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HOW THINGS WORK, EVEN BETTER

by DEAN STEVEN J. FLUHARTY

As an alumnus, a parent, and a member of the faculty and administration, I have taken part in many Penn graduations. Even so, this May’s ceremony was special for me. For the first time, as I celebrated the accomplishments of all our Arts and Sciences students—the College Class of 2014, the scholars who earned their doctoral degrees, and the many professional and non-traditional students who completed master’s and other programs—I did so with an understanding of what’s under the hood. Over the course of my first year as dean, I have learned a lot about the impressive group effort that results, every academic year, in over 2,100 new Penn Arts and Sciences alumni.

So what is under the hood? First of all there is an unbelievable churn of activity surrounding faculty recruitment. Competing against the top programs in the world’s best universities to attract leaders in their disciplines—who also bring a broad perspective that can feed new directions of inquiry and are dedicated to excellence in teaching—is a major undertaking. I’m proud to say that we have had some notable successes this year. Academic stars like Heather Williams, one of the world’s leading historians on the experience of slavery, and noted Biblical and Jewish studies scholar Steve Weitzman will inspire both their colleagues and our students for many years to come.

Then there is the work associated with making the Penn Arts and Sciences student experience even better. The campus-wide process for reaccreditation by the Middle States Commission on Higher Education, which takes place every 10 years, was a major focus for us last year. This exercise provided us with encouraging feedback on our ongoing efforts to assess how successful our programs are in meeting stated educational outcomes. And innovations in education are always underway. In the new undergraduate structured active in-class learning—or SAIL—courses in the sciences, students spend their class time solving problems and interpreting data or evidence. You can read more about one of these classes on page 32. Then there are new options like our just-launched Master of Chemical Sciences program, the first of its kind in the Ivy League, which offers current and aspiring professionals in the chemical sciences a path to build their expertise in a compact time frame.

Much of my time last year was spent looking even further under the hood: engaging with our faculty in an intensive strategic planning process. This consultative phase involved conversations about our future that began in 14 working groups involving over a quarter of the faculty. Two of these working groups—on diversity and innovation—are new standing councils that will provide a structure for progress in these critical areas. Other groups addressed our core research and teaching activities, while still others explored emerging interdisciplinary academic themes that might present special opportunities for major advances in research, education, and engagement. The planning process has been an extraordinary learning experience for me, and for our faculty, it’s been an opportunity to consider the impact of what we do in the broadest sense.

The work of our entire community has continued over the summer months. Our students traveled to locations well beyond campus to put their learning to work in internships, employment, research projects, and service experiences. Faculty have been pursuing the issues that they are most passionate about through research in the field, in archives and labs, and with collaborators worldwide. And in the dean’s office, I have continued to work closely with my colleagues to use the tremendous input we received through our consultative planning process, fine-tuning the School’s efforts, aligning our gears, and maximizing the School’s potential for years to come.
2014 DEAN’S SCHOLARS

Each spring, Penn Arts and Sciences names 20 students from the College of Arts and Sciences, the College of Liberal and Professional Studies, and the Graduate Division as Dean’s Scholars. This honor is presented annually at the Levin Family Forum to students who exhibit exceptional academic performance and intellectual promise.

College of Arts and Sciences
Michael Boreen, C’15, G’15, Biochemistry and Chemistry
Christina Economy, C’14, International Relations and Economics
Rachel Eisenberg, C’15, Religious Studies
Vinicius Ferreira, C’15, G’15, Chemistry
Ben Freedman, C’14, Biological Basis of Behavior
Aleksandra Igdalova, C’14, Visual Studies
Dahlia Klein, C’15, G’15, Biophysics, Chemistry, and Physics
Ting Cho Lau, C’14, Philosophy and Political Science
Rosaline Zhang, C’14, M’18, Biology and Urban Studies

College of Liberal and Professional Studies – Undergraduate Program
Darren Finn, LPS’13, Biology

Professional Master’s Programs
Jenna Shweitzer, Master of Environmental Studies

Graduate Division – Doctoral Programs
Margaret Andrews, Art and Archaeology in the Mediterranean World
Guzmán Castro, Political Science
Allegra Giovine, History and Sociology of Science

Adam Goodman, History
Alessandra Mirra, Romance Languages
Jill Portnoy, Criminology
Jerome Robinson, Chemistry
Madeleine Stone, Earth and Environmental Science
Dmytro Yeroshin, Mathematics

CONFERENCE CELEBRATES 40 YEARS OF GENDER, SEXUALITY, AND WOMEN’S STUDIES AT PENN

Penn Women’s Center (PWC) and the Gender, Sexuality, and Women’s Studies Program (GSWS) celebrated their landmark 40th anniversary this year with a two-day conference featuring faculty and student panels on a range of topics, including the role of gender in art, literature, health care, the labor market, and religion.

Demie Kurz, Co-Director of GSWS and the Alice Paul Center for Research on Women, Gender, and Sexuality, says the celebration drew large audiences and allowed some of the founders and early activists to return and participate in panels.

“Conference attendees were riveted by stories of how challenging it was to gain acceptance of the idea that scholarship on women was both legitimate and important, and that women at Penn—faculty, staff, and students—should be treated equally in relation to their male counterparts,” Kurz says. “Our keynote speaker, Jessica Valenti, founder of the popular blog Feministing, fully engaged the audience with descriptions of how women have come a long way but still face many challenges in terms of pay equity, sexual violence, and LGBT rights.”
KATZ CENTER’S RUDERMAN STEPS DOWN AFTER 20 YEARS

David Ruderman already had a long list of accomplishments when he came to Penn in 1994 to lead the new Center for Advanced Judaic Studies. When he stepped down as the center’s Ella Darivoff Director this spring, he left a globally recognized legacy.

Under Ruderman, the Katz Center (renamed in memory of its former Board of Overseers Chair Herbert D. Katz, W’51, in 2008) has become a place where Judaic scholars of all ages and cultures gather each year to develop a subfield of Jewish studies. They not only take time to think, learn, and write, but also work together and get involved in the life of the University and the community.

So far, 450 fellows have come through the center, forming bonds with their fellow scholars that last long after the year is over. “What administrator gets inspired every year by 20 new scholars?” asks Ruderman. “I got to know and guide them, and they got to know each other. I’m an intellectual shadkhan [matchmaker], bringing people together.

It’s been a privilege.”

Author and editor of a host of publications, Ruderman has twice received the national Jewish Book Award in history and won the Koret Award for best book in Jewish history. He edits the center’s series Jewish Culture and Contexts and was awarded the Charles Ludwig Distinguished Teaching Award at Penn in 2008. The National Foundation for Jewish Culture has honored him with its lifetime achievement award.

Ruderman remains Joseph Meyerhoff Professor of Modern Jewish History in Penn Arts and Sciences and continues teaching, especially undergraduates—always his first passion.

COMMENCEMENT SPEAKERS SHARE THE WISDOM OF EXPERIENCE

On Sunday, May 18, the College of Arts and Sciences celebrated the Class of 2014 at a graduation ceremony featuring speakers Laura Alber, C’90, and Dau Jok, C’14. Jok is a two-time co-captain of Penn’s varsity men’s basketball team and founder and director of the Dut Jok Youth Foundation, which aims to empower Southern Sudanese youth through leadership-building activities. He spoke to his classmates about his journey from a childhood ravaged by civil war in the Sudan to his rewarding time at Penn and the many champions who helped him along the way. Alber, who is president and chief executive officer of Williams-Sonoma, Inc., addressed the graduates, friends, and family about commitment, being in the moment, and the limitations of planning.

From left to right: Laura Alber, C’90, and Dau Jok, C’14.
ARTS & CULTURE INITIATIVES RALLIES INTEREST

In 2012, Karen Beckman, Elliot and Roslyn Jaffe Endowed Professor in Film Studies, set out to change the way students view Penn’s commitment to the arts. With regard to one of the top priorities—providing new resources for prospective students—the numbers are in. Since launching in 2012, the Arts and Culture Initiative has resulted in a 25 percent increase in applicants interested in visual arts, and a 17 percent increase in applicants interested in literature.

“We’re glad to see it,” says Dennis DeTurck, Stephen A. Levin Dean of the College of Arts and Sciences, of the increase. DeTurck, who is also the Robert A. Fox Leadership Professor and Professor of Mathematics, goes on to note, “There is a lot here for students who are interested in the arts and the special admissions efforts that the Art and Culture Initiative has put in place are highlighting that.”

The initiative introduces an alternative arts-based tour of campus for prospective students, and a first-year seminar series designed to increase engagement with faculty in a small classroom setting. This September, the initiative will host “HAIKU: The Humanities and the Arts in the Integrated Knowledge University,” a two-day exploration held at the Penn Museum that will examine the role of creative practitioners in the humanities and the wider university.

“We hope very much that students and alumni will participate in this event so that we can think together about how the roles that art and culture might play in the evolving research university,” says Beckman.

Visit the Arts and Culture Initiative online to learn more about the activities our students, faculty and alumni are involved in: https://provost.upenn.edu/initiatives/arts.

Three Penn Arts and Sciences faculty were recognized this year with the Lindback Award for Distinguished Teaching, the University’s highest teaching honor. Recipients were Charles Kane, Class of 1965 Professor of Physics; Heather Love, R. Jean Brownlee Associate Professor of English; and Philip Rea, Professor of Biology. In addition, Rogers M. Smith, Christopher H. Browne Distinguished Professor of Political Science, was honored with the Provost’s Award for Distinguished Ph.D. Teaching and Mentoring.

Professor of English Timothy Corrigan received the Ira H. Abrams Memorial Award for Distinguished Teaching, the highest teaching honor awarded by Penn Arts and Sciences. Other honorees included Associate Professor of History of Art Gwendolyn DuBois Shaw, Antonio Feros, and Brian Gregory. Third row: Eileen Doherty-Sil and Ellen Kennedy.

TEACHING EXCELLENCE IN THE SPOTLIGHT

FULL BLOOM

If the biological clock ticks relentlessly for humans, it can be even harsher for plants, specifically annuals, which have a lifecycle of a single year. In order to bear seeds and reproduce, annuals must switch from a growing phase to a flowering phase when the temperature, light, and soil nutrients are ideal. If plants flower too soon, their seed yield is sparse. And if they flower too late, they will not be able to produce seeds before the harsh winter.

This transition into flowering is the subject of a recent *Science* article co-authored by Professor of Biology Doris Wagner, a developmental biologist who studies how structures form in plants.

“Plants change from a vegetative to a flowering state by responding to intrinsic and environmental cues, and it is an incredibly complex process,” Wagner explains. “They are even able to sense their competition—how many other plants surround them. My lab is investigating transcription: Which genes encoded in the DNA are being activated to trigger flowering and how the plant knows when to do this.”

Wagner’s research has significance not only for the survival of a plant species but also for the planet’s food supply, as well as biofuel production. Most crops are grown as annuals, so their successful reproduction is crucial for human sustenance. “The food supply is also threatened by increased population growth and the decrease in available arable land due to climate change,” Wagner says. “We must learn how to generate a higher yield of crops with less land and also gain understanding of how to make plants drought-tolerant.”

Professor Wagner also studies epigenetics—the study of chemical reactions that activate and de-activate the genome. “How can it be that all cells in an organism have the same DNA but give rise to different cell types and structures?” Wagner asks. The answer to that question is that not all of the genome information is visible in each cell type—only what is needed to make it a heart cell or a leaf cell. Defects in epigenetics underlie many diseases, such as cancer, and epigenetics also controls memory and aging. In plants it helps them cope with changing environments.

When studying the regulatory mechanisms of plant epigenetics, Wagner sees an overlap between plants and humans—and this informs knowledge about human health. “This is why the National Institutes of Health funds a significant part of plant epigenetic investigations,” she says.

Wagner plans to take a sabbatical in Germany to learn new research techniques at the Max Planck Institute for Plant Breeding Research in Cologne. There she will hone her knowledge about molecular biological research on plants. When she returns to Penn, she will be teaching a class in epigenetics and she will also lecture on transcription in an introductory biology course.

“If one could isolate a moment in history when it is imperative to understand how plants monitor and adapt to different environments, for example in the switch to making flowers, we have arrived there,” Wagner says. “The survival of animals is dependent on the survival of plants.”
The Crusades have been understood almost entirely from the Western perspective: at first, a triumphant tale of a holy quest, and more recently as an embarrassing episode of intolerance. Professor of Near Eastern Languages and Civilizations Paul M. Cobb believes it’s time for a different angle.

Cobb’s new book *The Race for Paradise: An Islamic History of the Crusades* looks at the event “as a period in Islamic history in its own right, not some exotic episode that intrudes like a rude houseguest and then leaves in a couple of centuries.” Using contemporary Islamic histories and religious writings, he found “a very messy affair, not one of good guys and bad guys but one which really explodes from the sources as a multifaceted, diverse, and wonderfully complex period.”

Conventional histories have the Crusades beginning in 1095, when Pope Urban II proclaimed the First Crusade with the goal of restoring Christian access to holy places around Jerusalem, and ending in 1291 when the last Europeans were expelled from the Holy Land. The area involved has been limited to the region known as the Levant: generally Syria, Israel/Palestine, Lebanon, and part of Egypt.

Islamic sources, however, see the Crusades as just another outburst of a more general Frankish (European) aggression that began when the Normans conquered Islamic Sicily around 1000 and stretched into al-Andalus (Spain) and across the Mediterranean. Cobb considers the end date harder to fix, but opted for 1492, when the last Muslims were forced out of Spain.

From this perspective the event was a Mediterranean-wide, 500-year phenomenon in which Muslims regained bits of the Levant but lost Spain and Sicily and faced the fear of constant invasion on all fronts by a culture that was perceived as inherently violent. Cobb says, “It was a kind of cosmic challenge: How was it that these barbarians from the north were able to score these major victories against our divinely protected, ordered, civilized society?”

The long timespan meant the period was not just one of war. There was plenty of diplomacy, ambassadorial exchanges, and treaties, but the cultural interactions also went down to the personal level, to commerce, intermarriage, friendship, and intellectual exchange. Not just commodities but ideas and practices moved back and forth across cultural borders. Cobb says, “You get the sense from certain sources that some Franks, once they settled down, could be quite decent folk if you were willing to put up with their eccentricities.”

Western Europe, once a mysterious place on the edge of the known world, was integrated into the body of knowledge that an educated person was expected to know about the world.

Cobb wrote his book for a general audience, not to claim the Islamic perspective is better, but to suggest that multiple perspectives be brought to bear on these events. “I think the history of the Middle East is under attack and oversimplified by pundits today,” he says. “It may make for a good movie, but it’s bad history because history is like real life. It’s messy and complicated. Properly done, history should make it impossible to score very simple points.”
How would you decide if damming up the San Francisco Bay would solve the area’s water problems? In the 1950s, the U.S. Army Corps of Engineers built a one-acre model to answer this question, simulating the flow of water in the real Bay using concrete and copper strips. Their answer was no; the water just stagnated and didn’t make the freshwater lakes some had hoped for.

Models—concrete, mathematical, and now computer—are a vital part of research, says Associate Professor of Philosophy Michael Weisberg, author of *Simulation and Similarity: Using Models to Understand the World*. Unlike the experiments and data-gathering we usually associate with science, though, models aren’t a direct reflection of reality. There is an interpretive step in creating and using any kind of model, so how true can the results be? Why can models be trusted?

Weisberg describes modeling as a kind of surrogate reasoning: To understand a complicated thing, we try to understand something simpler—a model—and then to understand the relationship between the simple thing and the complex thing. Modeling has usually been thought of in terms of direct structure mapping, but Weisberg says this approach doesn’t appreciate the fact that models often must be distorted or incomplete by design. Even using today’s supercomputers, there are restraints on size and cost so that the smallest unit represented in a computer model may cover a three-dimensional space of hundreds of kilometers.

Because of these limitations, Weisberg argues the goal of modeling shouldn’t be a 100-percent-accurate representation of reality. Instead, scientists should try to identify a few important ways in which the model and its target must be similar. Because different modelers have different reasons to make models—to understand a process, to explain mechanics, to make a prediction—each act of model construction will require a different judgment of which features should be included in the model and which should be left out.

For example, with the San Francisco Bay project, “I think they would be much more interested in being able to make predictions about the velocity of water than, say, the temperature of the water or the conditions for swimmers,” he says.

“If you ask ‘How good is this model?’—I don’t think that question can be answered without knowing what it is that you want to do with the model,” says Weisberg. “Some models make the best predictions. Some models are highly explanatory. Some models sensitize our imaginations. Science relies on all of these things. That’s the picture I have, and it emphasizes the importance of using many different models to bear down on a problem from different angles.”
What kind of specialists might one need to recruit in order to outmaneuver some of the best government intelligence analysts? Computer programmers, financial investors, and pharmacists, according to Barbara Mellers, I. George Heyman University Professor, Professor of Psychology, and Professor of Marketing in the Wharton School; and Philip Tetlock, Leonore Annenberg University Professor, Professor of Psychology, and Professor of Management at Wharton. As part of their long-term Good Judgment Project (GJP), the husband-and-wife team has recruited a wide swath of volunteers from all walks of life. The objective: test participants’ talent for predicting future outcomes and then pit them against the experts in the intelligence community.

In 2006, Tetlock published the book *Expert Political Judgment: How Good Is It? How Can We Know?* One of the major findings was that experts thought they knew a lot more about the future than they actually did, and that the farther out the forecasting horizon, the more difficult it is for them to make accurate predictions. “I think the U.S. intelligence community saw the book as a challenge,” says Tetlock. “They decided they wanted to run a big forecasting tournament to test the effectiveness of various techniques for improving the quality of probabilistic judgment, with the hope that some of those techniques might be importable into the intelligence community at some point.”

That’s where GJP comes in. The initial tournament, funded by government program Intelligence Advanced Research Projects Activity (IARPA), pitted five university-based teams against each other and inquired: What’s the best way to ask people about the future, and what are the properties and characteristics of people who make the most accurate forecasts? Penn faced off against teams fielded by other prestigious universities and won two years in a row. “That’s when IARPA fired the other teams and funded us,” says Mellers.

Questions range from political to military to economic, and are developed by subject matter experts like Associate Professor of Political Science Michael Horowitz. Sometimes questions have close-call endings: One asked participants to anticipate whether or not there would be a violent confrontation in the South China Sea before year’s end in 2011. The forecasting community predicted a very low chance of such an occurrence, but as the deadline neared a member of the South Korean Coast Guard was attacked during an arrest. “There’s a huge component of irreducible uncertainty, so one of the big questions is how low you should set your forecasts to counteract the possibility that some fluky event could occur?” says Mellers.

Forecasters have a number of tools at their disposal when it comes to researching predictions, including Gallup polls and intelligent news-aggregating systems that provide daily alerts of any relevant goings on. The GJP pulls from other fields to aid in information gathering, as well. Lyle Ungar, a professor of computer and information science in Penn Engineering, helps the team develop models of aggregation using winning algorithms over a wide range of possibilities. The most successful forecasters, however, will go so far as to directly contact some of the organizations that are part of forecasting questions. One volunteer even contacted the United Nations for information on a question about world food price inflation.

It may seem like pure guesswork, but Mellers and Tetlock say the numbers don’t lie. “If you were a dart-throwing chimpanzee, the long-term average of your forecast for binary problems would be 50/50,” says Tetlock, who along with Mellers has recruited other psychologists, like Professor of Psychology Jonathan Baron, an expert in judgment decision-making, to analyze project results. “Our best forecasters are beating the intelligence agency analysts by as much as 30 percent, and fall somewhere between the chimpanzee and the omniscient being. The question is, how close can we get them?”

The GJP depends on fresh volunteers in order to compile the most accurate data. Interested people are encouraged to visit the website, http://www.goodjudgmentproject.com, and sign up to try their hand at becoming superforecasters.
Paris today is the most popular tourist destination in the world. And that is no accident, says Joan DeJean, Trustee Professor of French and the author of *How Paris Became Paris: The Invention of the Modern City*. “Paris was the first city to really tear the walls down, figuratively and literally,” says DeJean. “Like most cities, it was fortified, but in 1669 Louis XIV had had enough. It was transformed into the most public and vibrant city up until that point, and paved the way for cities as we know them today.”

In 1600, Paris was a city with huge amounts of empty space and undeveloped land. Religious wars had left the country underdeveloped and the population downtrodden. Within 100 years, however, unprecedented urban planning, led by the monarchy and visionary artisans, saw the rebirth of the city’s infrastructure. This included new kinds of bridges, the first-ever residential city square, planned city housing, and residential architecture in the city. At the beginning of the 17th century, the widest streets in Paris were 15 feet wide. By the end of the century the average width was between 30 and 32 feet.

“The idea of guiding people through the city had begun. A great walking city had been created whereby people could get around easily and everything was connected,” says DeJean. “This translated into a less stratified social class as well. Aristocrats in Paris walked. People were still commenting on this decades later, how unusual it was to see people of great station walking in the streets. This meant you could see how they were dressed—their fine clothes. It was like a walking advertisement for the luxury goods industry.”

In order to delve into the philosophy of the decision-makers at the time, DeJean examined royal decrees: pamphlets issued by the royal printing shop. For DeJean, this meant tirelessly sorting through historical documents at the National Library of Paris. “The light’s not very good in the library. Some people wore little miners’ hats with lights in the front. And your hands would be so blackened by the end of the day that you couldn’t touch anything,” says DeJean. Luckily, she found a kindred spirit in the form of a municipal file clerk. “Someone there was from the Caribbean and had the same last name as I did. One day she asked me where I was from and I told her Louisiana. So she asked me for some recipes and I got my books a lot faster,” DeJean laughs.

One of the main concerns the decrees addressed was the economy of Paris. This meant improving the lives of the merchant community; hence, wider streets for transportation and shopping. The second guiding principle was improving quality of life, which meant more open spaces and additional housing. This led to planned recreational space and green spaces in the city. Such attention to individual citizens’ comforts set Paris apart at the time, says DeJean, and echoed throughout the world. “In Philadelphia you have the Benjamin Franklin Parkway as a model thoroughfare with a very wide street in the middle, and then tree-lined walkways and landscaped spaces for pedestrians on either side. It harkens back to this type of thinking,” she says.

DeJean cites Saint Petersburg, the second-largest city in Russia, as one of the first descendants of Paris’ urban planning. There are documented visits with timestamps of Peter the Great studying Paris architecture and directly incorporating its parkways, or “prospects,” in Russia. Other cities, like London after the Great Fire, developed city parks and squares modeled after those in Paris.

Over time, Paris also became renowned for its entertainment and food. Actors set up makeshift stages to perform plays in public and cafés sprouted up throughout the gardens. “In the hot summer, people would sit and drink in the gardens and just enjoy the cool air in the evening,” DeJean says. “On the boulevard they would put lights in the trees at night and people would dance. Foreigners would write home to others about this, how extraordinary it was to see people dancing at 3 a.m. in the streets of a city. It’s a legacy of openness that lives on today.”
Frame of Mind
Dorothy Roberts on Redefining the Way We Define Race

by BLAKE COLE  design by MATTHEW LEAKE

PHOTOGRAPHY by SHIRA YUDKOFF  additional photographs courtesy of DOROTHY ROBERTS
Dorothy Roberts isn’t one to sit still. The George A. Weiss University Professor of Law and Sociology and Raymond Pace and Sadie Tanner Mossell Alexander Professor of Civil Rights holds appointments in sociology, law, and Africana studies. Her new undertaking—The Program on Race, Science, and Society—is designed as an interdisciplinary initiative challenging social and life scientists to be more creative in their approaches to integrating race in their research. The program is a natural extension of Roberts’ current research and latest book, Fatal Invention: How Science, Politics, and Big Business Re-Create Race in the Twenty-First Century, which attacks the notion that race can be categorized biologically. It’s an assertion Roberts says can only be addressed through sharing knowledge between the social sciences and humanities and fields like medicine, genetics, and neuroscience.

Roberts’ recognition as a scholar on race was catapulted after her article, “Punishing Drug Addicts Who Have Babies: Women of Color, Equality, and the Right of Privacy,” was published in Harvard Law Review in 1991. The article eventually evolved into her first—now widely taught—book: Killing the Black Body: Race, Reproduction, and the Meaning of Liberty. But as a new professor, Roberts felt pulled between teaching law and her interdisciplinary approach to advocating for social justice. Penn represented an opportunity to bridge these interests. The Program on Race, Science, and Society, which recently launched with its premiere symposium, The Future of Race: Regression or Revolution?, is a prime example of this synergy. “We want to develop research projects to address concrete issues,” says Roberts. “Like, what is the relevance of race to studying why African Americans have a higher rate of infant mortality? How can we ever hope to solve a problem like this if we just assume the cause is genetic?”

Roberts says the culture of defining race in biological terms is often unexamined, and therefore especially dangerous. “There is a device currently used for measuring lung capacity called a spirometer that actually has a button for race, which is a holdover from the belief that enslaved Africans innately had lower lung capacity,” says Roberts. “So what information should a doctor put in for a patient who identifies as black, but most of whose ancestors come from Europe or Asia?” In addition, new products and services like race-specific pharmaceuticals, ancestry testing, and widely publicized books like A Troublesome Inheritance: Genes, Race, and Human History, by former New York Times journalist Nicholas Wade, only reinforce false concepts of race, says Roberts. “We need to tear down these disciplinary silos and have an honest discussion about humanity. It’s the only way we will ever make any progress in the study of race and racism,” she says.

Roberts’ scholarly pedigree is the result of a life of witnessing tumultuous social change and diverse cultural interactions. Somewhere between her accounts of huddling into the basement of a local church for civil rights meetings as a child and her sojourn across Central America as a college student with nothing but bus money, it becomes clear that the line between her life story and her academic career is non-existent. From her beginnings as a young girl dreaming of becoming an anthropologist, to her decision to join her father in the role of professor, it’s a journey that stretches across the globe and into the lives of those she has encountered along the way. Join us as we follow Dorothy Roberts through time.
An 11-year-old Dorothy Roberts presents a book report on *Black Power: The Politics of Liberation*. Charles Hamilton, the co-author, is her father’s colleague at Roosevelt University. Soon, U.S. Senator Eugene McCarthy launches his anti-Vietnam War presidential campaign against Lyndon B. Johnson. Dorothy goes door to door after school, handing out fliers in support. The city is buzzing. Up and down the streets of Hyde Park, neighbors hold meetings as proponents of civil rights. They sit hunched around TVs that play footage of the ugliness in the South. The wheels are in motion. Things are happening. And she has a front row seat.

**A Secret Place**

Education was everything in the Roberts house: a huge Victorian with a locked door on the third floor. The room felt extra-mysterious, because it was above where they slept, detached from everyday life. When her parents were occupied she would drag a chair up and get on her tip-toes to reach the old-fashioned key that hung on a nail. Upon entering her father’s study, there was an almost impossibly large wall of books: ethnographies, arranged by continent. She sat for hours, reading through tales about foreign lands. There were many books about India, where her father, ever the adventurous type, had lived as a teenager with his aunt who was a missionary. She learned how to breathe correctly from a book about yoga and wondered how so many people in the States could be doing it wrong.

Roberts was no slouch when it came to adventure. When she was only three months old, her family moved to Liberia, where her mother had previously been an educator after first emigrating from Jamaica. After they returned to Chicago, it became their tradition to watch the 16mm family movies from their trip. In one clip, her father attends a trial in a remote village. The verdict: a heated knife to the leg. Whether or not the wound blistered would determine the defendant’s guilt. By the time Roberts was five, she had decided: Like her parents, she would pursue anthropology.
A Father’s Legacy: Part 1

Roberts’ father was a “white boy” from an immigrant community in Chicago. His brother never forgave him for marrying a black woman. In 1937, when he was working on a master’s degree at the University of Chicago, he began what would become a lifelong undertaking of interviewing interracial couples. In his interviews he spoke with couples that had been married as far back as the late 1800s, the better part of a century before the final state bans on interracial marriage were struck down in 1967. The project ran like a thread through Dorothy Roberts’ formative years. The couples came to be involved in every aspect of family life: her babysitters, her piano teacher, the plumber, the carpenter, family friends. Her mother, who met Roberts’ father while working as a research assistant on the project, welcomed guests from all walks of life and parts of the world, exposing a young Roberts to invaluable diverse interactions. The interviews were to become a sprawling book. Several book deals and decades later, that book remains unwritten. It exists in 25 boxes of transcripts and papers piled high in Roberts’ office.

Student of the World

At their house in Maadi, a suburb of Cairo, Egypt, there was a beautiful garden Roberts’ mother tended. She hosted a constant stream of international students that introduced fresh ideas to the household. Roberts’ father had landed a Fulbright Fellowship to teach at the American University in Cairo. Roberts had just begun high school at a private institution that boasted a student body made up of the children of international diplomats and Texas oil executives, among others. Roberts’ best friend was Tunisian. They would learn to speak French, like many Egyptians, her French teacher told them, forbidding English in class. By the time Roberts returned to the States, her high school had to create special advanced French lessons for her.
Roberts’ dream to study anthropology had been secured. But after two years at Yale, she yearned for adventure. She spent her junior year at Universidad de los Andes in Bogotá, Colombia. Her host mother, Miriam, was a black-Colombian fortune teller who read cards and told Roberts she had a good soul. Miriam was from the remote region of Chocó, which had a population made up of the descendants of escaped slaves and indigenous people. Her husband was a white, elderly German engineer who worked for a gold mine there. Roberts could relate.

The trip to Chocó was inevitable. “The road disappeared long before you arrived,” Roberts recollects. “The bus jolted you mercilessly, so that the metal seats chafed the skin off your back.” Her hard-earned respite: a cot in a cinderblock house with rooms separated by sheets. She was awakened in the morning by a small boy yelling that someone had stolen his porridge. *Mi avena!* “There might not have been any running water,” she reflects, “but the people were welcoming and beautiful—I had never felt more at home.”

**Home Away From Home**

There was trouble in paradise. Anthropology, Roberts’ first love, was not creating the kinds of opportunities she hungered for. “I didn’t have any mentors who could tell me how to use a Ph.D. to participate in social justice activism.” She made the decision to get a law degree and go straight to the heart of the policy debates. Soon, she was graduating from Harvard Law and learning litigation skills at a premiere Manhattan firm, but she had traded inaction for frustration. “Haggling over documents with opposing attorneys didn’t exactly allow me to delve deeply into social justice issues the way I wanted.” It became clear: She would follow in her parents’ footsteps; she would be an educator.

**A Paradigm Shift**

While researching *Killing the Black Body: Race, Reproduction, and the Meaning of Liberty* at Rutgers University, Roberts became acutely aware of the disproportionate number of black children in the child welfare system, the result, she believed, of a fundamentally flawed approach based on applying punitive measures instead of supporting struggling families. Her second book, *Shattered Bonds: The Color of Child Welfare*, was the result. She was close to realizing her full potential as an interdisciplinary scholar and activist.

Roberts accepted a position at Northwestern, the same university where her mother pursued a Ph.D. in anthropology. “There is a photo of my mother shaking hands with the president of Liberia when he visited Northwestern,” she says. “I can’t imagine there were many black women—or many women at all—in Ph.D. programs in the 1950s. Knowing she was working on her doctorate when I was born was very inspiring to me when I was little.”

Robert’s new position was a joint appointment as a professor at Northwestern’s law school and a faculty fellow at the Institute for Policy Research. Located on the university’s Evanston campus, the institute allowed Roberts to flex her formidable social science muscles. But she felt like she was being pulled between two worlds: law and the social sciences. Soon a new opportunity in Philadelphia would reveal itself. But was she ready to tear up her roots?
One campus. No racing across town. Penn seemed like a perfect fit. As a Penn Integrates Knowledge Professor she would have the opportunity to teach the diverse subjects she loved, not to mention join the newly launched Africana studies department. But how could she leave Chicago, the city that had nurtured her as a young girl with dreams of changing the world? “I remember Penn put us up at Rittenhouse Square during my first visit,” Roberts says. “The park was all lit up, and people were at the cafés at 11 p.m. There was a buzz, like Chicago. That was when I knew I could make this work.” With the launch of the Program on Race, Science, and Society, Roberts is looking ahead with the goal of changing the way we look at race forever. “We need to definitively reject the myth that human beings are naturally divided into races and instead affirm our shared humanity by working to end the social injustices preserved by the political system of race.”

A Home at Penn

The one-year-old birthday girl in the frilly tutu comes into focus, surrounded by black Liberian children and white Dutch neighbors. It’s one of many memories captured on 16mm, a reminder of a childhood defined by a mother and father’s commitment to education, love for travel, and belief in our common humanity. There are 25 boxes in Dorothy Roberts’ office waiting to tell a story. Of the triumphs and tribulations of hundreds of interracial couples over the better part of a century. Of the role of interracial marriage in the social upheavals that took place in that time. Of why a young white man in 1930s Chicago took it upon himself to conduct the interviews. Of what it means to be his daughter, reading them—and writing the book he never completed.

“I have to get it right,” Roberts says, with an almost visible weight on her shoulders. “It’s just too important a history to squander.” She was going through the boxes and found a stray envelope with notes scribbled down in longhand. If you look through her things you’ll find similar envelopes, with similar handwriting, in a similar voice. “I keep coming back to that book on yoga, and reading as a little girl about how we were all breathing wrong. It sounds strange but I think it helped me start to question authority, question the truths handed down to us.”

A Father’s Legacy: Part 2
In 1998, the eminent American biologist Edward O. Wilson published a book called *Consilience: The Unity of Knowledge*. It was a passionate yet scrupulously reasoned argument in favor of bringing together all fields of knowledge, using the fundamental natural laws and concepts that underlie everything.

While such unity may be elusive, the old-fashioned divisions among the natural sciences have been eroding. The tools of science have become ever more sophisticated and versatile, revealing a common ground that scientific disciplines share—and encouraging scientists in one field to look through the conceptual lens of another.

At Penn Arts and Sciences, boundary-crossing in the sciences is receiving an extra push through an innovative initiative with a daunting name: the Evolution of Dynamical Processes Far From Equilibrium Cluster. Also known as the Evo Cluster, the initiative is shaping faculty recruitment efforts across the School’s natural science departments, with the goal of strengthening resources and sharpening the focus on some of the biggest questions in science today.

The Evo Cluster initiative builds on the kind of interdisciplinary work that was already taking place at Penn Arts and Sciences. In July of 2012, as Edmund J. and Louise W. Kahn Professor of Biology Mark Goulian half-jokingly claims, the School’s Department of Physics and Astronomy did something that no physics department has ever done before in the history of the world: It hired a biologist. “A real biologist, not a biophysicist, but someone who’s a card-carrying biologist,” Goulian emphasizes. That biologist was Alison Sweeney, now an assistant professor of physics.

**IN THE SAME DIRECTION:**

**PENN’S “EVOLUTION CLUSTER”**

*BY MARK WOLVERTON*

*ILLUSTRATION BY KATE CASSIDY*
Sweeney’s research focuses on the novel and counterintuitive ways in which animals interact with light. “Vision is clearly the primary example you think of, but it turns out that animals do all sorts of other pretty sophisticated and nuanced things with regard to light,” she explains. Studying how squids, for example, change their camouflage in differing light conditions, or how giant clams are able to harvest every last photon that strikes their tissues, ranges far beyond biology into questions of physics, materials science, evolution, and behavior. “By the time I got to the end of my postdoc ... I was doing this work that was really fascinating to me and I had suddenly become arguably too ‘physics-y’ for a traditional biology department,” Sweeney recalls. Penn Arts and Sciences was different. “Penn physics was hiring someone in biophysics and the job description sure looked a lot like the work I was already doing, so I went ahead and threw my CV in the ring, and lo and behold, they interviewed me and offered me the job,” Sweeney says. “So now I’m doing the work I’ve always wanted to do and found most interesting, and it turned out that I needed to get myself into a really great soft matter physics department in order to make that happen most effectively. I think my work is taking on a new level of sophistication and physical nuance that would be much harder to come by if I were housed in a biology department.”

Years before Sweeney came to Penn, Goulian himself walked a similar path between two disciplines. He is a physicist by training and was originally hired by the Department of Physics and Astronomy in 2000. But as his research emphasis shifted away from soft matter physics toward the regulatory signaling circuits by which bacteria interact with their environment, he found himself becoming more of a microbiologist in practice. “It was really just a question of where was I going to end up putting my efforts,” he remembers. “In the end, I think where I ended up really having the most traction and where my research really took me was further and further in the biology direction.” He finally changed departments to biology.

These migrations across disciplinary territory did not go unnoticed by Richard Schultz, Charles and William L. Day Distinguished Professor of Biology and the School’s Associate Dean for the Natural Sciences from 2008-2014. Noting the “growing movement towards collaboration” across the sciences, Schultz played a key role in leading faculty in a process of identifying big issues that might inspire and benefit from even closer collaboration, asking them to consider “What are the big ideas? What are overarching questions within the natural sciences that people see as opportunities where we have an existing strength that we could build on?”

In the course of these discussions, evolution emerged as an obvious theme. As Schultz points out, “You can see evolution from the evolution of molecules to the evolution of the universe. It scales tremendously, the evolution of the biological world, the physical world. All the departments can hang their hat on that, they all have it.” Professor of Linguistics Robin Clark would agree. Clark uses game theory approaches to study the ways in which languages evolve and change over time. “If you look simply at language as a kind of object and you just take a snapshot of it, then a lot of the stuff going on is probably not going to make a lot of sense, it’s...
The following statement was developed by Penn Arts and Sciences faculty describing the basis for the Evolution Cluster initiative.

We live in a world of evolving structures and patterns. From the emergence and proliferation of life, to the development of society and language, to the dynamically changing climate and contours of the planet, natural scientists are confronted with understanding systems that are ceaselessly evolving – often into ever more complex forms. Scientists have been tremendously successful in understanding patterns for systems that have stabilized into an unchanging state of equilibrium, but the dynamical patterns of evolution owe their existence to being out of equilibrium. Equilibrium techniques developed serially in the physical, life, and social sciences over the past two centuries do not suffice to describe dynamics far from equilibrium. And so these fields all face this new frontier in parallel, raising the opportunity for a synergistic approach.
From the start, the Evolution Cluster idea was an almost radical notion. “Usually when there’s a search in a school, it’s predetermined as to which department will get the new hire,” Randall Kamien explains. “So even if the search committee is composed of people from other departments, you already know it’s going to be somebody in math or in chemistry, for example.”

But with the Evolution Cluster hires, all of the School’s seven natural science departments were involved. That sort of collegiality is almost unheard of in academia. Kamien notes, “Everybody I’ve talked to outside about this just wonders, how could you possibly get seven departments to cooperate? It might be something other universities want to do but I don’t think it’s something that they can constitutionally do. Penn’s really in a special position to be able to do this.”

Other faculty members agree. Mark Goulian says, “I think one of the most interesting things about it is that it was an experiment. It wasn’t clear whether it could work, that you could bring all these departments together, and so far it’s been remarkably successful, if you look at the number of hires that have come out of it.”

Languages and the words that comprise them are not living organisms, and the forces that affect their evolution are not those that work on living creatures. Yet many, if not most, of the same basic evolutionary pressures and processes remain. It’s that sort of synergy upon which the Evolution Cluster operates. “There are many areas which at first might seem disparate,” Clark says. “It’s easy to think of biological processes as evolutionary, but what about a chemical process, or a physical process that does not involve some sort of selection? Well, these involve dynamics and are evolutionary to one degree or another. To the degree to which we can characterize them, we can start to build a real theory of evolutionary dynamics as an independent field, and understand things like how evolution could affect information, or a physical or chemical process, or the process of soil formation. If you find out what the common properties are, that’s pretty exciting, I think.”

Says Randall Kamien, Vicki and William Abrams Professor in the Natural Sciences in the physics department, “We realized that evolution could be so broadly construed—it could be evolution of language, of cultures, of social networks, riverbeds, veins of leaves. We realized
that this was a huge leitmotif that recurs over and over again in different fields.” Fresh from chairing the search committee that brought Alison Sweeney to the physics department, Kamien was chosen to head the committee for the first faculty search under the new Evolution initiative.

That first recruit was soft-matter physicist Eleni Katifori. Currently a group leader at the Max-Planck Institute, Katifori will be joining Penn’s Physics and Astronomy Department in 2015—but she is already working closely with Alison Sweeney and reaching out to other Penn faculty with an eye toward collaboration. Her research centers on the physics of living organisms, specifically the vasculature inside leaves that transports vital nutrients and energy throughout the plant. That involves not only how such systems work, but how and why they’ve evolved and their commonalities with other biological systems—not the sort of issues a physicist would usually consider. “My work is not an easy fit for a very traditional department,” she admits. “They’re not going to allow people to do the type of things that I do. But Penn is an optimal environment for me.”

Mark Goulian notes that “sometimes it’s in breaking away from the literal applications to your own research that you get some of your more creative ideas.” Increasing the opportunity for faculty to think about their research questions from a different perspective is a benefit that is already being realized through the Evo Cluster. Theoretical biologist Erol Akçay, who joined the biology department in January 2014, specializes in the evolutionary and ecological dynamics of social behavior. The assistant professor has already struck up fertile working relationships with Professor Joshua Plotkin, a mathematical biologist; linguist Clark; and animal behaviorists in the psychology department. Even before he arrived officially, Akçay says, “It was obvious that there were going to be a lot of opportunities for interaction. When I arrived on campus a lot of people I wanted to interact with already knew who I was and were looking forward to talking to me.”

One of Akçay’s collaborators is Baird Assistant Professor of Psychology Joe Kable, who studies the mechanisms of decision-making, both from a neuroscientific and theoretical perspective. “One of the things I’m interested in with decision-making is understanding why there would be individual differences in our preferences. Why would some of us be very impatient and want everything now, while others are willing to be more patient and willing to wait for delayed outcomes and rewards? Usually if a behavior is beneficial, evolution should be pushing everyone towards that. So I think there are interesting questions about how you explain individual differences and personality from an evolutionary viewpoint.”

Akçay’s collaboration is providing Kable with a new perspective on these questions. Kable notes, “As an evolutionary theorist, he has the analytic and mathematical tools to ask those kinds of questions, and I have the data that plainly shows that people are quite variable in levels of impulsivity and risk taking. A big unanswered question is explaining that diversity, so we’ve been working together on that.”

While these collaborations are just beginning, they are proof of the concept that an interdisciplinary faculty recruitment effort, organized under a single big idea, has the potential to energize the School’s science faculty—long-established and newly hired alike. “It’s exciting that all of these different people are now talking to each other,” says Robin Clark.

For Randall Kamien, the appeal is also personal: “I get to learn all these really cool things that I don’t know.”
The summer of 2014 marks the 100th anniversary of the outbreak of World War I. The introduction to modern, global warfare, the Great War left over 15 million dead—including as many as 7 million civilians—and redrew the map of Europe. In violently ushering the world into the modern era, the conflict created a wake of events from the Bolshevik revolution and fascism to the 1918 influenza pandemic, uprisings against colonial powers, the Great Depression, and ultimately World War II.

We spoke to faculty from a range of disciplines—comparative literature and the history and sociology of science, as well as history—for their perspectives on the Great War and its legacy.
Q: You wrote that the violence of the Russian civil wars was the most advanced case of a more extended European civil war, beginning with the Great War. Why do you describe the period in this way?

It is crucial to see Russia’s Revolution emerging out of the war. Russia did not transition into revolution from its peacetime, 1914 guise, but—in a fundamental way—from a society which was re-structuring itself from 1914 to 1917 to wage total war. Many of the tools used by the Soviet state in fact evolved from tools developed in the First World War (surveillance, food supply, political violence). World War I served as an important bridge from pre–1914 Russia to the Soviet Union.

Second, our understanding of European history equally benefits from including the Russian Revolution as part of the overall story. Most accounts—especially most accounts in the English language—focus on the conduct of war from 1914 to 1918, with a special focus on the Western Front. In this standard narrative, the war ended either with the November 1918 Armistice or the 1919 Paris Peace Conference. But for most of Europe, the experience was more similar to that of Russia: The war did not end neatly with a peace, but in an extended paroxysm of revolutions, civil war, and domestic conflict. It was this experience of postwar revolution that gave birth both to Nazism and Bolshevism.

Q: One hundred years on, how would you summarize the war’s legacy?

The conventional—and correct—answer would be two words: “fascism” (Italian and German) and (Soviet) “Bolshevism.” The political ideologies of both the radical right and radical left emerged out of the First World War. Many of the key actors in both movements were forged in the wars and civil wars of the 1914-1924 period.

To this answer, I would add one more: decolonization, avant la lettre. The First World War witnessed the end of empire on the continent of Europe—with the collapse of all the dynastic land empires. One might say that the First World War, then, led to the de-colonization of Eastern and Central Europe—and that World War II would extend this process to Asia and Africa. The Great War also saw the emergence, post-1919, of a legal and political order marking a transition from the traditional colonial order: the League of Nations mandate system.

Peter Holquist is the author of Making War, Forging Revolution: Russia’s Continuum of Crisis, 1914-1921.
Q: What changes did Japan go through in the wake of World War I, and what led to the country’s military expansion in the 1930s?

Japan’s experience in the First World War highlights the profound impact of the Great War far from the Western Front. Historians of European and American history routinely describe the war as the true start of the twentieth century. This is the case for Japan as well. Japanese shipping and textiles boomed with the withdrawal of European power from Asia and helped transform Japan between 1914 and 1918 from an agricultural to a largely industrial economy. Craving for Japanese economic and military aid, moreover, catapulted Japan during the war from a regional to world power. Most importantly, the calamitous destruction of Europe between 1914 and 1918 raised serious questions about European standards of civilization (to which Japan had turned in its construction of a modern state in the latter nineteenth century), spurring a profound political, economic, social, and cultural restructuring of interwar Japan on a par with the latter nineteenth century nation-building effort. Japanese military expansion in the 1930s is less an extension of Japanese war aims from the latter nineteenth century or the First World War (as often suggested by historians) than the product of a turbulent domestic political debate over the dramatic Japanese turn to liberal internationalism after 1918.

Q: One hundred years on, how would you summarize the war’s legacy?

I agree with historian Barbara Tuchman’s assessment over a half century ago [1962] that the Great War “lies like a band of scorched earth dividing that time from ours.” It marked the beginning of the end of European global hegemony, the rise of an American century, and, with Japan’s rise as a world power, an early glimpse of the dramatic shift of global power to the Asia/Pacific region in the twenty-first century.

Frederick Dickinson is the author of *World War I and the Triumph of a New Japan, 1919–1930*, and *War and National Reinvention: Japan in the Great War, 1914 – 1919.*

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Jean-Michel Rabaté is the author of *1913: The Cradle of Modernism.*
Q: What sorts of pressures led to shifts in U.S. policy and practice regarding wounded veterans?

The first modernized U.S. rehabilitation program was created during World War I—at a time when both national image and the booming cost of the war weighed heavily on America’s shoulders and the government sought to reform the way in which it dealt with injured veterans and their recuperation.

Much of the philosophy behind institutionalized rehabilitation was political. Officials were well aware that during the Civil War, pension payout outpaced the total cost of the ground war. In order to counter this in World War I, the government sought to establish a program that would guarantee a soldier’s continuing contribution to the war, whether it be back on the front lines, or in a munitions factory. Back then quality of life referred less to personal happiness than it did to productivity: Can you get from point A to point B; can you open your front door and feed and clothe yourself?

Amputees were often used as props in photographs with government officials because their injuries—and remedies—were visible. But this kind of positioning often led to misplaced priorities. For example, the initiative to mass produce artificial limbs largely failed due to the government’s lack of foresight regarding the individualization of treatment. Because of these botched attempts to get injured soldiers back on their feet as fast as possible, maimed soldiers often went outside the system and reverted to more primitive technology—such as hook hands.

The intricacies of post-war rehabilitation have slowly revealed themselves throughout the years. There are important contemporary policy debates surrounding issues, like the rise in suicide rates among soldiers and post-traumatic stress syndrome’s lasting effects, which need to be continually reevaluated.

Q: One hundred years on, how would you summarize the war’s legacy?

Since institutionalized rehabilitation was largely nonexistent, the military had to construct a model. Up until World War I, hospitals were generally considered places of disease, not centers for recuperation. The reimagining of the hospital as a place for convalescing spurred a societal transition that saw the eventual privatization of physical therapy and other rehabilitation services, which in turn led to the establishment of civilian practices.

Beth Linker is the author of War’s Waste: Rehabilitation in World War I America.
During his 50-year career, Bill Labov has interviewed thousands of people to create a groundbreaking database of spoken American English. To get these men and women to tell their stories, he asks them about important things, up to and including life and death. He’s learned a lot about language and a lot about the people who use it, and the biggest is this: “Everybody has something to say.”
I asked one guy this question about the danger of death. … And he started off by saying, “I was in the Maritime Academy, and I had a rope secured around me to keep me from falling.” Very formal speech. And then, as he began to remember what it was like to be up on the masthead, he started sweating. And he said, “I was up there hanging by my fingernails. I was shakin’ like a leaf.” And to a large extent, we find as people begin to talk about reality we get two things in the narrative: The style comes closer to the unmonitored style they use in everyday life, and the view of the world that they give us is truer to what they actually think and see.

In academia, Penn’s John H. and Margaret B. Fassitt Professor of Linguistics is internationally acknowledged as the pioneer of sociolinguistics, the first to study how people actually talk and to devise ways to gather real data. He has a pile of groundbreaking books and papers, including *The Social Stratification of English in New York City*, *Language in the Inner City*, and the three-volume *Principles of Linguistic Change*, and he has been cited thousands of times. His most recent honor was last year’s Benjamin Franklin Medal. Among science’s highest tributes, the Franklin Institute award identifies individuals whose great innovation has benefited humanity, advanced science, launched new fields of inquiry, and deepened understanding of the universe.

His work reached a culmination of sorts in 2006 with the publication of *The Atlas of North American English: Phonetics, Phonology, and Social Change*, a text and audio resource that gave the first overall view of the pronunciation and vowel systems of the dialects of the U.S. and Canada. Coauthored with Sharon Ash, a research specialist at Penn Medicine’s Frontotemporal Degeneration Center, and Charles Boberg, an associate professor of linguistics at McGill University, the *Atlas* is based on a telephone survey of 762 people representing all urbanized areas of North America. The work redefined the regional dialects of American English and drew new boundaries reflecting those changes.

Within all the data, though, Labov has found bigger mysteries. He’s shown that despite the mass media that envelops us, differences between U.S. dialects are actually increasing. “People seem to be influenced almost entirely by those they speak with face to face,” he says. Most of the changes are imperceptible to us, but he demonstrates in his 2012 book *Dialect Diversity in America: The Politics of Language Change* that a rotation of short vowel pronunciations in the areas surrounding the Great Lakes—called the Northern Cities Shift—is growing more pronounced. It has reached a point where two American English speakers...
can’t always understand each other. For example, someone may hear a word as “bosses.” When given the context “the bosses we ride downtown,” most realize that the speaker is saying “buses,” but some misunderstand the word even in context.

Given that the point of a language should be to communicate, this inconsistency seems strange. On top of that, learning a language, despite its tremendous complexity, is an inborn skill. Every child can do it, which suggests some universal grammar common to all human languages. So why all the variation?

“That is the puzzle, as big as ever,” says Labov. “We can come up with particular causes, like the triggering effect of the Erie Canal on population movements westward. But we ask a more general question: How do we understand human nature with a language that keeps changing? My answer is that most of these changes are responding to other needs than that of communicating information.”

Labov believes the functions of communication exercised by earlier species are still part of our language system.

“Establishing identity and territoriality, submission and dominance, the convergence that we see when people speak to each other, those are responding to needs and functions that have always been there. Language has to serve that purpose as well,” he says. “And that’s where we come to narrative, because in narrative we get a chance to see more deeply the underlying norms and ideologies that move people.”

When he listens, Labov hears not only how people talk but the stories they tell. He says of his most recent book, *The Language of Life and Death: The Transformation of Experience in Oral Narrative*, “It’s very different from the quantitative studies we have done on linguistic change. The study of narrative is part of the humanities. We can’t prove the insights we gain into the study of narrative. We can only persuade people that this is a good possibility.”

Among the narratives I heard was one told me by a Jewish postman back in 1963. It was about how two brothers engaged in a struggle after continued on page 36
India’s 16th general election was historic in many ways. As with all national elections in India, this was by far the world’s largest electoral exercise, with 834 million registered voters. Sixty-six and four-tenths percent, or nearly 554 million, voted, an historic high for the country (the previous high was 64 percent in the 1984 elections). The male-female gender gap in turnout was 1.46 percent, a historic low and a notable decline from more than four percent in 2009. Just the increase in the number of votes cast over the previous general elections in 2009 (137 million) was more than the entire number of votes cast in the 2012 U.S. presidential election.

The election was historic in that a Westminster parliamentary democracy was converted into a presidential-style contest by the Prime Ministerial candidate of the Bharatiya Janata Party (BJP), Narendra Modi. His energetic and media-savvy campaign for the first time leveraged social media, which appears to have increased turnout among often apathetic urban voters. He even deployed holographic images of himself to make speeches across rural India. In 2013 there were about 25 million tweets about elections, governance, and politics during the entire year. In the first 20 weeks of 2014 alone, as elections approached, there were 58 million election-related tweets, with Modi leading the way.

The intensity and scale of the political campaign made this India’s most expensive election. While India’s Election Commission strictly monitors candidate spending limits, there are no legal limits on how much political parties can spend, a loophole that was exploited mercilessly. The quid pro quo for these mammoth expenditures—estimated between $3 and 5 billion—may well prove troubling for the country.

The electoral outcome was also historic in several ways. With the BJP winning an absolute majority on its own (282 seats in a 543 seat parliament), this was the first time that a political party other than the Congress party won an absolute majority. Indeed, it was the first time that any party in India has won an absolute majority since the 1984 elections, even though the BJP was part of an electoral alliance (the National Democratic Alliance, or NDA) which won 336 seats.

The result upended many shibboleths about the Indian political landscape, in particular that its polity was hopelessly fragmented, leading to weak coalition governments at the center, with an enfeebled central government and dominant regional parties. Several regional parties had to bite...
While some did well (notably in the states of Odisha, Tamil Nadu, and West Bengal) it is clear—for better or worse—that India will have a strong central government for at least the next few years.

More than any election since 1977 (when the Congress party’s Indira Gandhi was defeated after the “Emergency”), this election was tantamount to a referendum about one individual: Modi, the first Prime Minister to have been born after independence. In the run-up to the elections, views on him were extremely polarized. His supporters had very high expectations that he would rescue India from its economic doldrums with the sort of leadership he had demonstrated as Chief Minister of the state of Gujarat, while his detractors were deeply apprehensive of precisely that leadership, fearing he would undermine India’s secular fabric. In the end it was Modi and not the BJP that won this election. In post-election surveys, one in four respondents who voted for the NDA said they would not have voted for the coalition had Mr. Modi not been the Prime Ministerial candidate. In post-election surveys, one in four respondents who voted for the NDA said they would not have voted for the coalition had Mr. Modi not been the Prime Ministerial candidate.

The increase in the number of votes cast over the general elections in 2009 was more than the entire number of votes cast in the 2012 U.S. presidential election.

Analysts have taken for granted that the Indian voter is swayed primarily by identity politics and patronage that comes through government handouts. The Congress party and many observers of India continue to see Indian society as one that is poor, hierarchical, and therefore in dire need of government handouts. Indians, however, clearly do not see themselves in quite the same way. Only four uninterrupted democracies have had higher growth rates over a 30-year period than that which India has enjoyed since 1980. While India is still a poor country, the resulting economic changes coupled with political changes have unleashed a complex set of social forces. Data from a pre-election survey conducted by CASI found that economic growth, corruption, or inflation was the top concern for over 60 percent of voters, whereas only 10 percent of voters listed government benefits or identity as the top issue. This suggests that concerns about the larger macro-economy have supplanted these traditional issues. (To learn more about the surveys, visit CASI’s blog: IndiainTransition.com)

Indian society is changing, and with it the preferences of Indian voters. While the majority of India remains rural, rural India is increasingly shaped by urban sensibilities, blurring the hitherto sharp divide between rural and urban India. While Indian society continues to harbor multiple social biases, changes in voting behavior are being driven mainly by economic factors and a yearning for better governance. This election was clearly a vote for change. It is a pivotal election and is likely to affect India’s trajectory in fundamental ways. But how, precisely, only time will tell.

Devesh Kapur is the Director of the Center for the Advanced Study of India (CASI), Associate Professor of Political Science, and Madan Lal Sobti Associate Professor for the Study of Contemporary India. Since the fall of 2013, with funding from the Lok Foundation, CASI has been running the Lok Survey, a major panel survey on social attitudes in India, with 68,500 respondents across 24 states.
Professor Masao Sako makes his way around the room, pausing to eavesdrop on students and fielding theories with a secretive grin on his face. In the middle of the classroom, puzzled students huddle around a contraption that resembles a miniature super-collider. This is Structured, Active, In-class Learning (SAIL), where the focus is on keeping the learning experience dynamic and interactive. The courses refine existing models like the flipped classroom—in which students listen to the lecture portion of the course online—in order to keep students directly engaged with their professor.

“My traditional method of teaching introductory physics consisted of four hours of lecturing per week, and my students spent two hours per week in a lab with graduate student teaching assistants,” says Sako, an associate professor of physics and astronomy. “As a result, there can be a complete disconnect between what the instructors do in class and what students do in the labs. Over the years I’ve heard complaints that those labs are not useful and are stressful. So that defeats the whole purpose of the lab. If you’re not learning anything that’s related to stuff covered in class, why do it?”
In contrast, Sako’s SAIL classes are typically composed of six groups of six students, each with its own roundtable to foster discussion. Student response to the increased interaction has been overwhelmingly positive: “I genuinely enjoyed the course and felt that the small class size allowed each student to interact with the professor on both an academic and personal level,” says Helen Qu, C’17. “I think that one of the main reasons this course has been so rewarding and effective for me is because we are able to ask questions in person while working through the problems.”

Bruce Lenthall, Executive Director of the Center for Teaching and Learning, Advisor on Educational Initiatives to the Vice Provost for Education, and an adjunct assistant professor in the Department of History, says the objective of the SAIL program is to help faculty develop teaching techniques that better enable students not only to thrive but to sharpen their understanding of how to think in the discipline. “Faculty across the country have found that teaching with effective structured activities produces significant learning gains for students, especially when it comes to science and math,” Lenthall says. “Early returns at Penn suggest that these classes are energizing students and making them more aware of their own capacity to learn.”

The courses also have an effect on their instructors. It has challenged Sako to come up with new, more open-ended experiments for students. “Penn kids are too smart for the tutorial books,” he laughs. For one of the labs he brought in three objects: one empty bottle, one half-filled with water, and one packed with marbles. He challenged the students to make a prediction. If he was to roll all three down an inclined plane, which one would go down the fastest? The students were then given two hours to calculate theories and discuss possible solutions. “The answer is the bottle filled with water, due to rotational energy,” says Sako. “It’s an example of a very simple question with a not-so-simple answer.”

In an effort to compare notes, SAIL instructors meet on a monthly basis at the Center for Teaching and Learning to discuss teaching methods and course plans. One of the biggest challenges instructors face in the future is keeping class sizes small. When a physics class reaches capacity—which is considered to be around 40 students—the instructor’s ability to keep everyone progressing at an appropriate pace is challenged. Sako’s students agree that small class size is crucial: “It’s comforting,” says Steve Polomski, ENG’17. “It makes you feel like the people you’re sitting next to are there to help you learn, not compete against you on exams.”

Larry Gladney, Edmund J. and Louise W. Kahn Professor for Faculty Excellence, Chair of the Department of Physics and Astronomy, and Associate Dean of Natural Sciences, says the effectiveness of SAIL courses comes down to the instructor. “We have to go on the judgment of those who have taught these courses many times and thoroughly mastered the subject matter to the point where they have a good understanding of how people learn it,” says Gladney. “Most of us remember how we felt when we really ‘got’ physics and found ourselves explaining it to others. The essence of all the active-learning techniques is that they embody that ‘explaining to others’ component.”
POLICY FOR THE PEOPLE

by Blake Cole

This past February, current Mexican Senate President Ernesto Cordero, G’98, GR’04, visited campus to deliver a lecture on the state of the Mexican economy. Cordero has held two separate Secretary of State appointments—one in social development and one in finance—and in 2011 campaigned to become the elected candidate of the Partido Acción Nacional (National Action Party) in order to run for the Mexican presidency. As Secretary of Finance he was responsible for helping the Mexican economy recover from the 2009 global financial crisis. Below, the senator discusses his time at Penn and the challenges involved in being a high-level policymaker.

Q: When did you first decide to go into policymaking?

It was my interest since I was very young. I finished my undergraduate degree in Mexico then began working for the minister of energy. I felt I needed a good, sound foundation to be able to develop and evaluate policy. I had always liked economics, so I decided to pursue graduate studies in the field, and I chose Penn.

Q: How did your time at Penn prepare you for the road ahead?

It taught me the importance of professionalism and formality, and that you need strong technical foundations in order to deal with all the sea changes. My studies stressed the strength of the quantitative approach, and that has become a way of life for me. I also enjoyed being a teaching assistant, and when I came back to Mexico after graduating from Penn, I began teaching again as a lecturer for a couple of hours per week at the university.

Q: You’ve held two Secretary of State appointments: one in social development and one in finance. Describe those experiences and how they differed.

As Secretary of Social Development, I was able to apply solid foundations and design the application and evaluation of policy. We put together programs that influenced policy in 26 other countries. One in particular, called Oportunidades, is a cash-transfer program that has been applied here in New York City in some form. So for me it was very rewarding be able to apply all this technical stuff to improve the conditions of many Mexicans. It’s very important to see that what you learn at school, and what you do for your professional life, is really changing the lives of so many people.

I also had the opportunity to serve as Secretary of Finance. I was responsible for the recovery of the Mexican economy after the global crisis of 2009. We...
were able to put together the Mexican economy again. It was a very important job that was very different from being the Minister of Social Development—now you are in charge of the economy of an entire country. You need to be prudent, and often conservative. Stability is the key word. If you have stability then you can build growth. The years that I spent at Penn prepared me to assume that kind of responsibility.

Q: In 2011 you campaigned to become the elected candidate of the National Action Party in order to run for the Mexican presidency. What are some of the challenges of campaigning?

It’s a different kind of challenge. First of all, you need to have a good reason to look for an office—a genuine goal. And then of course you have to be able to communicate that goal to your constituency, to your electorate, and to be able to, in a very simple way, transmit this message. It requires very a different set of skills than that of a policymaker—personal skills.

Q: If you had to pick one issue that you’re most passionate about in your role as a policymaker, what would it be?

To maintain economic growth in Mexico. There are no magic solutions. If you want to be able to provide prosperity to your people, there has to be stability, and there has to be economic growth. Every now and then someone claims to have some magical solution to achieve faster rates of growth, but these are rarely sound, and are not based on the fundamentals of the economy. And it could end up having terrible consequences. So I’m very careful not to take a false exit and go off a cliff. Politicians feel pressure to follow the easy way, the way that is going to be popular with the electorate, popular with the people. But in terms of economic policy, sometimes you have to follow that way that’s not so popular.
their father had died, while they were sitting Shiva: “And a rat ran out in the yard. And he started to talk about it. I told him cut it out. But kids, you know, he don’t have to listen to me. That’s when I grabbed his arm and twisted it up behind him. And there was a knife on the table. When I let go his arm, he just grabbed it and let me have it. Started bleeding like a pig. Run to the doctor. The doctor says, ‘Just that much more, and you’d have been dead.’”

What triggered the conflict? Whatever the brother said was not quoted. Covering up or mitigating the conflict looks Machiavellian, but it’s really not. They’re just using their ordinary resources to let us see the world as they see it.

Labov’s career has been an effort to hear and understand ordinary men and women. He has conducted much of his research in the neighborhoods of Philadelphia and New York. He did some of his first work in Harlem, and demonstrated that African American Vernacular English (AAVE) is not incorrect English. Instead, it is a different but coherent system with its own grammar and rules, used by African Americans nationwide and untouched by the other dialect shifts around it.

Over the years he’s seen the gap between standard academic English and AAVE grow, something he attributes to increasing segregation between the black and white populations in the U.S. By the fourth or fifth grade in most schools in low-income areas, he says, “a majority of the kids cannot use reading for any useful purpose. That’s the largest social problem in the United States, as far as we can see, because it’s a bar to upward social mobility.” Using his knowledge of AAVE, Labov has developed the Reading Road, a program to teach standard academic English to African American children (see p.28).

Asked about grammar, he references Steven Vincent Benet’s poem “John Brown’s Body” to explain how linguists approach language change: “When the new thing arrives, do not say it is blessed. Do not say it is cursed. Say it is here.” That’s also his attitude toward those who are speaking. “I think the most important thing about field work is that you have to accept people as they are, and you have to let them know that you’re ready to hear anything they have to say,” Labov says. “And I would say that the best thing that happened to me is that, talking to lots of people, I’ve fallen in love with the human race.”

One time I was up in Prince Edward Island. I was interviewing a man who was a widower, a ferry boat captain, just retired. And he hadn’t much to say. Every question I asked him, I think the conversation sort of fell on stony soil. And then at the end of the conversation I said to him, “Well, if there’s one thing that happened to your life that you’d never forget, what would that be?” And he said, “It was when they came to me on the boat, and they told me she was dead.” And I felt pretty bad, and I asked him a few questions about his grandchildren, and I started to get up to go. And he said, “Come here a minute. I want to show you something.” So we went into this dining room where there were portraits of people around the wall. He said, “That’s her. I just wanted you to see her.”

Everybody has something to say.
As stars began to form billions of years ago, they left behind a trail of light. Assistant Professor of Physics and Astronomy James Aguirre is following that trail all the way back to the birth of the first galaxies. With the help of his colleagues, he developed a special telescope known as PAPER (the Precision Array to Probe the Epoch of Reionization), which acts as a sort of super FM radio. PAPER allows Aguirre’s team to use electric field recordings to measure almost all of the sky visible in the southern hemisphere. The array, made up of 128 antennas, is housed in the South African desert where outside signals can’t interfere with testing.
The 60-Second Lectures

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