Casting a Wider Net:
Karen Beckman Unveils Art and Culture Initiative
PAGE 22

Summer Internships 101:
Service and Scholarship Around the World
PAGE 26

A Multidimensional Mind:
Vijay Balasubramanian Sees the Universe and Asks, “Why?”
PAGE 30
Contents

FEATURES

Eight Years in the Life of a School: 12
A look back on Rebecca Bushnell’s tenure as Dean of the School of Arts and Sciences.
by Loraine Terrell

Casting a Wider Net: 22
Karen Beckman Unveils Art and Culture Initiative
by Blake Cole

Summer Internships 101: 26
Service and Scholarship Around the World
by Blake Cole

A Multidimensional Mind: 30
Vijay Balasubramanian Sees the Universe and Asks, “Why?”
by Susan Ahlborn

DEAN’S COLUMN 1
Looking Back, Thinking Ahead

JOURNAL 2
2013 Dean’s Scholars
William Labov Named 2013 Franklin Institute Laureate
Think Fast: 60-Second Lectures Series
2013 College Graduation Speakers
Chauvenet Prize for Penn Mathematics, Second Year in a Row
Penn China Center Attracts Top Minds

FINDINGS 6
History in the Making
A Healthy Start
Sun, Sand, and Science
The Sacred and … the Profane?
An Illuminating Experience
One Cell at a Time

FACULTY OPINION 18
Coming Back to Where You Started:
Incoming Arts and Sciences Dean Steven Fluharty reflects on his path at Penn.

SPECIAL SECTION

WITH CLASS 36
Teaching About Thinking

MOVERS & QUAKERS 38
Leader of the Pack: Alison Byerly
Food Justice: Erin Healy

LAST LOOK 41
This column is my last as Dean of the School of Arts and Sciences, as I prepare to hand over the job to my successor, Steven Fluharty, and to return to full-time teaching and research at Penn. This has been a time to look back on 15 years of service in the SAS administration, especially on my eight years as Dean of SAS, and also to look ahead, for both the School and myself.

Looking back, I’m proud of so many things that the School has accomplished in those years, most of all the investments we have made in students and faculty. These include launching exciting interdisciplinary initiatives for undergraduates, such as the Integrated Studies Program and the Vagelos Integrated Program in Energy Research. In eight years, in the course of the normal turnover, the School hired 188 new faculty. These faculty, including 11 Penn Integrates Knowledge professors, have brought great new energy and innovation to teaching and research in SAS. During a time of constrained resources, we completed an award-winning restoration of the historic Music Building and raised the funds to build the Neural and Behavioral Sciences Building, which begins construction next fall. And, of course, I am thoroughly delighted that we exceeded our goal for the Making History campaign, raising $529 million to support the School’s highest priorities.

All of the accomplishments of these years were made possible by the hard work, dedication, and creativity of so many people. Penn and SAS faculty, administrators, staff, and students made all these things happen. I have been very lucky to lead a school that has such talented people in it, people who are not afraid of new ideas or change, and who are remarkably loyal to this institution. I have also been so moved and inspired by the generosity and vision of our Board of Overseers and our countless donors and volunteers who have supported the School through what were admittedly some tough times.

People also ask me what I will miss most about being Dean of SAS. It is easy to talk about what I won’t miss: for example, endless budget meetings or late Friday afternoon crises (they always seem to happen on a Friday). But the answer to what I will miss most is also easy: It is the people I have met and worked with over the years. Around campus and around the world, I have had the opportunity to get to know a wide range of fascinating people, and many of them have become my friends. Here on campus I worked with economists, astrophysicists, archaeologists, and many others, people I would surely have never encountered as just a professor of English. And it has been delightful to engage with alumni and families, from New York to Los Angeles to Hong Kong to New Delhi to London and back home. I hope that many of these friendships will last much longer than my term as Dean.

This has been a challenging and deeply rewarding experience for me, but it is time now for me to return to my first love of teaching and research, what I came to Penn to do in 1982. I will be teaching new courses (next year, a large general education course on tragedy and an Integrated Studies course on the theme of “Reality”), and working on a new book on time and tragedy. I can do so very confident that the School’s next dean will take us to new heights. Steve Fluharty is a Penn person through and through: He knows SAS and Penn so well, and he embodies that can-do spirit and commitment to excellence that will be so important for leading the School in the future. I am very grateful to him for taking on the job, and to all of you who have helped to make the School of Arts and Sciences strong as the intellectual heart and soul of Penn.
Twenty students from the College of Arts and Sciences, the College of Liberal and Professional Studies, the Professional Master’s Program, and the Graduate Division were recognized as 2013 Dean’s Scholars at this year’s Levin Family Dean’s Forum. This honor is presented annually to SAS students who exhibit exceptional academic performance and intellectual promise.

**College of Arts and Sciences**

Priyanka Anand, C’13, W’13, Physics and International Studies

Christopher Burcheri, C’14, Music

Colin Fadzen, C’13, G’13, Biochemistry and Physics

Sarah Foster, C’14, Biochemistry and Physics

Kenneth Ginsburg, C’14, W’14, History

Vinayak Kumar, C’13, G’13, Biochemistry

Marguerite Leone, C’13, Anthropology and Classical Studies

James Sadler, C’13, Political Science

Kaiwen Zhu, C’14, Cognitive Science

**Graduate Division – Doctoral Programs**

Ananya Dasgupta, South Asia Studies

Daniel DiMassa, Germanic Languages and Literatures

Matthew Farmer, Classical Studies

Jacob Goldberg, Chemistry

Marina Isgro, History of Art

Whitney Laemmli, History and Sociology of Science

Sam Lin, Anthropology

Phillip Maciak, English

Erin Wiley, Biology

**College of Liberal and Professional Studies – Undergraduate Program**

Andrew Borstein, LPS’13, Psychology

**Professional Master’s Program**

Jaivime Evaristo, Master of Science in Applied Geosciences
WILLIAM LABOV NAMED 2013 FRANKLIN INSTITUTE LAUREATE

John H. and Margaret B. Fassitt Professor William Labov has been selected as a 2013 recipient of a Benjamin Franklin Medal by The Franklin Institute. The linguistics professor is one of eight laureates chosen from the fields of science, engineering, and technology. He was recognized for “establishing the cognitive basis of language variation and change through rigorous analysis of linguistic data, and for the study of non-standard dialects with significant social and cultural implications.” “This top science award is a fitting honor for a scholar and teacher who exemplifies Benjamin Franklin’s legacy of putting knowledge to use for the greater social good,” says Dean of the School of Arts and Sciences Rebecca Bushnell.

Labov’s research focuses on the social stratification of language and the forces governing linguistic change in progress. He co-edits *Language Variation and Change* and the *Journal of Dialect Geography*. A two-time Guggenheim Fellow, Labov has authored *Language in the Inner City, Principles of Linguistic Change*, and the *Atlas of North American English*. He developed The Reading Road, a tutorial program for struggling readers, and has been a senior author of Houghton Mifflin’s *Portals*, an intervention program for raising reading levels in low-income schools, since 1997.

In addition to his faculty appointment, Labov serves as the director of the Linguistics Laboratory. He has previously served as president of the Linguistic Society of America and is a member of the National Academy of Sciences. Labov joined Penn’s faculty in 1971.

Among science’s highest honors, The Franklin Institute Awards identify individuals whose great innovation has benefited humanity, advanced science, launched new fields of inquiry, and deepened understanding of the universe.

THINK FAST

For nearly 10 years, the School’s 60-Second Lectures series has challenged audiences and faculty alike to process a career’s worth of knowledge in just one minute. The outdoor, public talks feature experts ranging across the breadth of the School, addressing topics as universal as climate change and as specific as hip-hop in the Middle East.

“The 60-Second Lectures series has been a great way to showcase the incredible diversity and talent of the SAS faculty,” says Dean of the College of Arts and Sciences, Robert A. Fox Leadership Professor, and Professor of Mathematics Dennis DeTurck, who serves as master of ceremonies at the lectures. “It provides a convenient, quirky way to become aware of topics that are relevant, interesting, and fun. And where else can you learn so much in 60 seconds?”

A select few lecturers have returned for a second round. One of them is Rogers Smith, Christopher H. Browne Distinguished Professor of Political Science, whose topics include “How to Protect Civil Liberties While Protecting Against Terrorism” and “Why Supreme Court Decisions Are Hard to Read, and Why We Should Read Them Anyway.” “The 60-Second Lectures series threatens to confirm every academic’s nightmare that all those business and government officials may be right: Our arguments can be boiled down to one-twentieth their size without much loss!” says Smith. “It really dramatized for me the evidence needed to support what I was arguing.”

Lectures are easily accessible on the SAS web site at: www.sas.upenn.edu/60second. They are also available on YouTube, Facebook, and iTunesU. Check back for news about upcoming talks.
This year’s graduation ceremony for the University of Pennsylvania College of Arts and Sciences featured a speech by P. Roy Vagelos, C’50, a physician, businessman, and philanthropist who has made a global impact on health and science. The event, held on May 12 at Franklin Field, also featured Stephanie Lamb, C’13, as the student speaker.

Vagelos graduated from the College with a degree in chemistry. Following medical school at Columbia University, he had a distinguished academic medical career prior to being recruited in 1975 by Merck & Co., Inc. He directed the company as it developed groundbreaking drugs, led its rivals in sales, and was named “America’s Most Admired Company” by Fortune magazine seven years in a row. In 1987, under Vagelos’ leadership, Merck made the landmark decision to donate medication to combat river blindness, a chronic disease in much of the developing world. Today, the Mectizan Donation Program reaches more than 100 million people annually and is widely recognized as one of the most successful public/private health partnerships in the world.

A former chairman of the Penn Board of Trustees, Vagelos has endowed three unique programs to prepare the next generation of scientific leaders: The Roy and Diana Vagelos Scholars Program in the Molecular Life Sciences, the Roy and Diana Vagelos Program in Life Sciences & Management, and the new Vagelos Integrated Program in Energy and Research (VIPER). His philanthropy has also included the Roy and Diana Vagelos Science Challenge Award, financial aid, two endowed faculty positions, the Roy and Diana Vagelos Laboratories: Institute for Advanced Sciences and Technology, and a leadership gift to the Neural and Behavioral Sciences Building. A Penn parent, he is also a frequent visitor to campus, meeting with students about their Penn experience and their future plans.

Stephanie Lamb, from Allentown, Pennsylvania, received her degree in health and societies with a concentration in health markets and finance in the department of the History and Sociology of Science. She was a member of the Rodin College House staff for three years, and won the Henrietta M. Keller Prize in German her freshman year. While at Penn, she spent a semester in Washington, D.C., interning with Thomson Reuters, and another teaching financial literacy to West Philadelphia High students. Last summer she simultaneously did fieldwork in urban violence and, as a Summer Minority Undergraduate Research (SUMR) scholar with the Robert Wood Johnson Institute, on the growing bedbug problem in Philadelphia. She will work for LEK Consulting in Boston as a healthcare and life sciences consultant, as the first step toward a career in health policy.

CHAUVENET PRIZE FOR PENN MATHEMATICS, SECOND YEAR IN A ROW

Robert Ghrist, the Andrea Mitchell University Professor of Mathematics and Electrical and Systems Engineering, has been named as the recipient of the 2013 Chauvenet Prize of the Mathematical Association of America (MAA). The prize is awarded for outstanding exposition of a mathematical topic in an article. Ghrist won for “Barcodes: The Persistent Topology of Data,” in the Bulletin of the American Mathematical Society 45 (2008).

This is the second year in a row in
Penn China Center Attracts Top Minds

A little over a year ago, Penn’s first center dedicated to research and scholarship in and about contemporary China opened its doors—and it’s been a busy first year. “It’s exceeded our expectations in a big way,” says Avery Goldstein, the inaugural faculty director of the Center for the Study of Contemporary China (CSCC) and David M. Knott Professor in Global Politics and International Relations. “We expected a modest program the first year, with a handful of visiting speakers each semester, but almost immediately we started receiving interest from scholars all across the world who wanted to stop in to give talks.”

Guest speakers are one of the Center’s main means of cultivating scholarly research and discussion. Over the past year, the 25 speakers hosted by the CSCC have included scholars, policy advisors, and prominent business leaders such as Justin Lin, former Senior Vice President and Chief Economist of the World Bank. For its annual speaker, the Center hosted Governor Jon Huntsman, C’87, former U.S. ambassador to China and presidential candidate. “We’ve had one of the most dynamic programs in Chinese law and related fields,” says Jacques deLisle, the Stephen A. Cozen Professor of Law, Professor of Political Science, and Deputy Director of the Center. “We co-hosted a series on China and human rights last spring and a major conference with leading Chinese and U.S. scholars on Chinese administrative law this fall, plus several lectures, roundtables, and other activities in the field.”

In addition to guest speakers and events, the Center also attracts prestigious visiting scholars, including two rising younger researchers from leading Chinese law schools: Xia Liping, Dean and Professor of the School of Political Science and International Relations at Tongji University in Shanghai, and Wang Xixin, Professor of Constitutional and Administrative Law at Peking University Law School. Xia offers valuable insight on Asian security, nuclear nonproliferation, and China’s foreign strategy, while Wang focuses on administrative law and reform.

Undergraduate research also plays an integral role at the CSCC. At a recent conference, Center students handpicked graduate student papers from the region, which they then discussed in an effort to encourage collaboration and scholarly discussion among the student research community. In addition, the Center provides postdoctoral fellowships to exceptional candidates. Current fellows include Xiaoying Liu, whose research focuses on the economic impacts of environmental programs in China, and Seung-Youn Oh, who studies China’s industrial restructuring and developmental path. Grants are also made available to graduate students. Upon completion, the students give a presentation that outlines their findings.

“It provides an important opportunity for graduate students to advance their research and interact with the growing community of scholars at Penn who specialize in the study of contemporary China,” says Goldstein.

which faculty of the School of Arts and Sciences at Penn have been awarded this prize. The 2012 Chauvenet Prize was received by College Dean, Robert A. Fox Leadership Professor, and Professor of Mathematics Dennis DeTurck; Professor of Mathematics Herman Gluck; and alumni Daniel Pomerleano, C’06, W’07, and Shea Vela-Vick, GR’09, for their article “The Four Vertex Theorem and Its Converse,” published in Notices of the American Mathematical Society, Vol. 54, No. 2 (2007).

“We are delighted and honored that Professor Ghrist was awarded the 2013 Chauvenet Prize,” says Professor of Mathematics Jerry L. Kazdan, the department chair. “It is splendid that this is the second year in a row that members of our department received the prize, which is the premiere award for mathematical expository articles in the U.S. Our department cares a lot about quality teaching, as exemplified by these awards.”

Ghrist has produced a widely influential body of work that applies mathematical methods to real-world engineering challenges, especially in robotics and wireless sensor networks. He specializes in topology, a branch of mathematics that provides tools to visualize abstract spaces, such as finding gaps in a security network or automating robotic movement across a factory floor. His other honors include a Presidential Early Career Award for Scientists and Engineers and a CAREER Award from the National Science Foundation. In 2007 he was named by Scientific American as one of 50 top scientists for research innovation.
“An American Story.”

It’s a colloquialism often used to describe success stories, lending a kind of communal identity to its protagonist. But in a country as culturally diverse as the United States, there are a variety of American stories, says Professor of History Beth Wenger. “Every minority group has created an account of its origins and belonging in America. These stories do not constitute history in the academic sense, but rather are a blend of fact and fiction, and are often embellished and self-serving. These popular accounts allowed immigrant groups to produce a collective past that both eased their adjustment to American life and created a distinct ethnic history compatible with American ideals.”

In her book History Lessons: The Creation of American Jewish Heritage, Wenger uses primary sources that are often overlooked to document the Jewish experience. Using popular accounts of American Jewish history offered in speeches, sermons, newspapers, children’s textbooks, and public celebrations, Wenger demonstrates how Jews fashioned a collective heritage by fusing their Jewish past with their American present and future. In one chapter, she explores the commemoration of Jewish war service in the United States. “In European history, the willingness of Jews to serve in the military was a longstanding concern, especially in the debates over whether Jews should be emancipated. Consequently, American Jews marshaled the record of their military service not only to prove devotion to their adopted homeland but also to underscore how much they had overcome their European Jewish past.”

In European history, the willingness of Jews to serve in the military was a longstanding concern, especially in the debates over whether Jews should be emancipated. Consequently, American Jews marshaled the record of their military service not only to prove devotion to their adopted homeland but also to underscore how much they had overcome their European Jewish past.” She cites several popular accounts about Jewish service in the Spanish-American War in which Jews invoke the memory of the Spanish Expulsion and Inquisition. In these often self-congratulatory narratives, Wenger explains, “the reinvigorated Jews of America emerged to vanquish the memory of the European past and to exert a level of power that their ancestors could never have wielded.”

Wenger also explores Jewish celebrations of American national holidays, such as Thanksgiving and the Fourth of July. “Like other American ethnic groups,” she explains, “Jews used patriotic displays both to demonstrate loyalty to the nation and to articulate a sense of ethnic pride.” One popular legend connecting Jews both to Christopher Columbus and to Thanksgiving claims that a Jew who sailed with Columbus had been the first to name the turkey, the centerpiece of the Thanksgiving celebration, “calling it tukki, the Hebrew term for peacock.” Wenger also examined both Yiddish- and English-language textbooks, pageants, and plays written for children in the first half of the twentieth century. “I think in children’s literature you find the most crystallized accounts of what adults want Jewish children to know about Jewish history and about what it means to be a Jew in America.”

In addition to her role as a scholar, Wenger shoulders a number of administrative responsibilities. She is Director of the Jewish Studies Program, a position she’s held for seven years, and notes that, “Jewish Studies has seen enormous growth since I’ve been at Penn.” In addition, she serves as Chair of the History Department. “As a Jewish historian, and someone who thinks seriously about the past, it always strikes me that I teach students in my Modern Jewish History course about Jews in the 19th century who wanted so badly to teach and to see Jewish history recognized in universities but never could. Now, here I am as a Jewish historian, serving as Chair of a history department. It’s not something that I take for granted.”

Wenger is also one of four historians who helped to craft the core exhibition at the National Museum of American Jewish History in Philadelphia. She remains a consultant to the Museum, which also collaborates with the Jewish Studies program at Penn to host a panel discussion each semester. “Through a donation from the Arlene and Stanley Ginsburg Family Foundation, we’ve been able to create a series that creates connections between the story of American Jews that’s told at the Museum and broader themes in American history and culture. Right before the election, for example, we held a wonderful program on religion and politics.”

On top of her other duties, Wenger also serves as Chair of the American Jewish Historical Society’s Academic Council. Founded in 1892, it is the oldest national ethnic historical organization in the United States.
Ask Jere Behrman about the best investment a developing country can make, and he’ll show you a healthy infant.

Behrman, a development economist who is the William R. Kenan, Jr. Professor of Economics, is an expert on human resources and household behaviors in developing nations. Many of his major recent research studies have centered on the critical issue of early life nutrition, and his investigations have conclusively linked low nutrition in infants to decreased capabilities later in life, such as poor school performance and reduced wages.

“It is increasingly evident that what happens in early life has long-term consequences,” said Behrman, who has consulted with the World Bank, foreign governments and international aid organizations. “It is difficult to ameliorate deprivation later in childhood. It usually is more cost-effective to do that as soon as possible.”

A research associate at Penn’s Population Studies Center, Behrman stands at the crossroads of economics and sociology. His deep knowledge of what he terms “human resources”—meaning the essential resources needed to build a thriving society, such as education, nutrition, and health—has informed the public policy directives of developing countries in Asia, Africa, and Latin America. He has authored scores of publications, including books, monographs, and academic articles.

In addition to conducting major studies on the long-term ramifications of early-life nutrition, Behrman has analyzed other human resource matters critical to poor countries, such as disease and education. The issues he tackles are complex—and the stakes are high. With scant funds in poorer nations such as Ethiopia, Jamaica, Zambia, Chile, and Guatemala—all of which Behrman visited in 2012—governments must allocate monies strategically to provide their populations with the basic resources all human beings need to thrive.

Behrman’s expertise is sought after across the globe, including in the United States, where he serves as the economics and social science member of the National Institutes of Health’s National Institute of Child Health and Development National Advisory Council.

Although he stresses the importance of life’s earliest years, Behrman has also researched education in later childhood and adolescence. He recently collaborated with two other Economics faculty at Penn, Alfred L. Cass Term Professor Petra Todd and Walter H. and Leonore C. Annenberg Professor in the Social Sciences and Department Chair Kenneith I. Wolpin, and with Susan Parker of the research and academic center CIDE in Mexico, to design and evaluate the efficacy of a strategy tested by the Mexican Ministry of Education to award financial incentives to students and educators in order to raise math scores. Studying three variations of incentive programs in 88 Mexican high schools with over 40,000 students, they found that incentivizing math performance was most effective when students, teachers, and school administrators were all recipients of financial rewards based on the students’ level and improvement in performance on curriculum-based mathematics examinations.

Behrman conducts the majority of his research in developing nations, but his findings hold important implications for affluent societies, as well. In his influential paper with former Penn economics professor Mark Rosenzweig (now at Yale) on “Returns to Birth Weight,” they found that improved nutrition within the womb in the United States, controlling for all family and genetic background characteristics, causes increased schooling and earnings but not obesity or greater birth weights in the next generation.

Recently, Behrman’s work has centered on a series of National Institute of Child Health and Development, Bill and Melinda Gates Foundation, and Grand Challenges Canada projects for which he is the principal investigator, and which are studying the economic returns to mitigating early life risks—including malnutrition, infectious diseases, inadequate stimulation, and poor maternal care—throughout the developing world. Over 50 investigators in 17 countries are contributing.

“A child deprived of adequate human resources in early life almost always is missing a full life,” says Behrman. “Our aim is to understand the long-range consequences of that deprivation and protect every country’s most precious resource, its human capital.”

ABIGAIL MEISEL
Every year, the undergraduate students in Douglas Jerolmack’s Earth Surface Processes class use their spring break to go to a desert instead of a beach: White Sands National Monument in New Mexico. “We go there partly because I want this to be a very memorable experience for them,” says the assistant professor of earth and environmental science. “The dunes are paper white. It’s blinding. It is a wild, alien-looking landscape. But we sit down, roll up our sleeves, take some measurements, and we do basic physics. And they find that even a landscape so alien and unique has to follow the laws of nature, and then we can start to pick apart this landscape into a series of isolated problems and use basic physics to understand what’s going on.”

Jerolmack specializes in sediment, which he defines as “anything that gets moved by water and wind,” the primary fluids that shape the landscape. “I’m interested in how landscapes form by erosion and deposition,” he says. “But along the way there are lots of other problems that come up. And since I’m a curious person, I follow them wherever they lead.”

These annual trips provide a great opportunity to find and follow new leads. One year the group became curious about why they could feel moisture on their bare feet in such a hot, dry place. “We realized that to understand this environment, we had to dive into the groundwater,” says Jerolmack. They found that in parts of the dune field with many plants, the groundwater table was actually lower and the water less salty: With the lower groundwater, there was less evaporation and thus less salt left behind. “The plants actually make the water better for themselves. So that was a surprising result to us, but it turned out that it had been theorized but never been proven.” Jerolmack sent the resulting paper to the scientist who had authored the theory: “He was thrilled.”

This year they focused on smaller scale processes such as how individual sand particles are picked up by the wind—part of Jerolmack’s work to develop “erosion laws” that will help predict environmental effects. “For a long time these problems of studying erosion and deposition in the environment were thought to be so messy that all we could do was observe,” he says. “The sand particles are different sizes and shapes and the wind is unpredictable. But we ask, can we design very specific field experiments to figure out those unknowns? What we’re hoping to come up with is better erosion laws—to know that if I have a description of the wind, I can predict how much erosion on the landscape is going to result from that wind speed. We now have the technology to make progress toward that.”

“By having an army of curious students every year, we’ve been able to explore every facet of this problem,” Jerolmack says. “The thing for me is to take all the theory that we’re learning in class and put it into action and maybe just discover something brand new, and then write papers together about it. We’re doing fundamental research. We’re publishing papers every year out of the things that we’re doing there.”
Though many of history’s most recognizable pieces of art are religious in nature, scriptures and secondary texts from these same religions sometimes condemn the veneration of visual images. The reconciliation of the two is part of a complex narrative deriving from societal norms, says Jamal J. Elias, Walter H. Annenberg Professor in the Humanities and Professor of Religious Studies and South Asia Studies. In his book *Aisha’s Cushion: Religious Art, Perception, and Practice in Islam*, Elias deconstructs prevailing narratives that seek to define Islam’s relationship with art in easy terms.

“The Danish cartoon scandal is a good example of how the argument that Islam is anti-art gets framed in false terms,” says Elias. “The controversy was never about the images themselves—most of the protestors didn’t even see the cartoons in question—but rather about the perceived intentions of all parties. It evolved into a culture war between certain Muslims and Europeans that played out on the international stage. The Muslims accused Europeans of moral hypocrisy and the Europeans turned around and accused Muslims of being backward and intolerant. Art is entirely out of the picture at this point.”

The fallout of such conflicts often affects a culture’s own relationship with its artifacts. Elias cites the current Saudi project to modernize Mecca—the physical heart of the Islamic world—as a prime example. As part of the modernization, many shrines and other edifices venerated by Muslims are being intentionally destroyed, an act in keeping with the dominant Saudi religious ideology which considers veneration of relics and objects to be anathema. Other components of the modernization protest what some Muslims consider Britain’s claim of global centrality. “The Saudis erected a copy of the Big Ben clock tower, and put it on ‘Mecca time’ rather than Greenwich Time. It’s an iconoclastic act, without actually harming Big Ben.”

The notion that Islamic culture seeks to stifle art couldn’t be further from the truth, Elias says. Islam has rich traditions of book, musical, architectural, and metallurgical arts. Misinformed claims like this are due in part to modern society’s tendency to label what is and isn’t art. “When a sword-maker used to make a beautiful sword, he was an artist in his context. But today a sword-maker is not an artist unless the sword is installed in an art gallery. In contemporary society, art is defined primarily by intentionality, but historically, artistry was everywhere.”

While it is taboo to display portraits of Muhammad in most Muslim societies, it is not necessarily forbidden—a claim often erroneously perpetuated by international news coverage. Iran, for example, has a longstanding tradition of religious portraiture. Muslims don’t normally base their reactions to religious images on rules or doctrine, but on the intentions behind the art, Elias says. “Muhammad is depicted in a frieze on the Supreme Court building of the United States. No one gets worked up about it because the intentionality is positive. The real issue has never been the art—it’s the narratives surrounding it.”
The National Institutes of Health have issued a five-year, $10 million grant to Junhyong Kim, Edmund J. and Louise W. Kahn Endowed Term Professor of Biology, and his collaborator, James Eberwine, Elmer Holmes Bobst Professor of Pharmacology at the Perelman School of Medicine. The grant is part of an NIH-wide initiative to study single-cell biology in human cells by an interdisciplinary team that also includes Penn Medicine's Sean Grady, Charles Harrison Frazier Professor of Neurosurgery, and Jai-Yoon Sul, Research Assistant Professor of Pharmacology, as well as external collaborators Bernhard Kuhn of Harvard and Tamás Bartfai of the Scripps Research Institute.

The grant is unusual in that it was made at the discretion of the NIH’s central director’s office, which has its own budget to fund areas it believes are especially exciting or important. New advances in technology have only recently made it possible to study individual cells. According to Kim, our bodies each have about 100 trillion cells, but how many kinds is unknown. “Your skin looks different from your eyes, looks different from your hair, and so on, but we don’t really know how many different types of cells there are.” On top of that, we tend to assume all cells within a type are the same. However, we can tell just from looking at skin with and without age spots, for example, that cells of the same type are not identical—but we don’t know how they differ.

The question goes beyond age spots. “When we look at neurodegenerative brain diseases like Alzheimer’s, we know that cells start to degenerate, and you see dysfunction of the brain,” says Kim. “But it’s not like everything goes at the same time. If we can understand why this variability exists, then maybe that will also help us understand how to prevent that kind of degeneration.”

Right now, the best way to differentiate cells is to measure messenger RNA, an approach that is possible thanks partly to pioneering techniques developed by Eberwine. A single cell contains about one picogram of messenger RNA. “One gram is about a thimbleful of water,” says Kim. “So the messenger RNA in a single cell is one trillionth of that amount.”

A computational biologist, Kim then works with the data. “When we sequence the RNA for a single cell, we generate about 50 gigabases of data, the equivalent of about one-fifth of a standard hard drive,” he says. “We have to go through a lot of computation and analysis just to put it into a form that people can look at and understand.” He then uses statistical modeling to identify differences between the data, and then system-level modeling to put the whole picture together, “to say, because this gene is changing, that leads to this difference, and so on.”

The Penn scientists are using electrically excitable cells from the brain and heart, taken from a minute amount of tissue removed in the course of routine surgery. Heart cells are of particular interest because they have different degrees of regenerative capacities, which decrease as we grow older. After a heart attack, heart tissue dies, leaving dysfunctional scar tissue. “It is now known, however, that very small portions of even adult heart cells can regenerate,” says Kim. “So again there’s heterogeneity in how cells respond, and if we can figure out which ones regenerate and which ones don’t, then that has a lot of clinical potential.”
AN ILLUMINATING EXPERIENCE

It’s not often that an ancient manuscript is signed, sealed, and delivered to a researcher with a record of its copyist and the date and location of its production. Though seemingly well documented, the 12th-century Seljuk illuminated copy, or mushaf, of the Qu’ran is not without its mysteries. “In order to study an artifact with a history this complex, you have to conduct a sort of autopsy,” says Renata Holod, College for Women Class of 1963 Term Professor of the History of Art, and the curator of the Near East Section of the Penn Museum. “This particular Qu’ran copy, which came to the Penn Museum in 1927, has been reframed, repasted, and re-envisioned several times.”

In order to deconstruct the history surrounding the text, Holod recruited a group of undergraduate and graduate students—some from the History of Art department, and others from Near Eastern Languages and Civilizations—for a seminar co-taught with Yael Rice, GR’11, a post-doctoral student at Amherst College.

“Several of the students involved in the project speak and write Arabic, but even if they don’t, they bring unique and valuable skills,” says Holod. “We have one particular person who is a specialist in Japanese art—she was our paper specialist. Another is an expert in calligraphy, so she has valuable insight into handwriting style.

So it’s really about creating a collaborative environment that thrives on teamwork.”

This particular illuminated copy of the Qu’ran was produced in Hamadan, Iran in 1164 (559 H). Its pages tell their own unique narrative: Subtle differences in paper texture, shade, and alignment indicate page transplants and repairs, while differences in handwriting, ink color, and writing style reveal that portions of the text and illumination were added centuries after initial production. The careful study of these variables was facilitated first by a careful conservation survey and by initial scientific analyses of inks and colors. Now, high resolution scans of the pages allow the user to zoom in on minute details. The scans, part of the Penn’s Medieval and Renaissance Manuscripts Collection, are available online, free to the public.

The project marked its intermediate stage of study in a two day workshop this past February, during which students, instructors, and conservators presented their findings on a variety of topics that sought to explain some of the mysteries surrounding the age and authenticity of specific elements of the text. Elias Saba, GR’18, presented on scriptural “commentary” that was added to the book’s pages shortly after its original copying. These commentaries offered invaluable new context to the use of the book. “My interest in this manuscript began in 2008 when several pages of the manuscript were put on display as part of the Historians of Islamic Art Association first Biennial Symposium here at Penn,” says Saba. “It is very rare to have so old a manuscript copy of the Qur’an that is complete and in such good condition. The project really highlights the digital humanities’ ability to reach broader audiences and overcome many of the barriers of the traditional humanities.”

Also in attendance were handpicked specialists on Arabic and Persian manuscripts, including Penn graduates Marianna Shreve Simpson, CW’71, and David Roxburgh, G’91, GR’96. These experts provided crucial commentary on the research.

The workshop’s papers are currently being compiled in an e-book, which will be released later this year. A web site is also in the works that will act as a companion resource and show how the manuscript may have changed over time.

To view selections from the illuminated manuscript, visit: http://ph.ly/holod

Visit the workshop site: http://ph.ly/holod2

The illuminated copy of the Qu’ran was produced in Hamadan, Iran in 1164 (559 H). and came to Penn Museum in 1927.
Eight years isn’t a long time in the life of an institution that has been around since 1740, but eras are defined by change. When Rebecca Bushnell, Thomas S. Gates, Jr. Professor and Professor of English, became Dean of the School of Arts and Sciences in 2005, the country’s economy appeared to be strong, federal funding of basic research was on the rise, and no one had heard of MOOCs. Just two years later, the School was operating in an economic environment that has been compared to the Great Depression. New technologies were proliferating and having an impact on every aspect of teaching, learning, and research. Globalization, a more expansive understanding of diversity within the academy, and a more skeptical public eye on what a liberal arts education delivers have also done their part to make the landscape of 2013 very different from the one that Dean Bushnell encountered when she took the job.

Predicting how to achieve the brightest future for a complex organization like SAS is a tricky undertaking under the best of circumstances. As observed by expert statistician Nate Silver, “a lot of things can’t be modeled very well.” Nevertheless, the vision that Dean Bushnell articulated for the School in her 2006 strategic plan has largely been realized. A flexible and nimble approach to unforeseen challenges resulted in an impressive record of accomplishment. Combined with the resources secured by the Making History campaign—a record-breaking $529 million—these accomplishments have positioned the School well for the new round of challenges and opportunities that the next era will surely bring.

Following are some of the major milestones in the life of the School of Arts and Sciences under Dean Bushnell’s leadership.
STRENGTHENING THE FACULTY

STABILIZING FACULTY SIZE
For academic departments in top-tier research universities, bigger equates with better—or at least that’s the calculation that is frequently implied. When fiscal conditions made the numeric growth of the SAS standing faculty an unrealistic goal, the School focused on a new understanding of getting better. Under Dean Bushnell, the size of the SAS faculty stabilized near 480. But from 2006 to 2012, normal turnover created the opportunity to bring in 188 new faculty recruits. A careful, strategic approach to the selection of these new faculty allowed the School to maximize the impact of each appointment: Each was designed to broadly benefit several departments, programs, or centers. This approach has resulted in a faculty that is stronger, without being larger.

BUILDING ON INTERDISCIPLINARY STRENGTH
A related, and intended, consequence of the School’s more strategic approach to recruitment has been strengthening the interdisciplinary character of the SAS faculty. This development is backed up by numbers: In 2005, just one SAS faculty member held a dual appointment in another school at Penn. Today, there are 24 faculty with dual appointments—a group that includes Penn Integrates Knowledge professors as well other faculty who have appointments in more than one of Penn’s schools or more than one department within SAS.

Award-winning teacher and scholar Dorothy Roberts joined Penn in 2012 as the George A. Weiss University Professor. The 14th Penn Integrates Knowledge Professor, Roberts holds a joint appointment in the Department of Sociology and the Law School, where she is also the inaugural Raymond Pace and Sadie Tanner Mosell Alexander Chair. An acclaimed scholar of race, gender, and the law, Roberts writes and speaks about some of the most important and challenging issues facing our society. Her pathbreaking work in law and public policy focuses on urgent contemporary issues in health, social justice, and bioethics, especially as they impact the lives of women, children, and African-Americans.

NEW SAS FACULTY RECRUITS

FACULTY WITH DUAL APPOINTMENTS

$529M
RAISED THROUGH MAKING HISTORY CAMPAIGN
REDEFINING THE LIBERAL ARTS CURRICULUM

A major overhaul of the general education component of the curriculum, the introduction of several new interdisciplinary programs, and the launch of a comprehensive effort to assess the curriculum—including expected outcomes for graduating students—are some of the key initiatives that the School has undertaken since 2005 to strengthen the undergraduate experience. Among the new curricular options are two cutting-edge science programs: the Vagelos Program in Life Sciences and Management, which combines a life science major in SAS with a Wharton degree, and the Vagelos Integrated Program in Energy Research, or VIPER, which combines study in SAS and Engineering. (And as the names suggest, both of these programs owe a debt to Roy and Diana Vagelos, the School’s largest supporters of the Making History campaign.) The School has also made great strides in increasing funding for students to pursue research and internship experiences (see “Summer Internships 101,” page 26).

REVITALIZING THE PHYSICAL CAMPUS

Construction and renovation projects represent one of the most tangible areas of accomplishment over the past eight years. In all, eight major facilities projects were completed, launched, or officially announced—overall, a significant proportion of the 33 buildings that are part of SAS. These initiatives are improving the educational experience for undergraduates across the University and providing state-of-the-art facilities to advance faculty research.

Students from the Vagelos Integrated Program in Energy Research (VIPER), a dual degree program for undergraduates interested in developing alternative and efficient energy sources.
INVESTING IN DOCTORAL EDUCATION

The School invests heavily in doctoral education, and that investment is critical to maintaining Penn’s reputation as a leader in teaching and research. Since 2005, the average financial support package for SAS Ph.D. students has increased dramatically and now includes summer stipends. This increase has helped the School achieve its goal of admitting small cohorts of the strongest students, reflected in a higher overall yield in admissions (from 39% in 2005 to 48% in 2012) as well as a reduction in the average amount of time it takes students to complete their degree. SAS graduate programs are also tracking the success of their students in obtaining tenure-track positions, postdoctoral fellowships, and other relevant placements after graduation. Programs that encourage and support students from underrepresented minorities have been another priority and are part of a long-range strategy to enhance faculty diversity.

SUPPORTING EDUCATIONAL INNOVATION

The School restructured and renewed its programs for nontraditional students through its division of Professional and Liberal Education (PLE). Because PLE focuses on reaching new audiences of learners—often employing nontraditional technologies—the division has been an incubator for innovation within SAS. The School’s Coursera offerings (Coursera is the largest of the recently launched platforms for massive open online courses, or MOOCs), which are being developed through PLE, are just the most recent example. Experiments like these expand the School’s reach and allow faculty to explore new approaches for their campus-based classroom teaching. Professional master’s programs that capitalize on the School’s academic strengths to serve the needs of working adults have been another important growth area for PLE.
INTERDISCIPLINARY THEMES

In the Strategic Plan, five broad interdisciplinary themes were targeted to encourage the integration of knowledge in areas that would strengthen core SAS departments while capitalizing on existing strengths. These themes have provided a focus for much of the School’s faculty recruitment efforts and helped shape other critical investments such as facilities projects. The following are the themes that were identified in the 2006 plan.

**INTERDISCIPLINARY THEMES**

1. **Genes to Brains to Behavior**
   - Nanoscience
     - The study of phenomena on the nanometer scale, nanoscience brings together the strengths of a diverse set of science disciplines—including physics, chemistry, and biology, along with engineering and medicine—to promote exciting advances in fields as diverse as energy and biomedicine.

2. **Nanoscience**
   - Our growing knowledge about fundamental life processes at the level of genes and molecules is opening up a new understanding of the human mind. Biology and Psychology faculty working with an extensive network of collaborators elsewhere in SAS, as well as in Penn’s health science schools and centers, are at the heart of this initiative.
With the ever-increasing scale of interactions across cultures, understanding specific cultures, as well as the interconnections of society, politics, economics, and culture, are urgent topics of investigation. SAS humanities and social science departments are at the forefront of studies in this area.
Q: Your relationship with Penn officially started when you stepped onto campus as a freshman in the College of Arts and Sciences in 1974. What led you to choose Penn?

Fluharty: I had a pretty good sense of the campus as a destination from an early age. I’m originally from South Jersey, and the University was a hub of activity for me. My father had season tickets to the Philadelphia Eagles for years, and that was when they played at Franklin Field. In high school, a group of friends of mine were big Penn basketball fans, so we would go to games at the Palestra.

Q: By 1981 you had finished your Ph.D. here. How did all that happen so fast?

Fluharty: It started in the second semester of my freshman year when I convinced then-Provost Eliot Stellar to accept me into his advanced seminar course in physiological psychology. I
never thought I would get in, but somehow I convinced him that I had some passion for the subject. Then I learned about the University Scholars program. That was a brand new program that allowed undergraduates with focused interests to construct a customized curriculum to accelerate their path to an advanced degree. By my junior year I was doing research in Alan’s Epstein’s lab—he was a former student of Eliot Stellar’s in our biology department. I started to take a mix of graduate and undergraduate courses in the psychology department. And before I got my undergraduate degree, I applied for a predoctoral fellowship from the National Institutes of Health for my research in Alan’s lab, and I got it. The fact that an undergraduate was able to get a research grant from a federal agency is testimony to how effective the University Scholars program was. But the short answer is that because my program was consolidated, I did three degrees in what amounts to less than seven years.

Q: Have you always been focused on science?

Fluharty: Actually, at first I was not focused at all. I came to Penn as an aspiring English major. I do not suggest that anyone go to admissions records and pull my application, but if you did, you would discover that I submitted a series of original poems that I thought captured the life experience from birth to death. I was an avid reader, an avid writer, and I really saw myself as an aspiring humanist who would write novels. I came here with that in mind. But then, as now, the College curriculum encouraged you to explore different things. In my first semester I took Intro to Psychology with Randy Gallistel—an incredibly talented professor who was interested in brain-behavior relationships. He was just phenomenal. That opened up a new direction and I never looked back.

Q: You served for many years as the director of the undergraduate Biological Basis of Behavior program. If the program had existed in the mid-1970s is it safe to say that would have been your major?

Fluharty: [BBB founding director] Norm Adler and I used to joke that in some respects I was arguably the first BBB major.

Q: What were your proudest accomplishments as BBB’s director?

Fluharty: I came into the BBB program as part of Penn’s professional school faculty—I had a primary appointment in Veterinary Medicine and Medicine. But I loved to teach undergraduates and I saw BBB as a phenomenal opportunity. When I was appointed director, I felt that was a bold move on the part of the School that demonstrated we had succeeded in creating a truly multidisciplinary program involving faculty from areas of expertise that enrich the undergraduate experience—regardless of where at Penn those faculty came from. As Director, I focused on strengthening the curriculum by involving more faculty from other schools. I was also a big advocate for promoting and providing undergraduate research opportunities for students interested in research—and for BBB, that was probably 60 percent of the class. And then at the end I got very interested in outreach activities.

Q: What are some of the big questions that have motivated you as a scientist?

Fluharty: At the broad level, I’ve always been interested in brain-behavior relationships. How do you go from the mechanics of the brain, the neural circuits, the release of neurotransmitters, to actually produce behavior? How is sensory information about the environment received and interpreted and then used to execute action? Those have been the big questions. More specifically, my main area of interest has been the interface between neuroendocrinology and behavioral neuroscience. I was interested in where
and how peripheral signals—largely hormones that are generated and travel in the bloodstream—act in the brain. On the output side, I was interested primarily in what would be called the “ingestive behaviors” including feeding, thirst, and a phenomenon that’s somewhat unique to mammals, salt appetite—the act of seeking out of sources of salt, which is necessary to maintain circulation. I worked on all of those problems, but the principles were always the same: identify the peripheral signals and then understand where and how they act in the brain to produce behavior.

Q: How did your priorities change when you became Senior Vice Provost for Research?

Fluharty: I went through an interesting transformation. I recognized that I was deriving enormous professional and personal satisfaction from seeing Penn move collectively as a world-class research university; I didn’t feel any emptiness about having a less direct personal role in discovery. It was a kind of natural transition. What I found more difficult was walking away from an active teaching role—that was much harder than I thought it would be. At my last BBB class I felt like a retiring athlete. I was really choked up. To this day I miss active involvement in teaching, but I do find fulfillment in the opportunities I have to speak in other forums about what it means to be a great university.

Q: As Senior Vice Provost, you’ve been a vocal advocate for the role that research universities play in society and the importance of federal funding for research, particularly in the basic sciences. What do you see as your major challenges in taking on the role of advocating broadly for the liberal arts?

Fluharty: Whether it’s the energy crisis or political conflict, the reality is that, to understand the origins of today’s problems, to explore the range of solutions, and to understand the implications of implementing solutions, the broad perspective provided by the liberal arts is necessary. But there’s no question that in difficult economic times, people question the expense and the value of a broadly defined liberal arts education. The focus is on short-term gains: What can I measure in a year? What can I measure in a two-year period? The reality is that the impact of the undergraduate experience plays out over a long timeline. It can be a decade or more for the benefits of a liberal arts degree to be fully realized. But when you look at the analytics, you find that graduates of great universities like Penn, and the Penn undergraduate liberal arts experience, are having a huge impact on the world.
Taking Full Advantage of the Penn Experience

Cory Colijn came to Penn in 2007 as a guest student, and soon transferred here to finish her bachelor’s degree in the Earth and Environmental Science Department. During her time as an undergraduate she was named the EES Outstanding Undergraduate Teaching Assistant and graduated magna cum laude in 2011.

Cory later joined Penn as a staff member when she was hired as the Graduate Student Coordinator for the Professional Master’s Programs in Earth & Environmental Science. She supports many aspects of these programs, but her favorite part of her job is daily interaction with current students. “Our students really are the best and brightest,” she says. “They are a constant source of inspiration and energy.” Cory is now pursuing a Master of Science in Applied Geosciences at the College of Liberal and Professional Studies, with an individualized concentration and a career focus on land management.

Do Your Passion and Motivation Match Cory’s?

Penn offers you opportunities to advance your personal and professional goals with programs and courses to match your interests. Whether you enroll in one of our many innovative and multi-disciplinary professional master’s degrees or work with an advisor to design your own career-enhancing post-bac program, there are more ways than ever to pursue your passion at Penn.

WWW.UPENN.EDU/CHOOSEPENN
Casting a Wider Net

Karen Beckman Unveils Art and Culture Initiative
Chances are, even as you read this, that there’s a cultural event taking place on or around the Penn campus that you don’t know about. On any given day there are Egyptian mummies at Penn Museum, a Pulitzer-Prize winning author at Kelly Writers House, or a cutting-edge exhibit at the Institute of Contemporary Art (ICA), yet when people think of the arts, they don’t always think of Penn.

Karen Beckman wants to change that.

The Elliot and Roslyn Jaffe Endowed Professor in Film Studies is taking on the challenge of making sure Penn is on the culture map through a comprehensive new Art and Culture Initiative. In addition to increasing accessibility to the arts at Penn, the initiative seeks to improve communication among faculty, students, and art and culture centers on campus, as well as between the campus, general public, and outside art and culture organizations. This includes finding new ways to attract top art and culture applicants, equipping existing students with new resources, and introducing new art and culture courses and internships. “The richness of the arts at and around Penn sometimes goes under the radar,” says Beckman, one of the world’s preeminent film scholars. “There are so many exciting activities that don’t get recognized. Most students don’t even realize, for instance, that Andy Warhol had his first solo show at ICA. Penn arts has an exciting history, and we need to guarantee that legacy is maintained.”

Beckman’s first major undertaking was bringing together representatives from local arts organizations, both on and off campus. In addition to internationally recognized mainstays like Penn Museum and ICA, she recruited directors from Kelly Writers House, WXPN, the Penn Libraries and Special Collections, the Annenberg Center, the Arthur Ross Gallery, and the Morris Arboretum. “We face a competitive challenge, and communication is the key,” she notes. “Many of our peers are developing expensive arts centers on campus in order to attract top students.
But I don’t think the top-down, agenda-driven approach is right for Penn. We embrace independent thinkers and decentralization here. So the goal of the committee is to collaborate, not to homogenize.”

For Beckman, nurturing an already-strong relationship between Penn and West Philadelphia means keeping an open line with ambassadors from the city’s most prominent venues. These meetings have already resulted in better opportunities for students to explore the local arts scene. Penn’s shuttle bus, for instance, now includes a stop at the Philadelphia Museum of Art on nights when admission is cheaper. Also being stressed is the importance of establishing relationships with smaller arts organizations throughout the city. One example is the 30-year-old local media literacy education center, Scribe Video Center. The center, which Beckman describes as a sort of Kelly Writers House for media, makes media literacy affordable for the local community, including artists and young people, and represents a perfect example of a community organization Penn can both help and benefit from.

“IT’S ALL ABOUT CREATING AVENUES THAT PUT A NEW FACE ON A CERTAIN ASPECT OF THE ARTS THAT STUDENTS MIGHT NEVER HAVE EXPERIENCED BEFORE.”

In addition to exciting collaborations, the initiative also introduces new arts courses. This begins with pilot experiments that Beckman hopes will lead to the foundation of an arts scholars program she describes as being similar to the Benjamin Franklin Scholars Program, but with a particular focus on helping new Penn students explore art and culture in an array of formats. This goal is embodied in a series of freshman seminars that will kick off in the fall of 2013. The classes will strive to interact with greater University initiatives in meaningful ways. In a nod to Penn’s 2013-2014 annual theme, “Year of Sound,” Professor of Music Carol Muller is teaching a course on African diaspora music and Associate Professor of Music Emily Dolan is teaching Sound Art. “The courses run the gamut; Susan Bee at Kelly Writers House is teaching a course called Writing About Art that will take students around different gallery spaces and have them write a response,” says Beckman. “It’s all about creating avenues that put a new face on a certain aspect of the arts that students might never have experienced before.”

Ideally, the Arts Scholars program would provide a fully-funded internship to all Penn arts students. Two exciting global internships have already been secured: one at the Museum of Modern Art in Frankfurt am Main, Germany, where a student will work with a curator on an exhibition about the Brazilian artist Helio Oiticica; and the other at the Pera Museum in Instanbul, Turkey.

Also part of the initiative is a new online arts and culture magazine that will feature student content, as well as an interactive arts map that lets web users scroll over locations and see at a glance what is happening. Brooke Sietinsons, Senior Designer of Publications and the web project lead for the initiative, also worked closely with Beckman to launch an alternative campus tour focused on appealing directly to prospective arts students. As part of this same effort to increase resources for students and visitors interested in the arts, Beckman is collaborating with Campus Philly—a nonprofit organization that encourages students to explore, live, and work in the Greater Philadelphia area—to include Penn in Passport to the Arts, a pilot program which provides discounted arts opportunities to incoming students. If successful, and the costs of participating can be sustained over the long term, she hopes to eventually extend the passports to all incoming freshmen.

It’s a lot of coordination between a lot of parties and Beckman is the first to admit her role within the University has seen a seismic shift since her work on the initiative began. “It’s a challenge. I try to block off days and say, ‘OK, this
“The richness of the arts at and around Penn sometimes goes under the radar ... most students don’t even realize, for instance, that Andy Warhol had his first solo show at ICA.”

is going to get finished no matter what!” she laughs. Her scholarship, however, isn’t taking a back seat. She is currently at work on a new book focused on one of her passions: animation. This past fall, she hosted a conference on animation at ICA—the second half of a two-part program that began last spring in Berlin and included experts ranging from science historians to digital animation engineers and medical experts who use animation to teach patients and doctors in training. Topics ranged from the ethics of animation to whether “bloopers” in digital animation are caused by software or by the users. “We had the more technical minds on one side claiming it could only ever be human error, and on the other side we had humanists refusing to believe it,” Beckman laughs.

It has never been more important to endorse the liberal arts, Beckman says. “We’re in a very pre-professional moment of higher education. The whole idea that there is a war on liberal arts is driven by the economy and people’s understandable anxieties about getting a job.” Part of this, she says, is due to rising tuition costs and mounting loan debt, which lead students to choose an educational track they think promises a high paying career, rather than what they might feel passionate about. “With the initiative we hope to reinvigorate the art and culture landscape, help students discover the many potential career pathways that unfold out of a serious engagement with creative fields of study through increased contact with alumni—who can serve as wonderful career mentors—and guarantee students in these fields have the resources to be successful at Penn and beyond.”
Animating characters at Nickelodeon Studios, attending meetings at *Rolling Stone* magazine headquarters—internships aren’t supposed to be this fun, right? Each year, the RealArts@PENN program, committed to integrating art world practice into the academic experience, selects top students for targeted internships like these. Once a candidate has been chosen, they sit down with the employer in order to determine whether the position is a good fit. And while interviewing with an international media giant like Viacom may seem like a lot of pressure, the payoff is invaluable, as the resulting skills and connections carry over long after the summer ends.

Amanda Wolkin, a junior majoring in English with a concentration in creative writing, is headed to *Philadelphia* magazine, while Samantha Sharon, a sophomore in communication and art history, will get firsthand experience with the collections at the Jewish Museum in New York.

Departing for the west coast is Danny Eisenberg, a junior cinema studies major, who will be working one-on-one with prolific screenwriters David Stern and Stuart Gibbs in Los Angeles. “It’s an opportunity to get your foot in the door in a place that seldom allows access,” says Mingo Reynolds, Director of Administration at the Center for Programs in Contemporary Writing. “It’s so exciting to see someone’s future completely transformed by one summer of their college experience.”

Each year, internships send Penn students all over the world to fill roles that impact their own life experience and that of others, as well as inform their scholarly and career choices. Join us as we explore a sampling of undergraduates’ exhilarating summer plans.

**REALARTS @PENN**

RealArts@PENN

Each year, internships send Penn students all over the world to fill roles that impact their own life experience and that of others, as well as inform their scholarly and career choices. Join us as we explore a sampling of undergraduates’ exhilarating summer plans.
Spending ten weeks on an internship with the Center for the Advanced Study of India (CASI) will push your Penn education beyond the classroom. Whether you’re headed to the dry lands of rural India to work with a grassroots initiative focused on water and livelihood security like Aashna Desai, a freshman in the Huntsman Program, or joining Aravind Eye Care System in Madurai, which conducts hundreds of thousands of eye surgeries per year—the majority free of cost—like junior French major Diana Blidarescu, the lessons are life-changing.

Other India-bound students include sophomores Alex Polyak, a South Asian Studies major, and Philosophy, Politics and Economics major Jonathan Paz, who will both report to Lend-A-Hand India, a non-profit organization that provides vocational training, career development, employment, and entrepreneurial opportunities to young boys and girls. “Our students will face many challenges during their ten weeks in India,” says Aparna Wilder, Student Programs and Outreach Coordinator for CASI. “As they start to see the world through a different lens, they learn to ask harder questions, and return to Penn determined to re-engage with their own communities at a new level.”
Lots of students go back home for the summer. But a few lucky undergrads are headed to the most famous house in the world: the White House. It's just one of the competitive internships the Penn in Washington (PIW) program helps students secure. Designed to provide guidance to scholars headed to D.C. for the summer, the program also helps them maximize their time in Washington by organizing networking dinners, tours of the Capitol, informational interviews with experienced alumni, and special events like the State Department lunch, where students have the chance to meet with alumni who are foreign service officers, civilian employees, and even ambassadors. And best of all—it's free. “We just had a dinner with someone from the intelligence sector, because several of the kids were interested in that field,” says Deirdre Martinez, director of the program and senior fellow at the Robert A. Fox Leadership Program. “Multiply that kind of expertise by about 400—that's how many alumni working all across D.C. participate in PIW.”

Past interns include senior Morgan Finkelstein, a communication and public service and history major who interned at the White House; Charles Rubenfeld, a junior economics and political science student who worked with the White House Council of Economic Advisors; Caitlin Mumford (philosophy, politics and economics), Mina Miljevic (communication and political science), and Alex Haber (political science), all seniors who interned at the State Department; and political science senior Casey Becker, who got firsthand experience working for Congressman John Larson. “It's fantastic that alumni are willing to be a resource to students who can meet them in person and find out what life is like at, say, the State Department. It's incredibly valuable,” says Martinez.
Imagine a renowned scientist from your field of study pitching you a summer job. That’s business as usual at the Center for Undergraduate Research and Fellowships (CURF), dedicated to providing opportunities for students to pave the way to their own research careers. The Penn Undergraduate Research Mentoring program (PURM) invites faculty to submit 10-week projects for freshmen or sophomores to apply to and get immediate hands-on experience, ultimately providing a chance for the students to continue along the same research path during the school year.

A number of PURM internships this summer will be sponsored by Alex’s Lemonade Stand, an organization dedicated to fighting childhood cancer. Internships range from traditional lab work, like Professor of Pathology and Laboratory Medicine Warren Pear’s mentorship of sophomore Curtis Lee on the study of T-cell leukemia, to roles that stress patient well-being and complementary medicine, like Assistant Professor of Family Medicine and Community Health Jun Mao’s mentorship of College freshman Coby Basal, which will focus on young cancer survivors’ wellbeing. “PURM is an invaluable introduction to the field, and often the students continue to work throughout the rest of their undergraduate career with the same faculty,” says Aaron Olson, CURF’s Assistant Director for Communication. “It’s the perfect launching pad for independent research.”

In a sense, all students in the Roy and Diana Vagelos Program in Life Sciences and Management are bilingual—they speak the language of both science and business. It comes with the territory in a program designed to combine a strong background in research with cutting-edge business sensibilities.

This summer, sophomore Robert Hsu will cross the Pond to join the Behaviour and Health Research Unit at the University of Cambridge to study the marketing of potentially harmful products in preparation for a career in public health, while Hanna Kamaric, a junior, will work in public finance as she pursues her goal of a career in hospital administration. Max Shen, a sophomore, has accepted a summer internship at Vertex Pharmaceutical, where he will gain valuable experience regarding the intersection of pharmaceutical science and business. “It’s about preparing students for a competitive environment,” says Peter Stokes, LSM Director of Administration and Advising. “And stressing that, while research is fundamental, so is its application.”
“One of the glorious things about being a physicist is that you get to ask things like ‘Could there be extra dimensions?’” says Vijay Balasubramanian. “Does that sound crazy? Yeah. But could it be true? Yes. In fact, for string theory to work, it has to be true. So let’s try to make a prediction, an experimental test … How much cooler can it get?”

The Cathy and Mark Lasry Professor of Physics and Astronomy loves his job. As he sees it, his field is anything subject to the laws of physics. He examines black holes, explores the limits of Occam’s razor, researches how our brains work, and tries to figure out how there might be extra dimensions in our universe right now. (One possibility: dimensions so tiny we haven’t found them yet.)

He does this by paying no attention to any disciplinary dividing lines in researching a problem. Trained in computer science as well as physics, he concentrated on string theory for his doctorate, but became interested in neuroscience—the study of how neural circuits and brains work—toward the end of his graduate studies and as a junior fellow of the Harvard Society of Fellows.

When he came to Penn in 2000 he discovered that he could walk over to the neuroscience lab in the medical school during
lunchtime, and that faculty throughout the University were very interested in collaborating. He wrote a number of papers with Peter Sterling, now an emeritus professor of neuroscience. Then Balasubramanian applied for a neuroscience grant and got it. “All of a sudden I was doing both things—string theory and neuroscience,” he says. “And I thought, okay, apparently I enjoy it.” That was important: “I emphasize to students that if it isn’t fun, this probably isn’t the career for them.”

More than fun, it’s deeply meaningful to him. “I’ve always wanted to understand nature at all scales of organization, in the style of the great founders of physics rather than the compartmentalized mode of modern academia,” Balasubramanian says. He also believes our ability to understand the fundamental laws of nature is shaped and limited by how our brains themselves work; understanding that is part of the same quest.

Whether brains or black holes, that quest is to answer the question, “Why?” “Physicists believe there are orderly relationships that underlie even the most complex phenomena, that you should be able to explain why things are organized the way they are, not just what and how they are,” he says. “And if you believe there are laws to be uncovered, you go look for them.”

Physicists also bring “an arsenal of technical tools” to collaborations, and learn from their collaborators in turn. “Working in neuroscience has taught me the art, the importance, and the joy of being in close contact with the data and experimental facts,” says Balasubramanian.

“My interest in the ways information is produced and processed in neural systems has led me to information theory, and I’ve now applied those techniques to problems in string theory ranging from the physics of black holes to the ‘emergence’ of space time.” Information inside black holes is by definition unobservable. But, as physicist Stephen Hawking has shown, black holes slowly leak energy and evaporate, presenting one of the great conundrums in theoretical physics. “Quantum mechanics says that you cannot lose information,” says Balasubramanian. “But how do you recover the information that was inside the black hole?”

The information in complicated earthly systems, such as superconductors and brains, had long been equally unobservable, but technology has advanced so much we can begin to see what’s happening there. Scientists have been studying neurons one at a time, following a classic scientific method that examines a subject—whether society or a material or a living organism—by breaking it down. “Then you explain in great detail the properties of the constituent components,” says Balasubramanian, “and then, hey, it’s like Lego, you stick them together.”

He and others are realizing that this is not enough; in many complex materials information is shared across the entire system. “Suppose the key thing is actually the interaction between the constituents—that’s what makes the unit function,” he says. “If you think about human societies, they work the way they do because of the ways in which many, many, many individuals interact.”

Balasubramanian thinks of the brain as a sort of a computer, although organized nothing like a laptop computer, in which every task is handled by a central processing unit. In the brain, input is split up into many specialized functions, with a different area of the brain responsible for each one. Then each of those areas is further divided. It’s extremely efficient; a laptop consumes about 80 watts of power, while your brain uses...
about 10 watts. “Your brain consumes about the power of a refrigerator light bulb,” says Balasubramanian. “With such a small amount of power, we do enormously many things, right? And a computer can’t do art appreciation.”

“People talk in biology about the structures of animal bodies or the digestive system being adapted to what’s in the world around it,” he says. “So we’re saying that the information processing architectures in the brain are also adapted to what’s in the world.” To learn more, he’s studying how the brain processes input from sensory systems like sight and smell, collaborating with faculty including psychology’s Professor David Brainard and Assistant Professor Nicole Rust; fellow Professor of Physics and Astronomy Philip Nelson; and, at the Perelman School of Medicine, Associate Professor of Neuroscience Joshua Gold, and Assistant Professor of Otorhinolaryngology Maria Geffen.

His collaboration with Brainard, whom he describes as “a galactic expert on color vision,” began when they were both working with Sterling. “Vijay was thinking about first principles, explanations for why the retina has some of the properties it does,” says Brainard. “And we thought, hey, we ought to be able to take those ideas and think about their implications for the color process.” They published a paper on the reasons behind the arrangement of photoreceptors, and another on the Penn Natural Image Database, which they created for their research. They’re currently examining whether variations in how the retina adapts to changing environmental conditions can shed new

Balasubramanian says of studying the physics of the living world, “It’s the Columbus syndrome, right? There’s an uncharted land, so you should go there.”
Your brain consumes about the power of a refrigerator light bulb,” says Balasubramanian. “With such a small amount of power, we do enormously many things, right? And a computer can’t do art appreciation.”
Assistant Professor of Physics and Astronomy Alison Sweeney represents a different approach to interdisciplinarity: All her degrees are in biology. “I left college sort of wishing I had been a physics major,” says Sweeney. Fortunately, mentors steered her to a graduate program where she could work in “a synthetic area” between biology and physics. “The more questions I asked, the further I was able to develop my own ideas, the more I realized I was interested in explaining the physical underpinnings of what evolution acts on,” she says. “And to do that, I had to learn more and more physics. So ultimately it was surprising, but surprisingly right, to find myself in a physics department.”

Like Vijay Balasubramanian, she is studying optical systems. Right now she’s focusing on mollusks, which share a class of proteins called reflectins, with which they build what Sweeney calls “remarkable little optical apparatuses.” In work begun as a postdoc with Dan Morse at the University of California, Santa Barbara, she has discovered that giant clams use their reflectins to help grow the algae they eat. She’s also examining how squid use reflectins to camouflage themselves in light coming through open water.

Her work has industrial implications for biofuels, solar cells, and other uses. She’s already talking with professors in the School of Engineering and Applied Science about working together, continuing her study of the “nifty optical adaptations and strategies and solutions life has come up with to solve problems.”
With Class

TEACHING ABOUT THINKING
A PHILOSOPHER, A COGNITIVE SCIENTIST, AND A POLITICAL SCIENTIST WALK INTO A CLASSROOM. WHAT HAPPENS NEXT?

BY SUSAN AHLBORN

It’s not often you’re asked to think about thinking, but that’s exactly what 80 College freshmen did this spring, in an ambitious and demanding crash course in the full scope and power of the liberal arts.

Just finishing its second year, SAS’s Integrated Studies Program (iSP) was designed specifically for College freshmen accepted as Benjamin Franklin Scholars, a designation that requires an additional application process. “This was a way for us to dive into the core of what the liberal arts mission is, for students who really came here to pursue ideas for their own sake,” says Peter Struck, an associate professor of classical studies and the founder and director of iSP.

The program, which provides half of its students’ credits for the year, involves a professor each from the humanities, social sciences, and physical sciences, teaching an introductory class in his or her field, all organized around a common theme. The fall semester’s theme was “Knowing,” the spring’s was “Thinking;” both reflecting the University’s “Year of Proof.”

In both semesters, each professor taught one day between Monday and Wednesday; then all three, along with iSP’s three post-doctoral teaching
fellows, met with the students on Thursday. On Friday the fellows worked with sections of 14 students each. There is also an extracurricular program each Wednesday evening in Riepe House, where the students all live.

Spring semester, the faculty were Associate Professor of Philosophy and Education Karen Detlefsen; Janice and Julian Bers Assistant Professor in the Social Sciences Jeffrey Green, a political scientist; and Christopher H. Browne Distinguished Professor of Psychology Sharon Thompson-Schill, a cognitive scientist. They began meeting to design their course more than a year earlier.

"I learned more teaching this course than from any other course I've ever taught," says Green. "They're some of the most ambitious and driven and talented students, but they are freshmen."

"It was difficult—a lot of work," says student Harry Cooperman. "But it's a new approach, and it was something I wanted to experience, to try to learn three different, extremely separate topics and ask, how does each one approach the same idea?"

From the beginning, ISP was designed as a residential program, with the students not only learning but living together. "There's an ISP humor," Melissa Beswick says. "We were all reading the same things, talking about the same concepts, so people made really nerdy, really intellectual jokes that nobody outside ISP would understand."

Struck sees the program as a hothouse, to help the students discover their intellectual passion and prepare them for a world in which being able to see questions from a variety of angles will be invaluable. "We don't aim for some tidy bow at the end of the week, to say, okay, now we understand what X truly is," he says. "Just finding the boundaries and dimensions of each discipline's contribution is hugely instructive. The multiple disciplines give you another place to stand from which you can analyze what's happening in your own world. There's nothing like it."

Detlefsen adds, "Some of the students did an extraordinary job of writing philosophically with a richness that I don't normally see, precisely because they were drawing on productive ways of thinking from the other two streams."

Beswick realized that the program is making a difference in how she approached her other courses, and she brought perspectives from them to her ISP classes, as well. "It was impossible to write the essays without taking ideas from so many different places and putting them together in new and exciting ways," she says. "I could have worked on some of them for days or for weeks. Months."

"I feel it is something that has changed the course of my studies at Penn," says Cooperman. He had been pondering a double major but now feels that one major and other diverse courses will be a stronger background. "I think that's what ISP opened my mind to—trying different things. ISP was like dipping your feet into the water, a pool that you don't know the depth of. It was like a leap of faith. And it was worth it."
LEADER OF THE PACK

Alison Byerly, G’84, GR’89, former Middlebury College Provost and current visiting scholar in literature at the Massachusetts Institute of Technology, has been named the first female president of Lafayette College. We sat down with Byerly to discuss her experience at Penn, her work at Middlebury, and her big transition. Just how does a new college president balance scholarly interests with the demands unique to the job?

Q: Tell me about your time at Penn.

Byerly: I was very well served by the graduate program in English, and throughout my career I have remained very grateful for the excellent fellowship support I received. My major field was Victorian literature; I worked with Elaine Scarry, Nina Auerbach, and many other terrific faculty members. The program emphasized preparation for a wide range of different professional environments; it provided extensive teaching experience and really encouraged you to do things like get out and give conference papers and turn them into articles. My mother also has a Ph.D. in English from the University, so she had been in the same program years before. There were one or two faculty members at that time who still remembered her, and she certainly was an inspiration to me. So it felt nice to follow in her footsteps.

Q: What were some of the initiatives you oversaw as Middlebury College Provost?

Byerly: In my time at Middlebury, one of the things I was most interested in was figuring out which institutional structures help support and encourage innovation. I think sometimes in higher education you hear administrators and boards talk about faculty as being unwilling to change or being reluctant to embrace new ideas, but individual professors are very creative when it comes to their own classes. So I put together high-level task forces involving large numbers of faculty to engage in discussions about ways in which we could encourage innovation at an institutional level.

Q: You wrote an article for Inside Higher Ed that discussed ways in which university course evaluation systems might be revised. What solutions did you offer?

Byerly: I thought it would be beneficial to allow for faculty to have the opportunity to collect a set of course evaluations but not have them count if they’re teaching a new course for the first time. It doesn’t mean that we take teaching any less seriously because we don’t use course evaluations in our reviews. It means that, if you’re teaching a new course, you could ask to simply have that set of evaluations not put in your review file. I think the academic profession doesn’t really encourage risk-taking. It’s very structured. It encourages people to play by the rules. And there are moments when I think you can take a step forward a little bit more easily if you stretch those structures a little bit.

Q: You have maintained a role as an educator and scholar. How do you balance these undertakings with your administrative duties?

Byerly: As the provost, it was important to try to maintain both a teaching persona and a scholarly profile. I’ve been fortunate to have the opportunity to go on sabbatical even while serving in the administration. My book that just came out, Are We There Yet? Virtual Travel and Victorian Realism, combines my interest in Victorian literature with my interest in media studies. It explores affinities between realism in the 19th-century novel and contemporary ideas about virtual reality. That led me in the direction of looking carefully at technology issues, particularly in how they affect higher education in general.

I also wanted to make sure I continued to teach at least one course a year. I found that it was a terrific way to stay in touch with students. It’s very easy when you’re an administrator to see only the students who are excelling or who are student government heads, but not really have a feel for the student body as a whole.

Q: What do you foresee as your first major initiative as president of Lafayette?

Byerly: As head of the pack, it’s important to try to maintain both a teaching persona and a scholarly profile. I’ve been fortunate to have the opportunity to go on sabbatical even while serving in the administration. My book that just came out, Are We There Yet? Virtual Travel and Victorian Realism, combines my interest in Victorian literature with my interest in media studies. It explores affinities between realism in the 19th-century novel and contemporary ideas about virtual reality. That led me in the direction of looking carefully at technology issues, particularly in how they affect higher education in general.

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**Food Justice**

Erin Healy, C’00, is on a mission to improve access to healthy food for youth of all incomes. Her Miami-based organization, Youth L.E.A.D. (Leading Environmental Advocacy through Democracy), is dedicated to promoting local food resources, educating young people on nutrition, and training student apprentices to spread the word that everyone deserves a healthy start. Healy, who graduated with a major in anthropology and a minor in history of art, describes the obstacles young people face when trying to eat well, and why the rest of us need to step up and take action.

**Q: What first inspired you to found Youth L.E.A.D.?’**

**Healy:** It was a culmination of a lot of different experiences, observations, and research. I’ve worked in public health and in environmental protection and education. I’m a long-term vegan and I’ve always cared about the intersection of health and the environment. I felt that this intersection was not really being acknowledged by a lot of government agencies and organizations. I also found that low-income neighborhoods and young people were really not being included in this dialogue about our food system and about the environment. And yet those communities are often the ones that bear the brunt of environmental pollution and destruction.

While a freshman at Penn, I lived in Van Pelt, in the Gregory College House, which hosted many international students. I also took race relations and women’s studies courses as electives. I would not be the critical thinker and social activist I am today if I hadn’t had that exposure to diverse voices and the challenges that come with deconstructing race, gender, and class in America, and so with Youth L.E.A.D. I wanted to create a place where we could talk about these issues, while also incorporating a social justice element to it.

**Q: How do you get youths involved in their health?’**

**Healy:** We have an after-school training program in the fall, and then in the spring we place them in jobs that provide helpful nutrition information, places like farmer’s markets and community gardens. Last year, we conducted 500 surveys among residents to create baseline data and get feedback about food access and preferences. We use this information to brainstorm solutions to address issues like sustainability—ensuring the community has food that doesn’t harm anybody and is affordable, natural, and healthy. I felt it was important to create a design where we could train and empower young people so that, over time, what started with one person could really become a large core of young leaders and activists who continue working on these initiatives and eventually take them over in their own communities.
Q: How have participants responded thus far?

Healy: They show a huge change. Sometimes it takes a full year. Sometimes it takes longer. But they come back and say, “I changed the way I eat. I read food labels now. I’m able to focus at school, and I’m going to the farmer’s market instead of buying junk.” Once young people are educated about diet-related illnesses, they start really talking to their parents and their families and working together to make a change. We even had some that wanted to stay with the program after their second year, so we created a peer education workshop. And now they go out and recruit other youths, and they use that workshop to educate them. So it was a way for us to keep them involved if they were still interested past their second year of the program.

Q: Youth obesity is often cited as a national health crisis. Does the idea of food justice go hand in hand?

Healy: Absolutely. I think it’s all related. When students walk home from school, they’re just inundated with fast food advertising. They’ll go to the corner store, and they don’t have healthy options to choose from. So, a lot of it is about access, but I think also education—providing people both the knowledge and resources they need to create a change in their diet and support systems along the way. It’s difficult for people to change overnight, especially when it’s about food, something that we take in three times a day, if not more. Many people are so distanced from ideas about nutrition nowadays and it’s really important to bring them back in touch with where our food comes from and how all of this relates to our health and to our communities.

Q: What’s next for Youth L.E.A.D.?

Healy: I am working hard to secure funding to move Youth L.E.A.D. into its own space, complete with an on-site garden, kitchen, education rooms, and staff offices. We have been mobile since our inception three years ago, but we desperately need our own space to allow us more frequent interaction with participants and the community, as well as storage and kitchen facilities that we could use to cook, package, and process produce for sale at the markets and in local stores. The goal is for Youth L.E.A.D. participants to take on microenterprises whereby they grow, package, preserve, and sell healthy foods to earn revenue while increasing access to food among residents.

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* The deduction will vary with the federal discount rate at the time of your gift. Assumed rate 1.2%. The examples are for illustration purposes only.

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Photo by CU-Boulder scientists Bohdan Senyuk and Ivan Smalyukh
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