enhancing existing collaborations and enabling new ones.

Beginning with this issue, Connect is moving away from print distribution to a primarily online format, becoming a web-only publication. This means that our online presence will become more robust, taking full advantage of the multimedia potential of the web, while also retaining options under which you can download and print your own copy. We hope you find the transition a smooth and useful one.

In this new format, Connect will continue to celebrate the contributions to information technology at NYU, and to foster the purpose of ITS, which remains to connect people — to other people, to their work and studies, and to the information, training, and technical resources they need to achieve their goals.

— Marilyn A. McMillan

Associate Provost & Chief Information Technology Officer

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.

With this issue, Connect moves from print to primarily web distribution, while also providing options under which readers can download and print their own copies. Current and past issues of Connect, as well as podcasts of selected articles, are available on the web at www.nyu.edu/its/connect.

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.
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Sarah Boll
Wild monkeys know a lot about their environment. Like clever consumers who consider cost and rewards when deciding what store to visit, monkeys consider distance and the amount of fruit on a tree when deciding what tree to visit. Having studied the spatial memory of saki monkeys in Venezuela, I was intrigued by lemurs, monkeys’ primitive relatives. Do they rely on memory and learning?

Considered living fossils, lemurs have evolved in isolation in Madagascar. They are thought to be among the least intelligent of primates, and little is known about how they think. A better understanding of lemur spatial learning and memory might eventually help to unlock some of the unknowns in the evolution of intelligence in primates.

In order to find out what lemurs know about their environment, I realized I’d have to observe them in their natural habitat. A Dean’s Faculty Research Award from NYU College of Dentistry made it possible for me to visit several potential research sites in Madagascar. I decided to conduct my study in the remote Sahafina trail system, in the southeastern section of Ranomafana National Park. At Ranomafana, I knew I would have logistical support from the International Center for the Conservation of Tropical Environments (ICTE) and the Centre ValBio, a permanent research institution located on the edge of Ranomafana National Park. This support was essential for an ambitious short-term project.

I selected *Varecia variegata*, the black and white ruffed lemur, whose diet is 74 to 90 percent fruit,1 as my study species. Spatial memory may be particularly useful for primates that live in large home ranges and feed on patchily distributed resources, such as fruit.2 I needed to map the locations of fruit trees and the daily travel paths of the study animals. In Venezuela, a well-marked, mapped trail system divided the study site into quadrants of 25 by 50 meters, and using a compass, I could mark the locations of trees and monkeys in relation to this trail system. In Madagascar, the trail system was sparse. Even if I’d had the time to create an extensive trail system, the terrain was too rugged and the home ranges of the *Varecia* too large to make that plan feasible. GPS was the only way to get the data I needed.

The Sahafina trail system is probably one of the most difficult sites for collecting GPS data on the planet. A primary rainforest, it has dense tree cover and cloud cover, both of which reduce the ability of a GPS unit to receive a signal from a satellite. In addition, its many gullies and gorges further block the much-needed satellite signals. The site has no electricity and is about a 30-kilometer walk from the nearest road, through streams and rice paddies, and along a narrow, muddy, often steep and sometimes non-existent path. Energy for the GPS receivers was a concern.

Tooling Up
Since I had no experience with GPS, I knew I needed help. I visited the ITS Statistics and Mapping Lab, a predecessor of the current NYU Data Service Studio, to discuss projects involving GPS and Geographic Information Systems (GIS) with ITS Senior

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Faculty Technology Specialist Frank LoPresti. He became a partner in my research project, working with me for over a year as I applied for funding and prepared for the expedition. Frank set me up with GIS tutorials and lent me a GPS receiver. He suggested that I conduct a practice research project in a New York City park before leaving for Madagascar, to give me experience working with GPS and mapping programs.

To get me started, Jamie Martinez, a student mapping aide within the Data Service Studio, accompanied me to Tompkins Square Park to demonstrate the use of GPS. We took a Trimble receiver, which is capable of determining a location’s latitude and longitude within less than a meter of accuracy. The Trimble also runs ArcPad, a GIS program created by ESRI that not only collects latitude and longitude readings, but also is capable of spatial analysis. Unfortunately, the Trimble had trouble picking up signals, even in the most open areas of the park under blue skies. In addition, the Trimble uses a battery that needs to be recharged after six to eight hours of use, while I was planning to have two teams collect 24 hours of data every day. In our remote site, how would we recharge the batteries? I was very concerned about the viability of my project until Pat Wright, the founder of ICTE and the Centre ValBio, recommended Garmin, another company that designs and sells GPS receivers.

After some investigation of devices and antennae, we decided on the Garmin 60CSx. This Garmin comes with a “sensitivity chip” which allows it to receive signals in dense tree cover. Although the Garmin is not as accurate as the Trimble, it worked in all outdoor conditions in New York — even standing under a tree on a rainy day surrounded by tall buildings — so I was hopeful it would work in Madagascar. In addition, the Garmin worked for 12 hours on two AA batteries. We could easily carry a month’s supply of AA batteries to the bush camp. I mapped the locations of trees and the movements of squirrels in Prospect Park using the Garmin and was able to transfer the data from MapSource (software running on the Garmin) to Excel and to ArcView, another GIS software product from ESRI. ArcView not only allows you to create maps but to analyze spatial

The Varecias’ travel decisions will be analyzed with the help of logistic regressions and two computer models created by Charles Janson, a biologist who studies capuchin monkeys and who advised me on my study of saki monkeys. As we analyze the data, we will see what GPS and GIS technology can tell us about the minds of lemurs.
relationships and to overlay layers of data.

In January 2008, I received great news from the National Geographic Society: They would fund my expedition! I wanted to start collecting data before the austral winter set in and the *Varecia* reduced their ranging — so I had only two months to get the expedition together. I was grateful to receive the additional funding from the Dean’s Faculty Research Award from NYU College of Dentistry. Frank was able to obtain three Garmin 60CSx and a laptop for the project. Although I was not a GPS expert when I left for Madagascar, I had the resources and the knowledge to get the data I needed.

## Data Collection in Madagascar

The Centre ValBio had a team of experienced Malagasy research technicians waiting for me when I arrived at Ranomafana. In two days, we set out for the bushcamp. Our first task was to map the existing trails. The Garmin 60CSx is so user-friendly that Jean Claude Rakotonirina, one of the research technicians on my team, quickly learned how to record locations with it, even though he speaks little English, and I speak only a few words of Malagasy.

In a week, Jean Claude and Aimé Victor Tombotiana, another expert team member, traversed the Sahafina Trail System, marking it with orange flagging tape and recording locations every 25 meters for a map. At the same time, other members of my team were marking the locations of trees that are known to play an important role in the *Varecia*’s diet. Using the simple MapSource software, we were able to create basic maps of the trail system and of the trees whose locations we had marked.

Once we started to observe the *Varecia*, we usually set out from camp just before dawn, making our way through the forest by flashlight. After we located the “focal animal” (the *Varecia* we were observing that day), Jean Claude used a Garmin to record its location every five minutes and the location of all the trees the animal fed in.

The Garmin always picked up a signal. Rain and cloud cover did not seem to affect its accuracy, which was usually seven to nine meters, but when we were collecting waypoints in a gully, the accuracy could decrease to 15 meters. With every reading, the Garmin also automatically recorded the altitude of the location. Team member Donné Randrianantenaina gave each feeding tree an identifying number and flagged it with pink tape. At various intervals, he also recorded the height of the focal animal in the canopy, the occurrence of any *Varecia* loud calls, and the identity of any *Varecia* within 25 meters of the focal animal in field books. François Ratalata collected feeding data for the project.

After two months, I had to return to New York. I was grateful for the help of Frank Princée at ValBio, who managed the GPS data in my absence. Data collection ended in the middle of December. In February, as political unrest grew in Madagascar, Pat Wright brought the field books with my data to New York, just weeks before a coup d’etat on March 17.
More Sophisticated Mapping & Further Analysis

The next step will be to transfer the GPS data from MapSource — and from field books — to ArcView. While MapSource was a simple and useful field tool, with ArcView, we can create maps with layers for various categories of information. We will create layers mapping the locations of feeding trees, the focal animals’ daily paths, and the locations of other *Varecia*. This spatial information will be linked to nonspatial data sets, such as those recording the length of time focal animals visited feeding trees. The tree database and sets of maps will be made available to the Centre ValBio and other researchers. The *Varecias*’ travel decisions will be analyzed with the help of logistic regressions and two computer models created by Charles Janson, a biologist who studies capuchin monkeys and who advised me on my study of saki monkeys. As we analyze the data, we will see what GPS and GIS technology can tell us about the minds of lemurs.

The NYU Data Service Studio: Statistical Computing, GIS, Data Collections & More

The NYU Data Service Studio is an ITS/Libraries collaborative service, providing software, statistical computing, and data collection resources and expert assistance in support of University research and scholarship. Located on the sixth floor of Bobst Library, the facility features a 10-seat work and instruction space where students and faculty can receive consultation and resources in statistical analysis and geographic information systems (GIS), and gain access to a variety of software for statistical, qualitative, and GIS analysis (SPSS, SAS, Stata, R, ESRI GIS products, MATLAB, and others).

Consultation is available via email (data.service@nyu.edu), telephone (1-212-998-3434), by appointment, or on a walk-in basis. Visit the Studio on the web at library.nyu.edu/dataservice, or sign up at library.nyu.edu/classes for tutorials covering various statistical packages and data sources. Information on upcoming workshops and other events is available by subscribing to the ITS/FTS Statistics and GIS Group Listserv at statistics@lists.nyu.edu.
This past fall, NYU’s College of Dentistry (NYUCD) debuted its iTunesU interface. Capturing lectures for later reference is not a new practice, and universities have distributed such recordings on videocassette and via video conferencing for years. However, with the rise in popularity of small audio recording devices and mp3 players, lecture capture has become a commonplace practice.

At NYUCD, many of our students were already recording lectures on their own devices to provide a means of reviewing the information later, outside of the classroom. An early pilot study indicated that students wanted a more coordinated approach that would ensure that the lecture material was available to all. In September 2006, our first-, second-, and third-year classes in the predoctoral program were given iPods and adaptors that could be connected to the AV systems in our lecture halls and large classrooms. Students had control of the recording process — they began and ended the recordings, compressed and converted them to mp3 files, and uploaded the files to class websites.

In early 2008, Apple Computer, Inc., introduced updated server software, which included Apple’s Podcast Producer program, allowing for a more automatic process and direct upload to iTunesU. In August 2008, Apple Mac mini computers were installed in eight of the largest classrooms and lecture halls at NYUCD and were connected to the network and to the AV systems in these rooms.

Three students in each class are responsible for starting and stopping the recordings using a customized web page created by the NYUCD Office of Informatics. The recording process workflow has several steps.

- First, students begin recording the lecture in the room they’re in.
- The recording is then stored on the Mac mini.
- At the conclusion of the lecture, students specify the course in which the lecture was given and the title of the lecture.
- Finally, the recording is transferred to the Mac OS X server, processed, and uploaded directly to iTunesU.

Apple Mac mini computers installed in eight NYUCD classrooms and lecture halls are connected to the network and to these rooms’ AV systems.
Audio files are available for download within 30 to 60 minutes. Each begins with a copyright notice identifying the recording as property of NYUCD and for the use of only students and faculty of NYUCD as part of its educational program.

Between September 28, 2008, and March 1, 2009, there were more than 121,000 audio track downloads of lectures recorded and stored as part of iTunesU @ NYUCD. In addition to audio files, faculty can supplement the recordings by uploading files in a variety of formats. NYUCD has updated its system to capture PowerPoint slides as video recordings. These recordings are available 60 to 90 minutes after lectures are completed.

**Connecting to iTunesU**

Students are given access to iTunesU through an NYU learning management system (LMS) called ALEX (Advanced Learning Exchange). ALEX provides functionality similar to that of NYU’s more widely used LMS, Blackboard, but is developed by Sakai (sakaiproject.org), an open-source community of developers.

*iTunesU@NYUCD continues on p. 8 >*

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**A Brief History of iTunesU**

iTunesU is an environment within iTunes that allows students at participating universities to retrieve mp3 podcasts of class lectures. Apple launched iTunesU in August 2004, around the same time that Duke University began to distribute iPods to all incoming freshmen.

In the fall of 2005, Stanford University became the first institution of higher learning with a public iTunesU site. Apple added a link to iTunesU from within iTunes in the summer of 2007. At that time, 16 universities were listed on the site with more than 12,000 audio and video files.

By November 2008, there were 600 active iTunesU sites, both public and private, spanning 18 countries. There are now more than 250 iTunesU public sites and more than 125,000 free audio tracks.

iTunesU also contains a section called “Beyond Campus,” which offers links to non-University websites, including those of libraries and museums.

— Elise Eisenberg
Podcasting & iTunesU at the NYU School of Medicine

For nearly 40 years, the NYU School of Medicine has regularly recorded faculty lectures. In 2006, in an effort to keep pace with the evolving technology driving the video and audio lecture recording, students initiated a podcast-recording project. When ALEX (the learning management software also employed by NYU College of Dentistry, see pp. 6-8) was introduced in 2007, it allowed students streamlined, convenient access to these podcasts via iTunesU. This innovation changed the way faculty members taught their courses — and the way medical students learned from them.

Today, all NYU School of Medicine students, faculty, and residents can listen to and download over 1,500 of these podcasts from over 300 faculty members. Half of the recordings are in mp3 format. Half are full-video lectures, featuring audio tracks accompanied by screencasts of the lecture slides. Almost all are 40-60 minutes long. On average, students download 1,400 podcasts a week.

Multiple Methods

While most NYU School of Medicine podcasts are recorded during class lectures, others are recorded ahead of time. Some faculty members record themselves on their computers. They then upload their podcasts to iTunesU before class so students can download and listen to them beforehand. Instead of using class time for the lecture, they are able to use that hour for small-group exercises or simulations.

Podcasting Benefits Both Faculty and Students

NYU School of Medicine students and faculty have hectic schedules, which is why the ability to capture and revisit lectures via podcasts is especially valuable. Podcasts free up classroom time, allowing learners to go through the lecture at the pace that best suits their study needs. Additionally, students can access iTunesU 24 hours a day to download any podcasts they need. Many transfer them to mp3 players for later listening.

Dr. Marc Triola, the Director of the Division of Educational Informatics, oversees the use of educational technology and educational informatics research and development for the NYU School of Medicine and Graduate Training Programs. In his opinion, podcasting is immensely valuable. “Because students and faculty are rarely in one place at one time,” Dr. Triola observes, “the asynchronous nature of podcasts helps us deliver learning content to the classroom, the dorm room, and the bedside. It empowers the students by offering improved access to their learning materials.”

The Future

Podcasting at the NYU School of Medicine is still a relatively young practice, and Dr. Triola sees great promise in it. “I think the next step here for podcasting is that soon, the recordings will become a primary means for delivering didactics, and classroom and lab contact time will be reserved more for smaller group problem-solving or simulation exercises.”

— Dana Rasso

> iTunesU@NYUCD, continued from p. 7

primarily from higher education institutions.

Students log in to ALEX with their NYU accounts. They then select from a course menu, which opens the course material within iTunesU. Each course page in iTunesU contains all the recordings for the course.

Students can download recordings one at a time, or they can “subscribe” to courses and receive the latest podcasts for each course to which they are subscribed, automatically, when they open iTunes.

Supplementing In-Class Lectures

In addition to their coursework, students at the College of Dentistry serve in a variety of settings outside of NYUCD as well as participating in outreach programs. With iTunesU, students can review any lecture they might miss.

iTunesU allows us to interact more with our students during lectures. By providing lecture material ahead of time, we can use the lecture time to cover material in a more applied and interactive format and to review clinical cases and advanced concepts. §
Last year, the Master’s Program in Archives and Public History (APH) in the Department of History (GSAS) received a grant from the National Historical Publications and Records Commission for the purpose of creating a “model digital curriculum.” In February 2009, the New York Times confirmed the need for such a grant with an article titled, “Digital Archivists, Now in Demand.” Part of a recession-inspired series on “fresh starts” in a troubled economy, the article began by describing what digital archivists do and why so many organizations need their professional services:

“When the world entered the digital age, a great majority of human historical records did not immediately make the trip. Literature, film, scientific journals, newspapers, court records, corporate documents and other material, accumulated over centuries, needed to be adapted for computer databases. Once there, it had to be arranged — along with newer, “born-digital” material — in a way that would let people find what they needed and keep finding it well into the future.

“The people entrusted to find a place for this wealth of information are known as digital asset managers, or sometimes as digital archivists and digital preservation officers. Whatever they are called, demand for them is expanding.”

APH Director Peter Wosh, a past president of the Society of American Archivists, had been aware for some time of the urgent need for digitally literate individuals in his profession. Graduates from the program will go on to work in university libraries and museums, and at historic sites, nonprofit organizations, government archives, and corporations. They will bring a historian’s viewpoint to the task of preserving and presenting our culture’s most treasured memories and its most significant records.

NYU has educated archivists and public historians for many years, but it would be difficult to overstate the extent to which the age of digital information has transformed what archivists and public historians need to know.

Both archivists and public historians must learn how to cope with massive and ever-increasing amounts of born-digital electronic records.

For instance, a historian working at a museum that owns a set of interesting historical photographs will often be put in charge of a project to digitize those photographs and put them online, while an archivist working in a research library will need to make sure that boxes of unpublished letters by and to a famous person can be found using online search tools such as the library catalog, a database, or Google.

Both archivists and public historians must also learn how to cope with massive and ever-increasing amounts of born-digital electronic records. As the magazine Computer World reported, the outgoing administration of George W. Bush gave the National Archives and Records Administration “more than 50 times what it received from the Clinton years,” in terms of electronic records: about 140

Amanda French is the Assistant Research Scholar and Digital Curriculum Specialist in the Program in Archives and Public History in the Department of History (GSAS). Cathy Moran Hajo is an Adjunct Assistant Professor in the Department of History.

terabytes of information, including some 20 terabytes of email alone.\(^3\) Such records are crucial to historians, but archivists have not yet figured out the best ways to collect and preserve this unprecedented amount of information, while historians have not yet figured out the best ways to find and interpret what's important. Increasingly, archivists and historians are realizing that they will need to use new technologies to do their work, and these technologies emerge and change at a dizzying pace.

Professor Wosh's first step in trying to prepare his program's students for this vastly transformed field was to ask Dr. Cathy Moran Hajo, Associate Editor of the Margaret Sanger Papers, to develop and teach a new course titled “History in the New Media.” Dr. Hajo's work on NYU's Margaret Sanger Papers Project had given her extensive experience in working with programmers and librarians to create an online edition of Sanger's papers;\(^4\) the course she developed (first taught in the spring of 2008, currently being taught for the second time in spring 2009) teaches students to plan a major digitization project focusing on historical documents.

Students begin by identifying materials to be digitized and end with a fully realized grant proposal. Along the way, they learn about such issues as website design, document digitization and markup in eXtensible Markup Language (XML), image formatting and file size, multimedia digitization, preservation standards for digital assets, and project management. Students also gain experience with using a wiki, which lets them easily put material on the web.

The NHPRC grant allows for the creation of a model digital curriculum, one that outlines the issues archivists will face and the skills they will need as technology advances.

Both Dr. Hajo and Professor Wosh soon realized that a single course wouldn't be enough; digital skills and issues would need to be incorporated throughout the curriculum. Professor Wosh therefore proposed and obtained a grant to create a model digital curriculum from the National Historical Publications and Records Commission (NHPRC), a federal funding agency affiliated with the National Archives and Records Administration. The grant provided funds to hire Dr. Amanda French as a Digital Curriculum Specialist for one year.

Dr. French, whose background includes work on noted digital humanities projects such as the Rossetti Archive and the Sociolinguistic Archive and Analysis Project,\(^5\) has been at NYU since November 2008. Dr. French has been working, and will continue to work, on several tasks: drawing up a list of core digital competencies for APH students and assessing the skills of current students; arranging and in some cases teaching workshops on digital skills for APH students; advising APH students on digitally focused independent study projects; designing and building collaborative spaces for the APH faculty to discuss and agree on the curriculum; documenting the NHPRC project on a website; arranging digital internships for APH students at New York museums, libraries, and other cultural memory organizations; helping to develop a new course titled “Creating Digital History,” where students can get greater hands-on experience with technology; and more.

Thus far, some of the biggest challenges to revising the curriculum have been related to infrastructure: a digital curriculum needs wired classrooms and WiFi classrooms, server space, and software licenses. NYU’s emphasis on traditional humanities education is one of its strengths; our challenge now is to retain the best of that traditional humanities education while making room for a new kind of humanities education — a digital humanities education. §

\(^2\) en.wikipedia.org/wiki/Terabyte


NYU is home to several high performance computing (HPC) clusters and high-speed networks supporting NYU researchers with significant computational requirements. Among these resources is the NYU General Cluster, which started full production in April 2008. Over the past year, researchers have run more than one million computational analyses using this cluster. Their works include studies of arctic ice formations, brain electrical activity, stock market participation and risk aversion, as well as the evolution of galaxies and dark matter.

Along with this new research, some intriguing computational tools have been added to the cluster’s “toolbox” (see A Toolbox Supporting a Range of Research Applications, p. 16). This has also been a year of intense collaboration between departments and ITS high performance computational services. NYU researchers from the Center for Neural Science and the Department of Economics have emerged as significant cluster and data users.

More than the provisioning of compute cycles for these departments, the management of general data growth has proved to be a compelling challenge for researchers and ITS technical staff alike. NYU is not unique in trying to find answers to this national trend. ITS has been working closely with departments and researchers to resolve hosting, networking and storage issues related to the movement of significant amounts of data to computational resources and archives. (A related article, Big Data, is on p. 17.) To date, for example, researchers have accumulated 59 terabytes (TB) of data on the NYU General Cluster, out of a total of 74TB available.

The following is just a sampler of projects for which this HPC resource is being used, with descriptions provided by the researchers. Additional projects will be featured in the next issue of Connect.

Galaxies & Dark Matter Evolution
LasDamas (ls.s.phy.vanderbilt.edu/lasdamas) is an international collaboration among researchers from Vanderbilt University, the University of Washington, the Max Planck Institute of Astronomy, Stanford University — and Roman Scoccimarro of NYU’s Center for Cosmology and Particle Physics (FAS). Professor Scoccimarro’s interest is in theoretical cosmology, large scale structure of the universe, gravitational clustering, and primordial fluctuations.

A dark matter halo distribution in the LasDamas simulations, showing the computational volumes to scale. Smaller boxes allow much higher spatial resolution, to understand faint galaxies, whereas larger boxes are designed to study luminous galaxies and cover a large fraction of the observable universe.
Household Investment Behavior
Roine Vestman is completing his Ph.D. at the Department of Economics (FAS) under the supervision of Professor Thomas J. Sargent. His research interest is in macroeconomics and household finance. “This dissertation project,” he writes, “uses a dataset with detailed wealth information on a sample of Swedish households, as well as socio-demographic information on these households, to document households’ investment behavior as a function of house ownership and other characteristics. The observed investment behavior is compared with the predictions of a state-of-the-art portfolio choice model.

“The purpose is to understand households’ financial choices, by taking into account important factors, such as the household’s housing situation. Housing wealth is, for most house owners, a large part of total wealth. For renters, housing consumption is a large part of total consumption. So, it’s important to incorporate housing in the model, although that makes it more complex.” §

In the portfolio choice model, the household chooses whether to rent or own its home, as well as the size of the home. Simultaneously, the household makes a financial savings decision. Of particular interest is the choice of the allocation between safe and risky financial assets, the equity share, and how this decision interacts with the housing decision (bottom left panel). The model is solved using dynamic programming methods in FORTRAN.

Viscoelastic Fluid Models
Becca Thomases is an Assistant Professor of Mathematics at the University of California at Davis whose research focuses on analysis and computations of nonlinear partial differential equations (PDE) arising from physical systems. She and NYU Professor Michael Shelley (Mathematics and Neural Science, CIMS) have been using the cluster to work on simulations of viscoelastic fluid models in two- and three-space dimensions. Viscoelastic fluids are relevant to the study of biological fluids, as well as in industrial applications such as the manufacture of petrochemical lubricants and plastics.

“With the aid of Estarose Wolfson, also of CIMS, we have parallelized our pseudo-spectral code to run on multiple processors. The cluster’s high level of computational power enables us to get a very high degree of accuracy in our simulations. In two spatial dimensions, the cluster is used to obtain accuracy with $n=4096^2$ grid cell points and time steps of .00015. A total of 65,536 particle points are updated at every time step.” §

Clockwise, from lower left:
(a) The resolution of very steep gradients as the polymer stress becomes singular exponentially in time; the next step has been to analyze the stability of steady states in the problem.
(b) The polymer stress at $t=2000$ after the onset of a symmetry breaking transition in the flow.
(c) & (d) Particle tracers in the fluid; they start out separated into four quadrants and over time ((c) $t=500$) and ((d) $t=2000$) become highly mixed by the flow.
Oxygen Pathways in Myoglobin

The potential of mean force for CO diffusion in myoglobin from the single-sweep method.

As part of an international research group, Luca Maragliano — currently a postdoctoral researcher at the Department of Biochemistry and Molecular Biology, University of Chicago — and NYU Professor Eric Vanden-Eijnden of the Department of Mathematics (CIMS), have recently developed “a method to compute from simulations a three-dimensional free energy landscape for a dissociated ligand inside Myoglobin. Once the map is available, the paths for ligand migration are identified as minimum free energy paths on it. The basic idea of our method is to interpolate the free energy using a set of values of its derivatives, computed at different locations. Such calculations are independent from each other and hence are distributed on different cluster nodes.

“Myoglobin is the first protein whose atomic structure was revealed by X-rays. It binds molecular oxygen (O₂) at a reaction center in its interior, keeping it available for use by muscles, or oxygen compounds as CO. The binding site is buried in the protein inside, and no clear path to it can be observed by looking at the molecular surface. Indeed, finding the pathways of ligand entrance and exit in Myoglobin is one of the oldest problems in molecular biophysics.”

Above, two isosurfaces of the three dimensional free energy map for ligand migration in Myoglobin (red 2kcal/mol, transparent 7kcal/mol), superimposed on a representation of Myoglobin’s molecular structure. Yellow lines represent minimum free energy paths connecting the binding site to the solvent, and passing through protein internal cavities. White spheres are saddle points along these paths. To obtain this map, about 250 independent calculations of 40 hours of wall-clock time each were performed using the cluster.
Arctic Shelf Systems’ Behaviors

Tasha Reddy, Ph.D., is a postdoctoral fellow at NYU’s Center for Atmospheric and Ocean Science (CIMS). Her research involves studying Antarctic and Arctic open water ecosystems and sea ice using a combination of numerical modeling, satellite remote sensing, and field studies.

“The multi-year ice pack that covers the central Arctic Ocean has thinned from 3.1 m in the 1960’s to 1.8 m in the 1990’s. Over this time period, the long-term areal extent of sea ice has decreased by 14%. Although these changes could represent a component in a natural cycle, this trend could also harbinger the ‘meltdown’ of the Arctic in response to anthropogenic climate warming.

“In recent years, two major observational programs have been launched and have garnished significant physical, geochemical, and biological data over specific Arctic shelves. The successful Shelf-Basin Interaction (SBI) project over the Alaskan Shelf and Canadian Arctic Shelf Exchange Study (CASES) over the Mackenzie shelf represent a major step forward in quality and quantity of observational data upon which a model of the present and future behavior of the Arctic shelf systems can be constructed.

“The purpose of this project is to construct a robust, coupled physical and biological model of the Alaskan and Mackenzie shelf ecosystems and their interaction with the Arctic basin, based on the observational data sets of the SBI and CASES programs.”

Comparing Entrepreneurs’ & Wage Workers’ Earnings

Chloe Tergiman is a graduate of MIT and a current student at NYU’s Department of Economics (FAS). Her research interest is entrepreneurship and political economics, and her academic advisors are Professors Guillaume Frechette and Boyan Jovanovic.

“If we focus on the earnings of the median entrepreneur and compare it with the earnings of the median wageworker, data show that the median entrepreneur fares less well than his wageworker counterpart. This is true for any level of tenure, and the difference in their earnings increases with time. In other words, if we take an individual who has been an entrepreneur for 10 years say, and compare his earnings with the earnings of a worker who has worked for 10 years, the entrepreneur makes less money. After 10 years of tenure, this difference can reach 30%. This raises a significant puzzle: if the returns to entrepreneurship are so low, why are there so many entrepreneurs?

“The mathematical problems involved are all non-linear constrained optimizations with no closed form solutions. Further, because I chose to endogenize all the ‘economic variables,’ I needed to write code that could easily handle symbolic calculations. Mathematica (www.wolfram.com) was perfectly suited. I am currently expanding my model to a multi-sector economy (with different goods being produced by different entrepreneurs), thus expanding my computing needs.”
Predicting Ice Sheet Instability

Daniel Goldberg, a Ph.D. student at NYU’s Center for Atmosphere Ocean Science (CAOS, CIMS), is studying the dynamics of Antarctic ice shelves and fast-moving ice streams, using mathematical and numerical modeling, under the supervision of his advisor, CAOS Director David Holland (Department of Mathematics, CIMS). He writes:

“The West Antarctic Ice Sheet is a marine ice sheet, meaning that its base is below sea level. As such, there are strong interactions between the ice sheet’s streams and their floating ice shelves. This implies that factors affecting ice shelves, such as ocean melting and the breaking off of large pieces of shelves, can feed back on the ice sheet’s dynamics. The boundary between grounded and floating ice, also referred to as the grounding line, can change due to mass flux imbalances, which in turn can modify the flow of the streams.

“Using the deal.II software library (dealii.org), I have developed a model that makes use of the finite element and finite volume methods to solve the time-dependent Shelfy-Stream approximation to the governing glaciological equations.¹ Running this model on the cluster and using up to 16 CPUs simultaneously, I have carried out experiments to determine how both ice shelf buttressing and ice rises affect the instability to collapse predicted for an ice sheet on a foredeepened bed — that is, a bed that deepens moving inland.” §


Marine ice sheet with initially partly grounded shelf (ice rise). The sheet is cut away to reveal the seamount.
A Toolbox Supporting a Range of Research Applications

Enhancing the NYU General Cluster’s “toolbox” are a number of intriguing computational tools added particularly to support research and instruction on the cluster over the past year. For example, a new compiler from Berkeley Labs, Unified Parallel C (UPC, upc.lbl.gov), was used for class instruction in parallel computing by Professors Marsha Berger and David Bindel (Computer Science, CIMS). Luca Maragliano (p. 13) deployed a modified version of DLPROTEIN (www.sissa.it/cm/DLPROTEIN), a molecular dynamic software package for macromolecules. Roman Scoccimarro (p. 11) used Gadget II (www.mpa-garching.mpg.de/gadget), a code for cosmological N-body/SPH simulations on massively parallel computers with distributed memory. Daniel Goldberg (p. 15) used mathematical libraries, deal.II, A Finite Element Differential Equations Analysis Library, and PETSc, Portable, Extensible Toolkit for Scientific Computation. Finally, one of the popular “new” tools has actually turned out to be FORTRAN! Roine Vestman (see p. 12) introduced the use of this venerable compiler to speed up his application, formerly scripted in Matlab. Here are a few of the other tools available on the cluster:

ROOT is a data processing framework from CERN, at the heart of the research on high-energy physics. Every day, thousands of physicists use ROOT applications to analyze their data or to perform simulations. root.cern.ch/drupal/faq

Migrate-n estimates effective population sizes and past migration rates between n populations, assuming a migration matrix model with asymmetric migration rates and different subpopulation sizes. popgen.sc.fsu.edu/Migrate-n.html

FMS, Flexible Modeling System, is a software framework for supporting the efficient development, construction, execution, and scientific interpretation of atmospheric, oceanic, and climate system models. www.gfdl.noaa.gov/fms

Unified Parallel C (UPC) is an extension of the C programming language designed for high performance computing on large-scale parallel machines. The language provides a uniform programming model for both shared and distributed memory hardware. upc.lbl.gov

EEGLAB is an interactive Matlab toolbox for processing continuous and event-related EEG, MEG and other electrophysiological data incorporating independent component analysis (ICA), time/frequency analysis, artifact rejection, event-related statistics, and several useful modes of visualization of the averaged and single-trial data. sccn.ucsd.edu/eeglab

Structure is a free software package for using multi-locus genotype data to investigate population structure. Its uses include inferring the presence of distinct populations, assigning individuals to populations, studying hybrid zones, and identifying migrants and admixed individuals. pritch.bsd.uchicago.edu/structure.html

Rmpi is a package for R, a free software environment for statistical computing and graphics. It is an interface to MPI (Message-Passing Interface), a standardized and portable message-passing system designed to function on a wide variety of parallel computers.

Further Information About the Cluster
The NYU General Cluster offers 2.656 terabytes of combined memory, large-scale storage options, and a theoretical peak performance of 10.5 Teraflops; measured performance peaked at 8.418 Teraflops. The cluster consists of 140 compute nodes and two interactive login nodes, with a total CPU core count of 1120. Each compute node contains two Xeon Intel Quad-Core 64-bit processors, running at 2.33GHz. The cluster accommodates low-latency parallel runs via nodes that are connected with an Infiniband 4xDDR network from Cisco Systems, Inc.

Reservations for node segments, class use, special projects, and deadlines are available. For additional details, or for information on accessing the NYU General Cluster, please send email to hpc@nyu.edu.

Professor Scoccimarro writes, “Large Suite of Dark Matter Simulations (LasDamas) is a project to run a large suite of cosmological N-body simulations that follow the evolution of dark matter in the universe. The project’s focus is to obtain adequate resolution in many large boxes, rather than a single realization at high resolution.

“This will result in an enormous volume of data appropriate for statistical studies of galaxies and dark matter halos. We plan to study the clustering of halos as a function of mass and other properties, the internal density and velocity profiles of halos, their three-dimensional shapes, and their mass-accretion and merger histories. Quantifying these properties and their correlations with each other at high signal-to-noise will help improve halo models and will be invaluable for helping to understand the physics of galaxy formation.” §

>> Dark Matter, continued from p.11
Big Data

Researchers Discuss the Opportunities & Challenges

Because computers are getting faster, data-generating experiments and equipment are growing in complexity, and bandwidth requirements among computers and components are increasing. Researchers in all fields are creating more data and are working with larger sets of data. We have entered the era of enormous datasets — or “big data” — and each of us in the academy shares a responsibility to incorporate the burgeoning possibilities into our world.

Those of us who are responsible for networking and computation join with researchers in thinking through how options might be provided for moving large amounts of data quickly, and for storing and computing this data. Those of us in libraries are creating new means of associating metadata, building searchable collections of data, and working to preserve them for the next generation of inquiries. Those involved with the analysis and display of data are working together to develop algorithms and visual representations that make possible more efficient calculation and greater comprehension of complex arrays.

Enter the Big Data Sessions

An informal group at NYU is examining the scholarly issues and possibilities associated with big data. The group met twice this past fall, facilitated by David Hogg, Associate Professor of Physics in the Center for Cosmology and Particle Physics (FAS).

Professor Hogg has brought together, in a series of sessions, more than 70 researchers from across NYU, including the Medical Center and NYU Polytechnic Institute. These sessions have resulted in joint research projects and grant applications, as well as a more fruitful understanding of how NYU researchers can be served in their work with big data.

Professor Hogg’s research group works with up to 50 terabytes of astrophysics data, including data from the Sloan Digital Sky Survey, Spitzer Space Telescope, and Galaxy Evolution Explorer. However, his interests extend beyond his own discipline.

One of the questions he seeks to answer is what connections can be made — across fields of study, between massive-scale data generation and use — so as to foster innovation and promote discovery and collaboration: “The purpose…[of these sessions has been] to provide faculty and postdocs at New York University with a fun, intellectually stimulating, and focused opportunity to learn about the research of colleagues from different disciplines. In doing so, they are able to explore ideas and make connections between subjects that had previously seemed unrelated.”

He adds, “We are all using enormous datasets to do our science; this presents us with engineering and scientific challenges, some of which are domain-specific, but some of which cut across all disciplines. I expect we will find many points of common interest, from mundane issues like what kinds of disk controllers we use to high-level questions about data vetting, modeling, visualization, statistical inference, and publication.”

“80 Million Tiny Images”

To this end, Professor Hogg has enlisted in the process FAS colleagues Rob Fergus (Computer Science) and Kyle Cranmer (Physics), who respectively led the first and second Big Data sessions.

Professor Fergus’ research is in the field of computer vision, with links to computer graphics and machine learning. Specific areas of interest include object recognition,
computational photography, and problems in low-level vision.

His presentation, “80 Million Tiny Images,” highlighted how, with the advent of the Internet, billions of images now freely available online might constitute a dense sampling of the visual world. He explored this world with the aid of a large dataset of 80 million images collected from the Internet, using a variety of non-parametric statistical methods (see figure, below).

**Petabytes of Data**

Professor Cranmer led the second Big Data session. An experimental particle physicist, he is working on the ATLAS experiment, which is part of the Large Hadron Collider (LHC) project at CERN in Geneva, Switzerland.

The LHC is the world’s largest and highest-energy particle accelerator. These experiments record petabytes\(^1\) of data, aiding studies of fundamental particles’ masses and interactions. Professor Cranmer specializes in advanced data analysis techniques, statistics, and the interface between theory and experiment. In this session, he discussed the scientific challenges of addressing well-posed statistical questions in the context of very large datasets, very elaborate theoretical models, and a complex experimental environment.

The LHC will explore fundamental questions of particle physics by colliding protons together 40 million times per second. Each of these collisions will be recorded by huge particle detectors with approximately 100 million sensors. In these enormous, complex datasets, physicists will search for evidence of new particles that may be produced only very rarely.

In addition to the obvious computing and data mining challenges, experimentalists aim to make precise statistical statements within the context of theoretical models. These models can be very elaborate, with hundreds of parameters that have physical significance.

This spring, Professor Hogg again brought together researchers from all disciplines, as the series on massive scale datasets continued. If you may be interested in participating in such sessions in the fall, please contact ITS Director of Academic Technology Services Heather Stewart at heather@nyu.edu.

\(^1\) en.wikipedia.org/wiki/Petabyte

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*Detail from Professor Fergus’ “visual dictionary,” created as part of the “80 Million Tiny Images” project – from his website, cs.nyu.edu/~fergus.*
Today’s higher education student arrives at college with a set of technology-driven experiences that potentially place great challenges and stresses on institutional leaders, educators, and technologists to meet their expectations. Most students have had computers in their homes and throughout substantial portions of their K-12 education. To them, ATMs have always existed and cell phones have always been ubiquitous. Web sites for commerce, news and information, and digital media — music and videos, social networking, and other services — are integral to their youth culture experience. Observers of higher education perceive students’ experiences, along with their styles of work, play, and learning, to be at greater odds than ever before with the comparatively slow rate of institutional change and innovation. In the face of this challenge, higher education has been scrambling to improve infrastructure, pedagogy, and community.

At NYU, the technology experience for students spans a mixed terrain of services and resources provided by their individual schools, colleges, and programs as well as the NYU Libraries and Information Technology Services (ITS). NYU students find that today’s digital technology permeates the curriculum as a format, a tool, and a subject, and is applied in a variety of ways for administrative services and community building.

Through a multifaceted strategy involving the provisioning and renewing of computers and network services, ITS provides Internet connectivity to NYU residence halls, where more than 99 percent of 12,000 students have registered personal computers on NYU-NET; wireless networks in more than 100 locations on campus; more than 200 email kiosks, distributed around campus in building lobbies, Bobst Library, and several residence halls; and approximately 300 advanced desktop computers in four ITS computer labs, which supported 600,000 visits by more than 25,000 students in the 2007-2008 academic year.

Evolving Technology, Collaboration & Learning
ITS’ student computer labs reflect a remarkable evolution of computer and networking tech-
The earliest computer labs typically were of interest primarily to computer science students and students studying computation and data analysis, on mainframe computers that were accessed through punch-cards and “dumb” terminals. Today’s labs, their descendants, reflect the passage of many milestones — the introduction of the personal computer, the birth of the Internet, the development of the World Wide Web, and the extension of digital technology into every area of academics.

With change comes more change, and in the past two years, ITS has undertaken the redesign of all our facilities because traditional computer lab design was inadequate to the changing needs and styles of both students and faculty.

The current facilities are less lab-like, with new spaces and furniture that better support instruction, collaborative learning, and digital creativity. They now contain workstations, video and media studios, meeting rooms, video conferencing, classrooms-training rooms, WiFi, and laptop seating for students. These and other features are described below.

In fact, our four labs might be better described as student technology centers. The ITS Multimedia Center, ITS Washington Place Windows Lab, ITS Third Avenue Collaboration Center, and our new ITS Kimmel Laptop Lab, provide students with an array of features and services. Full-time lab technicians and student technology assistants are available to help students to use software applications, troubleshoot their problems, and assist them in accomplishing their goals.

**A Tour of the ITS Student Labs, Centers, and Studios**

There are several ITS technology labs, centers, and studios throughout the NYU campus. There is no charge to use them, and they are open to any student in a degree or diploma program, as well as to NYU faculty and staff. A valid NYU ID Card is required.

Each of these locations is equipped with state-of-the-art computers and software, and some offer special digital media services. Following, you’ll find an alphabetical list of these resources and an overview of the hardware, software, and services provided at each of them.

**Advanced Media Studio**

The Advanced Media Studio provides advanced digital media services to NYU faculty, students of the arts, and visiting artists with approved project proposals. Services include museum-quality digital prints; laser-cut flat materials; 3D color rapid prototyping and editing; and drum scanning featuring the ICG 380 vertical drum scanner, offering the highest quality and lowest noise scans of film and reflective artwork up to 12.6 inches by 18.7 inches, at resolutions of up to 12,000 dpi.

(ITS Multimedia Center, 35 West 4th Street, second floor; www.nyu.edu/its/labs/third)

**Assistive Technology Room**

The Assistive Technology Room provides software for individuals with disabilities, addressing a broad spectrum of issues and comfort levels. Students with visual impairments can access print or digital text, computer screens, and web pages with Kurzweil 1000 and 3000 devices, which speak text aloud. Both of these products record audio files for playback on iTunes or any mp3 player. Jaws is another screen reader application with Braille support. Dragon Naturally Speaking is speech recognition software that enables an individual to work with the computer using voice commands and dictation.

(ITS Multimedia Center, 35 West 4th Street, second floor; www.nyu.edu/its/labs/mm)

**Apple Desktop Computers**

Students can find 20”- and 24”-display, Intel-based iMac computers with Mac OS X and myriad software for word processing, data analysis, audio, multimedia, video editing, and more, in two locations on campus.

(ITS Multimedia Center, 25 West 4th Street, Second Floor, www.nyu.edu/its/labs/mm; ITS Third Avenue Collaboration Center, 75 Third Avenue, Level C3, www.nyu.edu/its/labs/third)

**Apple Laptop Computers**

17” MacBook Pro laptops and 13” MacBook laptop computers are making a “green statement” at the ITS Kimmel Laptop Lab. Kimmel is our newest lab, and our design goal was to lower power consumption through the use of laptops, which use roughly 20 percent of the power used by conventional desktop computers.

(ITS Kimmel Laptop Lab, Kimmel Center, Fourth Floor, www.nyu.edu/its/labs)
Audio & Video Conferencing
Students have access to both a Polycom Voice Conferencing System and a Polycom HDX Video Conferencing System; both units are situated in a collaboration room (see below).
(ITS Third Avenue Collaboration Center, 75 Third Avenue, Level C3, www.nyu.edu/its/labs/third)

Collaboration-Study Rooms
These rooms typically seat up to six individuals, are enclosed for privacy, and feature 42” plasma displays, stereo sound, adjustable lighting, and writing surfaces. Each plasma display is connected to NYU Campus Cable and doubles as a large format computer display. Students may connect their own laptops to the display or borrow an ITS laptop. One room is outfitted with high-definition, two-way videoconferencing capabilities and is available for student use.
(ITS Third Avenue Collaboration Center, 75 Third Avenue, Level C3, www.nyu.edu/its/labs/third. The ITS Washington Place Windows Lab, 14 Washington Place, basement, also has two meeting rooms without media displays.)

Interactive Multimedia Classroom
This teaching and learning environment allows faculty and students to experiment with instructional technology. The classroom contains 25 student Apple computers. The instructor’s computer controls a 65” wall-mounted SMART board touch panel, plus two mirroring 50” plasma displays (1080p and 720p). A VCR/DVD deck, HDV deck, and a Wolfvision document camera can be added to the display mix. Up to three sources can be displayed simultaneously using a wireless graphical interfaced Crestron Control unit. Two software applications, Apple Remote Desktop and SMART Board Tools, enable collaboration and screen sharing. SMART board tools allow displayed content to be annotated, saved, and exported to PDF.
(ITS Multimedia Center, 35 West 4th Street, Second Floor, www.nyu.edu/its/labs/mm)

Linux Computers
See Windows/Linux Training Room, below.
(ITS Third Avenue Collaboration Center, 75 Third Avenue, Level C3, www.nyu.edu/its/labs/third)

Personal Laptops
Students are encouraged to use their own laptops in ITS Technology Centers. All ITS facilities have informal seating areas for the use of personal laptops; WiFi is available; and our printers are accessible from student laptops.

Podcasting Studio
The Podcasting Studio combines all our audio and video applications into a single state-of-the-art soundproof production space. The studio is best for beginner- and intermediate-level projects. Students can use Audacity, GarageBand, and Pro Tools to record into a Digidesign mbox2 multichannel production system. Audio can then be edited, mixed, and formatted for use with video and PowerPoint slides to create enhanced audio or video podcast content. The studio is also a good venue to record one-on-one interviews using a Blue Snowball microphone. The Podcasting Studio contains a Panasonic Camcorder, an iPod, and a Bose iPod system to test podcasts after production. A Roland RS-5 keyboard, iSight Camera, Mackie Mixer, and Sony DV camera are also available.
(ITS Multimedia Center, 35 West 4th Street, Second Floor, www.nyu.edu/its/labs/mm)

Printers
New energy-efficient, high-capacity, black and white HP laser printers are available at all ITS facilities. The default printing setting is duplex printing (both sides), job size is limited to 20 pages, and the use of special paper and the printing of multiple copies are not permitted.

Scanners
Flatbed scanners for digitizing art, documents, photos, and text are available.
(ITS Multimedia Center, 35 West 4th Street, Second Floor, www.nyu.edu/its/labs/mm)
Software
ITS provides a collection of more than 150 software applications across the Windows XP, Mac OS X, and Linux operating systems. For a list of software and locations, see www.nyu.edu/its/labs.

Video Studio for Post-Production and Instruction
The studio contains 15 Mac OS X video editing stations, one audio editing station, and a multiformat video dubbing station; all stations have appropriate video editing peripherals and software (e.g., FinalCut). The studio also contains an instructor’s station to support class meetings. The instructor’s station features a pen-operated SMART display and is interconnected with the in-room audio system and two video projection systems, one standard definition and one high definition, for mirrored display of video and other curricular materials on a large-format screen. The arrangement of the seating within the studio also facilitates its use as a screening room.

WiFi
Access to NYU’s secure wireless network is available at all ITS Student Technology Centers.

Windows/Linux Training Room
A classroom-training room provides 18 advanced Dell desktop student workstations and one instructor’s station. The instructor’s computer features a pen-operated SMART display and is interconnected to a standard-definition video projection system. Each workstation — including the instructor’s — can dual-boot as either a Windows or a Linux computer with an extensive suite of software.

Virtual Worlds — Virtual Facilities
Virtual world software, such as Second Life (SL), is available on all ITS computers. In an SL virtual world, an animated character, known as an avatar, is operated from one’s computer keyboard and represents a person. The constructed 3D world allows avatars to engage in all forms of social and creative interaction. At NYU, startup activities in SL began in 2007 when ITS leveraged its membership in the New Media Consortium (NMC) to lease a parcel of SL virtual property in an NMC virtual educational community. Currently, there is exploratory use of Second Life by some units of NYU. ITS has also worked with several faculty members who use its SL facilities in support of their classes.

For more information on Second Life, see www.nyu.edu/its/libs/third.

Windows/Linux Training Room
Dell computers with Windows XP are available with myriad software for word processing, data analysis, multimedia, programming languages, and more.

Virtual Worlds — Virtual Facilities
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For more information on Second Life, see www.nyu.edu/its/libs/third.

An example of a Second Life avatar
The NYU ITS Academic Discovery Project
Exploring Faculty & Student Technology Needs

Meredith Rendall
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TS strives to give the University’s academic community the
technology services that can best support its diverse research
and instructional goals, and to anticipate its future needs as well as
the opportunities new technologies might provide. The multi-depart-
mental NYU Academic Discovery Project arose in the spring 2008
semester as part of the ongoing effort to obtain information that
can inform and guide ITS’ strategic initiatives. The results are helping
to provide a clearer picture of the role that technology services play
— and can play — in teaching, research and learning at NYU.

Interviews, Focus Groups, Surveys
ITS invited colleagues from the NYU Libraries, the Office of Faculty
Resources, and NYU Press to sit on the project’s advisory board. They
would work in collaboration with ITS Academic Technology Services
staff, as well as organizational assessment and development consultants
from MOR Associates, Inc., with the purpose of gathering insights
from faculty and students on the use of technology in teaching and
learning at NYU.

The first part of the process involved a series of interviews and
focus group meetings. Faculty members from different depart-
ments at the Washington Square campus were invited to meet in
one-on-one sessions with expert interviewers from MOR Associ-
ates. In addition to these faculty interviews, there were student focus
groups in which MOR Associates staff members talked with both
undergraduate- and graduate-level students about their technology
needs and expectations. The data collected from these faculty inter-
views and student focus groups provided the foundation for the
project’s next and larger phase: the surveys.

Two surveys were created — one for faculty and another for students.
Working with MOR consultants over the course of the summer,
the project’s advisory group vetted the subject areas and questions for
the surveys, and in fall 2008, the surveys were administered. Eight
hundred randomly selected faculty from all NYU schools and
departments were invited by email to participate. Similarly, 800 stu-
dents were invited to participate, with student invitations being
divided equally between graduate and undergraduate students. The
emailed invitations contained links to the web-delivered surveys, which
included a variety of item types — Likert (rating) scales, multiple
choice, and fill-ins, as well as free-form comment boxes.

How Technology Is Used & Viewed
There was a tremendous response from both faculty and students.
More than half of the faculty and students invited to participate
in the surveys did, which was an excellent response rate, increasing
the reliability of statistical analyses performed on the collected data.
The final report reviewed the frequency with which NYU faculty
and students use existing technol-
ology services, their preferred or
acustomed methods for learning about technology services, and how
they perceive the levels of service and technology that ITS provides
to the community.

Frequency of use information
is helpful for resource planning
because it highlights the technolo-
gies and services deserving the
greatest amount of attention, as
well as areas where resources ought
to be focused. Perhaps it is no sur-
prise, then, that the most frequently
used services are NYU Blackboard, email, and Lyris Lists. Faculty reported using these services for both instruction and research, with the majority using them either daily or weekly.

When computer labs were used for part of classroom and instructional sessions, they were used almost 80 percent of the time for individual assignments and instructors’ presentations, with almost equal time given to both activities. Heavy usage of computer labs was also reported for student presentations and collaborative group work, which garnered 62 percent and 48 percent of the time, respectively.

With respect to new or expanded technology services that respondents would like to see, the areas of greatest interest included wireless access, assistance with creating and maintaining websites, support for collaborative learning tools, and support for collaborative research tools.

**Learning About Technology**

In particular, faculty members were asked about how they learned of new resources (both NYU-provided and not), their adoption of new technologies, and their methods for learning about available support systems. The three most common means by which faculty “learn something useful on technology” are via the NYU Libraries’ website, word-of-mouth, and ITS email communications. More than 75 percent of the respondents reported these methods as their most common sources of such information.

More than one third of faculty reported learning useful information about academic technology from the NYU Libraries’ website on a frequent basis. The NYU Libraries and ITS work closely on a number of projects designed to provide faculty with electronic resources and tools that aid both instruction and research. The majority of tutorials and how-to’s, as well as Help Desk information, are found on the Ask ITS website at AskITS.nyu.edu (see sidebar for more).

Training sessions — classes, workshops, and clinics — are available through both ITS and the NYU Libraries. These resources are being expanded continually, and even more so in response to the Academic Discovery survey results, in which NYU faculty and students expressed a need for increased familiarity with, and understanding of, the instructional and research technologies available to them.

**Moving Forward**

With a clearer understanding of the perspectives and interests of faculty, researchers, and students, ITS and its NYU collaborators in this project can continue to plan, develop and coordinate the technology services that can best support them. As ITS and the Libraries work to sustain current IT services and build/roll-out new ones, their decision about such things can be informed by the survey results.

Many of our survey respondents expressed interest in participating in future focus groups on a variety of topics. If you are a faculty member or student who would like to participate in future focus groups, please send an email to fts.focusgroups@nyu.edu. §

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**For Technology Help & Training**

Online tutorials and support can be found on the ITS website at www.nyu.edu/its/faq and in the Ask ITS knowledgebase at AskITS.nyu.edu.

For information on classes offered by ITS (some in collaboration with the NYU Libraries), visit www.nyu.edu/its/classes.

For information on classes offered by the NYU Libraries (some in collaboration with ITS), visit library.nyu.edu/classes.

See p. 5 for information on the NYU Data Service Studio, and p. 49 for details on the Digital Studio and ITS Client Services.

For additional information and assistance, contact ITS Client Services at AskITS@nyu.edu or 1-212-998-3333.
Google has changed the way people think about searching. Web users have come to expect the ability to satisfy all of their research needs with a single search box. Libraries have been competing with and managing this expectation for years while anticipating the next generation of library research platforms.

In July 2008, NYU Libraries introduced a new version of BobCat, coming one step closer. Powered by ExLibris’ Primo, new BobCat represents the cutting edge of library catalogs and offers people the “one-stop shopping” search and features they have grown accustomed to when using sites such as Google and Amazon. This article will provide a brief behind-the-scenes look at BobCat and highlight new features and functionality.

**How Does New BobCat Work?**

In the past, BobCat was used for finding books, videos, and journal titles owned by NYU Libraries. It was a traditional library catalog. New BobCat is not only a library catalog, it is also a robust search platform that enables you to search across multiple types of content. With new BobCat, you can search three different types of content, each represented by a tab: Books & More, Articles & Databases, and Course Reserves.

To get a better idea of what actually happens when you search new BobCat, let’s look at the example of searching for books. When you enter your search terms into the Books & More search box, you are actually searching the Library catalog after it has been “enriched” behind the scenes by new BobCat. Your search results now also include related content and new options for further refining (“filtering”) your results. Finally, new BobCat presents all of this information in one clean, consistent interface. The benefit of having a single search platform will become even more obvious when we discuss searching across article content with new BobCat.

**Flexible Searching**

As compared to old BobCat, searching in new BobCat is more flexible and works more like a Google search. When you search, BobCat automatically “ands” your search terms and looks for all of your keywords throughout each record. If BobCat does not find any matches for your keywords, it will return a “Did you mean?” message that suggests spelling corrections and alternate terms. New BobCat also supports searching in non-Roman scripts, including Chinese, Japanese, Korean, Hebrew, Persian, and Arabic; this functionality was not available in old BobCat and was much needed.

New BobCat enables you to refine your results both before and after you search. Using “facets,” you can filter your results by format type, subject, author, online availability, language, and date (among others). An unrestricted, all-item search for “Hemingway” in the Books & More tab, for example, yields 676 items and a list of facets. In the Hemingway search, facets present myriad possibilities for exploring Ernest Hemingway in the context of Spain, Paris, Cuba, novelists, journalism, social circle, and more.

**Streamlined Display**

When BobCat returns results, they are relevancy-ranked and de-duplicated. Results can also be sorted by date and popularity. Different versions or editions of a book are grouped together under one entry, making for a cleaner display. A search for “Camus Stranger” yields results that include an entry with a link stating “There are 8 versions of this item.” Clicking the link allows

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Jessica Alverson is the Librarian for Journalism, Culture, and Communication at Bobst Library.
New BobCat enables you to refine your results both before and after you search. Using “facets,” you can filter your results by format type, subject, author, online availability, language, and date (among others).

Saving and Exporting Your Results
New BobCat offers many ways to manage the items you find. Email, export, or tag items either individually or from a check-marked list that you store in your e-Shelf. The e-Shelf works like a folder or shopping cart. From here, items can be directly exported to reference citation managers including RefWorks and Endnote.

There are two ways to bookmark an item for later use. You can tag your item using Delicious, a social bookmarking tool, by selecting the How to Save drop-down menu option and choosing Push to Delicious. Alternatively, you can tag the item within new BobCat. In order to tag items, you must be signed into your BobCat account.

Viewing Your Library Account and Renewing Items
As with old BobCat, you can view your library account online. From within BobCat, sign into My Account and click on e-Shelf. From here, you’ll be able to view and renew checked out items and see your fines.

Searching for Articles
While old BobCat was used to search books, videos, and journal titles, new BobCat can also be used...
to search for individual articles. Using the Articles & Databases tab in new BobCat, you can search across several article databases simultaneously using one search interface. For example, if you want to search for articles related to sociology, selecting the Sociology category enables you to search a pre-selected group of sociology-focused databases, which includes SocIndex, Sociological Abstracts, Web of Science, Criminal Justice Abstracts, and America: History & Life. Your search terms will be sent out to each of the article databases contained in that category, and the 30 most relevant results will be returned. By clicking the Display More Results link, you will be able to retrieve additional results. In the past, you would have searched each of these databases individually, requiring you to learn many different interfaces.

**Quick Link to Online Content**

NYU Libraries provides access to lots of full-text content via e-books, e-journals, and our numerous subscription databases. You can now access that content with one click. When searching BobCat for books or articles, if the full-text is online, you’ll see an option to access it. When searching books, just click the Online Access link. When searching Articles and More, click the Full Text Available link to view the full text.

**Planned Upgrades**

NYU Libraries is working continually to improve BobCat. Upgrades over the next few months will allow people to set up RSS feeds for search results. Using your saved search terms, BobCat will feed you updates (via RSS) each time new items are added to BobCat that match your terms. Results can be read via a feed reader (such as Google Reader). If you are working on a research project or just want to stay aware of new books in your area, this will be a great tool for you.

Additionally, the new BobCat platform will allow NYU Libraries to include and make searchable other types of content. For example, in the near future, content from the Faculty Digital Archive as well as digital collections from NYU Libraries may be included in your search results.

Gathering feedback from faculty and students has been an important part of the process, ensuring that BobCat truly reflects (and helps to enhance) the way NYU scholars’ work methods, research goals, and expectations are evolving with technology. To ask questions, provide feedback, or view BobCat FAQs and tutorials, see [www.bobcat.nyu.edu](http://www.bobcat.nyu.edu). §

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**To learn more about an item, you click on the item’s title. In the item record, you will see links to Amazon Search Inside and Google Books, both of which will allow you to search the content of books, helping you to determine if a book will be relevant for you.**
In August of 2007, a cross-functional team representing the Human Resources Division, the Office of Academic Appointments, the Payroll Department, and ITS developed a multi-year plan with an ambitious list of technology projects. The plan’s overall objectives were to introduce new systems and/or functionality that would improve efficiencies and service, provide better metrics, and ensure compliance with federal and state laws.

HR Reporting was one of the principal projects identified by the team. (See PeopleAdmin, p. 30, for another.) This three-year project’s goals are to replace HR eReports, the legacy reporting environment whose capabilities were now limited compared with the newer reporting tools; give individual administrators and departments the ability to create their own customized ad hoc reports; and develop human resource metrics that could be used in measuring the University’s progress toward achieving its strategic goals. This article highlights the process by which we accomplished Phase 1 of the project, and provides a brief look at the resulting benefits.

Project Kick-off
The project was formally begun in September 2007. Our project team’s first step was to conduct a six-month assessment of the existing reporting environment and to gather new reporting requirements. To accomplish this goal, our team created an inventory of 656 existing reports, and reviewed each of them to determine if the reports were still needed. We also ran workshops with the Schools and units, and surveyed 76 HR professionals and the staff of four central offices to determine their reporting needs. To support the new reporting requirements, we also identified the database structures and security features that would be needed to support a fast and secure reporting environment. Finally, we determined the reporting priorities and the schedule for releasing the reports that were to be developed. Our plan was to complete the project in two phases.

The project’s Phase 1 implementation kicked off in March 2008. Over the following nine months, the team learned the new reporting tool (Hyperion/Brio), designed, built, and tested the reports; and created the “views” (loosely, the structures) needed to support ad hoc, customizable reporting.

The last two months of this time were focused on preparing for the rollout of the system to the community of HR officers and departmental administrators. An HR Reporting website, along with an HR data dictionary (an online resource which describes the reports, tables, fields, and such) and training materials, were all created during that period.

Phase 1 Is Live!
As of January 12, 2009, HR professionals across the University have been empowered with data and flexible tools that can be used for strategic planning, analysis, and decision-making. HR officers can now run standard, pre-built reports with just a few mouse clicks, or create and save their own custom reports tailored for their specific organizational needs.

The new HR Reporting environment provides many benefits. By centralizing all HR reporting within the University’s Data Warehouse, and providing standard reporting tools consistent with those used in other University administrative areas, it helps ensure consistency of analyses and metrics across units and functions. It gives HR administrators the ability to develop their own reports that

1 www.oracle.com/hyperion
address business questions specific to their units. Moreover, the data and results can be exported in a variety of formats, including Excel, for further analysis.

Training sessions — in three levels, from beginning to advanced — began in January. It is expected that in all, more than 120 people will have attended these sessions by the end of April.

An HR-Finance Collaboration
At the same time that the HR Reporting project was underway, Business Systems Integration, Reporting and Application Development (BSIRAD — a department within the Program Services Division of the Senior Vice President for Finance and Budget) was in the process of rebuilding the Finance reports in Hyperion/Brio. Our two teams came together and decided to develop standards and deliverables that could potentially serve as a template for other groups that use the University Data Warehouse (UDW).

First, our teams collaborated on the development of a single look and feel for both the HR and Finance sets of reports. Since both the HR and Finance reporting projects were running in parallel and had a similar user base, there were advantages in working together to produce a single reporting dashboard design.

Second, we worked together to build a single administrative reporting website that provided information and content relevant to both Finance and HR. The HR section contains links to the standard reports and ad-hoc reporting views, provides help and training schedules, and creates a one-stop shopping experience for anything related to HR reports. The website is www.nyu.edu/reporting.

Finally, the HR Reporting team was able to leverage the data dictionary that was built by BSIRAD. The data dictionary is an online repository for definitions of reports, tables, fields, and business terms. The HR section of the data dictionary is a work in progress, and we hope to encourage the people using our system to submit definitions of terms for review and subsequent publishing.

What’s Next?
Phase 2 of the HR Reporting project is currently in progress. There’s more to come, just stay tuned and visit the administrative reporting website (www.nyu.edu/reporting) for news and announcements.

The Team
Phase 1 of the HR Reporting project could not have been completed without the volunteer project team — staff members from the Human Resources Division, the Office of Academic Appointments, the Payroll Department, ITS, and FAS Institutional Research — who worked tirelessly to learn the new reporting tool and design, build, and test the reports: Jenny Alulema, Jill Appel, Libby Berkowitz, Alfredo Braza, Dan Dunphy, David Houlihan, Annie Huang, Lisa King, Helen Likanje, Andrew Maliszewski, Mary Obermeier, Anne Mui, Tara O’Boyle, Gary Ufer, and David Vintinner. The Project Sponsor was Katie Casey, VP of Human Resources. And special thanks to Addis Crooks, Sean Ruyle and Andrew Walsh from BSIRAD for all their help. §
A new online system is helping Human Resource (HR) Officers, Finance Officers, hiring managers and other University administrators to accomplish day-to-day business operations more easily and efficiently. Called PeopleAdmin, the Internet-based system — which can be used on Windows and Macintosh computers, running any standard web browser — provides self-service functionality through which authorized NYU administrators can create new position descriptions and modify existing ones, create job postings from position descriptions, and move job applicants through the interview and hiring process.

NYU PeopleAdmin consists of two closely integrated modules: Applicant Tracking and Position Description Management. By automating many paper- and resource-intensive tasks and integrating the compensation management and applicant tracking processes, the cost-effective new system reduces error and significantly decreases the time required to submit and process transactions.

The NYU-customized implementation of software from PeopleAdmin, Inc., was rolled out this past February, as Phase 1 of a collaboration of Information Technology Services (ITS) and the Reporting, Compensation, and Talent Learning & Organizational Development Offices within the Human Resources (HR) Division.

Currently, both the Position Description and Applicant Tracking modules are being used for administrative and staff positions. In addition, through the successful completion of a pilot, the Applicant Tracking module also supports recruitment for the NYU Postdoctoral and Transition Program for Academic Diversity fellowship. In Phase 2, use of the Applicant Tracking module will be extended to all faculty positions, initially targeting recruitment of junior faculty.

Tracking Applicants

The PeopleAdmin Applicant Tracking module provides a customized online employment application along with web-based distribution of applications to hiring managers. The new system is expected to significantly reduce the time and costs associated with the employment process, while improving the service level to both applicants and hiring managers.

For example, using the module, it is possible to collect employment applications, résumés, cover letters and other documents online. Because applications of qualified candidates are now accessible to hiring managers online, HR staff will no longer be required to distribute applications via mail, fax, or email.

Applicants can log in to view the statuses of jobs they’ve applied for online. In addition, applicants can submit self-reported Equal Employment Opportunity information.

The new PeopleAdmin system can be accessed by authorized NYU employees from within the NYUHome Work tab, or at www.nyucareers.com/hr.
online at the time they apply, and hiring managers can document the results of their applicant search. And HR can access the status of any position in real-time, ensuring the proper control, oversight and tracking of the employment process for each open position.

In brief, Applicant Tracking enables NYU HR Officers to continue to screen applications electronically, and provides improved service and efficiencies. Moreover, the combined interface of Applicant Tracking with the Position Description module will reduce the staff time associated with the job posting process.

Managing Position Descriptions
Position descriptions describe what an employee does. They help HR staff members to make appropriate determinations about a position’s level within the University’s job classification/compensation system, which in turn helps them use market data to determine an appropriate salary range for the job.

The PeopleAdmin Position Description module automates many of the most time consuming functions of this process. For example, HR Officers and Compensation Consultants can review and compare both current and archived position descriptions, using a variety of search options and a convenient split-screen web interface, thus expediting their business processes and reducing the need to access and store paper files.

Departmental managers, via their HR Officers, can submit online requests to modify positions, or salary recommendations for newly hired candidates; have their requests routed automatically through the appropriate channels for online review and approval; and review the status of their requests online. When positions become vacant, HR Officers can easily convert position descriptions into job requisitions, using the Position Description module in conjunction with Applicant Tracking. And should a position require some modification prior to being posted, that request can be automatically forwarded for review and approval.

For More About PeopleAdmin
For more about the PeopleAdmin System at NYU, please visit www.nyu.edu/hr/employment. For further details, NYU Human Resource and Finance Officers may also contact their School or department’s Compensation Consultant or Talent Management Representative.

Job applicants can access the system at www.nyucares.com.
NYU-Poly Awarded Title III Grant

Polytechnic Institute of NYU (NYU-Poly) was recently awarded a five-year, $1.92M grant from the U.S. Department of Education under the Strengthening Institutions project. The goal of this program, also known as Title III, Part A, is to help “institutions of higher education to become self-sufficient and expand their capacity to serve low-income students by providing funds to improve and strengthen the academic quality, institutional management, and fiscal stability of eligible institutions.” NYU-Poly will use the grant for the development and design of innovative educational technologies for instruction in science-, technology-, engineering-, and math-related disciplines.

NYU-Poly, which became affiliated with NYU in the summer of 2008, has a rich history of leadership in the development of such technologies as scientific computing, networks, software engineering, and digital media. Now it also offers programs in interaction design (the shaping of interactive products and services with a specific focus on their use), human computer interaction, 3D graphics, visualization and simulation, and “serious games.” In addition, NYU-Poly Dean of Undergraduate Academics Iraj Kalkhoran notes that, “NYU-Poly has fully implemented the principles and practices of project-based learning, allowing us to effectively build ‘invention, innovation, and entrepreneurship’ (i2e) into the undergraduate experience of our students. It is a goal of the Institute that advanced students in these subjects will soon think it perfectly natural to work with research faculty to create enterprises out of the products they develop. Ideally, students will be running their own companies by the time they graduate.”

Students at NYU-Poly are already being taught to use specialized systems — including CAD, LabVIEW, and MATLAB — for project development and design in their courses. This important new grant will also make it possible to supply students with additional educational technologies for the completion of course objectives and provide them with advanced methods and examples for understanding abstract and complex theories. Dean Kalkhoran observes, “The challenge for students at NYU-Poly is to be aware of the continual technological changes taking place within their fields. The inclusion of educational technologies to support curricular objectives will not only advance student learning, but also provide access to cutting-edge technologies for communication, collaboration, and innovation.”

The grant will be used in a number of ways, including the provision of funding to:

- establish a center for faculty innovation in teaching and learning, allowing for the development of educational technologies to support NYU-Poly learning objectives; introduce development programs under which NYU-Poly faculty can explore innovative technologies for teaching and learning; and produce digital courseware and resources to support their curricular needs;
- create a digitally integrated learning environment by enhancing existing smart classrooms and building new ones throughout the institution;
- implement a standard learning management system for online instruction and student communication; and
- upgrade NYU-Poly’s campus-wide wireless capabilities for enhanced security, speed performance, as well as accessibility and capacity for use by students and faculty.

Dean Kalkhoran adds, “To support the i2e model, a distinct educational experience is needed, one which combines formal classroom learning with outside-the-classroom activities. The success of this educational model is strongly tied to how successful we are in our undergraduate academic instruction.”

NYU-Poly plans include creating the Faculty Innovations in Teaching and Learning Center (FITLC). The Center will enable NYU-Poly faculty to use educational tools and resources that mirror their technologically advanced coursework. Thanks in part to the Title III grant, the FITLC will also make it practicable for NYU-Poly to develop new instructional technologies.

— Heather Stewart

1 Source: www.interaction-design.org/encyclopedia/interaction_design.html
Last year, the Robert F. Wagner Graduate School of Public Service IT department reviewed its web services, with a particular focus on the needs of Wagner’s research centers, institutes, programs, and initiatives. These units tend to function more like entrepreneurial nonprofits than traditional administrative units, and consequently, their use of technology often differs from departments providing core, student-centric University services. Many Wagner centers have specialized partnerships with new and emerging nonprofits that use the most recent “anything/anywhere” Web services currently available.

Bridging the technological and cultural divide between operating within a major university with a complex set of systems and protocols, and working with new nonprofits, is challenging for Wagner’s small IT shop. Composed of two full-time staff members, part-time consultants, and part-time students, Wagner IT provides desktop support, database management, and Web services to the Wagner community. The department relies on Information Technology Services (ITS) for most services and systems, and enhances the value of wagner.nyu.edu by customizing local applications and integrating third-party services.

Recently, staff from the Wagner centers and programs expressed a general need to more effectively manage contacts and unit-specific projects. With an overabundance of Excel and Access files, often managed by temporary workers, the data files supported a common cause, but had few common naming conventions, and no connection to our online operations. There was a clear need for a reorganization of the data, ideally within a customer relationship management (CRM) system that would be fully integrated with our website.

Although the Offices of University Development and Alumni Relations offer Wagner offices their comprehensive database service, the University provides no general CRM capable of supporting Wagner’s varied research centers, institutes, and programs. Wagner staff sought solutions to meet several needs:

- Coordinate communications with the School’s external audiences
- Streamline workflow for Wagner-centric business processes
- Manage unique, division-specific projects and 48,000 contact records
- Integrate select data from NYU and third-party systems

Our initial review of CRM systems quickly evolved into a search for an enterprise platform offering more than what we currently required, knowing that our needs will change as Wagner grows. Beyond integration with wagner.nyu.edu, we sought a service offering “point-and-click” installations, as well as a robust development environment for customizing future services. In addition to using many of ITS’ ever-expanding services, Wagner staff members use an array of fee-based, free, and local applications:

- ApplyYourself.com for admissions
- Google’s Picasa Photo Gallery for news and events
- OnlineCourseEvaluations.com for academic reviews
- A student directory for private networking
- Facebook and YouTube accounts for marketing purposes

Given the mosaic of interfaces and login pages our staff is required to navigate, we were reluctant to add one more application to the software mix, but we were attracted to the potential of an online platform of services that would include
a new CRM system. Our plan was to leverage an outside resource, and to structure the implementation so that we would be well positioned to adopt new services offered by ITS in the future.

**Our Search for Software**

The most useful resource for reviewing and comparing software products was the Gartner Reports, available through Bobst Library’s electronic database service. “What’s Hot in CRM Applications 2008” and “Predicts 2008: SaaS Gathers Momentum and Impact” were of particular value. We knew that what might be deemed the “next big thing” can sometimes be the worst possible choice for an institution dealing with a maze of legacy systems. Early on, however, we were drawn to vendors offering Software as a Service (SaaS).³

SaaS is a software deployment model under which an application is licensed to customers for use as a service on demand. Typically, the application is managed remotely by the vendor and supported through frequent seamless updates. As such, SaaS can limit customers’ capital expenditures, a boon to small entities with limited budgets in a rapidly changing technology landscape. The most recent survey on SaaS from Gartner, in which “more than one-third of respondents” planned to “transition from on-premises to SaaS,” supported earlier reports noting the trend toward the on-demand software model. Salesforce, Oracle on Demand, Netsuite, and Microsoft Dynamics were among the SaaS products we examined.

After a lengthy review process, which included conversations with ITS, ITS Technology Security Services (TSS), colleagues at conferences, and multiple software vendors and their clients, we selected Salesforce as the lead product in the industry. We were attracted to Salesforce in part due to its strong relationship to the nonprofit sector and its innovative technology platform. Additional positive features included the following:

- The Salesforce Foundation offers nonprofits ten free user licenses, making the software accessible to many organizations in the Tri-State area, including such key Wagner partners as Idealist.org, an interactive resource exchange for the nonprofit community.
- The Salesforce Software as a Service provides quarterly updates for the CRM system, a great boon to small nonprofits lacking large, in-house IT departments.
- Salesforce offers access for enhancing its core product to software vendors who provide free applications for nonprofits, most notably CRM Fusion’s Demand Tools and PeopleImport.
- Over 800 vendors offer commercial products on the Salesforce Application Exchange to enhance the value of the service.
- Entrepreneurial nonprofits have leveraged the power of Salesforce to build their business model, including the micro-loan site Kiva.org.

Selecting the appropriate consultant can be almost as important as selecting the right product. One

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3 en.wikipedia.org/wiki/SaaS

of our key requirements was finding a company willing to offer 100 percent on-site presence during the implementation. Instead of hiring a large team of consultants that might swoop in and out quickly, we integrated a consultant experienced with Salesforce into our in-house team. This consultant conducted extensive interviews and configured the system while our lead developer worked with the Salesforce programming language to customize functionality beyond the standard features.

Custom vs. Common Needs
To balance the custom and common needs of the School, we organized the project by focusing on a single research center and one operational division — the Research Center for Leadership in Action (RCLA) and Wagner’s Office of Special Events. We interviewed other departments to confirm that we were covering many of the basic requirements.

RCLA, selected as the model research client for the implementation, collaborates with a range of public service organizations, from government agencies to community-based nonprofits. The center organizes experiential programs and conducts social science research on contemporary leadership issues. RCLA’s organizational structure was complex enough to represent the interests and needs of many administrative and research-oriented divisions.

The Office of Special Events, selected to represent a unit servicing common needs of the School overall, interacts with all divisions at Wagner. For Lisa Taylor, Wagner’s Senior Director of Career Services, Special Events, and Alumni Services, the appeal of Salesforce was the ability it provided to “identify and leverage relationships between individual and organizational partners,” and to understand our connection to these various audiences.

Shaping Salesforce to Benefit Wagner
Wagner uses Salesforce to complement core NYU services and offer a level of customization required to enhance productivity of the administrative and research divisions of the School. Comprehensive integration with our website of the following services was a major requirement:

Contact Management. The primary service of the Salesforce system is the capture and organization of a rich set of data related to the many activities and relationships Wagner contacts engage in.

Event Planning/RSVP. The Event section in Salesforce was customized to Wagner’s specific planning needs. Event proposals are reviewed in Salesforce, cataloged by very specific subject area terms, and published as RSVP forms directly to our website. Visitors reply online to invitations, thus submitting data back to the system; and the event title is associated with existing contact records or placed in a holding bin pending review.

Fellowship Applications. The formal admissions process for Wagner is managed by the Admissions Office, through ApplyYourself.com, but it was not cost effective to bundle Wagner’s other academic and programmatic applications with the primary Admissions product. Salesforce enables custom forms for these submissions, including a first-phase, online application system for the Catherine B. Reynolds Program in Social Entrepreneurship that serves all NYU schools and colleges.

Local Hardware/Space Management. We track the “public titles” of regular and grant-based employees, and publish this information to specific pages on our website, using workflow rules for new employees that trigger alerts related to office and equipment allocation. Staff use Salesforce to link every workstation or space to a specific user and/or piece of equipment. A security checklist is associated with each workstation to monitor the review of electronic files during on-boarding and off-boarding process.

Marketing and Business Intelligence. Through sets of dashboards, we monitor the level of interest prospective students have in our academic events; identify contacts collaborating with multiple centers; review demographic profiles of fellowship applicants; and analyze the quality of our data, as well as staff time spent using the system itself.

Proposal Management. Wagner tracks the pre-award proposal process to identify key subject areas of interest; success rates of principal investigators; and strategies to improve the match rate of funders to proposals. In the near future, descriptions from the database will be published directly from Salesforce to the “Faculty/Research” section of our website.

Customization & Application Programming
In order to meet all the requests for customized functionality, beyond the configuration options available to standard users, Wagner developers made use of a variety of technologies provided by Salesforce. For customization and application development within Salesforce’s online platform, Wagner utilized Apex and Visualforce.

Apex is a programming language based on Java, but limited to managing behaviors of applications, data, and processes within the Salesforce platform. Visualforce is an XML technology for creating customized web pages for information display and input, fully integrated with the Salesforce user interface and with Apex for back-end processing. “In combination, Salesforce’s database system, Apex, and Visualforce provide a Model-View-Controller architecture, one of the dominant paradigms in
A t NYU’s Leonard N. Stern School of Business, over the past year or so, we have been working on a project intended to offer state-of-the-art web-based messaging and collaboration services that completely meet the needs of Stern students, faculty, and administrators. A review in 2007 of Stern’s then-current email and calendar systems indicated that, among the features Stern community members had come to expect and need were a more up-to-date and friendly user interface, native support for mobile devices, and cross-browser compatibility. In addition, many community members were eager to subscribe to and publish calendar and news feeds, and to gain broader access to their mail and calendar through mobile integration.

Selecting Zimbra

The Stern Information Technology department, in conjunction with various members of the Stern community, formed an exploratory committee to investigate new messaging and collaboration services that offered a stable and scalable platform with improved functionalities. The committee investigated a number of options, and chose Zimbra as Stern’s next-generation messaging and collaboration platform. Zimbra offered open standards and open source and provided a modern, innovative messaging and collaboration platform compatible with diverse desktop and application environments. In addition, Zimbra featured a user-friendly interface that supported next-generation user interface technology compatible with all major web browsers. One of our primary objectives was to provide a consistent and full messaging and calendaring experience within all popular web browsers. Zimbra worked well with client applications across the Windows, Macintosh, and Linux platforms. It also offered excellent mobile device support for Windows Mobile, iPhone, and Palm. Best of all, Zimbra could be integrated easily into the existing underlying technology framework, making it not only an economical choice but one that required only minimal modification.

A Two-Phase Implementation of an Efficient, Intuitive Product Suite

Zimbra was launched at Stern in August 2007, and is being implemented in two phases. The first phase focused on providing integrated email and calendar capabilities, increased mail quota, and a redundant architecture. We are now planning the rollout of Phase 2, including enhancements and activation of additional new features. In addition to superior email, messaging, and calendar features, Zimbra offers new features surpassing those of earlier collaboration systems, such as a much-needed 1 GB mail quota, cross-browser compatibility, and RSS subscriptions. Additional features include the ability to interface with Microsoft Outlook, sync with the iPhone and Treo, share iCal calendars, and subscribe to multiple calendars such as the Academic and Public Events calendars.

The enhanced calendar, with its Free/Busy viewing option, simplifies the task of scheduling meetings and other events. Stern community members can view and confirm the availability of others, without having to contact them directly. With the addition of Zimlets (mash-ups), the integrated email and calendaring capabilities enable more effective and efficient management of collaboration tools. That is, a Zimbra user can access email and calendar services, and simultaneously pull information

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Anand Padmanabhan is the Chief Information Officer at the Leonard N. Stern School of Business.
modern web software development,” says Paul Tepper, the lead developer on the Wagner project.

Like other SaaS and cloud-computing platforms, Salesforce also offers an application programming interface (API) for building web-based services that integrate with Salesforce. The API is accessible through a variety of language-specific toolkits, and since wagner.nyu.edu is implemented primarily in PHP, Wagner created a large number of pages and scripts using the PHP toolkit.

The Results
Our ability to customize the system through programming was both a blessing and a burden. Having in-house staff to provide seamless integration was ideal, but it opened the door to a higher volume of requests for specialized enhancements, some of which blurred the line between customization and personalization of a business process. Whether a service is administered on or off site, locally or centrally, the level of granular customization impacts the labor, time, and expense of a project. Distinguishing among “required,” “preferred,” and “ideal” levels of customization was central to managing the project, which we launched in June 2008.

We completed the primary implementation three months later, and in the process, changed the way we work together. The project and the product provided us with a common platform for collaboration. We hold training sessions on site and meet regularly to formalize standards and protocols for the maintenance of some 48,000 records currently stored in the database. The CRM enhanced our business intelligence capability and is just beginning to provide us with actionable analytics to improve the productivity of our team, target our marketing efforts, and identify multiple relationships our contacts may have with Wagner.

The on-demand software model is a natural solution for a small IT shop like ours seeking to balance the needs and timelines of our School with the long term strategy of the University. Our goal was to provide a customized service within a dynamic platform capable of adapting to evolving technologies and responding rapidly to ever-changing user expectations. As we grow increasingly enmeshed in technical and social networks outside the University, Wagner IT is mindful to make every attempt to leverage in-house services. Having integrated this CRM with the Wagner site, we benefit from both the reliable support offered by ITS and the robust synergies of a platform supported by thousands of administrators, developers, and clients in the corporate and non-profit communities.

A sample of Zimbra’s advanced search capabilities

The Stern community has found the Zimbra messaging and collaboration suite very efficient and intuitive. As with the launching of any new product, there were some challenges, but once installation and implementation were complete, the system proved stable and fully capable of supporting the old and new features now available. Moving forward, Stern hopes to further develop the system’s collaborative capabilities through the integration of additional Zimlets and other collaboration services.
Statistics show that over one-third of the world’s commercial software applications are being used without a license, often by people who have no intention of breaking the law but who are unfamiliar with software licensing laws or have common misconceptions regarding software use.

Downloading and using copyrighted software without a license is considered piracy, and having unlicensed software on a computer can expose the responsible party and associated organization to legal action and hefty fines. This article provides an overview of software licensing basics — and some common misconceptions — that can help NYU community members to avoid the unintentional or accidental misuse of software.

What Is Software Licensing?
Today almost all computers run software programs, most of which are copyrighted. Just like a book, DVD or audio CD, computer software is intellectual property that is owned by the people who created it. To use software legally, you must get the express permission of the software developer or publisher. This permission almost always takes the form of a license or a license agreement. Therefore, when you purchase software, you are not purchasing the actual software, but rather a license to use the software.

A software license is a contract or agreement between the software publisher and the end user. These license agreements typically contain a definition of the product, acceptance terms, warranty provisions and, unless otherwise noted, strict prohibitions on further copying and distributing the software to other people or computers. It is sometimes permissible to make a backup copy of purchased software, to be used only as a backup in the event of a system crash. Always make sure to read the software license agreement carefully to determine the nature of the agreement.

Types of Licenses
There are many types of software licenses, but most fall into two main categories, single-user and multi-user licenses. Additionally, there are often special discounted licenses for educational institutions for software designated for educational use in classrooms and labs.

Single-User Licenses are the most common type of licenses, usually referred to as an “End-User License Agreement” or EULA. These licenses are supplied with fully packaged products that are typically purchased off-the-shelf at retail computer stores, including the NYU Computer Store. Today, EULAs are typically embedded in the software itself as part of the installation process, and if the user does not agree to the on-screen “Terms and Conditions” of the software, the installation process aborts. Original equipment manufacturer licenses are another type of single-user license, used when a PC comes preloaded with software that must stay bundled with the computer system rather than being distributed as a separate or stand-alone product.

Multi-User Licenses (also called volume or site licenses) allow organizations with larger systems to obtain multiple licenses under one license agreement. With this type of license, multiple copies of the same application can be installed and used by several people at the

Sunita DeSouza is Associate Director of the Office of Operational Risk Analysis and Compliance at NYU.
same time. These licenses are different from EULAs because typically they are obtained through negotiation and a written agreement with the software publisher. Volume licensing can be negotiated for as few as two users to tens of thousands of users per volume license. Today, most software publishers offer volume licensing for all their products.

**Myths and Misconceptions**

Several common myths and misconceptions about software licenses, including the 24-hour rule, the 80/20 rule, and the concept of Abandonware, are urban legends created on the Internet and circulated to justify violations of copyright law.

The 24-hour rule claims that a person can download software and use it for 24 hours to determine if s/he really wants to use it, after which time they have to delete it or buy it. This is untrue. Use of computer software without the consent of the copyright holder is considered copyright infringement, even for only 24 hours or less.

The 80/20 rule claims that a person can install and use a single-licensed software program concurrently on both a work computer and a home computer, as long as work use is no greater than 80 percent and home use is no greater than 20 percent. This is also untrue. Licenses usually are based on a “one-license-per-computer” model. Concurrent use rights do not exist for operating system software and operating system licenses cannot be transferred or removed from the particular computer to which they are assigned.

Abandonware is a term used to describe software that the copyright holder has not distributed or supported for more than five years. The assumption is that the owner has abandoned the copyright. This is untrue since copyright law specifies the duration of the copyright, which, for works created after 1978, is defined as the life of the author plus 50 years.

**Inventory Your Computer!**

The first thing you need to do is inventory your computer to determine what software is present on it. Public domain software, freeware, or software that is copy-right-free can be excluded from this inventory. Make sure that all copyright-ed software residing on your computer is licensed.

There are several ways in which unlicensed software can end up on your computer. Most commonly, this happens when publishers offer customers a free download for a seven-day trial. If you choose not to buy the software and forget to uninstall it, you will have unlicensed software on your computer! After the trial period, the program might stop working, but you are still responsible for that software if it is on your computer. It’s important that you uninstall any trial software downloads for which you do not have a license.

**Keep Records!**

The second thing you need to do is to match up the licensed software on your computer with purchase receipts that prove that the software license was purchased for your computer. Agencies like the Business Software Alliance (who represent big software companies like Microsoft) consider software on your computer unlicensed if it is not accompanied by the proper proof of purchase, even if the licenses for the software were originally purchased legitimately! Missing or insufficient proofs of purchase have resulted in lawsuits and fines. Therefore, it is critical to keep each proof of purchase, such as cash register receipts, dated invoices or signed and dated license agreements, for all software purchased (see sidebar for details).

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### Proof of Purchase

When software is purchased, it is important to retain valid proof that the purchase was actually made. Missing or insufficient proofs of purchase can result in lawsuits and fines. The list below clarifies what constitutes valid proof.

**Valid Proof of Purchase:**
- Dated invoices in the name of NYU
- Soft records (online account statements) from recognized reseller
- Signed and dated License Agreements
- Soft records such as Microsoft Licensing Statements
- Cash register receipts for retail sales where product, version, quantity, and price paid are included

**Not Considered Valid Proof:**
- Copies of checks (or other payments made) to software vendors
- Dated purchase orders without invoices
- Undated software licenses
- Credit card statements evidencing software purchases
- Media, manuals, or key-codes
- Invoices bearing an entity name other than NYU

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Third, in addition to purchase receipts, it is advisable to keep a log of all software licenses purchased. This log should contain the software product’s serial number, the date and source of the purchase, the serial number of the hardware (computer) on which each copy of the software is installed, and the location of all backup copies. The proof of purchase and this log should be kept in a safe location. In the workplace, a designated person within each office or department should be responsible for maintaining these records.
Software Licensing at NYU
A Software Licensing Committee has been created at NYU, with representation from ITS, the Office of Legal Counsel, the Computer Store, the Purchasing Services Division, and the Office of Operational Risk Management. The committee’s objectives are to increase NYU community members’ awareness of copyright and software licensing issues, and to create tools to assist the NYU community in identifying and tracking licensed and unlicensed software and in maintaining accurate and appropriate records.

To assist the NYU community, the Software Licensing Committee has created a website which provides additional information regarding purchase of different license types and required license documentation, specific instructions on how to identify licensed and unlicensed software on their own or their department’s computers (self-audit), and tools to help record and track on which computer(s) the software was installed. This information and the tools created are available on the NYU website at www.nyu.edu/operational.risk.compliance/compliance/software.licensing.html.

In addition, please be aware that the University’s Policy on Responsible Use of NYU Computers and Data has been amended to include your obligations concerning software licensing (www.nyu.edu/its/policies/responsibleuse.html). For more information on the software licensing project at NYU, contact Sunita DeSouza at sunita.desouza@nyu.edu or Norma Kenigsberg at norma.kenigsberg@nyu.edu. §

Six Easy Ways Everyone Can Save Energy in the Workplace

1. **Set your computer to the “hibernate” setting.** When your computer starts back up from hibernate, all your files, emails, and windows will appear just as you left them. When your computer is hibernating, it only uses 1 percent of the energy that it uses when turned fully on. You can find step-by-step directions to set your computer to hibernate at www.nyu.edu/fcm/cesfaq.htm.

2. **Unplug all office devices every night and weekend.** This is better for the security of your computer and reduces its energy use to zero. Many other electronics — such as TVs, copiers, and your phone charger — also continue to draw electricity when plugged in, even if they are not in use. Plug all your appliances into a power strip and you’ll only have to flip one switch at the end of the day.

3. **Look for the Energy Star logo.** When purchasing new appliances and devices look for energy-efficient Energy Star-rated products, such as copiers with low standby power and printers/fax machines with power management features. Then be sure to use the energy efficient features. See www.energystar.gov for more information.

4. **Replace the incandescent lights in your desk lamps with compact fluorescent lights (CFLs).** CFLs use only one-fourth of the energy and last up to 10 times longer.

5. **Switch off all unnecessary lights.** When possible, use natural light and task lighting rather than illuminating large spaces needlessly. Install occupancy sensors to automatically turn off lighting when spaces are not in use. If you are interested in having an occupancy sensor installed in your office, check with your departmental administrator. Work requests may be submitted by emailing the FCM Client Services Center at fcm.helpdesk@nyu.edu, using the online work request form at www.nyu.edu/fcm/workrequestform, or calling 1-212-998-1001.

6. **If possible, use laptops.** When appropriate, supply staff with laptops rather than desktop computers — they consume 70 percent less energy than desktops.

If we all follow these simple and eco-conscious steps, the University could potentially save over $850,000 annually!

— Sarah Boll

Sarah Boll is Recycling Coordinator at NYU Facilities and Construction Management.
Early six years ago, NYU’s Information Technology Services (ITS) launched a pilot wireless network that eventually evolved into the NYURoam service widely available at the University today. Around that time, WiFi technologies were just beginning to get a foothold in schools, homes, and businesses. The demand for wireless technologies has risen steadily since.

In the network’s first month of limited availability, slightly more than 2,000 members of the NYU community used NYURoam, a number that heavily reflected the early adoption of WiFi technology by NYU’s School of Law. Since that time, the number of individuals accessing NYU-NET wirelessly per semester has increased dramatically. In the fall 2008 semester, more than 26,000 community members accessed NYU-NET and Internet resources via NYURoam. This figure does not include guests (non-NYU-affiliated individuals), who are granted temporary access while visiting the University.

In order to address both growing demands for and advances in wireless technology, NYURoam’s coverage has been expanded steadily, and its radio components have undergone two complete upgrades, from IEEE 802.11b-only support to 802.11g support, and the subsequent addition of 802.11a radios to all of our deployed equipment. Further, ITS continues to evaluate strategies for both meeting increased demand and taking advantage of the service improvement opportunities offered by technology advances.

Currently, all of NYURoam’s wireless access points (WiFi network hardware that receives and transmits radio traffic) have been configured and managed as autonomous devices. That is, each device is its own entity, loaded with its own unique configuration, and tailored to the environment in which it will be delivering service. This operational model has long been accepted as a best practice, and is a solid service delivery model. It will soon be wanting, however, in the face of burgeoning demands for wireless service from the NYU community, industry trends, and the need to better monitor and control the WiFi environment we provide.

The current accepted best strategy for deploying and managing large-scale enterprise wireless networks like NYURoam is by means of a centrally controlled and monitored “unified” network.

ITS began evaluating this new approach to WiFi service delivery late in 2007 and, as part of this process, deployed a pilot network of this type at NYU’s 26th Street residence hall in summer 2008. The new network provided wireless coverage throughout the entire building, enabling ITS to use an array of metrics to determine whether the infrastructure and operational model on which it was based could meet NYU’s requirements.

A New Wireless Standard

Three key components were deployed as part of the new network’s architecture. The first was a set of 75 IEEE 802.11n pre-standard access points (APs) that were installed in the building. These devices send and receive radio transmissions to and from laptops and other radio clients.

Each of these new APs has six radios (three for each supported radio frequency, 2.4 GHz and 5 GHz), a hardware enhancement from our existing APs, which had two radios (one for 802.11g 2.4 GHz and 802.11a 5 GHz).
The four additional radios are required to support the emerging 802.11n standard.¹

The 802.11n standard has been heralded by many as a substantial leap forward for wireless technology. This is because of 802.11n’s high level of reliability and bandwidth delivery. Estimates of what the maximum bandwidth deliverable from an 802.11n AP fluctuate greatly depending on whom you ask. However, a generally accepted figure is approximately 200 Mbps per access point, to be shared by clients connecting through that particular AP. This is close to four times the bandwidth delivered by our current wireless access points.

Our 802.11n access points are configured to operate as “lightweight” APs, meaning that they are controlled by the second component of this new network architecture — a wireless LAN controller or Wireless Services Module (WiSM).

Managing An Integrated Network

WiSMs perform an array of functions; they are the workhorse of the unified WiFi network architecture. In the broadest terms, a WiSM configures, monitors, and fully manages all of the access points under its control. It establishes the security policies for each of its WiFi networks, performs extensive real-time Radio Frequency (RF) monitoring, and, as is the case with our test deployment, makes real-time decisions on what operational characteristics (e.g., transmission power level, radio channel) to adjust as it addresses interference issues, radio congestion, active security threats or attacks, “holes” in the service coverage areas, and more.

A single WiSM can support as many as 300 APs simultaneously. In our NYU-NET environment, these controllers would be installed in the routers positioned on the

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¹ Although the IEEE standards body has yet to ratify the current draft of 802.11n, the networking industry is moving forward by deploying the current “accepted” 802.11n pre-standard, confident that any modifications to the pre-standard would be addressed by simple software or firmware updates.
Further, access points can be instructed to reroute their data traffic to a different WiSM located elsewhere on NYU-NET should its primary WiSM fail.

Our new network architecture’s third component is the Wireless Control System (WCS), a powerful software package that enables many centralized functions. It can manage all the WiSMs on our network and, in turn, all the APs in operation, and has many other capabilities. As with the WiSMs, the WCS has too many features to list here. It provides a central point for WiFi management, policy enforcement, troubleshooting, LAN design, security monitoring, intrusion detection, and more. The extensive quantity of historic and real-time data generated by WiFi activity is gathered by the WiSMs and APs and is used by the WCS, enabling complete visibility into the network from many management and monitoring perspectives.

Figures 1 through 4 provide just a few illustrations of the breadth and depth of data and monitoring information made available at one’s fingertips through use of the WCS.

The WCS has numerous and varied analytical tools that are invaluable to managing an integrated network that needs to deliver the best possible wireless environment for today’s applications and the mobility-oriented applications of the future. Having a reliable, secure, and flexible wireless network that addresses the various mission-critical elements that make up a complex institution such as NYU is not a luxury but a necessity. A unified wireless network architecture helps lay the foundation for the University’s IT future. §

Figure 3. This graph displays the downstream (data transmitted to our wireless clients) and upstream (data transmitted from our wireless clients) through a specific WiSM controller over a four-week period. During this period, the downstream bandwidth peaked at almost 30 Mbps and upstream at over 12 Mbps.

Figure 4. These graphs represent the percentage of radio frequency utilization by a specific access point for both the 2.4 GHz (802.11b/g/n) & 5 GHz (802.11a/n) bands.
NYU Upgrades to Blackboard 8.0

After several months of diligent work, NYU’s primary Learning Management System (LMS), Blackboard, was upgraded to the latest version of the software and went live for the NYU community on December 1, 2008, ready for use in the spring 2009 term. An LMS, such as Blackboard, is typically used to provide online supplementation to in-class coursework and offer such web-based functionalities as electronic distribution of course materials and handouts; enhanced group communication through discussion boards, announcements, and email; student assignment submissions; and online testing, quizzing, assessment, and grading.

Here at NYU, Blackboard is currently used by over 75 percent of our faculty and students each semester.

ITS undertook the upgrade of this integral system to provide NYU with an LMS that has the most up-to-date functionality, the best possible performance, and the most current vendor support. As part of the upgrade, numerous improvements were made to the system and several new training and support initiatives were put in place. This project entailed coordinating input from several University divisions including their faculty and students. So far, community reaction to these enhancements has been positive, and faculty, students, and staff seem to be looking forward to exploring the system’s new features over the coming semesters.

System & Functionality Enhancements

Some of the benefits of Blackboard 8.0 include greater cross-browser compatibility, overall stability and performance, as well as many completely new features. These new features include Self & Peer Assessment for assignments, Adaptive Release for content items, and the Early Warning System and Performance Dashboard to track student progress. Along with new functionality, there are enhancements to existing tools such as a completely redesigned Grade Center, improvements to the Discussion Board (including subscriptions and grading) and email notifications for Announcements. With cross-browser and cross-system compatibility, it is now possible to use a powerful WYSIWYG (“What You See Is What You Get”) web page editor when adding content to your course site. This allows faculty members to design a more interactive learning experience in the content areas, complete with active text links, full formatting, and embedded multimedia.

Self & Peer Assessment makes it possible to create assignments and then allow students to evaluate and give feedback on each other’s work. It is also possible to better track each student’s progress through the online portion of the course material and set up notifications when a particular student is either excelling or falling behind, via the Adaptive Release and Early Warning System features.

With the additional enhancements to the Grade Center, instructors can now email students directly from the Grade Center display, views can be customized to focus on groups of students or groups of assignments, and specific grading schemes, bonus points, and question exemptions for individual grade items can be set. With the Discussion Board enhancements, course members can now elect to receive new forum posts via email, and instructors can grade student participation in a forum. Email notifications for Announcements allow instructors to alert students of new additions to a Blackboard course by emailing students the text of announcements displayed on the front page of the course.

Ethan Ehrenberg, Lillian Moran, and Meredith Rendall are Faculty Technology Specialists within ITS Academic Computing Services.
In addition to the direct enhancements that were achieved through the upgrade, a number of improvements were made to the Blackboard access method through NYUHome. First, the course list was split into four tabs for “Current,” “Past,” “Other,” and “Favorite.” A “News & Alerts” section was added, which displays current announcements regarding the Blackboard system and is a place to look for indications of new features, problems, and resolutions that affect the system. A new “Help & Support” section was also added to the NYUHome Blackboard channel. This section allows users to search a comprehensive knowledgebase of Blackboard support information and contact the Blackboard support team to report any specific problems.

Behind the scenes, a number of more technical accomplishments were also made. These include extensive system performance testing and tuning, database reconfiguration, new security measures, and a new Single Sign-On login system that can accommodate access to multiple NYU systems using just one user name and password credential.

**Training & Support Improvements**

As part of the upgrade, ITS also implemented a number of initiatives aimed at improving training and support for those using Blackboard. One of these involved converting over 500 individual web pages with Blackboard support documentation into the Ask ITS searchable knowledgebase. Not only is the knowledgebase more user friendly, with a simple search box and a drop-down list of categories to make finding the appropriate information easier, but the knowledgebase information is more comprehensive, up to date, and easier to maintain. As a dynamic knowledgebase solution, the quality of the information and its ease of use promises only to get better over time particularly as responses to individual questions in turn become new Ask ITS knowledgebase articles that benefit the community at large. Each knowledgebase article becomes a permanent URL link location that can be bookmarked, organized, and shared in email or on the web — many of which contain screenshots, images, and video tutorials that walk through specific how-to instructions.

Another large initiative of the upgrade was enhancing in-person training. Realizing that the new functionality in Blackboard 8.0 would create increased and diverse training needs, ITS, led by ITS’ Faculty Technology Services, responded with a suite of new in-person training offerings. The standard “Getting Started” session was augmented during the Blackboard upgrade with the introduction of several new session topics from which to choose, repeated twice weekly over a six-month period. Preview sessions gave informational demonstrations of selected new features, while topic-specific hands-on sessions helped participants accomplish specific tasks in their own courses related to either initial set up, content display, communication and collaboration, or student submissions. The Grade Center Walk-in Clinic allowed participants to sit down

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**Top 5 Things to Know About Blackboard 8.0:**

- **The basics have not changed.** Communicating with your students and uploading content is as easy as ever.

- **Enhanced discussion board.** Notice the new user-friendly interface and try out additional features such as student rating of posts and email subscriptions.

- **Gradebook vs. Grade Center.** The Grade Center has changed significantly and incorporates much added functionality and an improved grading experience.

- **Where is the Digital Dropbox?** The Digital Dropbox is no longer available and has been replaced by the Assignment tool, which is easier to use, better organized, and links submissions directly to the Grade Center for easy viewing and bulk downloading.

- **New Features.** Search the ITS Knowledgebase (at the bottom of the Blackboard Courses Channel in NYU Home or directly at www.nyu.edu/blackboard/help) for step-by-step instructions and video tutorials. Explore the Self & Peer Assessment Tool, the Performance Dashboard, the Early Warning System, and many other brand new or improved items.
with a Blackboard support expert to troubleshoot issues regarding the newly redesigned Grade Center. This extensive schedule of diverse training options allowed ITS to meet several hundred people face to face and help them take advantage of the new version of Blackboard.

ITS implemented another training and support initiative aimed at better coordinating with the many people from school and department administrations who are engaged in supporting Blackboard at a more local level. Called the Blackboard Liaisons program, this initiative has coordinated with approximately 70 people to date from many University schools and programs and several global sites. The program provides them with focused training and information about the Blackboard 8.0 features, materials to run their own local training initiatives, a forum to discuss issues pertaining to their school or department, and a dedicated support system allowing them more direct and rapid access to support. So far, the program has been a success and promises to grow in coming semesters.

These new initiatives were coupled with several important behind-the-scenes accomplishments to effect more efficient distribution of Blackboard support staff, greater fluidity of information sharing and documentation between various support groups, and more rapid problem analysis to ensure that issues can be identified, reported, and solved as quickly as possible with as little disruption to those using the system.

Communication & Coordination Process
The Blackboard upgrade would impact virtually all NYU schools and programs. Because of this, coordinating the upgrade was a complex and important task. ITS started communicating its intentions to upgrade the system in March 2008 and established a blog to allow the community to track the progress of the work. ITS also started meeting with specific constituencies at the University who had special requirements or whose Blackboard usage was particularly extensive. Through these meetings, ITS was able to draw up a project plan that allowed it to achieve a system upgrade for the overall University, while still accommodating the special needs of some individual schools and programs.

Before releasing a new system version for the entire community, however, ITS wanted to get some direct feedback from faculty and students interacting with the system. In order to do so, ITS conducted a beta test in which 13 faculty members, representing most schools and an abroad site, utilized the new version of the software in their live courses for the fall semester. They received special training and were asked to provide feedback on the new functionality and various support protocols, which helped ITS fine-tune its preparations for the more general release to the community.

One of the more difficult activities to coordinate was the migration of several semesters of prior course content to the new system. Early on, a primary concern for faculty was uninterrupted access to content in their Blackboard course sites. Many sites contain extensive course materials, compiled over many semesters, which would be difficult and time-consuming to re-create from scratch. Another early request from the administration was that, due to the “mission-critical” nature of the Blackboard system, the upgrade should have minimal to no downtime. The most effective way to accommodate both of these needs was to build a brand new system on fresh hardware while the previous system version was still in use and then to slowly migrate or copy the course sites from the old system to the new system behind the scenes. By the end of the upgrade, ITS had migrated over 19,000 Blackboard sites and used a massive communication effort to ensure that the new system was ready for the start of the spring semester.
Blackboard Upgrade Results and Community Feedback

Based on reports from the faculty beta-testers and initial feedback, the results of the upgrade have been mostly positively received. Below are the areas faculty members are highlighting as the benefits of Blackboard 8.0:

The Grade Center

Those familiar with the Gradebook feature in NYU’s previous version of Blackboard will likely agree that the new Grade Center feature in Blackboard 8.0 is this version’s most significant change. In initial faculty feedback, it was acknowledged that although the new Grade Center takes time to learn, more than 60 percent of the faculty surveyed reported being either satisfied or very satisfied with the new look.

Smart View

Faculty members found the option to view a subsection of the Grade Center via the Smart View feature to be extremely useful for grading various groups or sections of students within a course site.

Send Email

The ability to send email to specific students directly from the Grade Center was considered an excellent new feature.

Grade Modified Manually

Faculty members commented that seeing grade changes and grade history at a glance in the Grade Center is helpful.

Grading Schemas

The ability to create new grading schemas, in addition to the "Letter" grading schema, that can then be applied to one or more specific columns in the Grade Center, was also deemed useful.

Hide Class Average

Instructors liked the option to select whether to display the class average for an assignment, on a per-assignment basis.

Communication

The communication tools in Blackboard 8.0 have been enhanced. As previously mentioned, the ability to send email directly from the Grade Center is just one of these enhancements. Other features faculty members responded favorably to include the following:

Subscriptions

Instructors and students can now elect to subscribe to receive email notifications of new posts to a discussion board forum or thread. This avoids having to continually check Blackboard for new posts.

Announcements via Email

The text of announcements can be pushed out to students via email to help alert them to important aspects of their Blackboard site.

NYU Home Blackboard Courses Channel

“Refresh Blackboard Course List” Button

As the Blackboard Courses Channel automatically updates only every couple of hours, this button will refresh the channel immediately to reveal a newly created course site or an updated availability status.

Blackboard FAQ and How-To’s

The channel now includes a search box for the new knowledgebase that contains the Blackboard 8.0 Frequently Asked Questions, how-to’s, and new tutorials that can be downloaded as PDFs or viewed as video tutorials.
The Faculty Digital Archive

TERRELL JOHNSON
terrell.johnson@nyu.edu

The Faculty Digital Archive (FDA) is a place where full-time NYU faculty can deposit their work in digital form and share it via the web. Content can be open to the world, or restricted to the NYU community or selected individuals. The FDA is intended to be a highly visible repository of NYU faculty digital scholarship. With unlimited storage, and a technology designed to enable easy discovery (in Google Scholar, for example), the FDA is a great choice for sharing papers, research materials, video, audio, and images. In addition, it ensures a stable online location for your work, making citations to it as reliable as those within scholarly journals. Faculty and scholars looking for a flexible and easy-to-use option for storage and sharing should consider using the FDA.

Getting Started
Before setting up a collection, you must first decide on whether a public or private collection is the right choice for your purpose. Public collections are open to the world and are indexed by search engines, such as Google. Private collections can be restricted to the NYU community or to designated individuals. Faculty and scholars interested in creating a collection should email archive.help@nyu.edu. A member of the FDA service management team will assist you in the creation of your collection.

Once your collection is created, you can customize it with a logo, add descriptive text, add users as submitters or administrators, and upload content. Uploading content is an easy process, and all content can be labeled with descriptive metadata and tags.

A Few Sample Uses
The FDA is used daily throughout the NYU community. The Leonard N. Stern School of Business uses the

Editors’ note: ITS offers a palette of resources for the storage, management, and sharing of files and data. Several of these were featured in the Fall/Winter 2008 issue of Connect. Here, we feature another offering in this dynamic and evolving service area for NYU and ITS.
FDA to store thousands of working papers and research materials gathered from their faculty. Professors at the Steinhardt School of Culture, Education, and Human Development archive hundreds of teaching and learning videos from classroom observations. And hundreds of images, documents, and videos are archived by the Graduate School of Arts & Science for its Museum Studies program.

FDA or Files 2.0?

Files 2.0 is NYU’s web-based file storage system that is available to all part- and full-time faculty, staff, and students. With 2 GB of space, a very intuitive interface, and website-hosting capabilities, Files 2.0 is a great choice for storing your files for short-term use. The chart at the right compares some key features of these two services.

For more about the FDA, Files 2.0, and other options for file storage, management, and sharing, please visit www.nyu.edu/its/filestorage.

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<tr>
<th>Features</th>
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<td>Ability to create Groups</td>
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<td>Ability to allow users to administrator your collection</td>
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<td>Versioning of files</td>
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A comparison of the features offered by the Faculty Digital Archive (FDA) and Files 2.0

The Digital Studio

The Digital Studio, NYU’s gateway to digital services supporting scholarship and teaching, offers a collection of information technology services to faculty working on a wide range of instructional and research projects. NYU faculty can visit the Digital Studio to use digital media equipment, receive assistance from Digital Studio lab assistants, and gain access to various supported technologies (e.g., video digitization, Faculty Digital Archive, and Files 2.0 training).

Visit www.nyu.edu/studio for additional information or to make an appointment, or contact the Digital Studio staff at digital.studio@nyu.edu or 1-212-992-9233. A collaborative resource of the NYU Libraries and ITS, the Studio is located on Bobst Library’s second floor east and is open weekdays, 10 a.m.-6 p.m.

ITS Client Services: Your IT Helpdesk

You can also look to ITS Client Services for help and information on ITS computer, connectivity, email, and NYUHome services, and more.

Visit AskITS.nyu.edu or NYUHome’s Ask ITS area for tutorials and FAQs, to ask questions, or to request help; or send email to AskITS@nyu.edu. For help by phone, call 1-212-998-3333; helpdesk staff are on hand Monday-Friday, 8 a.m.-midnight, and Saturday-Sunday, noon-midnight. For in-person help, visit us at 10 Astor Place, 4th floor, on weekdays, 9 a.m.-6 p.m.

For Further Help

For additional sources of technology help & training, including the NYU Data Service Studio, see p. 24 and p. 5.
Also inside:

HR Reporting @ NYU
Phase One Goes Live

PeopleAdmin
Managing Position Descriptions
& Tracking Job Applicants

CRM Software Services
at NYU Wagner

Zimbra Messaging & Collaboration
Software at NYU Stern

The New BobCat

Big Data:
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