Brad Jolliff, the Scott Rudolph Professor of Earth and Planetary Sciences, led a team that analyzed the Lunar Reconnaissance Orbiter (LRO) images of a new volcanic complex discovered on the Moon, made visible here in the upper left by the red (high) concentrations of thorium. The volcanic province’s very existence will force scientists to modify ideas about the Moon’s volcanic history.
FIRST WORDS

Gary S. Wihl, Dean of the Faculty of Arts & Sciences and Hortense and Tobias Lewin Distinguished Professor in the Humanities

This issue of A&S Magazine is dedicated to the esteemed late dean of the College of Arts & Sciences, James E. McLeod. In remembering our colleague and friend, we wanted above all to honor his memory as an educator, which is one reason we have made innovations in science education our lead story. At Dean McLeod’s well-attended memorial service last fall, former Ervin Scholar Michelle Purdy, LA ’01 GR ’03, recalled him as more than a warm-hearted mentor and steadying hand. In his own quiet and gentle way, he never stopped pushing his students to remember that “one must take ownership of one’s Washington University experience. Success and achievement are not the same, and we must cultivate the habits of achievement.” For those who want to read more about this extraordinary individual’s life and work, please visit us online and view the Facebook page dedicated to him.

As I look around campus, I not only see all of the people who miss him but the legacy of his work. Along with his great personal warmth, charisma and gentle sense of humor, his vision and intelligent approach to undergraduate education still infuses our campus and will continue to do so for a long time to come.

The contributions of generations of dedicated and inspired leaders such as Dean McLeod have made our school the pioneering institution that it is today. They are the reason why our students compete so successfully on the national stage and why we are consistently ranked among the top universities in the country. At Washington University we are redefining the relationship between learning and doing, classroom education and research, dedicated study and transformative leadership. For this reason, I also want to extend a special note of welcome to our new dean of the College of Arts & Sciences, Jennifer Smith. You can read about her appointment on p. 37 as well as a light-hearted look at her paleoenvironmental field research on p.12.

I hope you enjoy this issue and our new look. Thank you to everyone who participated in our magazine survey last summer and my best wishes to all for a full and productive year.

A lasting legacy  James E. McLeod, vice chancellor for students and dean of the College of Arts & Sciences, died on Sept. 6, 2011, after a two-year battle with cancer. McLeod’s greatest accomplishment, he once told a Student Life reporter with characteristic humility, was in making “reasonable progress at being a decent human being.”

More than 2,000 alumni, parents and friends have so far committed $4.6 million in pledges and contributions toward the McLeod Scholarship Fund. This year, six new McLeod Scholars were named (five from Arts & Sciences and one from Engineering), joining the first three who were named last year.
Every year I collect book recommendations from faculty. This year, with our lead science story in mind, I asked our faculty what they thought of recent popular-science titles. With the amount of work they are involved in, I wasn’t even sure they had time to read on the side, but the number of thoughtful and intriguing recommendations astonished me. I’m also including a book of my own from my summer reading. Happy foraging! – G.W.

The World of Yesterday: An Autobiography by Stefan Zweig University of Nebraska Press, 1964

Gary Wihl, dean of the Faculty of Arts & Sciences: This summer I led a wonderful trip on one of the most spell-binding rivers of Europe: the Danube. In my suitcase I had an autobiography by Stefan Zweig. You may or may not have heard of this distinguished Austrian writer from the early 20th century, but in this gripping memoir he describes his encounters with great artists, writers and intellectuals who are household names: Picasso, Freud, Yates, James Joyce.

The Emperor of All Maladies: A Biography of Cancer by Siddhartha Mukherjee Scribner, 2011

Joseph Jez, associate professor of biology: I recommend this to my Biochem 2 class when we talk about signal transduction pathways, especially if students are thinking about cancer research from either the basic or clinical side. It gives a great lay view on how our understanding about cancer has changed over time. It’s also very well written; it’s surprisingly captivating as he moves between clinic, science and people.


Doug Wiens, professor and chair of earth and planetary sciences, who sent in his recommendations while on a research trip to the Malvinas Islands: The story of how a 19th-century physician discovered how cholera is spread by making a map of the death toll in London. The book I’ve most enjoyed recently was not about science, but history.

Over the Edge of the World by Laurence Bergreen (William Morrow, 2004) is a fascinating description of Magellan’s voyage around the world. I’m on a research cruise in the Pacific near Guam, and it’s hard to imagine what it must have been like for those sailors to voyage across the vast Pacific with no idea where they were going.

Over the Edge of the World by Laurence Bergreen

The Immortal Life of Henrietta Lacks by Rebecca Skloot Crown, 2010

Kathy Miller, professor and chair of biology: This is a very interesting book about the first “immortal” cell line, how it came about and the person whose cells were used, her family, informed consent, etc. It’s a fascinating story. I actually used this cell line in my PhD work.


Ursula Goodenough, professor of biology: Only one in the past year, and it’s very challenging even though written for a non-scientist audience. But it’s of huge importance.

Illustration: detail from the cover of The Ghost Map visualizing the succession of the epidemic.
Double Shadow refers to “the tension between the part of us that wants to hold back from taking chances, for safety’s sake, and the other part that takes chances, the risk part, without which a human life is two dimensional.”
HISTORY IN THE CRACKS

Sarah Dunant, author of a trilogy of internationally acclaimed novels about the Italian Renaissance (The Birth of Venus, In the Company of the Courtesan and the new Sacred Hearts), was visiting lecturer in comparative literature in fall 2011. She taught three weeks of The Birth of Venus, a course dedicated to the art, politics and history of Renaissance Florence, Venice and Rome. Team-taught by Harriet Stone, professor of French and chair of comparative literature, and William Wallace, the Barbara Murphy Bryant Distinguished professor, the course explored how in these cities the arts flourished alongside the sometimes oppressive rule of the Church, marriages that were arranged or otherwise “forced,” and the rise of courtesan culture and pornography. Dunant introduced the class to the historical documents, including both visual and textual sources (such as Titian’s Venus of Urbino, above), that she used in creating her novels. Dunant is interested in women’s history and recreating history from the traces left behind. In an interview with the Riverfront Times, she says, “For me, it’s more interesting to see the way history was lived in the cracks.”

FULBRIGHT STARS

In the 2011–12 competition, WUSTL was again ranked a top producer of Fulbright scholars. Eleven out of 47 WUSTL applicants received Fulbright scholarships, a 23.4 percent yield. While other research institutions received more grants than WUSTL, there are few that had better outcomes with similar numbers of applicants. Of the 11 WUSTL Fulbright scholarship recipients, seven are recently graduated Arts & Sciences seniors, three are Arts & Sciences graduate students and one is an architecture graduate student in the Sam Fox School of Design & Visual Arts.

DOUBLE SHADOW, QUADRUPLE HONOR

The National Book Foundation named Carl Phillips a finalist for the National Book Award for Double Shadow, a collection of poetry. Phillips, a professor of English, has been nominated four times. In describing the book’s title, Phillips says it refers to “the tension between the part of us that wants to hold back from taking chances, for safety’s sake, and the other part that takes chances, the risk part, without which a human life is two dimensional.” Phillips and his colleagues were again honored with USA Today’s top ranking for the English department’s master’s in fine arts program. Similarly, Poets&Writers named Washington University 9th overall in its 2012 MFA rankings (from 16th last year).

GUGGENHEIM 3 FOR 3

The John Simon Guggenheim Memorial Foundation has awarded one of its prestigious fellowships to an Arts & Sciences faculty member three years in a row. Each competition attracts more than 3,500 contenders. The awards are intended for men and women who have already demonstrated exceptional capacity for productive scholarship or exceptional creative ability in the arts. The winning lineup includes Matthew Gabel (Political Science), 2010, Pascal Boyer (Anthropology and Psychology), 2011; and John Bowen (Anthropology), 2012.
Pond Scum to Petrol

Algae biofuel might be the best hope in replacing fossil fuels: it does not affect fresh water resources, can be produced using ocean and wastewater, is biodegradable, is relatively harmless to the environment even if spilled, and requires a manageable size of dedicated production space. But there’s been a fundamental problem: there’s no cost-effective procedure for turning pond scum into petrol. A new $2.2 million project funded by the U.S. Department of Energy will finally develop a comprehensive understanding of the metabolic machinery needed to make that happen. The team is headed by Himadri Pakrasi, the George William and Irene Koechig Freiberg Professor of Biology in Arts & Sciences, professor of energy in the School of Engineering & Applied Science, and director of the International Center for Advanced Renewable Energy and Sustainability (i-CARES).

Predictive Power

Jeff Zacks may not be able to tell the future but he can explain how we make near-future predictions—such as if a dropped object may break, who is likely to be calling on the phone and what the likely result of taking that shortcut may be. Zacks published a paper this year that reports on a study of how predictive perception works. At the core of his group’s theory is the belief that a good part of predicting the future is the maintenance of a mental model of what is happening in the present. “When we watch everyday activity unfold around us, we make predictions about what will happen a few seconds out,” Zacks says. “Most of the time, our predictions are right.” The group conducted a functional MRI experiment and saw significant activity in several midbrain regions at key points, such as when subjects were trying to make a choice and again when they received feedback about the accuracy of their predictions. These brain regions are also the part of the brain hardest hit by neurological diseases such as Parkinson’s Disease, which means that understanding these mechanisms may offer tools for diagnosing and assisting patients with these diseases.
HONORS STUDENT

Adam Hasz, a senior majoring in environmental studies, was selected as one of the nation’s top rising young leaders in the clean energy sector by Focus the Nation, a national nonprofit that supports those launching careers that accelerate the transition to clean energy. Twenty students from across the country were selected for their dedication, passion and unique contribution to increasing clean energy in the United States. The students met for one week in August in Oregon at the ReCharge! Retreat and hiked Elliot Glacier, which has experienced 60 percent snowpack loss since 1982; toured the Boardman Coal Plant, scheduled to close by 2020; and visited Biglow Canyon Wind Farm, which powers 125,000 homes in Oregon.

THE ARTFUL BRAIN

Mark Rollins, professor of philosophy, curated an exhibition in the Teaching Gallery at Mildred S. Kemper Art Museum, “Art and the Mind-Brain,” in spring 2012. Rollins’ selection of works from the museum’s collection encourages viewers to reflect on a central principle of neuroaesthetics: that the aesthetic and art historical interest of a work of art can be understood in terms of its power to engage the perceptual and cognitive systems of the brain. New brain imaging technologies and sophisticated psychological measures have provided insights into the artist’s creative process and the perceiver’s response to art. This research has also led to the development of neuroaesthetics, a new field that addresses questions about beauty, artistic expression and style in neurological terms.
**KEEPCING IT CLEAN**

Kevin Moeller, professor of chemistry, published a paper urging the widespread adoption of solar energy to power chemical reactions, eliminating toxic by-products. The idea is simple, Moeller says, and yet it has huge implications: “All we are recommending is using photovoltaic cells (clean energy) to power electrochemical reactions (clean chemistry).” He is the first to admit this isn’t new science. “But we hope to change the way people do this kind of chemistry by making a connection for them between two existing technologies,” he says. To underscore the simplicity of the idea, Moeller and his co-authors used a $6 solar cell sold on the Internet and intended to power toy cars to run reactions described in an article published in *Green Chemistry*.

**MARTIAN ROVER**

NASA selected Ray Arvidson, the James S. McDonnell Distinguished University Professor, as a participating scientist on the Mars Science Laboratory, a mission to land and operate the Curiosity rover on the surface of Mars. His proposal was one of 29 chosen from among 149 vying for a coveted participating scientist spot on the rover team. The rover, five times larger and carrying ten times the mass of scientific instruments of its predecessors, was launched in November 2011 and is expected to land on Mars in August 2012. Arvidson is also deputy principal investigator for the science payload on NASA’s Mars Exploration Rovers Spirit and Opportunity, which in September 2011 found evidence of ancient water on Mars.

**CHEERS!**

Peter Wyse Jackson, the new director of the Missouri Botanical Gardens, was installed as the George Engelmann Professor of Botany this fall. Wyse Jackson became president of the Missouri Botanical Garden in September 2010 and, by tradition, the president of the garden also is awarded the professorship at WUSTL. Wyse Jackson is one of the world’s foremost botanists and plant conservationists. George Engelmann, who immigrated to the United States in 1882 and was a friend and adviser to St. Louis businessman, philanthropist and MOBOT founder Henry Shaw, was an MD by training whose research was devoted to plant morphology. Wyse Jackson, who looked up George Engelmann’s research in preparation for his installation, reported that he played a little-known role in rescuing the French wine industry from fungus invasion.

**TORTURED UNDERGRAD/GIFTED PLAYWRIGHT**

In October, WUSTL hosted “Tennessee Williams at 100,” a program marking the anniversary of the playwright’s birth and the 75th anniversary of his matriculation at Washington University as an English student. The three-day celebration of Williams’ achievements and contributions included two, one-man performances by actor Jeremy Lawrence [a popular Williams doppelganger] and a lecture by Henry Schvey, professor of drama. Schvey spoke about Williams’ childhood and education in St. Louis and his bittersweet relationship to both the city and the university. A special video interview with Schvey from his talk can be viewed on our website.
A New Jewel of Art in the Midwest

Crystal Bridges Museum of American Art opened last year in Bentonville, Ark., the town where Walmart first set up shop as Walton’s Five-and-Dime in the 1940s. A longtime project of Walmart heiress Alice Walton and delightfully designed by Moshe Safdie, the new museum is set on 120 acres and features American art from Colonial times to the present. An additional $20 million gift, provided by the Walmart Foundation, means there is no fee to view the museum’s permanent collection.

The museum has proven unexpectedly controversial for its placing of a major body of American culture in a part of the country that is new to high art and public institutions of this scale.

For a Midwestern university, however, this is an interesting moment. Suddenly this river city again becomes oriented on a north-south axis that connects the revered Art Institute of Chicago to the north and now Crystal Bridges to the south. The opening of yet another major museum in the Midwest creates a critical mass of great art in the region.

We spoke to some of our faculty experts to find out what the opening of Crystal Bridges means to them.

Elizabeth Childs, associate professor and chair of art history and archaeology: While there are many major museums of art of the modern era located throughout the Midwest, the opening of Crystal Bridges last fall is a landmark event that will change the study of American art for the 21st century. With a highly impressive collection that ranges from Copley to Moran, and from Gorky to Warhol, this is a profoundly exciting new resource for scholars and students alike – not only in our region, but nationally and internationally as well. We will all benefit from the new waves of creative thought in the fine arts centered at this stunning new museum, and we look forward to developing an important new regional partnership with this groundbreaking institution.

Angela Miller, professor of art history and archaeology: Alice Walton has really put together an astoundingly good collection. It’s very strong in 19th-century landscape and 20th-century modern works – both of which are areas of research for me. One of the things I find interesting is that the collection does not only include the iconic works that you would expect. There are also more unusual choices – for example, a series of self-portraits by 20th-century artists such as Joseph Stella and Max Weber. There’s so much about the museum that suggests possibilities for further study, including an excellent research library with artists’ papers. In the near future, we’re thinking about organizing a field trip for our undergraduates and graduate students. My hope is that we will develop the opportunity for sustained contact and exchanges, perhaps through graduate internships.

Peter Kastor, associate professor of history and American culture studies: In the interest of full disclosure, I make no claim to interpret the museum in artistic terms. Rather, as a historian, I see the museum and the controversy surrounding the acquisition of its objects as emblematic of a profound transformation in the nation’s economy and its regional development. Most revealing is the fact that the museums that lament the loss of their objects to Crystal Bridges were themselves products of a very particular moment in American history, when new wealth and the growth of the Northeastern cities that housed that wealth created some of the nation’s first great art collections. The notion that a world-class art collection would emerge from a new fortune located not only away from either the East or West Coast but, equally important, in a small town, is a major departure from the way Americans have imagined their cultural institutions. What I see in this controversy is rather a reflection of the broader fear that cities that long fueled American development are themselves under assault from global economic change.

The museum at nightfall.
Two hundred thousand years ago in the geographical backwater of Europe and western Asia, Neandertals emerged as a distinct regional group, cut off from the rest of the populated world. They lived in small clusters all across Europe and western Asia and were undisturbed for 150,000 years before early modern humans began moving out of Africa and into Europe and eventually supplanting the Neandertal.

Why did they disappear? We talked with the most qualified modern-day representative, Erik Trinkaus, the Mary Tileston Hemenway Professor of Anthropology and the world’s foremost authority on late archaic humans (Neandertals) and early modern humans. Recently, Trinkaus published a paper establishing the lifespan of early modern humans and Neandertals as approximately the same. He was also part of two teams that identified the oldest known skeletal remains of anatomically modern humans in all of Europe.
Q&A WITH A NEANDERTAL

Boorish brute or cunning survivor? An examination of our archaic ancestor

To start, can you confirm the pronunciation? Is it Neander-THAL or Neander-TAL?
The literal translation from the German is “Neander Valley.” In German, the “th” is pronounced as a “t.” In line with the modern German spelling, I drop the “h” entirely to avoid confusion. It’s Neander-TAL.

What are the main physical differences between Neandertals and modern humans?
Neandertals had bigger faces, big brows, big noses, a stocky build, a broad trunk. They were more muscular in the shoulders, arms and hands, and were wider across the hips, both men and women. Our brain cases are higher and more rounded. Most were right-handed, which is a sign of lateralization of the brain, just like us. They had the anatomy of the brain, just like us. They had the anatomy of the brain, just like us. They had the anatomy of the brain, just like us. They had the anatomy of the brain, just like us. They had the anatomy of the brain, just like us. They had the anatomy of the brain, just like us. They had the anatomy of the brain, just like us.

How would they fare on a modern IQ test?
Their brains are basically the same size [as ours], and there’s no reason to think their brains were organized any differently. We see from their tools that most were right-hand, which is a sign of laterality of the brain, just like us. They had the anatomy for language. In many ways, they were smarter than us — they had to be. The ultimate weapons of a hunter-gatherer are extensive knowledge of the landscape and the ability to predict: what is where and when, what is edible, what is not edible, what’s most likely to eat you, what’s safe.

Did they have families?
Neandertals had coherent social groups. They were among the first to bury their dead, and we can see the respect they had for one another in their burials. They cared for one another in a human way. But the makeup of those groups? We don’t know.

How did they get such a bad reputation? Brutish modern-day individuals are sometimes disparaged as “Neandertals.”
It wasn’t always that way. In the early 19th century, Neandertals were seen simply as an early stage of man. But by the 1910s, they were being described as semi-human — not a respectable ancestor. These images were picked up by Hollywood and used in movies such as The Neanderthal Man [1953], even though by that time the science had been discarded. The image dies slowly, but it is changing. When I published a controversial study 15 years ago on the intermixing of early modern humans and late archaic humans, it was widely covered — in documentaries, news reports, the front page of the Sunday New York Times. There was an outpouring of support from the public. I received emails from all over, everything from “Thank you for explaining Uncle George” to “Thank you for telling us back to the natural world.” So maybe we’re back to where we were in the late 19th century: believing that Neandertals make a perfectly logical step in human emergence.

Why aren’t Neandertals around today?
It’s called extinction by absorption. They were simply absorbed into a larger population of early modern humans. There certainly was genetic intermixing. We can see this in the fossil record. Early modern humans found Neandertals to be acceptable mates. Sex happens. Some people get hot under the collar about this issue, but the important thing is this: The mixing shows us that they saw each other as people.

Conservation biology is full of these examples. European wild cats are disappearing into the domestic cat population. American black ducks are being absorbed by mallards introduced from Europe. Given a disturbed ecology, even what we think of as separate species will freely interbreed and produce perfectly viable, fertile offspring.

I’ve been asking my whole career, Why were modern humans more successful? I have a colleague who says, “It’s like there was a football game, and the Neandertals lost.”

Any thoughts on the Geico caveman?
It’s a good advertising routine. But he’s not particularly made up to look like a Neandertal. He could be an early modern human from the Pleistocene.
Jennifer R. Smith, associate professor of earth and planetary sciences

For Jennifer Smith, going out into the field requires a detailed research plan and gear – a lot of it. On her January 2012 trip to the Nile River island of Sai, in the heart of Nubia (present-day northern Sudan), she suited up like a one-woman field operation crew. Smith, an expert in paleoenvironmental reconstruction, reads the sediments for clues about changes in ancient river flow and the response of the island’s Neolithic cattle herders in order to reconstruct the history of human-environment interaction in the area. Here’s what she needs to get the job done.

Pack
Holds gear and the 10 pounds of rock and sediment samples that might be picked up each day on her 15-mile hikes.

Hand lens and dog whistle
Magnifies sediments, to aid in identification and classification, and startles shepherd dogs that might otherwise attack.

Measuring tape
Measures the thickness of layers in each profile and the height of the surveying instrument.

Multi-tool
Leatherman-type tool clamps (equipment needing repair), cuts (rope for binding gear) and spreads (peanut butter, for lunch).

Trowel
Scrapes clean the holes, or “profiles,” dug with pick and shovel to see layers of sediment more clearly.

Field notebook
Records observations and is kept in an easily accessible case outside the pack.

Binoculars
Assess the landscape, assists tracking of wildlife (including 20-foot-long Nile crocodiles).

Camelbak water carrier
Delivers on-the-go purified Nile water.

GPS
Marks the geographic location of landscape features and collected samples (and where the car is parked). The island is located at 20.70779 N 30.333223 E.

Surveying instrument
Precisely measures distance and elevation of topographical features.
“The challenge is to get students excited about science as a process – not as a set of facts – and to develop programs and courses that can sustain that excitement.”
THE INTRO CLASS BLUES
by Kathleen Fields
A radical new approach to science education and why it matters

When Alex Anderson enrolled at Washington University, his future seemed all but sealed. Through hard work and a natural aptitude, he earned A’s in his high school math and sciences courses and scored near the 99th percentile on his SAT exam. For the thrill of the challenge, he spent his spare time solving math–competition-type problems and reading math books. He was just the sort of recruit that science departments hope to pull into their ranks and develop into a future scientist.

Anderson, however, felt a bit uneasy about it all. “I was not sure what I wanted to do with my life,” he says. He wanted to work in math, physics, biology or computer science, but didn’t have a clear sense of the possibilities. Further, the idea of a career in science seemed intimidating. “I was worried that I would not be able to do research,” he says. “I was worried that I was just not capable of creating new ideas.”

Even when students like Anderson arrive brimming with enthusiasm for science, it can be a tough start.

The first two years are a critical test for both students and departments in the process of producing future scientists. “Freshman year is the time when you win or lose a science major,” says Sarah C. R. Elgin, the Viktor Hamburger Distinguished Professor in Arts & Sciences. The goal for both: students succeeding in their chosen field of study.

During the first two years, science students decide whether or not continuing in their major is worth the hard work. Majors in the natural sciences are required to take a slew of introductory courses outside their discipline as freshmen and sophomores. General Chemistry and Physics I, for example, are required by 13 different majors, including earth and planetary sciences, environmental biology and computer science. Fundamentals of Biology is required by five majors. Until they understand why establishing that breadth is necessary and have the opportunity to integrate it in a meaningful project, Elgin says, the schedule “can be a bit of a slog.”

The importance of these introductory courses is heightened because they provide the foundation for the remainder of the student’s learning. “Science is so sequential; you have to hit the ground running,” Elgin says. Concepts covered in the introductory biology and chemistry courses, for example, must be mastered before a student can fully understand the biochemistry course, like building a foundation and first floor before beginning the second. “It’s very hard to be the Comeback Kid as a science major.”

For those reasons, it’s not surprising that the No. 2 reason students who had planned to major in biology, chemistry or physics changed their major to something outside the natural sciences altogether was that “the introductory courses turned me off the subject,” according to a 2007 survey of students at WUSTL and its peer institutions. (The No. 1 reason was that they simply found another major that interested them more.) It’s a bigger problem than merely a diminished number of students in these disciplines, says Kathryn Miller, professor and chair of biology. “We lose women and under-represented minorities in greater proportion,” she says. “But with more diverse perspectives, you have better solutions.”

And for those same reasons, A&S science departments are continually finding ways to help their students succeed in these introductory courses. “We want students to see science as we do: as an exciting process of discovery, creativity and collaboration,” says Gina Frey, director of the Teaching Center and professor of the practice in the chemistry department. “The challenge is to get students excited about science as a process – not as a set of facts – and to develop programs and courses that can sustain that excitement.”

There has been something of a national panic about students excelling in the STEM areas (science, technology, engineering and mathematics). For 20 years, the media has been reporting on the decline of the American competitive advantage.

The most recent benchmarking exercise from the Organization for Economic Co-operation and Development reveals only a middling ranking for 15-year-olds in the United States on international science tests. At the university level, the problem isn’t performance but quantity: according to a report published by the National Science Board, American students earned only 11 percent of the world’s 4 million undergraduate (or equivalent) science and engineering degrees in 2006, compared with 21 percent in China and 19 percent in the European Union. Only about a third of American students pursue bachelor’s degrees in science and engineering, compared with 63 percent in Japan and 53 percent in China. (At WUSTL, just under 30 percent earn degrees in science or engineering fields.)

And any shortage of new scientists affects the national economy. Science and engineering sectors are powerful engines of prosperity, responsible for more than 50 percent of our sustained economic expansion, according to the U.S. Department of Labor. But only 5 percent of American workers are employed in those fields.

Correcting this trend means retaining science students through the freshman and sophomore years and giving them a boost to continue on to graduation and beyond. Arts & Sciences faculty have devised a number of approaches – some aimed at students predicted to be class leaders, some aimed at students who might struggle with the curriculum – to do just that.
The first step toward solving this problem begins on the first day of freshman year – or, for many newly admitted students at WUSTL, even a few months before.

Students interested in biology or biomedical engineering are invited to compete for a spot in the Summer Scholars in Biology and Biomedical Sciences program, which brings 20 incoming WUSTL freshmen to campus the summer before their first semester. During their seven-week stay, the not-quite-freshmen learn basic research skills and then apply them, with the help of a mentor, to a variety of research problems in biology, bioengineering, and biomedicine. The objective is to help them transition to active learning (a model of instruction that emphasizes the learner’s responsibility for his or her learning) by engaging them in research even before they begin their freshman year.

In the chemistry department, incoming students signed up for the introductory course are required to take an online diagnostic exam, developed by Frey, that helps determine the type of support they will need to succeed when the semester kicks off in August. Course instructors and advisers use the results to recommend which of the myriad support programs are appropriate. So, a student with a high degree of proficiency might be advised to participate in the department’s highly successful peer-led team-learning (PLTL) groups, while a less prepared student would be encouraged to sign up for smaller peer-mentoring groups, in addition to participating in PLTL. All students attend lectures and recitation sessions. With nearly 800 students in three sections of General Chemistry, it’s enormously helpful to both student and instructor to have this strategy worked out even before the first lecture begins – and long before trouble arises. The

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**BY THE NUMBERS**

Top 10 countries for bachelor’s (or equivalent) university degrees in science and engineering

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of S&amp;E degrees awarded</th>
<th>Percentage of all degrees awarded</th>
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<tbody>
<tr>
<td>China</td>
<td>911,846</td>
<td>52.8%</td>
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<tr>
<td>United States</td>
<td>478,858</td>
<td>31.9%</td>
</tr>
<tr>
<td>Japan</td>
<td>350,137</td>
<td>23.1%</td>
</tr>
<tr>
<td>Russia</td>
<td>308,042</td>
<td>23.5%</td>
</tr>
<tr>
<td>India</td>
<td>176,036</td>
<td>23.5%</td>
</tr>
<tr>
<td>Mexico</td>
<td>116,231</td>
<td>23.5%</td>
</tr>
<tr>
<td>South Korea</td>
<td>111,805</td>
<td>16.5%</td>
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<tr>
<td>United Kingdom</td>
<td>107,355</td>
<td>16.5%</td>
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<tr>
<td>Brazil</td>
<td>111,480</td>
<td>16.5%</td>
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<tr>
<td>Poland</td>
<td>117,304</td>
<td>17.7%</td>
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</tbody>
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Note: Data include all science and engineering fields – physical/biological sciences, mathematics/computer sciences, agricultural sciences, social/behavioral sciences, engineering – for 2006 or most recent year. *2007; †1990; ‡2005
Source: Science and Engineering Indicators 2010 (National Science Board)
Keeping freshmen and sophomores interested in the sciences requires some kind of motivating experience.

upshot is that students in this class, once feared as the hardest on campus, are now succeeding, with up to 75 percent of them earning A’s or B’s.

REQUIRE THEM TO LEARN, NOT JUST MEMORIZE

New undergraduates are often shocked by the expectations of college-level academics, and nowhere is that more pronounced than in the sciences. “A college-level chemistry course is very different than anything first-year students have taken in high school, even if they’ve taken AP Chemistry,” says Bill Buhro, the George E. Pake Professor and chair of the chemistry department. “It’s about understanding concepts and problem-solving, not memorization. We teach them to look at a problem upside-down, inside-out and backward.” Whether or not a student can make this conceptual leap in chemistry class is a strong predictor of his or her ability to do so in any class.

To help students bridge the divide, Frey is again working on a new test that will provide insight into the learning strategies of introductory chemistry students. Mark McDaniel, director of the Center for Integrative Research on Cognition, Learning and Education (CIRCLe) and professor of psychology, has developed a test that divides test-takers into two categories: those who learn by rote memorization and those who learn by applying theory. Frey and McDaniel are piloting this test in the classroom with WUSTL introductory-chemistry students, as well as with introductory-chemistry students at six other institutions.

Their results are added to the work of students participating in the program at other universities, building a database available to scientists around the world. “It’s a new experience for the kids,” Elgin says. “It involves work, aside from the learning experience.”

The data are truly important science. The host for the phage viruses is a strain of bacterium related to TB and leprosy, though the one used in the lab is nonpathogenic. Scientists are interested in understanding the viruses that can kill that bacterium because they may be useful as vectors in medical research. Recently, 12 students from the first Phage Hunters course contributed to a research paper published in PLoS ONE, the peer-reviewed online journal of the Public Library of Science.

Beginning in spring 2012, the biology department will bring a taste of this research experience to a select group enrolled in its introductory course, Fundamentals of Biology. About 120 of the course’s 600 students will take a lab that condenses the bioinformatics portion of the Phage Hunters course, giving them the opportunity to learn the computer skills and annotate one of the their own phages isolated by fellow students. The plan is to refine the lab and then offer it again to all introductory bio students in spring 2013, giving even more students the chance to do real scientific research as part of their regular class schedule. “The nature of science is driven by active participation,” Miller says. “Teaching in a passive way doesn’t take advantage of the nature of science.”

DEMYSTIFY THE CAREER OF A SCIENTIST

The biology department takes a dessert-first approach to science education with Phage Hunters, a genomics course that comprises a year-long research experience investigating phages, a type of virus that infects bacteria. In 2008 WUSTL became one of the first in the country to offer the course, which is funded by the Science Education Alliance at the Howard Hughes Medical Institute.

The timing of the course – offered only in the freshman year – is important because it reaches students who might otherwise be turned off by the long march through the introductory courses. “It gives them a chance to get their hands in the goo right away,” Elgin says. To meet demand, the department now offers two sections of the course.

Students spend the first semester engrossed in so-called wet bench work, learning the lab techniques involved in collecting, purifying and isolating the phage. Over winter break, the Washington University Genome Institute sequences the genomes of the class’s phages. In the spring, students engage in the bioinformatics portion of the course. They meet in a computer lab to learn the tools necessary for genomic analysis, which allows them to identify individual phage genes and try to determine their functions (a process called annotation). Because phages are so numerous and evolve so quickly, nearly all are novel, which adds to the students’ excitement.

EMBRACE NEW WAYS OF TEACHING

Introductory physics is another course required in a dozen majors; each year, more than 700 students are signed up. The vast majority, up to 90 percent, are pre-med or engineering students
who won’t continue in physics past the introductory level. This is the only shot they have to pick up the physics they’ll need down the line. “For science majors, physics is critically important,” says Ken Kelton, the Arthur Holly Compton Professor and chair of physics. “The concepts we teach underlie the things they end up doing in their careers. It’s the foundation that underlies the physical world.”

Most introductory physics courses in the United States follow a standard sequential, lecture-heavy model that’s been employed since the 1950s and covers some topics in a way that is essentially unchanged since the late nineteenth century. “Some students love this model,” Kelton says, “and others need a different paradigm.”

In 2004, physics professor Tom Bernatowicz brought a new way of teaching to campus, a course called Six Ideas That Shaped Physics, and offered it as a section of Physics I. The goal was to create a deeper level of understanding, not an easier course. The new model organizes the semester around central concepts – conservation laws, Newtonian physics, special relativity, electromagnetism, quantum physics and statistical/thermal physics – instead of chronology. This allows for in-depth explorations of the ideas across time.

Bernatowicz scrapped the traditional lecture format, too. Six Ideas students are required to actively prepare for class by completing readings and working homework problems based on those readings. In a typical class, they hear one or more 10-minute lectures over the material, talk about two-minute problems in groups and discuss their answers. Often there is a demonstration that illustrates the material. At last, they go home and rework the original set of homework problems. The multiple passes over the material, in different and novel ways, create learning that sticks.

Students immediately responded to the new format; they were clamoring to get in. In 2004, there was one Six Ideas section of 62 students and four traditionally taught sections. This year, there were five Six Ideas sections of 120 students.
each and only one section of traditional physics – which means that the department actually increased the total number of physics sections taught. “This is overwhelmingly due to the increased student interest in the active-learning style of freshman physics,” Kelton says.

Assessment tests demonstrate that Six Ideas students learn and, importantly, retain the course material better than their traditional-lecture-course counterparts, especially women and pre-med students. “There’s a striking difference,” Kelton says. “They retain more and have a better attitude about physics.”

Keeping freshmen and sophomores interested in the sciences isn’t a matter of smoothing the path for them. A 2011 survey of WUSTL students shows that biology, chemistry and physics majors ranked “ease of coursework” as last in importance among the factors in choosing their first or second major. Instead, hanging on to them requires “some kind of motivating experience to keep them going,” Elgin says.

For Alex Anderson, who graduates in May with bachelor’s degrees in mathematics and physics, that seminal experience was the Phage Hunters course. “Phage Hunters was one of my best classes at Wash. U.,” he says. “It was really cool to get engaged in research and to interact with professors in a small setting. . . . It gave me more confidence in my ability to contribute to the scientific community.” He went on to win a prestigious Goldwater scholarship and to conduct published research with physics professor Carl Bender. His enthusiasm for science nurtured and expanded, he plans to pursue a doctoral degree in theoretical physics.

In the end, perhaps the most important things first- and second-year science students learn are persistence, the ability to apply concepts and the confidence to ask their own questions – just like a scientist.
YOU MUST
LOOK
BEFORE
YOU CAN SEE

by Kathryn Atnip
The Muslim world’s golden age of rationalist philosophy — that is, a worldview based on reason and deduction — produced a dazzling body of work that also provided significant contributions to the development of Western thought. Philosophers such as Avicenna (c. 980–1037), the most influential thinker of classical Graeco-Arabic scholarship, synthesized Aristotle’s great works and proceeded to write hundreds of original treatises on theology, medicine, philosophy, geology, logic, and physics. Avicenna’s work in turn influenced St. Thomas Aquinas and contributed to rationalist scholarship during Europe’s Middle Ages. And then, as the traditional story goes, a dark age descended as the Islamic world turned inward, beginning around the 12th century.

While Western philosophers went on to develop the ideals of the Renaissance, the accepted view has been that the great Muslim thinkers concerned themselves mainly with transmitting religious scholarship based on the Quran and the Sayings of the Prophet Muhammad. “Once the Renaissance starts in Europe, the cliché is that the torch has been passed on,” says Ahmet T. Karamustafa, professor of history and religious studies and chair of Jewish, Islamic and Near Eastern languages and cultures. Western historians of the 19th century declared this period (until c. 1900) “sterile” in terms of advancing new rationalist ideas. In their estimation, the notable Arabic material had now been translated into Latin and there was nothing worthy of study left in Islam. “The assumption is that Europe alone produced the top philosophers of the world,” Karamustafa says. “As a result, we have been left with our own ‘dark ages’ as Islamicists.”

Until now.

**ASSEMBLING A DREAM TEAM**

A group of scholars files into a conference room and sits down around the table. Books, pens, papers come out; there is lively conversation followed by rapt silence, spilled tea, some laughter. The assembled individuals are an unlikely alliance of scholars from different geographic locations (Washington University, University of Minnesota, Cambridge, Harvard, McGill, Free University of Berlin), disciplinary affiliations (religious studies, history of physics, logic, political thought) and language proficiencies (Greek, Latin, Arabic, Persian, Turkish). Their mission: investigate the writings of this post-classical period to reveal seven centuries’ worth of undiscovered original thought that carries on a rationalist tradition.

They’re already finding success. In one workshop, a scholar presented a manuscript titled “The Elevated Questions,” in which theologian Fakhr al-Din al-Razi (1149–1209) argued against the Aristotelian theory that bodies fall at a speed that increases with their weight. Four hundred years later, Galileo, unaware of al-Razi’s work, came to the same empirical conclusion.

Such fruitful discoveries explain the zeal with which three scholars are undertaking an unprecedented systematic inventory of the post-classical period. Karamustafa has added this line of research to his expertise in Sufism, the major mystical tradition within Islam. Asad Q. Ahmed, assistant professor of Arabic and Islamic religion, who conceived of the project, formulated it and has led it from the beginning, researches logic, philosophy and theology during this era in Muslim India; these workshops are a natural extension of his current focus. Their colleague Jon McGinnis, associate professor of philosophy at the University of
Missouri–St. Louis, is a scholar of Avicenna and the classical period and is now turning his attention to the richness of this later age.

There is no comprehensive understanding of the cultural and intellectual production of this period. They’re beginning to create it. As co-directors of a John E. Sawyer Seminar on Comparative Cultures awarded by the Andrew W. Mellon Foundation, these three scholars have a commitment of $175,000 to help them. The funds support a series of focused workshops and a larger conference to be held at Washington University, gathering together the best minds in the world, and offering two fellowships for graduate students beginning work in this area.

PAGE BY PAGE

But the first step in this process is the dissection of a passage of text. The scholars assembled around the conference table focus on one reading, contributed by a participant, one page at a time; sometimes a single paragraph consumes an hour. The format of the text itself complicates the matter: most writings from the period are in the form of commentaries and glosses, or annotations, marked in workbook-style texts used by teachers. Each page begins with a few lines of material; the remaining space is given over to notes and comments on those notes. The edges of the pages may also contain additional annotation, with as many as 100 comments in a single manuscript. It is worth noting that this format made it easy for later Western readers to assume that “it’s only annotation and regurgitation of the same material . . . that there is nothing new here,” Ahmed says.

Further, the question of authorship is difficult to establish, with notes and comments written by multiple scholars over a period of time. The entire text might be inscribed as a
devotional piece dedicated to the reigning ruler (rather than the product of an individual’s work), and the material was not always dated. All of this makes it difficult to trace the development of ideas.

And so line by line, page by page, the scholars test their interpretations of the text chosen for investigation. McGinnis compares these workshops to graduate-school seminars, a sort of back-to-basics experience. “It’s humbling to dig into the meaning of words, abbreviations and points of grammar,” he says. The exploration depends on scholarly teamwork, quite different from the solitary work done by the original authors – so well versed in so many disciplines – and that of many humanities scholars today. “The nature of the integrated knowledge we’re encountering makes this effort collaborative by necessity,” Karamustafa adds. “The third line down, you hit a problem with the language or the logic and you need to look for help.”

Keeping in mind that while there are about two dozen people in the world working on post-classical Islamic rationalist thought, the sheer volume of manuscripts, housed in libraries across the world, is estimated to be ten times the volume of those from the great thinkers of Europe. “It’s massive, it’s daunting and it’s scary,” Ahmed says. Still, he asserts that we cannot afford to ignore this tradition because the story of rationalism is complex and in need of a contextualization that spans beyond Western Europe. Through a broader understanding of this rich tradition of inquiry, Muslims can begin to see themselves as inheritors of a vibrant intellectualism. Karamustafa concurs, adding that this work can provide a valuable antidote to misconceptions about the nature of Islam.

And so the prospecting party of scholars begins its work, sifting through manuscripts, parsing lines, certain they will find a trove of original rationalist thought, if only as scribbled notes in the margins of its pages.
TO SERVE THE PRESIDENT

by Kathleen Fields
Help wanted: Seeking passionate, patriotic individuals for whom public service is a priority. Must be a team player, able to withstand long work days and committed to solving the most difficult social and economic problems of the day. Excellent communication skills and analytical ability required. Must be willing to relocate.

More than 450 people working in the Executive Office of the President have answered this call for service, putting on hold personal ambition, personal lives and, it seems, sleep. Like many others with office jobs, their workday lives are measured in meetings, conference calls, emails and hallway conversations — except their boss is the leader of the free world, whom they might bump into in the stairwell. For several Arts & Sciences alumni, it’s all in a day’s work.

In his book The White House Staff, Bradley H. Patterson Jr. calls them compatriots in the battle to effect the president’s program of change and details their numerous activities. A quick rundown: under the president’s guidance, they develop and oversee domestic policy; coordinate foreign and domestic economic policies; provide legal advice to the chief executive; manage legislative affairs; inform the press; oversee communications; write speeches; build alliances with constituent groups; schedule the president’s activities; collaborate with state and local governments; review political appointments; advance presidential trips; and liaise with the Cabinet. The work is demanding; the hours are long.

These White House staffers are equal parts endurance athlete, change agent and awestruck observer.

THE FIRST DAY

There’s no time for first-day jitters. The pace and weight of a new position are quickly made apparent.

“I will never forget my first few days at the White House,” says Danielle Borrin, LA ’05, deputy director for Intergovernmental Affairs and Public Engagement in the Office of the Vice President. “The streets in Washington were still filled with the excitement of the Inauguration, and the White House was just starting to buzz with activity.” As she was receiving her White House badge, President Obama was signing into law the Lilly Ledbetter Fair Pay Act of 2009.

On his first day, Jason Green, LA ’03, associate counsel to the president, attended a meeting in the Situation Room — the intelligence-management center in the basement of the West Wing where the president gathers his National Security Council staff. Though Green can’t divulge the topic of the meeting, he says he was “struck by the speed with which you’re expected to operate. There’s an incredibly short orientation period.”

Dino Falaschetti, GR ’99, who was senior economist at the Council of Economic Advisers (CEA) for a year during the George W. Bush administration, bumped into Jonathan Wolfson, LA ’05, on his first day. Wolfson had joined the CEA a month before as research assistant (and later became director of reasearch support and policy analyst). Later that day, as Falaschetti sat with CEA Chairman Ben Bernanke and an impressive group of economists to listen to the final report given by his predecessor, he suddenly realized, “Oh . . . I’m going to have to do this next week!”

THE DAILY SCHEDULE

Daily life is hectic and inspiring, says Anne Filipic, LA ’04, deputy director of public engagement. “You need to be able to juggle a dozen balls at once. You’ll run from a meeting about one topic to another meeting on a completely different topic, all the while trying to keep up with dozens of emails involving 10 other pressing issues. But then you’ll walk into an event with the nation’s top leaders on a given subject, hear President Obama speak and pinch yourself that you have the opportunity to be a part of it.” Some days are so jam-packed that her only opportunity to catch up with her husband, who also works at the White House, is on the drive to work. There are also times she realizes only in the late afternoon that she never had the chance to eat.

Daily life was just as demanding during the Clinton years. Matt Millikin, LA ’98, JD ’01, worked in both the Gift Unit and the Office of the Staff Secretary, where his job was to track the documents that went to the president and to compile the president’s daily briefing binder, which included a copy of the president’s schedule and all of the background materials he would need to attend the meetings and events the next day. Days in the staff secretary’s office were long. Milliken says: “I had to be in the office before the president started his day. I couldn’t leave until the president returned to the residence for the night and I had the president’s briefing materials ready for the next day. Days started before 7 in the morning and could last until midnight or later.”

Few have had a more intense schedule than Cole Randle, LA ’09, associate director of the White House Travel Office. For domestic and international trips, his job is to coordinate logistics for the traveling White House press corps to get to and from the president’s event locations and to file their stories. “If you hear a reporter say they’re ‘traveling with the president,’ it’s my office helping to make that happen,” Randle says. Since starting at the White House, he’s traveled with the president and the press corps to Indonesia, Chile, Poland, Australia, South Korea and 17 U.S. states, logging nearly 150,000 air miles. If changes to the program are made at 3 am, he starts working on it at 3:01 am.

“Remarkably, given the hours, it never seems like work,” Randle says. “I couldn’t be happier.” Staffers do leave the White House grounds, but not without a tether. “It’s certainly
possible to get away,” says Katherine Platt, LA ’03, “but it’s not easy to get away from the BlackBerry!” Platt is director of White House operations in the Office of Management and Administration. An avid runner, she typically trains for a marathon in the fall, requiring long Saturday-morning runs. “This year I found myself constantly debating whether to take my BlackBerry with me or put up an ‘out of office’ message letting folks know I’d be away from email for a bit,” she says. “But it all worked out just fine.”

THE PURPOSE

Despite the toll the job takes, a hearty corps can’t resist the chance to make a difference – on a national, international and even universal scale. Eric Helland, GR ’95, senior economist with the CEA under George W. Bush, describes his experience as “a policy geek’s dream.” He spent much of his time working on a task force charged with determining the future of the space-shuttle program, just after the 2003 Columbia disaster. “When the shuttle went up for the last time [in July 2011],” he says, “I was reminded that the task force I served on made that decision back in 2003. You’re pretty anonymous as a staffer, but you impact a lot of areas.”

Borrin describes her job as “rewarding beyond words.” She says, “My colleagues and I arrive each day dedicated to helping make the federal government more accessible to all Americans and inspired to connect the public on issues of national importance. We’ve helped fishermen recover some of their losses from the BP oil spill, been inspired by survivors of domestic violence and sexual assault, and saluted champions of change.”

Filipic was involved in the conferring of the 2011 Citizens Medals, the second-highest honor the president can bestow on a civilian, after the Medal of Freedom. “After the long nomination and selection process, I had the great honor of calling the awardees to let them know President Obama wanted to bring them to the White House to bestow upon them the honor,” she says. “These are everyday people who have devoted their lives to helping others and improving their communities. Making those phone calls – and then meeting them and seeing the president interact with each of them before the awards ceremony – is an experience I will never forget.”

“It’s humbling to play a role – albeit a very small one – in helping the president move the country to a better place,” says Eric Schultz, LA ’02, associate communications director in the Press Office.

THE LIGHTER MOMENTS

Like any workplace, thankfully, there are lighter moments as well. “Oddly, the biggest perk was the Easter Egg Roll,” Helland says. His young daughter was invited, and a score of CEA colleagues volunteered to help watch her. “She and a friend went to the roll with something like 15 of us as escorts,” he says. Helland confirms his daughter had a good time, too.

Helland encouraged Falaschetti to embrace the White House perks. “He told me, ‘Whenever you get a chance to do something cool, do it – it will be your last chance.’” So for the last month of Falaschetti’s term in CEA, he attended South Lawn welcome ceremonies for the president of China and the prime

1 President Barack Obama delivers remarks during a reception for members of the Federal Judge Association in the Grand Foyer of the White House, May 24, 2010.
2 Dino Falaschetti, GR ’99, far left, and his wife, Suzanne, met President and First Lady Bush at the White House Christmas Party. Three A&S alumni worked in Bush’s Council of Economic Advisors during his term.
3 Arts & Sciences alumni currently in the White House: (back row) Cole Randle, LA ’09; Jason Green, LA ’03; Michael Block, LA ’03, LW ’08; (front row) Eric Schultz, LA ’02; Kendra Barkoff, LA ’02; David Z. Cohen, LA ’11; Danielle Borrin, LA ’05; Katherine Platt, LA ’03; Lisa Kohn, LA ’05, LW ’10; Anne Filipic, LA ’04.

The views expressed in the article are the interviewees’ and do not represent the views of the Office of the President of the United States or the Office of the Vice President of the United States.
minister of Japan and snapped up tickets for the President’s Box at Kennedy Center.

Wolfson took full advantage of the access White House staffers have to the grounds. “I gave pretty much every friend and family member a tour,” he says. “I took my wife on our first date to the Fourth of July on the South Lawn, and we got engaged in the Rose Garden!”

Of course, some lighter moments are not planned. Green once nearly interrupted a press conference, a joint briefing with the presidents of Pakistan and Afghanistan, while attempting to cross the Grand Foyer. “I walked right onto the red carpet and turned right back around,” he says. “I thought I was going to get a call from my mom that night saying she’d seen me on the news.”

Exhausting hours, an unrelenting schedule and a mountain of problems to be solved—maybe that’s what a White House job posting should detail. But prospective staffers would likely sign up anyway, eager for the chance to be a part of history.

“The energetic and intellectually aggressive men and women who make up the White House staff are driven not so much by the thirst for fame in the present as by the prospect of nudging the future,” Patterson writes in *The White House Staff*.

As Platt sees it, “It’s a very special combination to work for someone I respect and believe in, to enjoy my job responsibilities and to have such amazing colleagues. And that it all happens at a place like the White House makes me feel like the luckiest person in the world.”
UNDERSTANDING THE ECONOMY

by Katherine L. Comfort-Mason
The unemployment rate dropped, the economy added more new jobs than expected, home sales inched up and the Dow soared triple digits. Good news, right? It depends on who’s doing the spinning. President Obama and his allies would certainly tout such numbers as evidence that the administration’s policies are working, and that a recovery is under way. His opponents, however, would point out that unemployment dropped only because discouraged workers – those who have given up looking for jobs – are not included in the count. And home sales? They were inflated by bottom-feeders snapping up foreclosures. As for the stock market, there’s just as likely to be a triple-digit drop tomorrow.

So, should we celebrate, despair or scratch our heads in dismay? In fact, both optimists and pessimists may be partially correct in their assessments of the economy, in a glass-half-empty vs. glass-half-full sort of way. But if no one is completely right, how can we discern who is more right?

As the country struggles to emerge from the economic downturn, many of us who previously paid scant attention to economic statistics are tuning in like never before.

How, then, should we evaluate what we hear, particularly in a presidential election year where good news is bad, bad news is good and shouting partisans are more concerned with making political points than in offering honest assessments? How do we use the various economic indicators that we hear and read about to come to an informed opinion?

“It’s hard not to focus on unemployment numbers,” says Randall Calvert, the Thomas F. Eagleton University Professor of Public Affairs and Political Science. “The gross domestic product [GDP] is also certainly an important indicator, but it doesn’t tell enough of the story.”

Those statistics, when placed in proper context, are indeed meaningful, if not definitive. Most U.S. economists consider an unemployment rate between 4 and 6 percent to be essentially full employment. That was the case throughout most of the 2000s, until the downturn began to take hold in late 2008. In 2009, dark and depressing days by any measure, the unemployment rate briefly rose to 10 percent and averaged 9.9 percent for the year. (While it may be scant consolation to those looking for work, it is useful to recall, if only for perspective, that the Great Depression saw unemployment rates twice as high – unthinkable by today’s standards.)

An annual growth rate of 3 percent or greater for the real GDP is considered desirable by most economists, while 4 percent is considered quite brisk. However, when various economic indicators begin to contract, the country is said to have entered a recession. The National Bureau of Economic Research (NBER), a private nonprofit organization generally considered the final word on such matters, defines a recession as “a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production and wholesale-retail sales.” Other economists define a recession as two consecutive quarters of a declining real GDP.

According to the NBER, the recent recession officially began in December 2007 and ended in July 2009. Still, few economists are excited by the tepid 1.7 percent growth rate 2011 is expected to notch, once final calculations are released. And polls show that most Americans still consider the economy to be in a recession, although cautious optimism may finally be taking hold.

Economic inequality indicators provide a necessary counterpoint to a strong real GDP, adds Calvert. Although growth has resumed, albeit slowly, median real incomes have remained stagnant for the past decade, and the gap between the wealthy and everyone else – those days termed “the 99 percent” – is increasing.

“That’s highly problematic when you look beyond the nation as a whole and instead consider its people,” says Calvert.
Michele Boldrin, the Joseph Gibson Hoyt Distinguished Professor of Arts & Sciences and chair of the Department of Economics, believes that the employment figures are actually more essential than the unemployment figures. “Unemployment is a tricky thing,” he says. “It can tell a lot of different stories. But the employment number tells you who’s actually working, and that gives a clearer picture of how people are faring.”

In fact, total employment numbers continue to lag behind pre-recession levels. The employment level is down about 6 million from its peak of about 138 million just before the downturn. That, Boldrin says, is why so many people have detected no improvement in their personal situation, regardless of what the NBER says.

Comparing abstract subjects to matters with which non-experts can relate may be helpful when explaining, say, physics. But Calvert says such simplifications can actually be misleading when it comes to the economy. “The federal budget is not like a household budget,” he notes. “It’s unrealistic, even dishonest, to suggest that the same theory can be applied to the country as to a family of five.” After all, few households have a defense budget.

So, Calvert says, regard with a healthy dose of skepticism anything politicians advocate regarding the relative merits of spending cuts versus tax increases. Both are touted as the best solution to a balanced budget, but also come with what are perceived by the opposition as punitive results. This debate, Calvert believes, has devolved into partisan posturing, the result of which is frequently ineffective half-measures.

Steven Fazzari, associate director of the Weidenbaum Center on the Economy, Government and Public Policy and professor of economics, appreciates the challenges even the most informed person faces when trying to understand where the economy is headed.

“People tend to come to these issues with fairly strong beliefs, and if you’re only looking to confirm those beliefs, you’re not going to make a very informed decision,” Fazzari says. “There’s a great deal of disagreement among the expert community, so it’s fairly easy to find a credible source to validate your opinion.”

Boldrin’s primary advice to anyone trying to become more informed about the economy is straightforward: find reliable sources, which are more likely to be found on your computer screen than your TV screen.
In summer 2011, William Acree, assistant professor of Spanish, traveled 5,500 miles to Montevideo, Uruguay, to work on a Fulbright-funded project investigating a late-19th-century form of public spectacle called the Creole circus. He spent two months sorting through a century’s worth of paraphernalia in well-worn public archives and more off-the-beaten-path ones like the Sociedad Criolla, a compound on the city’s outskirts that houses a museum of sorts and several outbuildings, including a barn where stashes of boxes were piled up. With doors wide open and the cool southern hemisphere’s winter air blowing in, a dozen roosters pecked at his feet while Acree flipped through circus programs and photographs of performers in his quest to explore the lasting cultural impact of the short-lived phenomenon. A bit out of the ordinary, but right at home with the Creole circus.

The Creole circus took root in the countryside of the Plata River region of Latin America, specifically in Uruguay and Argentina. In the colonial era, the term Creole (criollo) legally signified a Spaniard born in the Americas, but by this time it had come to denote what was considered authentically Argentine or Uruguayan.

Traveling circus troupes (with as many as 50 members) hopped from city to city, setting up camp for six to eight weeks for each engagement. Open fields became performance space, with huge tents and temporary stands. Locals turned out by the thousands to catch the daily show, put on twice on Sundays, which featured a program of equestrian tricks, gymnastic and acrobatic stunts, folk dances, musical acts, poetry presentations and a short theatrical work, the Creole drama. Admission was cheap, about the cost of a pack of cigarettes. And everybody wanted to go.

The Creole drama quickly became the central attraction. Plays in the genre told the story of a native son, usually a gaucho figure from the countryside, who is persecuted by a corrupt system of justice and who now seeks revenge. Works such as Martín Fierro – the tale of a reluctant Argentine outlaw unjustly treated by local officials (and the subject of an epic poem with the same title) – struck a chord with the audience. During the performance of another play, Juan Moreira, the actors portraying law-enforcement officers were mobbed by the audience during the scene when they stab the hero in the back – an act of cowardice according to the rural code of honor. This seemingly simple story of “country boy gone bad” highlighted renewed nationalism in response to the arrival of large numbers of immigrants in the region and dramatized questions surrounding the forces of modernization.

By the 1890s, circus families were setting up their own permanent theaters in urban areas and attracting a broad audience; poor and rich alike attended the shows in great numbers (one theater accommodated 5,000). Through the 1910s, the Creole circus was a key source of entertainment and the best place to socialize. This national tradition evolved into a vibrant theater culture that today ranks alongside that of Paris, New York and London. In Buenos Aires, the famed Corrientes Avenue, a South American Great White Way, extends for miles. In Montevideo, theaters perform an average of 60 plays per week.

1 The Creole circus took root in the countryside of the Plata River region of Latin America, specifically in Uruguay and Argentina. In the colonial era, the term Creole (criollo) legally signified a Spaniard born in the Americas, but by this time it had come to denote what was considered authentically Argentine or Uruguayan.

2 Traveling circus troupes (with as many as 50 members) hopped from city to city, setting up camp for six to eight weeks for each engagement. Open fields became performance space, with huge tents and temporary stands. Locals turned out by the thousands to catch the daily show, put on twice on Sundays, which featured a program of equestrian tricks, gymnastic and acrobatic stunts, folk dances, musical acts, poetry presentations and a short theatrical work, the Creole drama. Admission was cheap, about the cost of a pack of cigarettes. And everybody wanted to go.

3 The Creole drama quickly became the central attraction. Plays in the genre told the story of a native son, usually a gaucho figure from the countryside, who is persecuted by a corrupt system of justice and who now seeks revenge. Works such as Martín Fierro – the tale of a reluctant Argentine outlaw unjustly treated by local officials (and the subject of an epic poem with the same title) – struck a chord with the audience. During the performance of another play, Juan Moreira, the actors portraying law-enforcement officers were mobbed by the audience during the scene when they stab the hero in the back – an act of cowardice according to the rural code of honor. This seemingly simple story of “country boy gone bad” highlighted renewed nationalism in response to the arrival of large numbers of immigrants in the region and dramatized questions surrounding the forces of modernization.

4 By the 1890s, circus families were setting up their own permanent theaters in urban areas and attracting a broad audience; poor and rich alike attended the shows in great numbers (one theater accommodated 5,000). Through the 1910s, the Creole circus was a key source of entertainment and the best place to socialize. This national tradition evolved into a vibrant theater culture that today ranks alongside that of Paris, New York and London. In Buenos Aires, the famed Corrientes Avenue, a South American Great White Way, extends for miles. In Montevideo, theaters perform an average of 60 plays per week.
In the years leading to graduation, 577 members of Arts & Sciences’ Class of 2012 studied abroad through Overseas Programs for a semester, summer or year. They studied in 50 countries, the most popular being Australia, China, France, Spain and the United Kingdom. Other far-flung locales include Cameroon, Croatia, Fiji, Madagascar, Peru, Tibet and Switzerland.

“All of our programs are rooted in academic departments,” says Mark Beirn, associate director of Overseas Programs. “Faculty play a key role in determining where our students go. They visit programs, review them, make suggestions for new programs.” This diligence ensures that students who study abroad have a rigorous educational experience.

The top majors and minors sending students were international and area studies, political science, anthropology, history, Spanish, economics, environmental studies, philosophy-neuroscience-psychology and English.

All WUSTL students now have the opportunity to earn a global certificate, a curriculum through which students develop a nuanced understanding of international social, political and economic systems and issues – with a keen eye to their ethical dimensions – and the intercultural skills and confidence to apply this knowledge to solve real-world problems.

A&S Magazine and the College of Arts & Sciences invited members of the Class of 2012 to share memories of their studies abroad in the second annual Senior Photo Contest. Congratulations to winner Kieran Holtzhauer, who studied in Kazakhstan and India. View all the entries on our website, magazine.arts.wustl.edu.

1 Kieran Holtzhauer, Anthropology, Kazakhstan: The field portion of the WU Archaeology and History of Central Asia program in Kazakhstan started with a bang, when our refurbished Soviet-era bus became entrapped in a ditch as we tried to make it to camp before dark. Aside from providing a striking site, this experience allowed the group to show ingenuity, creativity and flexibility from the beginning of field life. After trying unsuccessfully to move the bus in the dark, we ate a quick meal, set up makeshift camp and tried again in the morning.
2 Robert Peters, International and Area Studies, Russia: While studying in St. Petersburg, Russia, I played for the St. Petersburg White Knights, one of two lacrosse clubs in the entire country. On Oct. 23, 2011, the first-ever full-field 10-on-10 lacrosse game in Russian sports history took place between the White Knights and the Moscow Rebels in Moscow. Two national-television channels reported on the game, as did a St. Petersburg-based channel, giving the sport exposure throughout the entire country.

3, 4 Parsa Bastani, History, Egypt: 3 Protest-control forces in Egypt. This picture was taken on my BlackBerry at the onset of the protests in January 2011 that led to the toppling of the Egyptian government. 4 This picture captures me and one of my study-abroad friends from Middlebury gazing at the ancient pyramids from a sand dune a few miles away. A few people from my program had traveled from Alexandria to Cairo to look at the pyramids. Little did we know that just a few days later we would be evacuated from Egypt because of the revolution.

5 Amanda Wolff, Environmental Studies, Costa Rica: I took this picture in Monterrico, Guatemala. Students at the San Carlos University Center for Conservation Studies run a turtle hatchery on the beach [protecting the eggs from being sold as food]. For 10 quetzales (about $1), you can pay to release the sea turtles into the ocean at sunset. It was beautiful to watch the baby turtles crawl into the ocean and get pulled away by the waves.

6 Alexandra Willcockson, Biology, Denmark: Watching the Denmark vs. Japan World Cup in City Hall Square (Rådhuspladsen) in Copenhagen, Denmark.

7 Rebecca Slotkin, English and Anthropology, Madagascar: Coming home from school one night, my homestay aunt, Totovero, had set up a small stove and was cooking dinner. Frying fish, sweeping floors – no matter what task she was doing, she did it with extraordinary elegance.
“Astaire was a jazz drummer without a drum kit. Several times he remedied this lack and danced with drums as his partner.”
NEW FACULTY
2011–12

Anthropology

Kedron Thomas, PhD, joins the Anthropology department in Arts & Sciences as assistant professor. Her research interests include international law, fashion and branding and indigenous entrepreneurship in Guatemala. She is co-editor of Securing the City: Neoliberalism, Space, and Insecurity in Postwar Guatemala (Duke University Press, 2011). She earned a doctorate from Harvard University in 2012. Previously, she was awarded the Charlotte W. Newcombe Doctoral Dissertation Fellowship for her dissertation, titled “The Ethics of Piracy: Intellectual Property Rights in Post-Conflict Guatemala.”

Elizabeth Quinn, PhD, joins the Anthropology department as assistant professor. Her research interests include breastfeeding, breast-milk composition, cross-cultural parenting, intergenerational influences on human biology and health, human growth and development, developmental plasticity, and infant-feeding beliefs and practices. Her work also includes methodological applications, specifically the development of new techniques for the study of human milk and continued research into natural variation in milk composition within and between individuals. She earned her doctorate from Northwestern University in 2011 with a dissertation titled “Life Course Influences on Milk Composition in Filipino Women.”

Art History and Archaeology

Marisa Bass, PhD, joins the Art History and Archaeology department as assistant professor starting July 1, 2012. She is currently a lecturer and Mellon postdoctoral fellow at Columbia University and has previously held fellowships at the Center for Advanced Study in the Visual Arts and the Metropolitan Museum of Art. Her primary field of research is northern Renaissance and Baroque art. In 2011 she earned her doctorate from Harvard University with a dissertation titled “The Venus of Zeeland: Jan Gossart and the Revival of Antiquity in the Netherlands.”

Kristina Kleutghen, PhD, joins the Art History and Archaeology department as assistant professor. She specializes in cross-cultural perspectives on late imperial, modern and contemporary Chinese art, and her research examines the lives and afterlives of Qing dynasty (1644–1911) imperial objects. She is currently revising a manuscript titled Imperial Illusions: Crossing Pictorial Boundaries in Eighteenth-Century China. Most recently, she was visiting assistant professor at Dartmouth College, and was awarded a National Endowment for the Humanities Summer Stipend for 2011.

Biology

Lucia Strader, PhD, joins the Biology department as assistant professor. Her research interests include the study of the roles of phytohormones on plant development in the model plant Arabidopsis thaliana. Her work has been published in The Plant Cell, Molecular Plant and The Plant Journal, among others. She earned her PhD in molecular plant sciences from Washington State University in 2004. Most recently, she was a postdoctoral research scientist at Rice University from 2004–11.

Chemistry

Jay Ponder, PhD, joins the Chemistry department as associate professor. An expert in computational chemistry, his research focuses on developing and applying molecular simulation and computational tools for problems in structural biology, organic chemistry and materials science. His laboratory produces and distributes software packages that allow for the prediction and modeling of structural chemistry and the relation of structure to molecular properties. He earned his doctorate in organic chemistry from Harvard University. He currently holds courtesy appointments in the Biomedical Engineering in the School of Engineering and in Biochemistry and Molecular Biophysics at the School of Medicine.

Classics

Timothy Moore, PhD, joins the Classics department as the John and Penelope Biggs Distinguished Professor in the Classics starting July 1, 2012. Currently, he is professor of classics at the University of Texas, Austin. His research interests include Greek and Roman comedy, Roman historiography, modern views of the Romans, and ancient music. He is author of Artistry and Ideology: Livy’s Vocabulary of Virtue (Athenaeum Press, 1989), The Theater of Plautus: Playing to the Audience (University of Texas Press, 1998), Roman Theatre (Cambridge University Press, forthcoming), Music in Roman Comedy (Cambridge University Press, forthcoming) and articles on topics ranging from Greek music theory to Japanese comedy. He earned his bachelor’s degree from Millersville University and his doctorate from the University of North Carolina at Chapel Hill.

East Asian Languages and Cultures

Zhao Ma, PhD, joins the East Asian Languages and Cultures department as assistant professor. His research interests include modern China, urban culture, women and gender, and political and legal history. He earned his doctorate from Johns Hopkins University in 2007 with a dissertation titled “On the Run: Women, City, and the Law in Beijing, 1937–1949.” Previously, he

Earth and Planetary Sciences

Alexander Bradley, PhD, joins the Earth and Planetary Sciences department as assistant professor starting July 1, 2012. He is currently a postdoctoral fellow at Harvard University. His research focuses on understanding the coevolution of the Earth and the microbial world, in particular, molecular biomarkers: organic compounds that record fossil evidence of life. His work has been published in Organic Geochemistry and Earth and Planetary Science Letters. He earned his doctorate from the Massachusetts Institute of Technology.

Bradley Jolliff, PhD, joins the teaching faculty of the Earth and Planetary Sciences department as the Scott Rudolph Professor. His research interests include the geology, petrology and geochemistry of the Earth, Moon and Mars. He currently participates on the science teams of NASA’s Lunar Reconnaissance Orbiter and the Mars Exploration Rovers. He earned his doctorate from the South Dakota School of Mines and Technology. Most recently, he was research professor at Washington University.
was assistant professor at SUNY-Fredonia. Most recently, he was a postdoctoral fellow in China studies at Washington University from 2009–11.

**Economics**

Paulo Natenzon, PhD, joins the Economics department as assistant professor. His research interests include economic theory, decision theory and behavioral economics. He earned his doctorate from Princeton University in 2011. As a doctoral student, he was awarded the Stephen Goldfeld Research Fellowship, the Bernard Marcus Fellowship and the Stephen Goldfeld Fellowship, the latter of which was shortlisted for the Stephen Goldfeld Prize for Outstanding Teaching. He earned his undergraduate degree in economics from the University of São Paulo and his M.Sc. in mathematics from the Instituto de Matemática Pura e Aplicada (Rio de Janeiro).

Carl Sanders, PhD, joins the Economics department as an assistant professor. He specializes in labor economics, in particular looking at the reasons for occupational switching. His other interests include the effects of noncognitive skills on labor market outcomes, how firms and workers bargain, and rural-urban migration patterns. His work “Heterogeneous Human Capital and Lifecycle Wage Growth” (with Christopher Taber) is forthcoming in the *Annual Review of Economics*. He earned his doctorate from the University of Wisconsin, Madison in 2011 and his AB in economics from the University of Chicago.

**English**

Danielle Dutton, PhD, joins the English department as assistant professor. She earned her doctorate from the University of Denver in 2007 and holds degrees from the School of the Art Institute of Chicago and the University of California-Santa Cruz. She is author of *Attempts at a Life* (TarPaulin Sky Press, 2007) and *S P R A W L* (Siglio, 2010), which was shortlisted for the 2010 Believer Book Award and was featured in *Harper’s Magazine*. Most recently, she taught fiction and literature classes in the Jack Kerouac School of Disembodied Poetics at Naropa University and was book designer for Dalkey Archive Press. She continues as editor of Dorothy, a publishing project, which has published books by Renee Gladman, Barbara Comyns and Manuela Draeger.

Musa Gurnis-Farrell, PhD, joins the English department as assistant professor. Her research and teaching interests include early modern drama and religious culture, as well as gender studies and performance theory. She is writing her first book, *Heterodox Drama: Theater in Post-Reformation London*, which argues that the specific working practices of the theater industry generated a body of drama that combines the varied materials of post-Reformation culture in hybrid fantasies that helped audiences emotionally negotiate and productively reimagine early modern English religious life.

**Film and Media Studies**

Colin Burnett, PhD, joins the Film and Media Studies program as assistant professor. His research touches on the social history of film style, especially in the dynamic between cinephile taste culture and cinematic storytelling in France and among a number of “minimal” filmmakers in world cinema. He earned his doctorate in film at the University of Wisconsin, Madison in 2011 with a dissertation titled “The Invention of Robert Bresson: Style and Taste in the French Cultural Marketplace for Cinema, 1934–1959.”

**History**

Venus Bivar, PhD, joins the History department as assistant professor starting July 1, 2012. She is currently a Mellon postdoctoral fellow and lecturer at the University of California, Berkeley. Her research interests include environmental history, utopian thinking, polar exploration and classical political economy. She earned her doctorate in history at the University of Chicago in 2010 with a dissertation titled “The Ground Beneath Their Feet: Agricultural Industrialization and the Remapping of Rural France, 1945–1976,” which examines the role of land-use policy in the postwar industrialization of French farming.

**Jewish, Islamic and Near Eastern Languages and Cultures**

Hayrettin Yücesoy, PhD, joins the Jewish, Islamic, and Near Eastern Languages and Cultures department as associate professor. He earned his doctorate from the University of Chicago in 2010 with a dissertation titled “The Development of Ottoman Planning: Gaza, Jerusalem, and Washington” (Tarpaulin Sky Press, 2007). His research focuses on topics in Arabic and Islamic studies. Previously, he was associate professor at Saint Louis University.

**John C. Danforth Center on Religion and Politics**

Marie Griffith, PhD, joins the John C. Danforth Center on Religion and Politics as the John C. Danforth Distinguished Professor and director of the center. Her research focuses on American religious history. She is author of *Born Again Bodies: Flesh and Spirit in American Christianity* (2004) and *God’s Daughters: Evangelical Women and the Power of Submission* (1997). She earned her doctorate from Harvard University. She served as professor of religion at Princeton University, where she received the President’s Award for Distinguished Teaching. Most recently, she held the John A. Bartlett Professorship at Harvard University.

In 2010 he published *Heaven’s Bride: The Unprintable Life of Ida C. Craddock, American Mystic, Sexologist, Martyr, and Madwoman*. Most recently, he was the Charles Warren Professor of the History of Religion in America at Harvard University.

**Philosophy**

Charlie Kurth, PhD, joins the Philosophy department as assistant professor. His research interests are ethics, moral psychology and metaphysics. His recent work focuses on questions about moral objectivity, moral reasoning and judgment, questions about the nature of promises and debates about the metaphysics of color. He earned his doctorate from University of California, San Diego in 2010 with his dissertation “Rethinking the Objectivity of Ethics.” His research has been published in *Philosophical Studies*. He was awarded Outstanding Paper Prizes by the American Philosophical Association in 2008, 2010 and 2011. Most recently, he was associate instructor at the University of California, San Diego.

Ron Mallon, PhD, joins the Philosophy department as associate professor and director of the Philosophy-Neuroscience-Psychology program. His research focuses on naturalistic understandings of culture and the mind. He has been the recipient of a Charlotte W. Newcombe Doctoral Dissertation Fellowship, a Research Assistant Professorship at the University of Hong Kong, a Laurence S. Rockefeller Visiting Fellowship at the Princeton’s University Center for Human Values and an American Council of Learned Societies Fellowship. In summer 2012, he will again co-direct an NEH Institute for College and University Teachers on “Experimental Philosophy.” He earned his doctorate from Rutgers University. Most recently, he was associate professor at the University of Utah.

**Psychology**

Ryan Bogdan, PhD, will join the Psychology department as assistant professor starting July 1, 2012. He is currently completing his postdoctoral fellowship in the Laboratory of NeuroGenetics at Duke University. He earned his doctorate in clinical science from Harvard University in 2010, and completed his clinical internship at the University of Mississippi Medical School. His research focuses on understanding how common genetic variation and environmental experience contribute to individual differences in brain function and structure, behavior and psychopathology.

Julie Bugg, PhD, joins the Psychology department as assistant professor starting July 1, 2012. Currently she is assistant professor of psychology at DePauw University. Her research examines cognitive control mechanisms, especially those that are used to resolve attentional conflicts. Current areas of focus include differentiating internally driven control from control that is triggered by external cues, and contrasting age-related changes in these control mechanisms. Her work has been published in *Journal of Experimental Psychology: Human Perception and Performance*, *Psychonomic Bulletin & Review*, and *Neurobiology of Aging*. She earned her doctorate from Colorado State University in 2006.

Josh Jackson, PhD, joins the Psychology department as assistant professor. His research examines how personality develops across the lifespan, and the effects that personality has on important life outcomes, such as educational attainment and health status. His work also examines different methods to best measure personality and assess personality across time and contexts. He earned his doctorate from the University of Illinois at Urbana–Champaign in 2011 with his dissertation titled “The Effects of Educational Experiences on Personality Trait Development.”

**Women, Gender and Sexuality Studies**

Rebecca Wanzo, PhD, joins the Women, Gender and Sexuality Studies program as associate professor. Her research interests include theories of affect, African-American literature and culture, critical race theory and popular culture. Her first book, *The Suffering Will Not Be Televised: African American Women and Sentimental Political Storytelling*, was published by SUNY Press in 2009. She earned her doctorate from Duke University. Most recently she was associate professor of Women’s Studies and English at Ohio State University.

**New Appointments | Jennifer R. Smith**

Jennifer R. Smith, associate professor of earth and planetary sciences and of environmental studies, has been named dean of the College of Arts & Sciences effective July 1. Smith has served on more than 20 department and university committees since joining the WUSTL faculty in 2002 as an assistant professor of earth and planetary sciences.

Gary S. Wihl, dean of the faculty of Arts & Sciences, says that Smith has the “courage, vision and energy” necessary to lead the university’s largest undergraduate school with 4,000 students. “Like Jim McLeod, she sees potential in every one of our students and will guide the college in the coming years to bring out the best in our undergraduates.”

For a special A&S interview with Dean Smith, please see our website.
ACHIEVEMENTS & HONORS

Anthropology
T. R. Kidder was elected as president of the Southeastern Archaeological Conference, the second-largest professional association of its kind in the United States, for the term 2012–14.

Biology
Sarah C. R. Elgin was elected to the American Academy of Arts and Sciences.

Alan Templeton was elected to the American Academy of Arts and Sciences.

Earth and Planetary Sciences
Frédéric Moynier was awarded the Nier Prize, presented by the Meteoritical Society for outstanding research in the field of meteoritics by a young scientist.

Education
William F. Tate was named a fellow of the American Educational Research Association in Washington, D.C.

English
Carl Phillips was awarded the Los Angeles Times Book Prize for poetry for his 2011 book Double Shadow. Phillips was also a finalist for the National Book Award in poetry.

Germanic Languages and Literatures
Jennifer Kapczynski was awarded the GSA/DAAD article prize for “Postwar Ghosts: Heimatfilm and the Specter of Male Violence.”

Mathematics
Alvaro Pelayo was awarded an “Honorary Doctor Vinculcado” position at the Spanish Center for National Research.

Philosophy
Julia Driver was the honoree of the conference “Virtues and Consequences” at the Brackenridge Philosophy Symposium.

Physics
Ernst Zinner was elected a fellow of the American Association for the Advancement of Science.

Political Science
Mona Lena Krook received the Early Career Award from the Midwest Women’s Caucus for Political Science.

Frank Lovett has received the First Book Award from APSA’s Foundations of Political Theory Section for his book A General Theory of Justice and Domination.

Susan Rotroff, Classics, Art History and Archaeology

Susan Rotroff, the Jarvis Thurston and Mona Van Duyn Professor in the Humanities, was named the 2011–12 Norton Lecturer by the Archaeological Institute of America. One of the institute’s highest honors, the Charles Eliot Norton Memorial Lectureship is awarded to a distinguished archaeologist and eminent scholar chosen by an AIA committee. Rotroff traveled the United States and Canada giving lectures to 17 local AIA societies. A popular lecture topic was “The Unsolved Mystery of the Agora Bone Well,” in which she presented the results of an interdisciplinary study of an Athenian well abandoned in 2 BC that contains a large collection of bones, mostly from human infants and dogs. She is a world-renowned expert in Hellenistic pottery and has published three authoritative volumes on the subject. Last summer, a conference was held in her honor, “The Matter of Antiquity,” hosted by the American School of Classical Studies at Athens and the Canadian Institute at Athens, and in November she delivered the prestigious W. Kendrick Prichett Lecture at the University of California, Berkeley.
Selected Publications

**Anthropology**


Bret Gustafson, *Remapping Bolivia: Resources, Indigeneity and Territory in a Plurinational State* (School for Advanced Research, 2011) (with Nicole Fabricant)

Derek Pardue, *Brazilian Hip-Hoppers Speak from the Margin: We’s on Tape* (Palgrave Macmillan, 2011)


**East Asian Languages and Cultures**


**Education**


– Beyond Stock Stories and Folktales: African Americans’ Paths to STEM Fields (Emerald Press, 2011) (with Henry Frierson)

**English**


Mary Jo Bang, translator, *The Inferno by Dante Alighieri* (Graywolf Press, 2012)

**Germanic Languages and Literatures**

Paul Michael Lützeler, *Hermann Broch und die Moderne* (Fink, 2011)

**History**


**Jewish, Islamic and Near Eastern Languages and Cultures**


– Avicenna’s Deliverance: Logic [translation and notes] (Oxford University Press, 2011)

– editor, *The Islamic Scholarly Tradition* (Brill, 2011) (with B.Sadeghi and M. Bonner)

**Earth and Planetary Sciences**

Bruce Fegley and Katharina Loders, *Chemistry of the Solar System* (Royal Society of Chemistry, 2011)
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<th>Field</th>
<th>Author</th>
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<tbody>
<tr>
<td>Math</td>
<td>Steven Krantz</td>
<td><em>A Mathematician Comes of Age</em></td>
<td>Mathematical Association of America</td>
<td>2011</td>
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<td></td>
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<td><em>The Proof Is in the Pudding: A Look at the Changing Nature of Mathematical Proof</em></td>
<td>Springer</td>
<td>2011</td>
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<td><em>The Geometry of Complex Domains</em></td>
<td>Birkhauser</td>
<td>2011</td>
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<td>Philosophy</td>
<td>John Heil</td>
<td><em>The Universe as We Find It</em></td>
<td>Oxford University Press</td>
<td>2012</td>
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<td></td>
<td>Christopher Wellman</td>
<td><em>Debating the Ethics of Immigration: Is There a Right to Exclude?</em></td>
<td>Oxford University Press</td>
<td>2011</td>
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<td>Political Science</td>
<td>Mona Lena Krook</td>
<td><em>The Impact of Gender Quotas</em></td>
<td>Oxford University Press</td>
<td>2012</td>
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<td><em>Leadership or Chaos: The Heart and Soul of Politics</em></td>
<td>Springer</td>
<td>2011</td>
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<td></td>
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<td>(with Maria Gallego)</td>
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<td></td>
<td>Michael Sherberg</td>
<td><em>The Governance of Friendship: Law and Gender in the Decameron</em></td>
<td>Ohio State University Press</td>
<td>2011</td>
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<td></td>
<td>Julie Singer</td>
<td><em>Blindness and Therapy in Late Medieval French and Italian Poetry</em></td>
<td>Boydell and Brewer</td>
<td>2011</td>
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**Todd Decker, Music, American Culture Studies, Film and Media Studies**

*Music Makes Me: Fred Astaire and Jazz* makes the case that Astaire, best known for his stylish dancing in movie musicals such as *Top Hat, Holiday Inn* and *Easter Parade*, was deeply invested in jazz music and dance. Analyzing dozens of dance numbers spanning the dancer’s long career – from a 1926 recording with George Gershwin to his 1970 blues stylings on television – Decker shows how Astaire’s creative work was modeled on jazz practices and profiles Astaire’s collaborations with jazz musicians, among them many African Americans, both on screen and behind the camera. *Music Makes Me* earned the 2012 Society for Cinema and Media Studies Best First Book Award, which praised Decker’s cross-disciplinary scholarship, rigorous archival research and sharp textual analysis. Its award committee wrote that Decker’s book is “eloquently written in ways that make it accessible and indeed compelling to the nonspecialist.” (University of California Press, 2011)
**SELECTED EXTERNAL GRANTS & FELLOWSHIPS**

### Anthropology

**Geoff Childs**, $400,000 from NSF for “Genes and the Fertility of Tibetan Woman at High Altitude in Nepal.” Co-PI with Cynthia Beall, Case Western University, and Sienna Craig, Dartmouth University

**John Bowen** was awarded a John Simon Guggenheim Memorial Foundation Fellowship

**Pascal Boyer** was awarded a John Simon Guggenheim Memorial Foundation Fellowship

**David Freidel** (with graduate student Diana Fridberg), $23,033 from NSF for “Classic Maya Human-Animal Interactions”

**Gayle Fritz** (with graduate student Clarissa Cagnato), $25,197 from NSF for “Doctoral Dissertation: Reconstructing Ancient Maya Cuisine across Time and Space: Micro and Macrobotanical”

**John Kelly**, $16,000 from Cahokia Mounds Museum Society for “A Proposal to Locate the North and East Walls of the Central Palisade at Cahokia”

**Bradley Stoner**, $1.572 million from the Centers for Disease Control for “St. Louis STD/HIV Prevention Training Center”

**James V. Wertsch**, $100,000 from the Ford Foundation for support for research, teaching and an exchange program with Fudan University on new directions in American studies

### Art History and Archaeology

**Elizabeth Childs**, $4,000 from the College Art Association’s Millard Meiss Publication Fund for the publication of *Vanishing Paradise: Art and Exoticism in Colonial Tahiti, 1800–1901* (University of California Press, 2012)

**Ram Dixit**, $634,293 from NSF for “Role of the Plant Kinexin FRA1 in Constructing the Cell Wall”


**Erik Herzog**, $1.144 million from NIH for “Mechanisms and Modeling of Networked Circadian Pacemaker Synchronization”


**Tiffany Knight** (with graduate student Lauren Woods), $14,389 from NSF “Dissertation Research: The Influence of Metacommunity Size and Habitat Destruction on Diversity Partitioning across Spatial Scales”

**Tiffany Knight** (with graduate student Kristin Powell, $13,913 from NSF for “Dissertation Research: The effects of Invasive plant Species on Biodiversity across Spatial Scales”

**Kenneth Olsen** (with graduate student Nicholas Kooyers), $13,539 from NSF for “Dissertation Research: Determining the Mechanisms of Recurrent Cline evolution in White Clover [Trifolium Repens]”

**Philip Osdoby**, $104,603 from the Amgen Foundation for “Rank-FC Treatment to Reduce Bone Loss in a BRTL Murine Model of Human Type IV Osteogenesis Imperfecta”

**Himadri Pakrasi**, $2.2 million grant from U.S. Department of Energy for “Use of Sytems Biology Approaches to Develop Advanced Biofuel–Synthesizing Cyanobacterial Strains”

### Biology

**Bruce Carlson**, $6,250 from NSF for “Research Experience for Undergraduates: Synaptic Mechanisms for the Processing of Temporal Codes”

**Tiffany Knight** (with graduate student Lauren Woods), $14,389 from NSF “Dissertation Research: The Influence of Metacommunity Size and Habitat Destruction on Diversity Partitioning across Spatial Scales”

**Himadri Pakrasi**, $2.2 million grant from U.S. Department of Energy for “Use of Sytems Biology Approaches to Develop Advanced Biofuel–Synthesizing Cyanobacterial Strains”

### Chemistry

**Liviu Mirica**, $450,000 from the U.S. Department of Energy for “Novel Palladium Catalysts for the Oxidative Oligomerization of Methane and Carbon Dioxide Reduction”

Research fellowship from the Alfred P. Sloan Foundation

### Classics

**William Bubelis**, selected as the Sterling and Elizabeth Dow Fellow at the Center for Epigraphical and Palaeographical Studies, Ohio State University

**Catherine Keane**, selected as the Margo Tytus Visiting Scholar at the University of Cincinnati Department of Classics for spring 2013
SELECTED EXTERNAL GRANTS & FELLOWSHIPS

East Asian Languages and Cultures
Rebecca Copeland, $2,429 from the Association for Asian Studies for the 2011 Japan Distinguished Lecture Series

East Asian Languages and Cultures
Lutz Koenig conducted the Fulbright Summer School in the Humanities in Moscow, Russia, with a grant of the Fulbright Specialist Program

Germanic Languages and Literatures
Martin Jacobs, Fellowship at the Katz Center for Advanced Judaic Studies, University of Pennsylvania

Jewish, Islamic and Near Eastern Languages and Cultures
Martin Jacobs, Fellowship at the Katz Center for Advanced Judaic Studies, University of Pennsylvania

History
Paul Ramirez, Dibner Research Fellowship in the History of Science and Technology from the Huntington Library for “Minerva’s Mexico: Fighting Disease in the Age of Enlightenment”

Political Science
Brian Crisp, Fulbright fellowship to conduct research in Colombia

Mathematics
Matthew D. Kerr, $127,412 from NSF for “Algebraic Cycles, Hodge Theory, and Arithmetic”

Music
Peter Schmelz, Fellowships for University Teachers from NEH for “Russian Composers Alfred Schnittke and Valentin Silvestrov and the End of Soviet Music”

Physics
Mark Alford, $364,000 from DOE for “Signatures of Color Superconductivity in High-Density Quark Matter”

Alvaro Pelayo, Mathematics
Alvaro Pelayo has received a five-year, $457,736 CAREER award from the National Science Foundation for research titled “Symplectic and Spectral Theory of Integrable Systems.” The foundation’s most prestigious award in support of junior faculty, the award is given, according to NSF, “in support of the early career-development activities of those teacher-scholars who most effectively integrate research and education within the context of the mission of their organization,” with the goal of “building a firm foundation for a lifetime of integrated contributions to research and education.” Pelayo’s research areas are dynamical systems and symplectic geometry and geometric aspects of partial differential equations, with a particular emphasis in the semiclassical analysis and symplectic geometry of completely integrable systems. Pelayo recently completed a one-year stay at the Institute for Advanced Study at Princeton University, and in January 2013 he will be a visiting scholar at Harvard University.

Alvaro Pelayo, Mathematics
and Elemental Analyses of Presolar Grains”

Carl M Bender, $2.505 million from DOE for “Studies in Quantum Field Theory and Astroparticle Physics”

Mark Conrad, $570,000 from DOE for “In Situ NMR to Understand Hydrogen Storage Chemistry”

$36,800 from Sandia National Laboratories for “Measurement of Exchange of D Between D2 Gas and PdDx Deuteride”

Jonathan I. Katz, $100,000 from the American Chemical Society Petroleum Research Fund for “Ultrasonic Studies of Jamming Transitions”

Henric Krawczynski, $667,461 from NASA for “Sensitive Hard X-ray Spectropolarimetric Observations with X-Calibur and In FOCuS”

James G. Miller, $418,000 from NIH for “Bayesian Enhancement of Echocardiographic Strain Assessment”

Zohar Nussinov, $255,000 from NSF for “Theoretical Approaches to Multi-Scale Complex Systems”

James S. Schilling, $540,000 from NSF for “Studies of Alkali Metal, Noble Metal and Hydrogen-Rich Superconductors under Extreme Pressure”

Stuart Solin, $41,446 from PixelEXX, Inc. for “Fabrication of multifunctional I-EOC and EEC devices that can be employed to conduct biological measurements on appropriate biological entities”

Ernst Zinner, $1.38 million from NASA for “Laboratory Studies of Supernova Grains”

$37,600 subcontract from UMSL for “Strategic Processes and Age-Related Changes in Prefrontal Activity Patterns”

Todd Braver, $376,200 from the National Institute of Mental Health for “Motivational State as a Mechanism of Cognitive Self-Regulation”

Brian Carpenter, $187,405 from the Fridolin Charitable Trust for “Enhancing Family Communications Skills”

Cheri Levinson, $41,800 from NIH for “Shared Vulnerabilities of Social Anxiety and Eating Disorders”

Simine Vazire, $43,988 subcontract from the University of Arizona for “Eavesdropping on Character: Testing the Stability, Variability, and Changeability of Naturalistically Observed Virtuous Behavior”

$299,999 from NSF for “Self and Other Knowledge of Dynamic Personality Processes”

Romance Languages and Literatures

Departmental Grant,
$30,000 from the Educational Foundation of America for need-based scholarships to the department’s summer institutes in France, Italy and Spain for summer 2012

Psychology

Heather Bailey (postdoctoral research associate), $170,128 from the National Institute on Aging for “Situation Model Updating in Young and Older Adults”

Deanna Barch, $101,395 grant from NSF for “CRCNS Data Sharing: An Open Data Repository for Cognitive Neuroscience: The Open MRI Project”
The case for solar energy

By Ursula Goodenough

The world’s energy consumption rate is currently 15 terawatts (terawatt = $10^{12}$ joules/second), around 80 percent of which derives from oil, gas, and coal. At present rates, we’re very soon going to run out of the stuff. But here’s another fact: The sun provides 86,000 terawatts of energy every year. That’s right: 12 terawatts extracted from fossil fuel; 86,000 terawatts provided via sunshine. The conversion of solar energy into useful forms could, in theory, solve the energy problem, and the solar industry is pulling out all stops to get that to happen.

That said, solar technology isn’t positioned to run the planet anytime soon, and battery-powered jet airplanes fly only in the realm of fantasy. Meanwhile, it turns out that there’s a great way to make oil from sunshine. It’s called photosynthesis. Plants absorb sunlight and use the energy to convert atmospheric CO$_2$ into organic products. Indeed, that’s how our current hydrocarbon reserves were generated in the first place: with the aid of geology, the ancient products of photosynthesis were crushed and converted into oil and coal.

Even better, though, many plants don’t need to wait for death and subduction to contribute to the planetary hydrocarbon project. Instead, they know how to use sunlight to convert atmospheric carbon into oil in real time. No, not the yucky crude they drag from beneath the seas. Stuff like olive oil, which works beautifully as diesel fuel and can fly jet airplanes.

To be sure, combusting olive oil to fly airplanes would release CO$_2$ and contribute to global warming. However, since plants take CO$_2$ out of the atmosphere to make themselves and hence to make the oil, the balance sheet is far more encouraging than the one we’re now looking at.

Most land plants don’t make oil except in their seeds. But there’s a diverse and abundant population of photosynthetic organisms, collectively called the algae, that can be induced to make the likes of olive oil, oil that can fly jet airplanes just fine.

So, full disclosure: About two years ago I started up some experiments in my lab that related to algal biodiesel, and they worked, and I now have funding from the Department of Energy to pursue these leads. Having studied the sex life of a particular green soil alga, 

*Chlamydomonas reinhardtii*, all my research life, during which we made lots of cool discoveries that had no planetary impact whatsoever, it’s a trip to be asking interesting questions of Chlamy that are potentially also relevant.

When you deprive *Chlamy* of nitrogen, it bloats up with triacylglycerides (TAGs) until it looks like a fat-guy cartoon. Same goes for marine diatoms: they all but burst with TAGs when deprived of silicon. Chemists can take these TAGs and readily convert them into transportation fuels. Better yet, the fat-extracted algae can be dried down and fed to chickens.

The algal biodiesel field is in its infancy. The solar-panel industry is booming by comparison. There are daunting problems to be solved. But there are also very smart engineers and start-up companies thinking hard about how to implement this potential source of fuel.

And there’s a wonderful aesthetic to it: You put an enormous vacuum-cleaner-style hose on top of the stack of a coal-burning power plant, pass the emissions though pollutant filters, and then bubble the CO$_2$ into an adjacent algal pond, perhaps derived from waste water, whereupon the algae obligingly turn it into fuel. The CO$_2$ is prevented from going into the atmosphere as a greenhouse gas, and you get both oil and chickens.
The Dean’s Medal is awarded to a friend of Arts & Sciences whose dedication and support have been exceptional and whose leadership, advice and inspiration have served to place the school at the heart of one of the world’s premier universities. This year, the medal was awarded to Bob Virgil, emeritus professor and dean of the Olin School of Business and an emeritus trustee of Washington University in St. Louis.

Virgil’s service to the university is legendary. As a member of the business school faculty, he was elected by students “Teacher of the Year” nine times. As the school’s dean for 15 years, he guided it through a period of dynamic growth, with the construction of Simon Hall and a surge in endowment from $200,000 to $75 million. He helped to organize the 1992 presidential debate at Washington University with only one week’s notice, and he led the university’s Sesquicentennial Celebration. At present, he chairs the Scholarship Initiative, which will shape undergraduate education at Washington University for decades to come.

His service has been recognized with numerous honors, including the Search Award from the Eliot Society, the Distinguished Alumni Award and the Dean’s Medal from the business school, and an honorary doctorate of laws from the university.

For all his great accomplishments, Virgil’s educational career started with a bachelor of arts in English from Beloit College in Wisconsin, and he is a personification of the possibilities afforded by a liberal-arts preparation. Now, he offers his management expertise and leadership acumen as a member of the Arts & Sciences National Council.

**Robert L. Virgil, MBA ’60, DBA ’67, honorary Doctor of Laws ’09**

**1. Robert A. Anshel**
AB ’76

**2. Samuel Halperin**
AB ’52, MA ’52, PhD ’56

**3. Naomi Lebowitz**
MS ’55, PhD ’62

**4. Susan Fisher Sterling**
AB ’77

**5. Mark Steinberg Weil**
AB ’61
Not as easy as it looks  Senior photo-competition winner Kieran Holtzhauer snapped this scene of a fellow student learning the tricky business of transplanting rice from dry to wet fields as part of WUSTL’s Village India program.

Started by anthropology professor Glenn Stone, this program is designed for self-starter students with an interest in experiencing village life in India, in exploring anthropological research in the field and in service-learning through teaching in an Indian classroom. The program is based at Pai Junior College in Kalleda Village, Warangal District, Andhra Pradesh.

Read more from seniors reflecting on their study-abroad experience on page 32.