

PENN

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MAGAZINE

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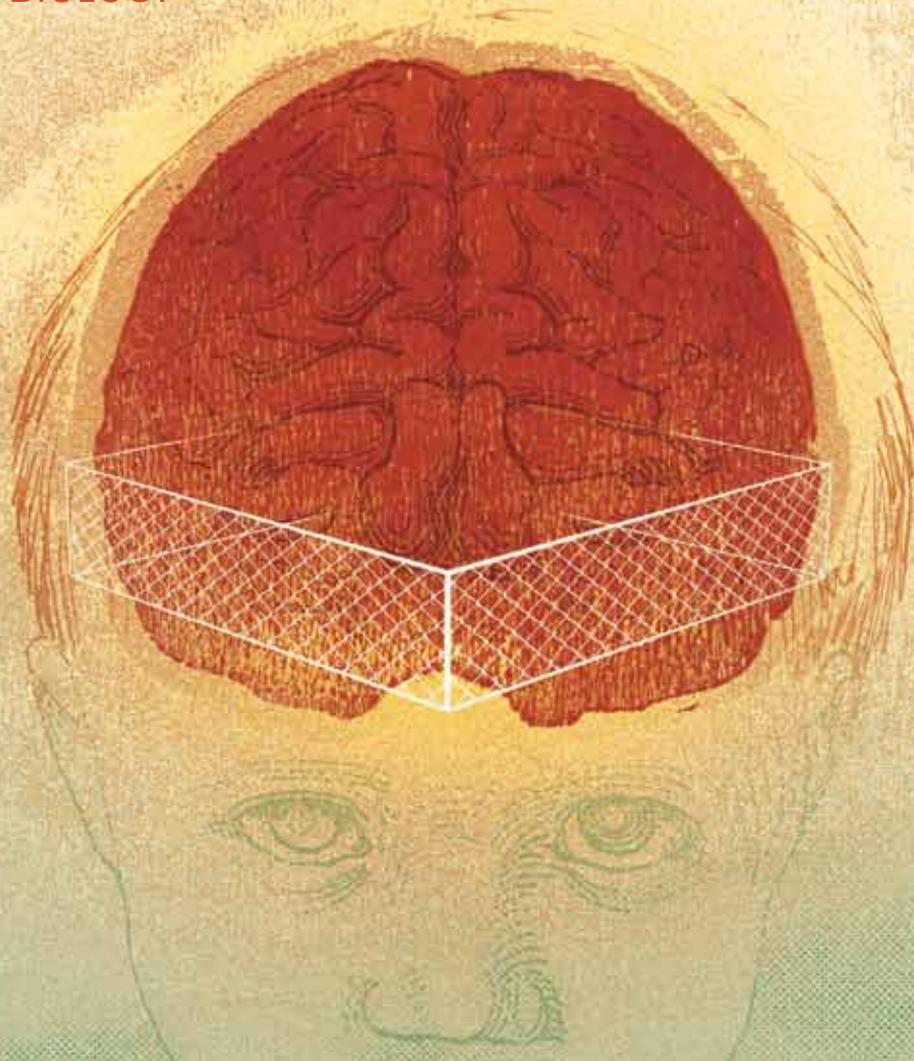
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PENN STARTS HERE

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LISA GOOFREY

A DAY IN THE LIFE OF THE DEAN

by Dean Rebecca W. Bushnell

Learning never ends. That's one of the key messages we convey to our students, and if there's anything "typical" about my workday as dean, learning is it. One moment I might be making plans with scientists for renovating chemistry labs, and the next I'll be dining with an art historian who could be a new addition to our faculty. Managing the astonishing intellectual breadth of the arts and sciences—from chemistry to classics—makes my job exciting and rewarding. And in the course of a single day, I encounter as many perspectives on the School as the people I meet: faculty, students, staff, alumni, parents and other deans at Penn. I'm constantly learning from all these different voices. This experience informs every aspect of my leadership of SAS; I use all that I learn to make the best decisions that will shape the future of the School.

People often ask me what it's like to be dean of the School of Arts and Sciences. What follows is a snapshot that could be any given day.

Let's say my first appointment is with a prospective faculty member whom we're trying to recruit. In these meetings, I'm checking them out but also selling Penn, which isn't hard, since many scholars are attracted to the interdisciplinary environment here. Last spring, for example, I met with Kaja Silverman, a true superstar from Berkeley who, I'm pleased to report, has joined us as the Keith L. and Katherine Sachs Chair of Contemporary Art. Kaja is an extraordinary scholar of film studies who is currently writing a book on photography, a personal interest of mine that led us quite naturally into a stimulating conversation.

Following the recruitment meeting, I put my head together with Associate Dean for the Natural Sciences Richard Schultz, our Vice Dean for Finance and Administration, Ramin Sedehi, and other scientist-chairs. We're making plans for a new Neural and Behavioral Sciences building that will provide facilities for the biology and psychology departments. For me, as an English professor, understanding what kinds of spaces and facilities are needed to explore the frontiers of science—not just for

scientists now but for those who will do research 20 years from now—is both an illuminating and bracing process.

At noon I share a meal with an alumna who is the parent of a freshman who has just moved into one of the College Houses. I enjoy meeting with alumni when they return to campus. They tell me about their own time at Penn and how much things have changed here, but they also clue me in as to what their own child is experiencing. And of course I'm always on the lookout for opportunities to talk about fundraising and other ways alumni can support the School.

Then, I head to the Provost's office where the Council of Deans is meeting. The Provost regularly convenes the deans from Penn's 12 schools to talk about matters of mutual interest and plan collaboratively for the University. I've learned a great deal hearing from other deans about how they handle all the challenges we encounter in

IF THERE'S ANYTHING "TYPICAL" ABOUT MY WORKDAY AS DEAN, LEARNING IS IT.

moving the University forward in tough times, and it's in the Council of Deans that I'm exposed to the great diversity of teaching and research across the whole of Penn.

My English seminar then meets in the late afternoon: this year, it's a survey of literature from Chaucer to Milton. I've been teaching this material for 28 years now, so I always ask myself, how can I keep it fresh? I never cease to be amazed by how the students, with their enthusiasm and new viewpoints, keep it fresh for me. Each time I teach, they show me things in the text I hadn't seen before.

As the streetlamps come on across College Green, I sometimes have a few moments to reflect on the day. It's a time to bring everything together, to prepare for the next day when I face the hard and exhilarating work of leading the School. Taking what you learn and making it matter: that, in the end, is the mission of the School of Arts and Sciences.

NOBEL BOND

2010 LAUREATE IS
PENN CHEMISTRY'S SEVENTH

Make way for another Penn Chemistry Nobel Prize recipient.

Ei-ichi Negishi, winner of the 2010 Nobel Prize in Chemistry, completed his doctorate at Penn in 1963. The Nobel committee cited his research on palladium-catalyzed cross couplings in organic synthesis.

Negishi is the seventh laureate to emerge from the Department of Chemistry in the School of Arts and Sciences. The first, Christian Anfinson, whose Master of Science dates back to 1939, received the Nobel in Chemistry in 1972. Michael Brown, C'62, M'66, an undergraduate chemistry major, was awarded



MATTHEW LEANE

the 1985 Nobel Prize in Medicine for his work on the regulation of cholesterol metabolism. Another chemistry undergraduate major, Stanley Prusiner, C'64, M'68, received the Nobel in Medicine in 1997 based on his method for tracking disease-causing agents called prions.

The next in this distinguished line came in 1999, when Ph.D. alumnus Ahmed Zewail, G'74, was awarded the Nobel in Chemistry. In 2000, the late Alan MacDiarmid, a former professor of chemistry, and Hideki Shirakawa, a former postdoctoral research associate at Penn and MacDiarmid's collaborator, were awarded the Nobel in Chemistry for their work in developing organic polymers that conduct electricity.

—BC



LISA GOREFF

REBECCA BUSHNELL DEANSHIP EXTENDED

Rebecca Bushnell's term as Dean of the School of Arts and Sciences has been extended through June 30, 2013. Bushnell, the Thomas S. Gates, Jr. Professor and Professor of English, was appointed dean of the School in 2005. From 1998 to 2003, Bushnell served as the School's Associate dean for Arts and Letters, overseeing the humanities departments and centers. From 2003 until December 2004, she led the School's undergraduate programs as Dean of the College of Arts and Sciences. She is a scholar of early-modern English literature, culture and history, and she continues to teach and write in her field while serving as dean.

University President Amy Gutmann praised Bushnell's leadership skills during an uncertain fiscal period. "Rebecca has been a strategic and collaborative leader," Gutmann said, "working closely with her faculty, with her leadership team and with the Provost and me to identify key priorities and to advance the School's vital education and research missions, even in the face of unexpected economic constraints."

Bushnell's term as dean was scheduled to end on December 31, 2011. She agreed to remain as dean for an additional 18 months to help carry forward the School's ongoing initiatives, including the *Making History* campaign, which to date has raised more than \$300 million. The campaign has led to critical improvements in the School's facilities and strengthened the faculty, especially in interdisciplinary programs of research and teaching.

"We are confident," Gutmann said, "that, with Rebecca's continued leadership, the School of Arts and Sciences will rise to the many opportunities and challenges ahead of it." —BC

CHANGING NORMS TO CHANGE LIVES

“It’s one of the most exciting times of my life,” says Cristina Bicchieri about her work as a social norms and human rights consultant to the United Nations Children’s Fund. Bicchieri, the Carol and Michael Lowenstein Professor of Philosophy and Legal Studies, is using the science behind social norms to help UNICEF workers around the world find more effective ways to end practices such as female genital cutting, child marriage, the denial of education to girls and violence against women and children.

If human rights workers hope to convince a group to embrace or abandon a certain practice, Bicchieri contends, they must understand the social norms supporting it. “People will follow a social norm on condition that certain expectations are met,” she explains. “Which expectations? First, the expectation that other people follow the norm.... Second, the belief that relevant others—others that belong to the community of reference of the individual—think the individual should follow the norm.”

To change a negative norm, she says, rights workers must change people’s expectations. Bicchieri gives the example of child marriage: a mother may not approve of giving her young daughter in marriage, but she may fear that if she refuses she’ll be seen as a bad mother and her daughter will be considered unfit for marriage. Her expectation is that they would both pay a high price for her resistance. The mother will decide to follow the norm unless those expectations can be changed. The same holds true for female genital cutting: parents may think it’s harmful, but their expectation is that their daughter won’t find a suitable husband otherwise, so they follow the norm.

The way to change these expectations, Bicchieri advises, is by doing it gradually, trying to convince people they can abandon these practices without sacrificing their values. For example, in a culture that doesn’t educate girls but values motherhood, the key is to demonstrate that schooling girls can help them become better mothers. The second step is to provide open conversations in which community members can make public commitments to stop the practice. This creates a new expectation that individuals won’t revert to the old ways. If the parents of boys pledge not to marry their sons to girls who have been cut and they learn that a prospective bride has been cut, they will know—and perhaps the entire community will know—that her parents broke their pledge. Female genital mutilation has been abandoned in many communities where members have made such pledges. Another important component has been to link being uncut with values that matter to the community, such as purity and body integrity. “When enough people abandon the practice, the norm will change,” Bicchieri asserts.

She believes top-down approaches to change that focus solely on creating laws are inadequate. “When laws exist but are in conflict with social norms, social norms win,” she says. If rights violations are the norm, such behaviors are considered acceptable, and the threat of punishment is not seen as a deterrent. Instead, she advocates a bottom-up approach that engages the people whose lives UNICEF is trying to improve. Rights workers must “improve them on their own terms,” she cautions. This means using the people’s language and cultural tools; respecting their



values even while condemning a practice; and working within the people’s social network.

This past July, 40 UNICEF employees came to Penn’s campus to take part in a training program that Bicchieri developed on how to use social norms to promote social change. By the end of the two-week program, the participants from India, Pakistan, Bangladesh, Afghanistan and many African nations had developed papers on how they could use social norms to address issues like promoting the education of girls, encouraging the use of public sanitation and curbing female genital mutilation and were ready to take these ideas back to their colleagues for use in the field.

Bicchieri has been working with UNICEF for two years, ever since representatives of the organization became aware of her 2006 book, *The Grammar of Society: The Nature and Dynamics of Social Norms*. The book explores social norms like fairness, cooperation and reciprocity and discusses how these norms develop and why people follow them. Although her book didn’t specifically relate social norms to human rights issues, she was pleased UNICEF recognized the connection and asked for her assistance. She says, “It’s really the greatest satisfaction of my life that my theories can be tested and implemented and change the lives of people. What else could I want?”

—Tracey Quinlan Dougherty, G’03

OUT OF THE LECTURE HALL AND INTO THE WATER

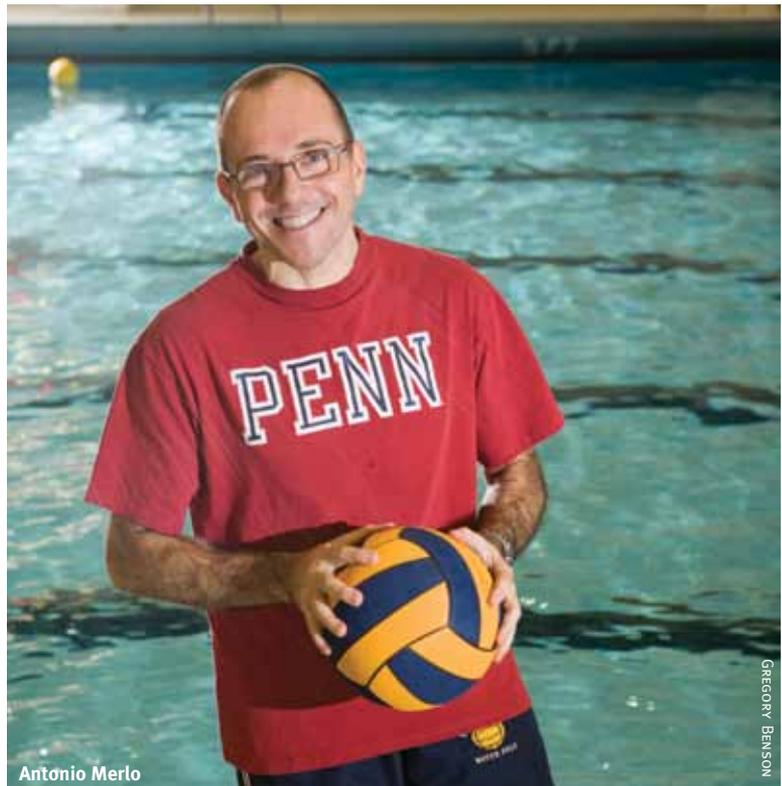
Antonio Merlo's voice is scratchy and low. But Merlo, the Lawrence R. Klein Professor and Chair of the Economics Department, didn't lose it lecturing at an economics symposium—that's merely part of his day job. He lost his voice pool-side, coaching Penn Men's Water Polo.

"It's the passion of my life," Merlo says. "Growing up in Milan, Italy, watching the players on the television—I was hooked."

A serious player himself until he headed to New York to pursue his Ph.D. in economics at 26, Merlo explains that, "Aside from soccer, water polo is one of the most popular sports in Italy. It was especially huge after Italy claimed Olympic gold in Barcelona in 1992." Eventually, Merlo's Italian team—"all guys I grew up with," he says—made it to the national league, where he played against all-time greats like Spain's Manuel Estiarte.

Merlo, who is also Director of the Penn Institute for Economic Research, came to Penn from New York University in 2000. His main area of research is political economy, a discipline that "views standard economic outcomes through the lens of the political sector." Having coached the men's team at NYU, he was eager to get back into the water and began practicing with the Penn team when he arrived at the University.

"They had a coach at the time, but three years ago, coming off a great season, he left for San Francisco," Merlo says. "The team was stranded, and since I practiced with them, they asked for my help. I agreed but told them to keep looking for a coach. And now I've been here for the last three years."



Modern collegiate play in the U.S.—under the banner of the Collegiate Water Polo Association, or CWPA—is divided into varsity play and club play. Penn is part of the club conference, which permits any full-time student to play, including MBAs and medical students—both of which Penn has on the roster. The team has won seven titles in their Mid-Atlantic division, this past season being their seventh. They battled rival Penn State in the division championship and won 9-5.

Merlo, given his European background in the sport, says he brings a unique perspective. He gathers his players in a room each Monday and screens old footage to help them understand the speedier Italian play. "As a professor, my main goal is to teach," he explains. "It's no different here."

In addition to the team's play in the National Collegiate Club Championships, 2010 marked the first year of the Ivy Championship, a unique tournament where varsity teams and club teams can face off against one another. Penn finished 2-2, with wins over Dartmouth and Columbia. Merlo, who declines the club salary, says the team's passion keeps him coming back.

"One of my best defensive players, Brady Sieber, was a varsity player for Johns Hopkins," Merlo says. "Now he's at Penn in medical school. He's doing surgery rotations right now. He actually wakes up at 4 a.m. so that he can do his rotations and then come play with us. That is the level of dedication in these kids." —BC



PENN HUMANITIES FORUM ENTERS CYBERSPACE

DIANE PIZZUTO

Rome wasn't built in a day—just ask Diane Favro, Professor of Architecture and Urban Design at UCLA, one of the renowned scholars at this year's Penn Humanities Forum. Favro, alongside her team of researchers, is rebuilding Rome. There's just one catch: the city is made entirely of 3D computer models.

Favro is just one of the six scholars that James English, Professor of English and the Forum's new director, helped recruit for the Fall 2010 lecture series (another half-dozen speakers are slated for this spring). The Forum's purpose is not only to attract and entertain audiences, but also to expand the common conception of the humanities and encourage interdisciplinary exchange. This year's theme is "Virtuality," and while the topic may seem at odds with traditional subject areas in the humanities, English explains that the lines have been irreversibly blurred. "It's inescapable," he says. "Books, libraries—everything is digital now, even old films. I don't even remember how I did research before the advent of these new technologies," he laughs.

The lecture series, English says, is the public face of the Forum. With the annual theme in mind, scholars from varying academic fields present work at the cutting edge of humanistic research. In another event in the fall series, Tod Machover, who is Professor of Music and Media at MIT and known as "America's most wired composer," discussed technology's relationship to musical instruments and how the combination of digital technology and music—think *Guitar Hero*—might allow the average musician to play like a virtuoso. "These so-called 'hyper-instruments' raise really interesting questions about virtuosity," English says. "What are we to make of a virtuoso whose performances are digitally enhanced? Does it make sense to talk about 'virtual' virtuosity?"

In addition to the lecture series, the Forum also hosts three seminars: one for faculty fellows, one for graduate students and one for undergraduate students. The seminars kindle the exchange of scholarly ideas in an effort to create a collaborative intellectual atmosphere. Participants are selected on the basis of proposed research projects, which they work on during their fellowship year. The seminar serves as a sounding board for their works-in-progress, a place where ideas can be floated and other scholars can offer critiques and advice.

One of the undergraduate fellows is College junior David Dunning, a double major in English and Mathematics who plans to utilize his interdisciplinary expertise to examine author David Foster Wallace's novel *Infinite Jest*. "Wallace posits a distinction between the 'mathematically real' and 'the really real'—mathematics becomes the ultimate virtuality," Dunning explains. "My work will be not just an argument for some point in a rarefied academic debate, but a sincere

study of what Wallace's fiction can teach us about living as real human beings in an increasingly virtual world."

English himself will lead off the faculty fellows seminar with a paper on African film festivals. The essay will delve into what English says is the disconnect between the "African cinema" that is celebrated on the film festival circuit and the realities of film production and film culture in Africa. "Most of these films are produced by a world-film industry and for a world-film audience that has little to do with Africa," English says. "The whole enterprise is mainly for the benefit of the festival system itself." Though he describes the paper as a critique, it's intended to be a constructive one. It calls for a reorientation of the festival circuit toward the actual screen cultures of Africa, like the thriving DVD industry in Nigeria, which might represent a viable model for other sub-Saharan countries. His designated respondent in the seminar will be Tsitsi Ella Jaji, an African literature expert in the English department.

Though the three seminars are separate, English notes that there are opportunities for the different participants to meet. For example, some of the faculty fellows and all the students will be attending a luncheon conversation with one of the visiting speakers.

"Adaptations" is the theme for the 2011-12 Penn Humanities Forum and will likely explore areas of overlap in the humanities and biology and other natural sciences. "The humanities at Penn," English says, "are engaging one way or another with pretty much everything that is going on in the academic world, from computer engineering to intellectual property law, from environmental science to bioethics. We hope to really expand people's notion of what contemporary work in the humanities can be."

—BC

RESETTING THE BIOLOGICAL CLOCK

“It’s something everybody knows about, but it seems totally unfair,” observes Michael Lampson, an assistant professor of biology. He’s referring to the decrease in fertility in older women, or what’s ruefully known as the “biological clock.” Why do women become less fertile as they age, while the male of the species, even if he may lose a bit of his youthful vigor, keeps producing new, viable sperm to a ripe old age?

A cell biologist who specializes in studying how cells preserve the fidelity of their chromosomes during division, Lampson notes that while the correlation of advanced maternal age with genetic disorders such as Down syndrome has been known for over 70 years, the underlying mechanisms have proven elusive. Eventually, most birth defects and developmental disabilities were shown to result from a lack or excess of certain chromosomes, a phenomenon known as aneuploidy. Older women are more likely to produce egg cells that are aneuploid. But what creates the aneuploidy in the first place?

In a paper recently published in *Current Biology*, Lampson and his co-authors, including Richard M. Schultz, Associate Dean for the Natural Sciences and the Charles and William L. Day Distinguished Professor of Biology, propose an answer based on research in mice—fellow mammals that display the same sort of aneuploidy in eggs from older females. During cell division (meiosis), a structure called the meiotic spindle separates and pulls the chromosomes apart into



MARK DIETRICH

the two daughter cells. But that’s only part of the story. “There’s also something called cohesion that’s holding the chromosomes together,” Lampson explains. Cohesion ensures that sister chromosomes do not separate until the proper time, so they can be properly segregated. It’s controlled by a protein complex called cohesin, which associates with chromosomes during chromosome replication.

Women are born with a lifetime supply of egg cells (or oocytes), which differ from other cells in an important way. “They’re arrested in what we call a prophase-like state, so they’re ready to divide but they’re not going to divide yet,” says Lampson. “Once a woman is sexually mature, once a month, one at a time, they mature and go through division,” whether or not they go on to become fertilized embryos. Through all that time, which can be up to 40 or 50 years long in humans, the cohesin proteins in the oocytes have to remain ready and on call, unlike in other cell division processes where they might be needed only for several hours.

That makes the depletion and deterioration of cohesin proteins over time “a good guess for what it could be when people talk about the biological clock,” Lampson surmises. It also explains why age-related aneuploidy is seen more in women than men, since males continue to create new sperm cells throughout their lives. “We’ve demonstrated that problems of cohesion actually are the problem underlying this age-dependent aneuploidy,” notes Lampson. The conclusions are supported and complemented by several recently published papers by other researchers, which confirm greatly reduced levels of cohesin proteins in older mice. The previous discovery by Schultz of age-related aneuploidy in mice has provided researchers with an enormously important experimental model.

The next questions are what causes this loss of cohesin proteins and whether there could be some way to reestablish cohesion or slow down its loss. While Lampson emphasizes that the answers, and ultimately a way to stop or even turn back the biological clock, aren’t likely to be found anytime soon, he refuses to be discouraged and quotes Schultz: “You have to understand it before you can solve it.”

—Mark Wolverton

MACHINE LANGUAGE



How does one go about teaching a machine a human language? This was the question DARPA (Defense Advanced Research Projects Agency) had in mind when it issued a call for the creation of an organization to support human language technology research and development—a call answered with the establishment of the Linguistic Data Consortium (LDC) at Penn. “Think of it as a semester abroad for computers,” jokes Mark Liberman, the Trustee Professor of Phonetics and Professor of Computer and Information Science who founded the Consortium in 1992. “Learning a language takes a lot of experience.”

In order to gain this “experience,” a computer requires vast amounts of human language data, as well as directions for interpretation. These collections are often too time-consuming and expensive for individual research groups to create, and in providing shared resources to speech and language researchers around the world, the Consortium helps facilitate intellectual exchange. The LDC also acts as an intermediary for intellectual property rights. Its contracts with over 70 data providers allow researchers at more than a thousand institutions to use billions of words of text, and tens of thousands of hours of speech, without violating the copyrights of publishers and broadcasters.

LDC team members are skilled in some combination of linguistics, computer science and project management. Though many of the methods the Consortium uses to gather speech and language data are automated, the majority of data sets depend on human analysis. One of the key research areas the LDC supports is speech recognition (speech-to-text). Speech is collected from a variety of different sources, including satellite dishes and cable feeds. It is also captured from human subjects recruited to participate in telephone conversations and face-to-face interviews. Afterwards, the recordings are transcribed and stored, along with information about the source and the recording process.

In order to learn to “understand” speech or text, machines—just like humans—need information about meaning. To provide these data, LDC annotators are often asked to tag texts for “entities,” such as people or places. Researchers then use these tagged texts to develop and test programs that can extract the same sort of information automatically from new material.

To develop and test methods for speaker identification, researchers need examples of speakers recorded in multiple places, talking about multiple topics, using multiple recording devices. Otherwise, instead of learning to recognize differences among speakers, machine algorithms would learn to recognize differences among microphones, differences between rooms, or even differences between casual conversations and formal interviews.

Technology derived from this research could eventually lend authorities the ability to match threatening phone calls to suspects in custody, or enable a telephone banking service to identify a customer by voice alone.

Some Consortium projects work toward a very different goal, explains Christopher Cieri, LDC Executive Director since 1998. For example, annotator Alyaa Abboud has spent the last two years updating a 1960s-era Iraqi-Arabic dictionary, a U.S. Department of Education–sponsored collaboration between the Consortium and Georgetown University Press. Her work will lead to a new, standardized edition for use in academia and other venues. In all, the Consortium has published data containing material in 75 languages.

In addition to his professorial duties and work at the LDC, Consortium founder Mark Liberman is also Faculty Director of College Houses and Academic Services and founder of Language Log, a blog that presents linguistic research in a popular form and dissects linguistic idiosyncrasies in popular media and literature. “The LDC has played an important role in the last 20 years of progress,” Liberman says. “We continue to be in the middle of exciting new developments. I look forward to an increased impact on speech and language science, and to applications in new areas.”

—BC

RESEARCH BEARS FRUIT

FRUIT FLY RESEARCH REVEALS GENETIC RISK FACTOR FOR ALS

Can fruit flies and yeast help save human lives? A recent breakthrough by biologists Nancy Bonini and Aaron Gitler, with collaborators at Penn Medicine, indicates the answer may be yes. Their use of basic research tools has led to the discovery of a genetic risk factor for amyotrophic lateral sclerosis, the fatal neurodegenerative disease known more commonly as ALS or Lou Gehrig's disease.

Bonini, the Lucille B. Williams Professor of Biology, has spent her career working with fruit flies to study human neurodegeneration. Her research with Gitler of the Medical School on the



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human gene ataxin 2, including studies of a similar yeast gene and its relation to an abnormal brain protein present in ALS sufferers, has uncovered a genetic mutation associated with an increased risk for ALS. "Having the mutation in ataxin 2 does not necessarily cause ALS, but it does increase the risk for it," Gitler says.

Their study appeared in the journal *Nature* in August, and the ALS Association has called it "very exciting." According to the association, those diagnosed with ALS have an average life expectancy of only two to five years. Current treatments can slow the disease, but so far there is no cure. Bonini, Gitler and their colleagues hope their findings lead scientists to a treatment that could stop this killer. "We're getting at the molecular pathways involved in these diseases," Bonini says, "and we are hopeful that we'll be able to identify targets for therapy"

—Tracey Quinlan Dougherty

DON'T BLINK; YOU MAY MISS AN EPIPHANY



MARK DIETERICH

Dennis DeTurck

Sixty seconds—it's not a lot of time to tackle a subject like "The Knowable Universe." But over the past seven years, more than 50 School of Arts and Sciences faculty have taken on the challenge of making short statements about big topics as part of the School's 60-Second Lecture series.

The format is engaging for the audience—and it also keeps professors on their toes. "The panic-induced adrenaline rush at the 50-second mark stayed with me for the rest of the day," says Campbell Grey, Assistant Professor of Classical Studies, who delivered a talk this past fall on parallels between the United States and ancient Rome.

Dean of the College and Robert A. Fox Leadership Professor of Mathematics Dennis DeTurck serves as the program's moderator. He notes that the series is a unique way to showcase the faculty's "range of expertise and imagination, from new developments in science to controversial political issues to rarefied ideas in the humanities. They're great on the web, but even more impressive to experience live." DeTurck is himself a former presenter and his own talk, "Down With Fractions," continues to attract notice for its somewhat provocative stance on the early math curriculum.

All 55 lectures that have been compiled since the program's inception are posted on Facebook and YouTube, and they can also be accessed directly from the School of Arts and Sciences website. To browse the archive, visit www.sas.upenn.edu/60secondlectures. Look for new lectures starting in April 2011. —BC

TEXT GENERATOR

For many, cell phones offer a mobile office, instant communication with friends and family, or perhaps just a diversionary game. But during an internship in India last summer, economics major and Benjamin Franklin Scholar Alexander Ryu, C'11, discovered mobile phones also can help promote the health of rural women and children.

Supported by the School's Center for the Advanced Study of India (CASI), Ryu spent 10 weeks in the city of Bangalore and its surrounding villages working with Karuna Trust, a nongovernmental organization focusing on healthcare, education and other areas of economic development. After reviewing the monthly reports of an affiliated health clinic, Ryu wondered how it could increase the number of patients it reached for prenatal care and infant vaccinations. "This type of basic, preventative care has a huge potential to raise life expectancy and prevent dangerous issues," Ryu says. He knew the auxiliary nurse-midwives who handled these cases each had thousands of patients both at the clinic and scattered in far-flung villages. Many patients had little or no transportation to the clinic, and there was no system for ensuring a particular patient would be available for care on the day the midwife visited her village.

But Ryu, who is a premed student with hopes of entering an M.D./M.B.A. or master's of public health program, had an idea. "One thing I noticed in all my visits to the very rural areas is every family had a cell phone," he says. "It's surprising. The phones and the service are very cheap, and it's their central means of communication." He wondered if the clinic could text-message women



KENN GOODALL

about their check-up or vaccination. He shared the idea with Karuna's founder, who encouraged him to pilot the procedure. Ryu gathered telephone numbers, built a database, crafted a message in phonetic English that could be easily read by diverse groups and sent the messages. Gratifyingly, women began appearing more regularly for check-ups and vaccinations.

The clinic still uses Ryu's system, although having a health practitioner text-message patients individually is a bit unwieldy. So Ryu, in partnership with his sister Annemarie—a Harvard undergraduate who shares his interest in global health—is conducting further study to automate the messages, incorporate characters from the local language and seek funding and guidance in order to enlarge the scope. He hopes to travel to India during winter break to continue the project.

—Tracey Quinlan Dougherty

YOU'RE ONLY A VOTER ON ELECTION DAY

DEMOCRACY BEYOND THE VOTE

BY JEFFREY GREEN

On November 2, millions of Americans voted in mid-term elections in which all House seats, 37 Senate positions and 37 governorships were determined. Numerous states, in addition to local elections, had important referenda on the ballot. Although few would dub it “the most important election of our lifetime,” there was much at stake—the balance of power between the two major parties, a test of the strength of the Tea Party and the launch of the presidential campaigns for 2012 hopefuls.

At such a time, political life comes to be dominated by the Vote, an institution that has come to symbolize democracy itself. Candidates seek the Vote as their ultimate prize. Political journalists cover the competition for the Vote as the central event of our political system. Pollsters and pundits interpret the meaning of the Vote’s results. And various pro-democratic public-interest initiatives strive to “get out the Vote” and find in voter turnout an index of democratic health.

Voting is a precious liberty, hard won in many cases, and still unrealized in too many parts of the globe. Yet our celebration of the Vote threatens to becloud a sober understanding of the position and place of ordinary citizens, insofar as it blinds us to three important distinctions.

First, excitement about elections blurs the difference between exceptional and ordinary political time. Election day is exceedingly rare. Every election (in a biannual system) is separated by 689 days without voting. Although it is normal to call ordinary citizens “voters” or “the electorate,” in fact ordinary civic



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experience—the experience of most citizens most of the time—is bereft of formal decision-making and is characterized by a passive attention to the select few who, as officeholders, do decide law and policy on a regular basis. A too-intense fixation on voting threatens to lead us to conflate what is normal and what is out of the ordinary, with the perverse result that we look past the raw reality of the vast time between elections.

Second, an overemphasis on elections warps a correct understanding of the Vote itself, leading us to confuse the election of politicians (which does occur) with the selection of policies (which does not happen, outside of a few referenda). Candidates present themselves as members of parties, and parties present themselves as committed to a coherent ideological platform. This creates the impression that the Vote is not about who holds power but about how that power should be applied: whether, in the current lingo, the country should go conservative or liberal, Republican or Democrat, strengthening traditions or charting a new, progressive course. Without denying that there is some correlation between leadership and policy selection, it is a mistake to think that an occasional, usually binary, choice about which leaders to elect can be cleanly translated into the far more detailed and expressive language of legislation. Belief in the existence of a liberal–conservative ideological continuum helps preserve the faith that a vote for a liberal or conservative candidate is not primarily the selection of a person. But we should be suspicious of this continuum because its definition remains contested, because so many of the most important issues faced by political leaders

—how to respond to financial crises, terrorist attacks, foreign relations—do not admit of clear ideological solutions, and because faith in the continuum so obviously flatters and exaggerates the power of ordinary citizens.

Third, by blurring the difference between ordinary and exceptional political time and between the choice of leaders and the choice of policies, an excessive excitement with the Vote blinds us to the difference between everyday citizens (whose only political act is voting) and political officeholders (who possess great and direct power to make decisions shaping the fate of our polity). In truth, elections are as much about legitimizing power differentials as they are about determining how power gets to be used. But if we see ourselves as legislators making substantive decisions about laws and policies, if we forget that election day occurs less often than Christmas, we lose sight of the fact that elected representatives possess decision-making authority, fame and quite often wealth vastly disproportionate to those of ordinary citizens.

In a society where not all can vote, such observations would be unhelpful if not irresponsible. But in a society where there is universal suffrage (and America since the 1965 Voting Rights Act is arguably such a society), a new responsibility arises: not merely to extend voting rights to all but to attend to the fact that voting equality does not fully realize the political equality on which democracy rests. On the one hand, accepting the limitations of the Vote is a pessimistic reflection on the relative powerlessness of ordinary citizens. On the other hand, insofar as the acknowledgment of the limits of the Vote is simultaneously an acknowledgment

that the march of democratization is not yet complete, consciousness of such unpleasant realities unleashes a spirit of progressivism.

This progressivism can stimulate the push for democratization *beyond voting*. In my recent book, I argue for democratizing the media *images* we observe—forcing political leaders to appear in public under conditions they do not control, which would make their appearances more spontaneous and genuine rather than prepackaged and fake. The recognition that voting equality is not synonymous with political equality also raises the prominence of economic indicators of democratization: the amount of welfare provided to the least advantaged citizens, the reliance on inequality metrics as barometers of democratic health and perhaps also a renewed insistence (obvious to ancient popular governments like Athens and Rome) that the super-rich have special economic responsibilities by virtue of living in a democratic society. Finally, an acceptance that democracy is not fulfilled by universal suffrage underlines the importance of a long-standing republican ideal: “eternal vigilance is the price of liberty.”

OUR CELEBRATION OF THE VOTE THREATENS TO BECLOUD A SOBER UNDERSTANDING OF THE POSITION AND PLACE OF ORDINARY CITIZENS.

Such vigilance need not be limited to governmental transparency and the removal of leaders from office but might include a more literal notion of accountability: compelling leaders to provide an account of their conduct through mandatory public testimony, both while in office (as is done in the

British practice of Question Time) and upon leaving office (as the Athenians institutionalized with a mandatory public audit, or *euthuna*, for magistrates at the conclusion of their public service).

These are but three examples of an extra-electoral conception of democratization—regulating how the powerful appear, how much they pay and how rigorously they are held accountable. All three indicate a notion of democratization that does not pretend to cancel the division between the few and the many but only to mitigate, reshape and moderate the power of elitism in a democratic society. Such programs of reform are inspired less by citizens reflecting on themselves as political equals than by citizens acknowledging the persistence of inequality in a not-fully-democratic society as a problem in need of redress. In other words, recognizing the fact that universal suffrage does not fulfill democracy not only stimulates the push for extra-electoral democratization but points toward what is likely the permanent incompleteness of the democratic project.

The limits of the Vote remind us of the relative powerlessness of ordinary citizens. My claim is that just as it is a civic duty to vote, it is a civic duty to acknowledge and be conscious of this relative powerlessness.

Jeffrey Green is an assistant professor of political science. He is the author of: *The Eyes of the People: Democracy in an Age of Spectatorship*.

WHAT WILL YOU DO?

MANAGING ENVIRONMENTAL RISKS IN AN UNCERTAIN WORLD

BY PETER NICHOLS

PHOTO BY GREGORY BENSON

The class was seated around a seminar table talking through the merits of two competing priorities—both important, both highly fraught and neither an obvious pick, based on available science. Nevertheless, a decision had to be made about how to manage trade-offs between clear benefits and possible costs associated with new consumer products that use nanotechnology.

“America has a lot of momentum in this industry,” one student argued, “but if we presume the products are harmful and require companies to first *prove* they’re safe, it’ll stifle innovation.”

With equal fervor, another student countered, “The health effects of breathing nanoparticles are unknown. We *have* to be careful about exposing children to clothing and pesticides that use them. We should put a ban in place, or at least slow down until we know more.”

“Although we want to be able to say that a product is completely safe in most cases,” observed instructor Edward Chu, “there are *huge* uncertainties about safety. As a risk manager, you’ll have to balance potential effects with uncertainty to make the call. What will you do?”

Each Tuesday last summer, Chu drove from his White House job in the nation’s capital to teach an evening course called Managing Environmental Risks in an Uncertain World. Chu is the Deputy Associate Director for Green Jobs, Community Protection, and

Climate Solutions at the White House Council on Environmental Quality. Before stepping into that post, he was at the Environmental Protection Agency for 15 years, where he dealt with issues related to chemicals, air toxins, green economic development, children’s health, waste and land management, Superfund cleanups, climate change and other problem areas that need seasoned managers who know how to balance the scales of risk and opportunity.

The course is part of the Master of Environmental Studies program. “Ed has real-world public-policy experience that prepares students to go out and start working right away,” notes Yvette Bordeaux, G’92, Gr’00, who directs this professional master’s program.

“IN ORDER TO FEEL LIKE YOU’VE MADE THE RIGHT CALL, YOU HAVE TO UNDERSTAND THE COMPLEXITIES, THE UNCERTAINTIES AND ALL THE FACTORS THAT IMPACT PEOPLE.”

The class was a mix of traditional students and older, part-time learners already in the workforce. They came from the chemical and plastics industries, urban design, marketing, environmental planning, solar-energy start-ups and other fields. On the day of the nanotechnology debate, two students were absent: one flying between oil platforms in the Gulf of Mexico monitoring the release of greenhouse gases, another handling the hazards of a fuel-oil spill in the basement of a local hospital.

Over the summer, Chu walked the group through case studies of risk-management decisions—some that he had worked on himself—breaking down the muddle of politics, regulations, information, special interests, perceptions and biases to look at how policymakers weigh uncertainties and likely outcomes to devise risk-reduction and risk-balancing strategies. “The science alone isn’t going to help you decide,” he kept telling the class. “In order to feel like you’ve made the right call, you have to understand the complexities, the uncertainties and all the factors that impact people.”

The dozen students were each required to study some product or event and its associated hazards. Then, using available scientific data and other information, they had to present a risk assessment, which characterized



White House environmental official and part-time Penn instructor Edward Chu (second from left) teaches students to think green and always assess ecological impact.

the dangers. Students looked at pollution from steel-mill coke ovens, the presence of lead in a poor neighborhood, ethinyl estradiol (a hormone in birth control pills), diuron (the compound in a common weed killer), radiation in Belarus from the Chernobyl disaster and other health risks to humans and the environment. For the second half of the course, they put together a risk-management response—policies and actions that would protect public health from the risks they had detailed in their assessment.

The action plans took into account how risk perception and risk tolerance play into decision-making and how more or less precautionary approaches might play out. “There were more pros and cons involved than I would have thought about,” says hospital-billing-department supervisor Carlotta Johnston-Pugh. Jamison Maley, a high school teacher interested in environmental justice, summarizes Chu’s course as “compelling, eye-opening and at times unsettling.”

As disputes flared over high-stakes issues, Chu kept pulling the class back to the risk-manager’s mantra: “There *are* good policy choices, but you have to consider the trade-offs and the uncertainties.”

“With that kind of passion,” he adds, “they’ll make good public servants because they really believe in protecting the public.” ♦



Sharon Thompson-Schill uses mock MRI machines like this one to acclimate patients to the claustrophobic conditions sometimes associated with the scans.



THINKING ABOUT THINKING

SHARON THOMPSON-SCHILL'S BRAIN WORK ON THE WORKING BRAIN

BY MARK WOLVERTON

PHOTOGRAPHY BY SHIRA YUDKOFF

Is thinking of a strawberry, picturing one in your mind, imagining eating it, the same as actually seeing it and popping it into your mouth? How do we know what to do and what not to do in various situations? Why are children so hard to control yet easier to teach than adults?

These might seem like trivial questions, but the answers go directly to the core of how we think, feel and behave—and how our brains have evolved to make sense of the world. They're the kinds of questions that neuroscientist Sharon Thompson-Schill, the Class of 1965 Term Professor of Psychology and new Director of the Center for Cognitive Neuroscience, is trying to answer.

"The kind of questions I ask are about how people think, remember, organize their knowledge of the world and how they use that knowledge," she says. "If I ask you to tell me whether a strawberry is closer in color to a raspberry or to a tomato, what are you doing right now? That's one of the questions we're interested

in, and in particular whether you're doing something similar to actually seeing those fruits. Obviously there's a difference—but no one would say the experiences are identical—but we're interested in some of the similarities of what's going on." She's particularly interested in how such processes arise from and manifest in the brain and how cognitive and perceptual activities might differ from or resemble one another among individuals.

To find out, Thompson-Schill employs a broad range of experimental techniques, from simple ones like flash cards to some of the most sophisticated medical tools available, such as functional magnetic resonance imaging (MRI). Functional MRI can show in real time

THINKING ABOUT THINKING

the blood flow variations to different parts of the brain associated with increased or decreased activity in those areas, making it a powerful tool for researchers.

“We look at how different parts of the brain change in response to different things we have people do, but we’re doing that, in part, to find out how they’re doing

“THE KIND OF QUESTIONS I ASK ARE ABOUT HOW PEOPLE THINK, REMEMBER, ORGANIZE THEIR KNOWLEDGE OF THE WORLD AND HOW THEY USE THAT KNOWLEDGE.”

the things they’re doing at a psychological level,” she says. “There could be two things that seem—when you observe the behavior—the same. And then you put someone in the scanner, and you actually see that there are different kinds of brain responses. Or conversely,

you could observe people doing things that look very different, and then you look at their brain scans and discover there’s actually something in common between these two things.”

Another valuable source of information is a large database of stroke patients who have damage in fairly circumscribed areas of the brain that might have caused subtle impairments in the cognitive functions Thompson-Schill studies. Comparing the responses of those patients to individuals without damage in the same brain areas can provide important insights.

The newest and most advanced experimental technique is called transcranial magnetic stimulation (TMS). “We can take somebody who has a normal, healthy brain and, using a brief magnetic pulse, we can disrupt the ongoing electrical activity of the neurons that are right underneath where we place this magnetic coil,” she explains. “TMS is a noninvasive way of getting at the causal link in how a certain change to the brain gives rise to some mental phenomena.”

Much of Thompson-Schill’s work focuses on the role of the frontal lobes, the evolutionarily newest and



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FUNDAMENTALS OF INVESTMENT: HOW TO BUILD A GREAT FUTURE

Every fall, I have the privilege of being a part of one of the most inspiring events of the academic year—a celebration that brings together scholarship donors with the undergraduates who are able to come to Penn because of these scholarships. There's a wonderful feeling I get when I see fellow alumni meet the kids whose lives they've helped change by making Penn affordable to them. And at the same time, I see the thrill that the students experience in meeting the people whose generosity is having such a tremendous impact on their lives.

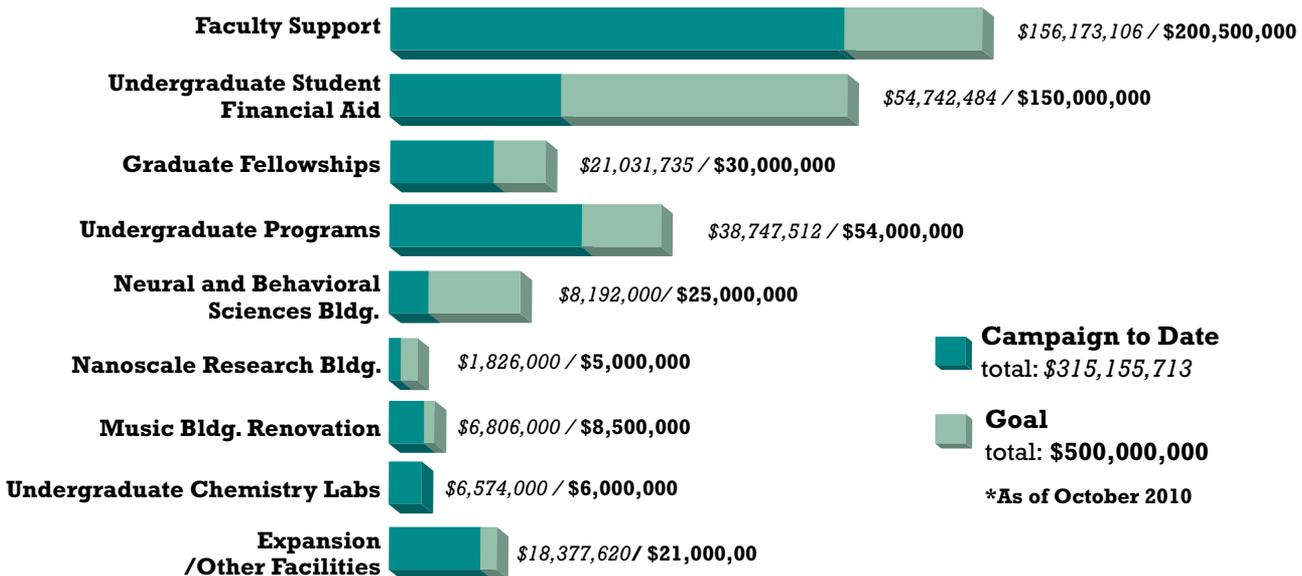
I support financial aid because it's the most fundamental investment I can make in the future—not only the future of individual students, but also our society. I believe that giving talented young people access to a great education is the necessary first step to develop the next generation of leaders in a complex world.

The need for undergraduate scholarship support at Penn is compelling, especially in the Arts and Sciences. The College offers students the broad range of programs, a first-class faculty, and the drive to pursue and integrate knowledge that motivates kids to make a difference in the world. Nearly two-thirds of Penn's undergraduates are students in the College, and over 40 percent of them would not have the resources to attend Penn without financial aid.

We have made tremendous progress in raising money for scholarships, but there is much more we need to do. If you need a reason to believe, just look around campus at the incredible students—as I often do. They are the best reminders of what this is all about.

George Weiss, W'65
Chair, Making History Campaign

Campaign Progress to Date *





DALGLISH CHEW, C'10, W'10

“My decision to make a gift to the College was an easy one. I am deeply grateful to my faculty mentors in the English department for the unwavering support and unfailing friendship I received during my undergraduate years, and which I continue to receive as an alumnus. Having begun my own graduate studies in English during a time when funding for the humanities is becoming increasingly scarce, it is my sincere hope that this gift will go some way toward supporting the humanistic endeavors of my graduate student colleagues at Penn.”

AN ENDURING COMMITMENT

It’s no exaggeration to say that Sarah W. Fuller, CW’71, PAR’04, PAR’07, knows a few things about Penn. As an undergraduate history major, as the parent of two Penn alumni, and as a longtime volunteer who has served on boards at Penn since 2003, Fuller may feel at times that her world is red and blue. The President of Decision Resources Inc., a leading research and advisory firm focusing on health care, Fuller is currently a University Trustee and a member of the School of Arts and Sciences Board of Overseers. She also sits on the advisory boards of the Huntsman Program in International Studies and Business and the Vagelos Life Sciences and Management Program (LSM), as well as other key alumni boards. We sat down with Fuller recently to talk about her path to becoming a University Trustee, and the impact that her experiences at Penn have had on her.

Q: You are a presence at the University on many levels. How did you come to be so involved here?

Fuller: There’s really no road map as to how that evolves. I feel I’m still a neophyte with the Trustees —I’m still feeling my way. My involvement began with the Huntsman program, and then I became a member of the SAS Overseers and the Vagelos LSM board. They’re all interesting in different ways. My involvement with Vagelos developed naturally from my work in the life sciences. It’s an extraordinary program. I see the kids coming out of it and I grab them. I’ve hired a number of students out of Vagelos both for summer internships and full-time positions.

Q: In addition to your volunteer service, you’ve also given generously to core SAS priorities. What are some of the things you look at in deciding how to direct your support?

Fuller: I always ask Rebecca [SAS Dean Rebecca Bushnell] where it’s needed. As a manager myself, I know that if you have discretionary funds it makes your life a whole lot easier—and I think that the people running the School probably have a better



Sarah W. Fuller, CW’71, PAR’o4, PAR’o7

idea than I do of where the money will have the most impact. Rebecca is exceptional, as was [former SAS Dean] Sam Preston.

Q: What most inspires you about Penn today?

Fuller: Penn has done some extraordinary things. It’s on fire, partly because it has been able to play so many multidisciplinary cards through its different schools. The whole focus on the integration of knowledge—which has always been at the core of Penn—has been met with an extraordinary level of success.

Q: Your own background seems to demonstrate the benefits of integrating knowledge. How did your liberal arts background contribute to your career?

Fuller: My initial focus at Penn was math, but I switched to major in history, and of course my career now is focused in the life sciences. And I think that this is the point of a liberal arts education—it gives you tremendous breadth. Whether you study history or literature, you gain a context for human behavior that more technical fields may not offer. And ultimately, of course, life is about people.

A CULTURE OF SERVICE THAT BEGINS AT HOME

When Art, W'75 and Dahlia Bilger, parents, met with SAS Dean Rebecca Bushnell a few years ago, Art Bilger asked, "What is the hardest money for you to raise?" A venture capital investor, Bilger understands the challenge of raising funds for unproven enterprises. Dean Bushnell told them about the much-needed undergraduate chemistry lab renovation, which the Bilgers immediately agreed to support.

Bilger has been involved at Penn since he graduated, endowing a Wharton School scholarship fund, serving on its Board of Overseers, and helping to formulate and fund the launch of the Wharton Interactive Media Initiative. Dahlia, with four nieces and nephews who attended Penn, was also no stranger to the campus. Much to their surprise, all their children (Alex, C'09, Sabine, C'12 and Eve, C'14) chose Penn. After that, it seemed only natural that their generosity extended to the School of Arts and Sciences.

Most recently, the Bilgers established a new scholarship fund in the College of Arts and Sciences, with the goal of making it possible for their scholarship recipients to participate in "the broader range of activities in the school community," without being unduly burdened by a work requirement. Additionally, they have endowed internships to support undergraduates conducting research in the humanities.

For the Bilgers, philanthropy is a family endeavor. When Art and Dahlia become interested in programs that have the potential to improve lives, their children are often part of the discussion. And engagement means more than a one-time gift. After supporting an initiative to create clean drinking wells in Africa and elsewhere in the world, Art and Sabine toured villages in Ethiopia with the organization's founder to see the results and explore how they could help expand its impact. And on campus, both Sabine and Eve have attended presentations at the School of Medicine, where the Bilgers have been funding Alzheimer's research for several years.

Art notes that, in both his business and the family's philanthropic priorities, "education has been a big theme." Dahlia, for example, has volunteered to tutor in a neighborhood school, while Art has funded and helped build several online education companies. Reflecting on their shared commitment to service, Dahlia adds, "Art and I have been incredibly blessed with what we've been able to do for our children. It's important for us to be able to do what we can for others."



Art Bilger, W'75 and Dahlia Bilger



NOT YOUR FATHER'S LAB

A recently completed renovation of the Department of Chemistry's undergraduate teaching laboratories is making it possible for Penn to teach chemistry for the 21st century. This project was one of the key facilities priorities for the School of Arts and Sciences' Making History campaign. The newly renovated Lee Laboratory and Vagelos Laboratory provide for clean, safe, and appropriate instruction for hundreds of Penn students every year, including students bound for careers in medicine and research as well as many others who seek to bring a solid foundation in the basic sciences with them into a wide range of careers.



McNeil Center for Early American Studies Fellows for 2010-2011. Thanks to Robert McNeil's generous support, MCEAS is able to offer both predoctoral and postdoctoral fellowships to talented young scholars, serving as an incubator for inquiry into the histories and cultures of North America in the Atlantic world before 1850.

REMEMBERING ROBERT McNEIL, JR.

We note with sadness the passing last May of longtime friend of the School of Arts and Sciences Robert L. McNeil, Jr. Mr. McNeil was the former chairman of McNeil Laboratories, manufacturer of pharmaceutical products and former chairman of the Barra Foundation. In addition to making a naming gift for the School's distinguished Center for Early American Studies, he provided funding that built the Center's permanent home.

"Robert L. McNeil, Jr., was the most generous patron of the scholarly, intellectual and cultural life of the Philadelphia community that I have known. The McNeil Center for Early American Studies is a prime example of his beneficent spirit. Acting entirely on his personal initiative, Bob more than tripled its endowment and also provided it with a splendid new building on the Penn campus. Thanks to Bob, the MCEAS is now a securely established, flourishing institution. It was a great privilege to have worked with this wonderful man."
Richard S. Dunn, Nichols Professor of American History Emeritus and Director of the McNeil Center for Early American Studies, 1978-2000.

IT ALL ADDS UP

A few years ago, Professor Emeritus of English Stuart Curran watched one of his doctoral students work for weeks to secure funding to travel to an archive critical to his research. The amount needed was comparatively small, but the student was married with a new baby and had nothing of his own to spare. "That instance convinced me that a small annual fund would be a godsend to our graduate students," Dr. Curran says.

In January 2009, Dr. Curran created the Curran Graduate Student Travel Fund to provide this support. He was able to make the gift by arranging to have his bank set aside a relatively small sum from his monthly income in a savings account. Those monthly allocations have added up: in the past two years, the Curran Fund has covered

travel expenses for 17 graduate students. Dr. Curran has also made a bequest in his will to endow the fund so it will support generations of students into perpetuity and have a lasting impact on the department.

"I was a professor at Penn for 35 years, and I watched as English became a world-class department," says Dr. Curran, who added that he feels an obligation to his students as well as his colleagues who supported him as he pursued his own career.

"The Curran Fund," he says, "will benefit untold students who pass through Penn and will be, I hope, a continuing legacy of a devoted educator who has had an enormously fulfilling career at the University."

most advanced parts of the brain, in regulating and controlling how we behave, learn and think—a process called cognitive control. One of her newest ideas is, as she jokes, “almost heresy”: the possibility that cognitive control might not always be a good thing.

Cognitive control by the prefrontal cortex is what allows us to respond appropriately to cues in our environment, to focus on tasks and to decide on the best course of action. For example, it’s what keeps you from just reaching across the dinner table and grabbing someone’s food after cleaning your own plate.

“Since people have started thinking about the role of the frontal lobes in regulating behavior,” notes Thompson-Schill, “the overarching assumption has been that, no matter what, it would be better to have more cognitive control than less.” But there are two notable groups who lack cognitive control: patients with damage

to their frontal cortex, and—as every parent knows—kids.

In children, it’s a normal phenomenon because their prefrontal cortex is still undeveloped and immature. “If you observe behaviors or mental processes of young children, they look like patients with frontal lobe damage, or they look like other species that are known for having very small frontal lobes,” says Thompson-Schill. “So you can show errors of certain kinds that are characterized as a failure of cognitive control.” These could include familiar kid behaviors like impulsivity and the tendency to be easily distracted or disregarding the consequences of one’s actions—running into the street after a ball, for instance.

Thompson-Schill points out that this “hypofrontality,” the natural slow development of the frontal cortex and its effect on child behavior, has caused some to ask whether it might be a good idea to

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RESEARCHER LEARNS FROM UNDERGRADS



[undergrads] aren’t.” That constant turnover of fresh intellectual energy and enthusiasm is “super exciting,” she says, noting with a laugh that “by the time they’re graduate students, they’re already a lost cause.”

Thompson-Schill’s dedication to education shows. Among her many roles, she is the Director of Undergraduate Studies in the Psychology Department and the founder and director of the department’s undergraduate honors program. She has been recognized with a number of awards, including the Lindback Award for Distinguished Teaching, the University’s highest teaching honor, and is an inaugural Penn Fellow, a program that was established by the Provost to recognize and provide leadership development to select Penn faculty members. And despite her joke at the expense of graduate students, she has mentored nearly a dozen doctoral candidates in psychology and neuroscience, earning the Women in Cognitive Science’s graduate mentorship award.

—Mark Wolverton

At some research universities, working with undergraduates is just a sideline to the real job of doing original research. But Class of 1965 Term Professor of Psychology Sharon Thompson-Schill passionately resists that notion.

“I absolutely love teaching,” she says. Not only does she love it, she teaches nothing but undergraduate classes. “I just found that working with undergraduates and even teaching them

in a lecture course has been such a source of research inspiration for me.”

Many of her research ideas, she observes, “began with a question in my undergraduate course with a student saying, ‘But couldn’t it be this?’ or, ‘Why does that happen?’” Experienced researchers, she says, “can get so immersed in the dogma of our field—we’re just getting older, and we’re running out of ideas, but they



The SSV *Corwith Cramer* with all its sails set.

OCEANS OF PLASTIC

GRAD STUDENT SCOURS THE SEA FOR PLASTIC DEBRIS

BY SAMANTHA DRAKE

PHOTOGRAPH BY ROMAN SHOR

Roman Shor, C'09, EAS'09, GEng'10, didn't expect to see piles of floating litter when he set off on the Plastics at SEA expedition, the first federally funded venture to study the accumulation of plastics in the North Atlantic Ocean. He already knew that the term commonly used to describe the debris—"garbage patch"—is a misnomer. The plastics he encountered on the voyage were, in fact, tiny: no bigger than a fingernail in most cases. But the garbage was definitely there—an incalculable number of miniscule bits of plastic that had amassed in a swirl of ocean currents near Bermuda.

Shor, a doctoral student in the Department of Earth and Environmental Sciences and a Penn mathematics and computer science alumnus, was one of 33 crew members who took part in a landmark study organized by the Sea Education Association (SEA). All hands served as both field scientists and crew aboard SEA's vessel, the SSV *Corwith Cramer*, which departed last summer from Bermuda on June 10 and returned on July 14. The volunteers were all veterans of previous SEA expeditions—recent college grads as well as mid-career

professionals—selected from a pool of 100 applicants interested in plastic-pollution research.

Plastic—primarily polyethylene, polypropylene and polystyrene—accumulates in specific regions of the oceans carried by currents all over the world, according to SEA. The most notorious of these oceanic plastic debris concentrations is located in the eastern North Pacific Ocean and is dubbed the "Great Pacific Garbage Patch." Shor saw the Pacific patch in his sophomore year while on a 40-day SEA Semester. For Shor, an avid

OCEANS OF PLASTIC



rower who grew up in Telluride, Colo., it was his first time sailing on the ocean, and the experience sparked his interest in oceanography.

“We know more about the surface of the moon than we do about the surface of the ocean,” he says. “Even the most high-tech equipment we have doesn’t show us what’s really there. It’s still a great unknown.”

SEA has been studying the Pacific garbage patch and its lesser-known counterpart in the North Atlantic, southeast of Bermuda, since 1986. The debris patches

WHEN THE WIND DIED AND THE OCEAN WAS CALM DURING HIS EXPEDITION LAST SUMMER, SHOR COULD LOOK DOWN INTO THE WATER AND SEE A MASS OF SPECKLES.

gathered up by the currents are more accurately described as regions, and they have yet to be reliably measured due to changing currents and ocean conditions.

Many questions remain about the presence of plastic in the ocean. Much of the plastic that finds its way there comes from litter and runoff. Shor says he was initially surprised by the small size of the plastic particles. “The interesting thing about plastic is it just gets smaller—it doesn’t disappear,” he explains. “That’s the current theory, at least.” Researchers say it’s impossible to tell what each bit of plastic was or what it came from before the larger object broke down.

When the wind died and the ocean was calm during his expedition last summer, Shor could look down into the water and see a mass of speckles. Larger objects, such as plastic bottles, were relatively few; perhaps three or four bottles a day might be spotted. He and his shipmates sampled the ocean surface every few hours by towing nets through the water. They then sorted what was hauled aboard into biomass and plastic. Plastic particles were also found in the stomachs of fish that the crew cut open.

Members of the expedition divided their time between conducting science and contributing to the work of sailing the 135-foot long brigantine-rigged tall ship. The ship operated on the three-shift Swedish watch system, which allows the crew to operate a ship 24 hours a day. “It was all about teamwork,” Shor notes. And adaptability. On a typical day, he might have been on watch from 11 p.m. to 3 a.m., off until noon, back on duty from 1 p.m. to 7 p.m., then off again at 3 a.m. Alarm clocks weren’t necessary, he says, because “somebody always made sure you were awake.”



A net is towed through the water to collect microscopic organisms and plastic marine debris.

“Being a scientist at 3 a.m. was interesting,” he says, recalling hours of sorting and cataloging plastic particles in the early morning hours as the ship swayed. His favorite job was standing watch on the bow at night, with starlight above and a blue-green bioluminescent glow from marine life in the water below. Still, it was impossible to forget the ugly fact of plastic debris.

The Plastics at SEA crew spent 34 days conducting 128 net tows over 3,817 nautical miles. In all, they collected and counted 48,571 bits of plastic. “The numbers to me were just appalling,” Shor says.

The amount of plastic finding its way into the oceans is declining, Shor observes, because industries are making an effort to reduce the amount of plastic they use and discard. But researchers have no idea how much plastic degrades in the ocean or how long

“THE INTERESTING THING ABOUT PLASTIC IS IT JUST GETS SMALLER—IT DOESN’T DISAPPEAR.”

it remains there. Most commonly used plastics never fully break down, according to SEA. Even worse, it’s impractical, if not impossible, to clean up the vast quantity of tiny plastic fragments mingled with the ocean’s waters. According to SEA’s website (www.sea.edu), a typical net tow operation filters 120,000 gallons of water—and yields about a handful of plastic particles. In the process, the nets also catch loads of microscopic plankton and other organisms, meaning that large-scale attempts to filter out plastic particles could actually harm the ocean ecosystem.

According to Shor, the best way to deal with plastic in the ocean is to prevent it from getting there in the first place by protecting the watersheds surrounding rivers that flow into the ocean. Everyone should also make an effort to reduce the use of plastic, he says, and reuse or recycle what they do use. But he isn’t one to get up on a soapbox. “I try to raise awareness by setting an example,” he says. And that example includes experiences like his summer with SEA. “It was a way for me to give back because the Atlantic patch is not well known,” Shor remarks. “It was also a good way to go sailing,” he adds with a smile. ♦

Samantha Drake, CGS’06, is a writer and editor living in Lansdowne, Pa.



PLASTIC POLLUTION

A research vessel from the Sea Education Association (SEA) has sailed from the Woods Hole Oceanographic Institution in Massachusetts to the Caribbean every fall for more than 20 years. On each trip, students conduct net tows to study marine biodiversity and also hand pick, count and measure all the bits of floating plastic collected. The undertaking has given us a high-resolution image of the progression of plastic garbage in the oceans.

The data produced by 64,000 bits of plastic—most smaller than a half-inch across—from more than 6,000 net tows was analyzed in a recent study published in the journal *Science*. The paper showed that there has been no significant increase over the period, which is surprising since plastic production has increased three-fold over the last two decades. The data also showed that, following the publication of an EPA study of industrial plastic pellets in the oceans and subsequent industry actions, the number of pellets has decreased appreciably.

The predicted center of the plastic debris field, somewhere in a vortex of ocean currents in the Sargasso Sea, was not in the existing dataset, so SEA organized a research expedition last summer, which I was part of, to carry out net tows there. We never found the eastern edge of the debris field. In fact, the area of greatest density of plastic occurred on the eastern-most point of our cruise track and resulted in concentrations of well over 20 pounds of plastic per square kilometer of ocean, compared to the usual two to four pounds per square kilometer.

The only conclusion that can be reached without more study is that there is indeed a lot of plastic in the ocean, that it is not spread evenly, and most importantly, that it cannot be economically cleaned up. It has been shown that this problem can be solved at the source, so it is our responsibility to use less, recycle more and properly dispose of everything else.

—Roman Shor



The eyelashes of the 3,800-year-old
"Beauty of Xiaohe" are still intact.

TRACKING THE TARIM MUMMIES

IN THE ANCIENT REMAINS OF A MYSTERY PEOPLE,
SINOLOGIST VICTOR MAIR FINDS PROOF OF
BRONZE AGE CONTACT BETWEEN EAST AND WEST.

BY PRIYA RATNESHWAR

PHOTOGRAPH BY WANG DA-GANG

As an English major at Dartmouth College, Victor Mair could not have imagined that 30-odd years into the future, his academic career would have him scouring the sands of a hostile desert in northwest China for ancient DNA samples. This journey began when the Professor of East Asian Languages and Civilizations served as a Peace Corps volunteer in Nepal during the mid-1960s. His experience inspired an abiding fascination with Buddhism and Sinology.

Interested in tracking the spread of Buddhism from India to China, Mair began exploring the historical use of language in early Chinese vernacular literature. His research established the importance of Buddhism in shaping not only Chinese culture, but also the country's spoken and written language. As his work progressed, Mair began to notice patterns that suggested that religion was not the only foreign influence on the development of Chinese civilization.

An expert in several languages—Sanskrit, Tibetan, Chinese and Japanese to name just a few—Mair encountered words in early Chinese texts that seemed borrowed from Indo-European languages even older and from farther west than Sanskrit. He also read Han

Dynasty-era history books that told stories of hairy, monkey-like people with big noses and green eyes living in the western provinces. Rather than dismiss them as myth as many scholars did, he suspected they were descriptions of ancient inhabitants of these regions.

From findings like these grew an idea close to Mair's heart: that migration and cultural exchange have shaped humanity since its dawn. But lacking hard archaeological evidence to support his theory, Mair found it difficult to convince colleagues of its validity. This skepticism was fueled by the dogma, espoused after the 1960s, that societies invented themselves and that similarities between geographically disparate cultures were coincidental. In 1988, however, a chance encounter

TRACKING THE TARIM MUMMIES

would not only launch Mair's scholarship on a whole new trajectory, but also revolutionize our understanding of how civilization developed in Eurasia.

Mair was leading a tour of Americans through a museum in Ürümqi, the capital city of China's northwest autonomous region of Xinjiang, when he noticed a new exhibition. On display were some mummies that had been unearthed by Chinese archaeologists from the Tarim Basin, the desert wilderness that comprises most

THE RESEARCH ON THE TARIM MUMMIES PAINTS A PICTURE OF CULTURAL EXCHANGE MILLENNIA BEFORE GOODS WERE TRADED BETWEEN EAST AND WEST ALONG THE SILK ROAD.

of Xinjiang. Behind black curtains in a dark room lay the bodies of Chärchän Man—named for the county in which he was excavated—one of his wives and an infant, along with textiles, tools and pottery found near the mummies' graves.

Though desiccated, the corpses were intact, retaining defined facial features and even their hair color. The burgundy and blue of the infant's wool shroud and cashmere cap were as vivid as if they had just been knitted. Most striking, Mair recalls, was the female mummy's robe. Tightly woven and radiant with the sheen of luxury yarn, it wouldn't have seemed out of place on the racks of a fine boutique.

To Mair's disbelief, the remains were estimated to be around 3,000 to 4,000 years old. "The whole thing felt like I was in Madame Tussaud's wax museum," he says. "At first I thought it was a hoax."

Subsequent studies would reveal that the Tarim Basin's parched climate, frigid temperatures and saline soil were primarily responsible for this astonishing preservation. The greater mystery lay in the bodies themselves. With his deep-set eyes, long nose and ginger hair, Chärchän Man reminded Mair of none other than his brother David. (In fact, the mummy is now known internationally by Mair's affectionate nickname, Ur-David, meaning "original" or "earliest" David.) Considering Mair's own towering frame and Austrian heritage, the resemblance came as a surprise.

Over the last few decades, more than 200 ancient mummies have been excavated from the Tarim Basin,

and like Chärchän Man, most bear features similar to peoples found to the north in Siberia and to the west in Persia and Europe. Although the Silk Road brought merchants from a variety of cultures through Xinjiang as they traveled between East and West, scholars date the beginnings of the famed trade route to around the second century B.C. The oldest of the Tarim mummies predate the Silk Road by 1,600 years.

Mair also puzzled over some of the objects found with the mummies. They belied advanced weaving and metallurgy techniques as well as an agropastoral lifestyle that he did not think existed in China at that time. In these anomalies, he realized with mounting excitement, could be the flesh-and-bones proof for his hunch that East and West made contact as far back as the Bronze Age.

Mair realized his extensive study of language would not be enough to understand what these long-silent witnesses of prehistory had to say about the movements of peoples, ideas and technologies. To that end, he has spent the last two decades spearheading interdisciplinary research collaborations with linguists, archaeologists, historians, molecular biologists and other scholars from around the world.

"To study the mummies," Mair insists, "you can't just study genetics or physical anthropology or textiles. One field cannot do it by itself."

Although the Tarim mummies were virtually unknown when Mair first stumbled upon them, thanks in large part to his efforts, they are now considered among the greatest recent archaeological finds in the world. But he has not always found a willing partner in the Chinese government, which was not eager to embrace the idea of outside cultural influences on the origins of Chinese culture.

Moreover, in Xinjiang authorities face separatist activity from nationalist Uighurs, a Turkish-speaking Muslim people who live in the area. Some Uighurs argue that they are descendants of the people found in the Tarim Basin to support their own historical claims to the region. Although most scholars agree that the Uighurs did not migrate to Xinjiang until the ninth century A.D., the Tarim remains tell a story of cultural diffusion that counters the official Chinese narrative.

Owing to these political sensitivities, Mair describes some of his expeditions to the Tarim Basin as akin to "guerilla warfare." During the aforementioned 1993 trip to collect ancient DNA samples, he and Italian geneticist Paolo Francalacci were waylaid when Chinese authorities confiscated the fruits of their labor.

“We collected samples first-hand, laboriously, with surgical masks, rubber gloves, collection vials and everything,” Mair explains. “I got to take out six, and we were only able to do that because some Chinese archaeologists wanted the work to be done and they stuck their necks out.”

In 1995, Mair returned to Xinjiang with textile experts Elizabeth Wayland Barber and Irene Good, Gr’99, an alum of Penn’s doctoral program in anthropology. Again, they ran up against the authorities, and this time they left empty-handed.

Despite difficulties like these, the collective body of research on the Tarim mummies has continued to grow. The limited DNA Francalacci was able to test showed that some of the mummies have European genetic markers. And even though they lost their samples, Barber and Good relied on their detailed notes to make connections between some of textiles found at the Tarim sites and those of the same age woven by ancestors of the Celts in Central Europe. In addition, Hang Kangxin, a physical anthropologist with whom Mair has worked extensively,

studied the skulls of the mummies and concluded that the earliest inhabitants of the Tarim Basin were not Asian.

Mair teamed up with archaeologist and linguist James Mallory to author *The Tarim Mummies*, published in 2000. This comprehensive book, the writing of which Mair likens to “puzzles and chess games,” synthesizes an enormous body of research from across fields to determine the ethnic and linguistic identity of the mummies. The authors hypothesize that the earliest Bronze Age colonists of the Tarim Basin came from the steppes of central Eurasia (north of the Black Sea and where Kazakhstan, Kyrgyzstan and Tajikistan now are), and spoke a precursor of Tocharian, an ancient Indo-European language related to Celtic, Germanic, Italic and Hellenic languages. A second wave of migrants arrived from what is now Iran.

Mair also translated and summarized reports coming out of another excavation that took place between 2002 and 2005. More than 30 mummies—to date the oldest discovered in the Tarim Basin—along with their coffins and other artifacts were excavated from the

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Philadelphia's Lazaretto is the oldest standing quarantine station in the western hemisphere.

INFECTIOUS HISTORY

A SCHOLAR'S ENTHUSIASM HELPS SAVE PHILADELPHIA'S LAZARETTO QUARANTINE STATION

BY CAROLINE TIGER

PHOTOGRAPHY BY GREGORY BENSON

It's a sweltering summer day, and Associate Professor David Barnes is standing with his back to the main building of the Lazaretto, a 19th-century quarantine station on the Delaware River, 10 miles southwest of Philadelphia. The river is calm. Its banks are wild and green with thick stands of trees. Barnes, an expert in the history of medicine and public health, makes a sweeping gesture with one arm that takes in the entire waterfront. "We're right off of I-95," he says, "on the doorstep of the fifth largest city in the country, a stone's throw from the airport, and here we are in this bucolic landscape. It's almost rural—when planes aren't landing."

Barnes, the Director of the Health and Societies program in the History and Sociology of Science department, is as incredulous today as he was the first time he saw the unlikely site in 2006. Newly arrived at Penn, Barnes heard about the Lazaretto when it was suggested as a field-trip destination. His curiosity piqued, Barnes made a detour to check it out one day when driving down I-95. "I imagined a corrugated-tin warehouse that was rusty and falling apart," he recalls. What he found was a largely intact and largely forgotten red-brick Georgian structure situated on a riverbank near a wildlife refuge. "It was the incongruity that wormed its way into my head," he says, "and wouldn't leave me alone."

"Lazaretto," derived from St. Lazarus, the patron saint of lepers, has been a term for European maritime

quarantine stations since the 14th century. From the time it was built in 1799 in response to a series of devastating yellow fever epidemics until it closed up shop in 1895, Philadelphia's Lazaretto quarantine station served as the entry and inspection point for ships headed up the Delaware. Suspicious cargo was seized, sick passengers and crew were treated in the hospital and ships were disinfected. This "great-grandfather to Ellis Island," as Barnes calls it, is also where many immigrants first stepped onto U.S. soil.

After his first visit to the site, Barnes decided to read everything he could find on the Laz—his nickname for the historic quarantine station. "Everything" turned out to be a single article written in 1984. He now believes the Lazaretto went unexamined for so long because it lacked

INFECTIOUS HISTORY



David Barnes is working on a book on the Lazaretto's history.

the hooks or angles that so often help to capture the attention of historians. No single dramatic or cataclysmic event was associated with the place. No famous or notorious personality—no George Washington, Benjamin Rush or Ben Franklin—was ever linked to it.

ALTHOUGH IT WAS NOT BASED ON A BACTERIOLOGICAL SCIENCE OF MICROBES AND INSECT VECTORS, QUARANTINE IN THE 19TH CENTURY WAS SCIENTIFIC, IN ITS OWN WAY.

For Barnes, the Lazaretto was a gateway into the larger topic of quarantine. “I realized the history of quarantine is actually pretty fascinating,” he says. “I don’t think we in the 21st century really understand how quarantine looked to people in the 19th century.” To

further that understanding, Barnes is working on a book on the Lazaretto’s history. He is also helping with two documentaries currently in production, one by College senior Allison Rhodes and another by the team behind the “Precious Places Community History Project,” an oral-history project by Scribe Video Center in University City. All these productions will attempt to answer the question: Why is this a story worth telling and a place worth preserving?

The short answer is the Lazaretto is the oldest standing quarantine station in the western hemisphere. Ellis Island and Angel Island in San Francisco Bay are still standing, but they are nearly a century younger than the Lazaretto. “The Laz’s early 19th-century contemporaries in New York City, Boston, Baltimore and Savannah have long since disappeared,” Barnes notes. “The quarantine station on Staten Island was burned to the ground by irate neighbors in 1858.”

Barnes’ research has tempered the notion of 19th-century quarantine held by some historians. The practice of quarantine is generally thought to have been

guided by a model of disease causation that conceived illness as being spread by contagion—direct contact between a sick person and a healthy person. Prior to and into the 19th century, the theory of contagion was the subject of lively debate. The medical journals were filled with physicians arguing about the spread of yellow fever, which Barnes believes has misled historians into thinking that quarantine was based on an assumption of the contagiousness of disease. Before he started combing the minutes from meetings of the Philadelphia Board of Health, which ran the Lazaretto, he assumed the prevailing theory of interpersonal contagion would have determined its decisions. Instead, he discovered that the board was often more concerned with ships' cargo than

FROM THE TIME IT WAS BUILT IN 1799 UNTIL IT CLOSED UP SHOP IN 1895, PHILADELPHIA'S LAZARETTO QUARANTINE STATION SERVED AS THE ENTRY AND INSPECTION POINT FOR SHIPS HEADED UP THE DELAWARE.

the health status of passengers and crew.

"Certain kinds of cargo, like sugar and molasses, were always considered okay," he explains. "Coffee was always considered suspect—as were animal hides—and rags were almost always detained and quarantined." This preoccupation with cargo implies a more sophisticated understanding of disease transmission than public health officials of this era are typically credited with because they were basing their decisions on a theory of infection rather than contagion.

"Infection"—from the Latin for "to dye" or "to taint"—had a different meaning back then. "In the 19th century, it meant that physical things and people could absorb some kind of morbid or pathogenic influence from an environment," says Barnes, "and then, potentially, transport that morbid influence to another place or person. Although it was not based on a bacteriological science of microbes and insect vectors, quarantine was scientific, in its own way. It was based on an empirical science of careful observation and



record keeping, and on very detailed investigations of past disease outbreaks."

At the time he discovered the Laz, Barnes had just embarked on two other research projects, but the place soon edged them out and infected him completely. It wasn't the first time the professor had backed into a research topic that would change the course of his career. He first encountered the history of medicine while studying 19th-century French social history as a grad student. An advisor suggested tuberculosis in 19th-century France as a seminar topic. "I wasn't that interested in tuberculosis," he recalls, "but I really trusted her, so I wrote the paper."

That research gave rise to unanswered questions that led to a second seminar paper, a dissertation and Barnes' first book, an exploration of societal responses to tuberculosis in 19th-century France. On the job market, he was striking out as an expert on French social history, but his work on tuberculosis was winning prizes and attracting professional interest. "I always told people, 'Well, I don't really *do* history of medicine. I do French social history, and this disease happens to be my topic,'" he recounts. "I finally realized, 'Duh! Stop saying you don't do history of medicine. If the people who do it think you do it, and they like what you do, then let them



FACT IN FICTION

Careful examination of copious minutes from meetings of the board that ran the Lazaretto quarantine station have provided David Barnes, Associate Professor of the History and Sociology of Science, with a great deal of insight into 19th-century public health policies and practices. But to uncover accounts of personal experiences of quarantine, Barnes has at times had to dig creatively. His discoveries include *Under the Yellow Flag*, a self-published memoir by a Penn Medicine graduate and physician at the Port of Philadelphia—which operated as the quarantine station in the off-season. Other bits and pieces have emerged from personal papers at the Historical Society of Pennsylvania and the Winterthur Museum in Delaware, whose archives hold letters from a Philadelphia merchant who was detained and quarantined at the Lazaretto in 1802. “He was writing to his mother and sister in Philadelphia, saying ‘I can’t wait to get out of here,’” Barnes reports.

To supplement these accounts, Barnes has searched through thousands of novels, poems and plays—a feat that is within reach thanks to the digitization of 19th-century fiction. Keyword searches for “quarantine” and “Lazaretto” have yielded a robust sampling of mostly novels, including some by Herman Melville and James Fenimore Cooper, that mention maritime quarantine.

“It’s abundantly clear from all these sources that everybody hated quarantine,” Barnes says. “It was bad for business. Merchants despised it. Ship captains and crews did too—you know, time is money and this is a delay. Even doctors complained about it because it was inconsistently enforced in different cities and different ports.”

While these findings do much to provide color and context to his reimagining of life at the Laz, they have raised more questions than they’ve answered. “This is the puzzle I have to explain,” observes Barnes. “How did this survive when everybody hated it?”

—Caroline Tiger

offer you a job!” That’s exactly what happened, and Barnes went on to a post-doctoral fellowship at U.C. San Francisco and then to teach for seven years in Harvard’s history of science department.

Just as Barnes was discovering the Lazaretto, its very existence was in limbo. A developer’s plan to raze the historic main building and three surviving outbuildings to build an airport parking facility was thwarted by Tincum Township, which bought the property with the help of a state grant. The terms of the deal allowed the township to use some of the money to build a fire station on the northern half of the property, away from the historic buildings. Those interested in the Lazaretto, including Barnes, protested, arguing the station would violate the site’s historic context. In the end, the township got its fire station, and a nonprofit organization, the Lazaretto Preservation Association of Tincum Township (LPATT), was established to oversee the rest of the site. Barnes serves on the board as the resident scholar.

“David brings a level of credibility to the effort through his research and his professorship,” says Paul Steinke, Treasurer of the Board and General Manager of Reading Terminal Market. “More than that, he brings a level of enthusiasm that’s infectious. It’s hard not to get excited when you hear him expound on the Lazaretto.”

Barnes’ participation in planning for the Lazaretto’s future has taken him down another unexpected path. “It’s gotten me into historic preservation and what we call ‘public history,’ which, when I was in graduate school, was a vaguely pejorative term,” he remarks. “But I see public history very differently now. I feel it’s my responsibility and, to some degree, the responsibility of all historians to communicate the importance of what we do to the general public. I feel like it’s my job to make the place legible and to tell its story to a wider audience.”

He’s taking the job seriously, and his most visible contribution so far is the yellow international quarantine flag that flies over the historic building—a replica of the one that would have been raised there by the Philadelphia Department of Public Health at the start of each quarantine season (June 1 to October 1). Historically, the annual ritual involved a banquet that culminated with brandy and cigars. Last June 5, the LPATT group oversaw a reenactment of the flag raising to kick off their preservation efforts. “The flag,” says Barnes, “was my idea.” ♦

Caroline Tiger, C’96, is a freelance writer living in Philadelphia.

THINKING ABOUT THINKING—continued from page 17

facilitate the early development of cognitive control—of the frontal lobes—in children. As the mother of three herself, Thompson-Schill is sympathetic to that idea, but as a scientist, she found herself considering the issue from another angle.

Underdeveloped frontal lobes notwithstanding, children do tend to excel at some important cognitive

she majored in math. “And that was going fine until, I guess, the beginning of my sophomore year, maybe end of freshman year, when I realized I wanted to do something with math,” she laughs. That’s when she developed an interest in statistics.

A break during college where she worked for a Swiss pharmaceutical company proved pivotal. She was assigned to analyze data from a drug trial that looked

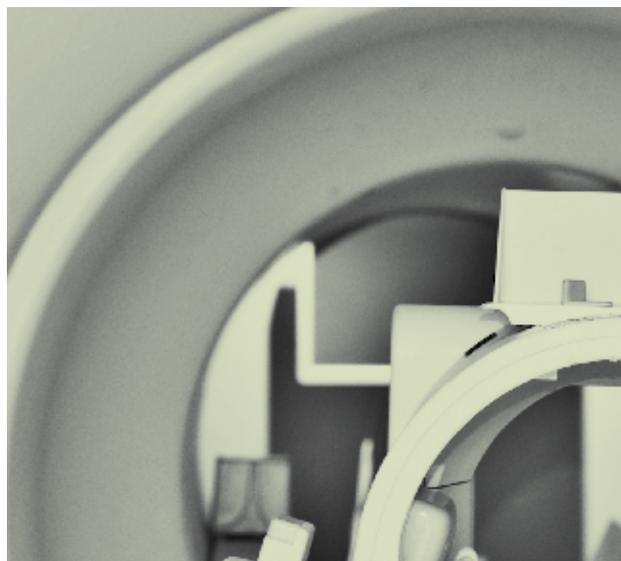
ONE OF HER NEWEST IDEAS IS, AS SHE JOKES, “ALMOST HERESY”: THE POSSIBILITY THAT COGNITIVE CONTROL MIGHT NOT ALWAYS BE A GOOD THING.

skills: learning language, for one—a process that requires taking in huge amounts of information very quickly and without a lot of filtering or self-censorship. Is there an evolutionary reason for this period of frontal cortical immaturity—and if so, might it actually be a bad thing to force kids to have greater cognitive control?

Thompson-Schill proposes that “there’s this fundamental trade-off between what’s good for learning and what’s good for performance. Cognitive control is good for performance; it’s good for behavior; it’s good for executing things properly. But it’s actually bad for learning, and it’s particularly bad for learning things that require aggregating lots of information.”

She emphasizes that these ideas will require much more research before anything is confirmed, but she’s excited by the possible implications. “It’s possible that, as brain and language co-evolved in early humans, there was an advantage for people who had this longer window of frontal development,” she conjectures, “and that we might have hit a sweet spot. Or maybe not. Maybe longer development is always better. But it’s interesting to think about. Clearly, having little kids without cognitive control makes them much more vulnerable because of the implications of not being able to control their behavior. That increases demands for parental investment.”

Despite her obvious enthusiasm for her field, Thompson-Schill admits that “as a teenager when I left for college, the last thing in the world I wanted to do was study psychology.” With two psychologist parents, she was looking for something different, so



at cognitive changes in patients with various forms of dementia. “That was when I figured out I wanted to be a professor,” she says. “I got hooked on thinking about the relationship between cognition and the brain. So I went back to college resolved to be an academic and do something in psychology that would relate to studies of the brain. It wasn’t even called cognitive neuroscience at the time.”

As the newly appointed Director of the Center for Cognitive Neuroscience, Thompson-Schill will have even greater opportunity to expand and broaden her research horizons, asking seemingly simple questions that actually penetrate to the heart of what it means to be a thinking, feeling human being. “I think Penn is becoming a real center for thinking about these issues,” she observes. And she is poised to remain one of Penn’s driving forces on this frontier. ♦

Mark Wolverton is a science writer based in Bryn Mawr, Pa., and the author of A Life in Twilight: The Final Years of J. Robert Oppenheimer.

TRACKING THE TARIM MUMMIES—continued from page 25

Xiaohe Cemetery. Most recently, Mair played a crucial role in developing “Secrets of the Silk Road,” a historic exhibition that brought a host of Tarim remains to the United States this year (see “Silk Road Secrets Come to Penn” below).

The research on the Tarim mummies paints a picture of cultural exchange millennia before goods were traded between East and West along the Silk Road. This includes an eastward spread of certain seminal technologies, such as the domestication of wheat, wool, bronze and iron tools, the wheel and the domestication of the horse.

Nevertheless, myriad mysteries remain, and Mair is committed to fostering the cross-disciplinary scholarship needed to solve them. One of his current projects is facilitating more extensive and precise DNA research by organizing collaborations between Chinese scientists and those in other countries—a difficult enterprise because the Chinese government has refused,

in recent years, to let anyone but Chinese scientists conduct genetic studies on the mummies.

“Usually when people study ancient DNA, they have their results checked by a lab in another country,” Mair explains. “This is standard scientific procedure and it’s essential.”

And now a new discovery is calling Mair back to the deserts of Xinjiang. In 2008, 372 miles to the southwest of Xiaohe, a Uighur peasant stumbled upon a site dubbed the Northern Cemetery. To date, no formal archaeological reports have been filed about it, but Mair has heard rumors that, despite being so far from Xiaohe (in Bronze Age terms), the remains seem to indicate a similar, perhaps even older culture.

Notwithstanding the political tensions in Xinjiang, Mair is already planning his return. “I don’t care if I’m 80 years old, I’m still going to find a way back,” he says. “You can’t hide this stuff—it’s too important to be a secret. I’ve got to let the world know.” ♦

SILK ROAD SECRETS COME TO PENN

After decades of arranging difficult expeditions to Xinjiang to study the Tarim remains, Victor Mair never imagined they would wind up in his back yard. But from February 5 through June 5, 2011, these invaluable ancient artifacts will be on display at the Penn Museum of Archaeology and Anthropology. The historic traveling exhibition, called “Secrets of the Silk Road,” was organized by the Bowers Museum in California, and Penn will be its only East Coast stop.

“It’s totally mind-boggling that this is able to happen,” says Mair, who consulted on the exhibition and edited its landmark catalog. “It is the greatest collection of materials from the Silk Road that has ever been assembled at one time outside of China”

“Secrets of the Silk Road” includes two mummies—the

infant found in Chärchän County and the 3,800-year-old “Beauty of Xiaohe,” whose long auburn hair and eyelashes are still intact. Also on display are the full burial trappings of a third mummy, as well as clothing, textiles, wooden and bone implements, coins, documents and even preserved foods. The artifacts span both the 1,500-year period of the Silk Road as well as its prehistory.

“If you come to the exhibition, you’re going to feel identification with ancient peoples,” Mair says. “You’ll discover that they liked sweets; they liked beautiful clothing; they had symbolism. They weren’t just primitive. You’ll also learn that cultures are linked up and that people moved around. Even long ago, they just didn’t sit on their thumbs. They were curious and inquisitive.”

In addition, some Penn undergraduates will have the chance to delve even deeper into the Tarim Basin’s mysteries. Mair is teaching a spring semester course, called “Mummies of the Silk Road,” that guides students through in-depth study of exhibition items. The course aims to situate Xinjiang within the context of Eurasian history, and discussions will span a gamut of topics, including ancient and modern DNA, physical anthropology, bronze technology and the spread of agriculture.

“There has never been such a course at Penn or anywhere else,” Mair says. “The chance to see the mummies and associated artifacts first-hand—and not just read about them or see them in pictures—will have a deep and lasting impact upon students.”
—PR

A MILLENNIUM OF THEATRE

For her dissertation, anthropology and folklore graduate student Leah Lowthorp is exploring the cultural politics surrounding efforts to preserve Kutiyattam Sanskrit theatre. She spent two years living in Kerala, India, observing and interviewing the approximately 100 artists who still perform this 1,200-year-old art form. Before Lowthorp returned to the U.S., she held a public exhibition of photographs she had taken of their performances, such as this one of Kalamandalam Reshmi playing Sita, heroine of the Sanskrit epic *Ramayana*. “The artists were incredibly generous in working with me,” Lowthorp says. “I wanted to give something back as well. The exhibition was a neat way to unite, in spirit, the Kutiyattam community and to heighten public awareness of this remarkable tradition.”



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