

FALL 2015

acumen

The magazine of Lehigh University's College of Arts and Sciences

Facewall

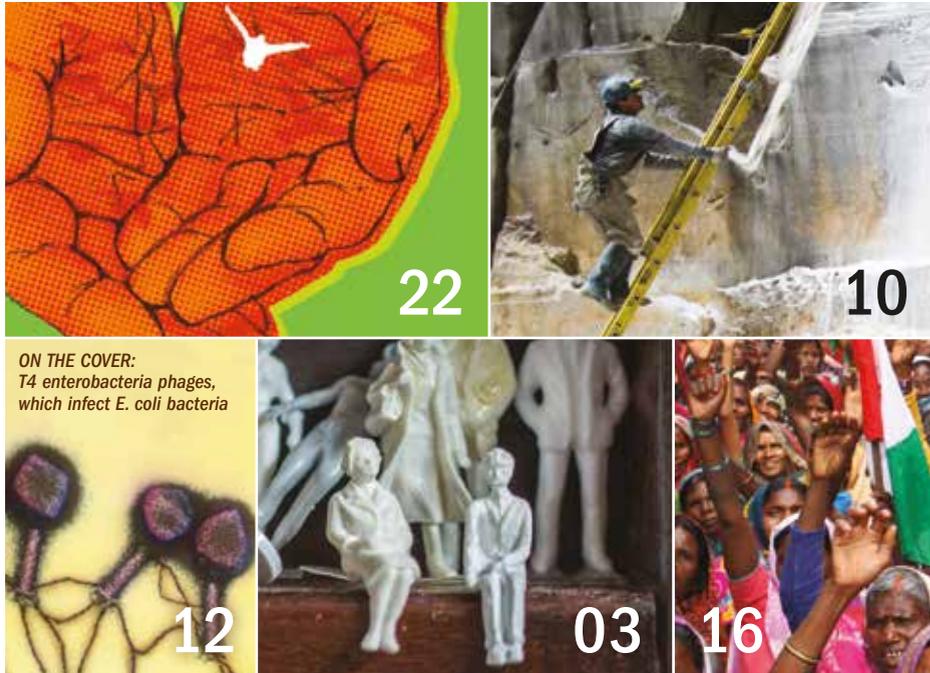
Beachy Head

Neurogenesis of Sea Anemones

Racism and Implicit Bias

Fostering
a Passion





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which infect E. coli bacteria

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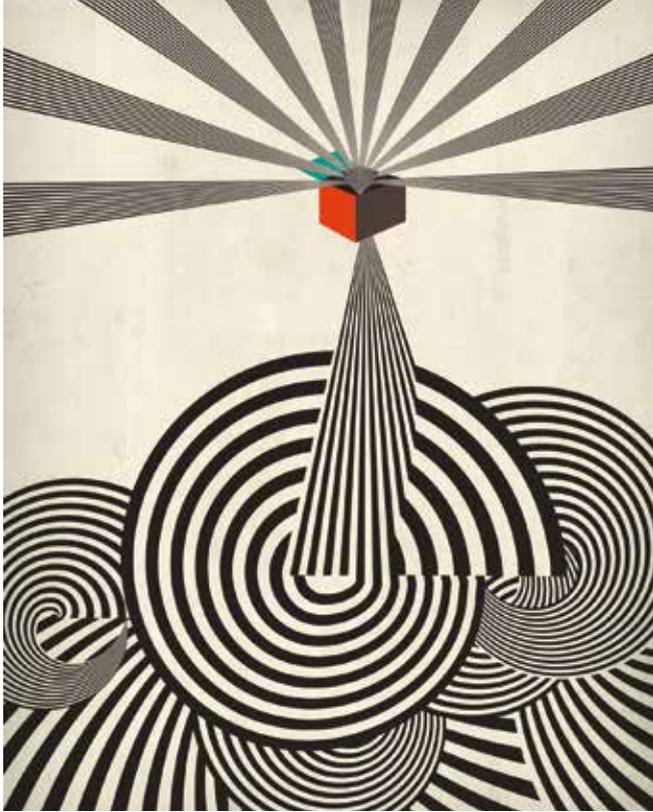
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Message from the Dean



Taking the Lead in Research

This issue of the magazine explores the importance of research and its impact on CAS alumni, faculty and students

I am most excited to share with you the latest issue of *Acumen*. This issue revolves around the importance of research and this issue exemplifies the importance of research as our students and faculty continue to advance their respective fields.

At Lehigh, the College of Arts and Sciences fosters and supports academic inquiry. Research lies at the core of an arts and sciences education at Lehigh, and we recognize that research invariably leads to a better understanding of, and a deeper appreciativeness for, the field of study. At the undergraduate

level, students' career goals usually clarify after they participate in research. How will a student know he or she wants to be a biologist, for example, unless he or she has opportunities to gain real-world experience in the laboratory?

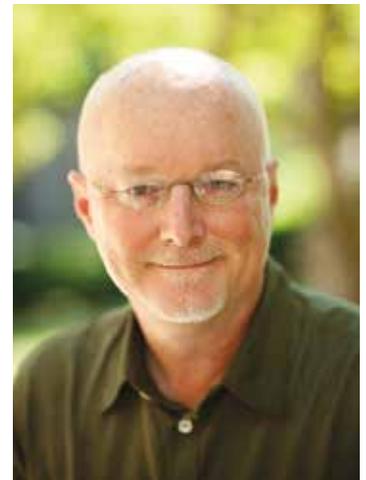
The researcher's sense of persistent discovery shapes much of what we do in the College of Arts and Sciences and the stories in this issue demonstrate that commitment. Inside this issue of *Acumen* you will learn about Professor Nandini Deo's exploration of feminism and social activism in India. You will also learn of graduate student Lillian Soto-Cordero's investigation in seismic activity, and Danielle Taitt's study of urban planning policies in Ghana.

A trademark of the College's research culture is our commitment to supporting students as they follow new paths of inquiry. Funds for student research offer them learning opportunities that cannot always be achieved in a traditional classroom. Our goal is to provide every student in the College of Arts and Sciences with the opportunity to engage in research no matter their field of study. Danielle Taitt, a science, technology and society major, took advantage of funds established by Dale Strohl '58 to conduct field research in Africa. The research and scholarship undertaken by the College is often recognized by alumni and friends. Inside this issue, you'll also learn about an initiative supported by the Mellon Foundation to support college efforts to engage undergraduates with the local community and to foster meaningful interactions in the field of digital humanities.

Research is vital to the continued success of our students, and we are keenly aware that our discoveries can effect change throughout the world. The research and creative work of our students often continues after leaving South

Bethlehem. Inside, you'll discover Brianna Eiter '00, whose research is shedding light on the cognitive factors that influence mine workers' ability to identify mine site safety hazards. And Heather Gilligan '96 took her undergraduate degree in chemistry and went on to a successful career as a composer.

This issue of *Acumen* again casts a spotlight on the talents and commitments of our students, faculty and alumni. The work we do is impossible without the interest and support of our alumni. We motivate students to reason and act in ways that will help their communities and help those around them. Our alumni go on and make wonderful things happen. If you'd like to learn more about how you can support support the college, please contact Kelly Stazi, our director of development. I hope you enjoy reading about them as much as I have. I invite you to learn more about how alumni can play a role in these types of



programs. As Lehigh alumni, you can help shape the future of students in the College of Arts and Sciences.

I look forward to hearing your thoughts and comments.

Donald E. Hall
Herbert and Ann Siegel Dean

ART

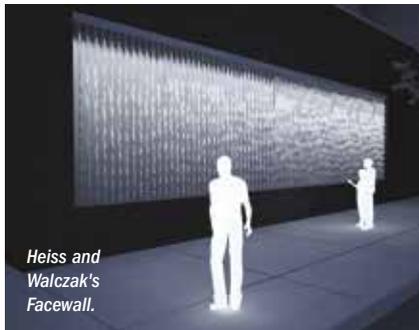
“Facewall”

The arts and humanities building at California State University at Chico is a gateway linking the university and the town. It is also the location of the latest installation by artist Wesley Heiss.

Heiss, associate professor of design in the department of art, architecture and design, is collaborating with artist Marek Walczak on “Facewall,” which features 1,000 faces in steel silhouettes mounted on totems.

Heiss and Walczak were commissioned to install art on the newly built building, and they have developed an installation spanning 42 feet, composed of 82 vertical steel planes, 11 feet high, with silhouettes of faces cut

out at the front of each of them. At the bottom are concealed high-intensity LEDs that cast light and create shadow between each vertical piece. Sunlight will generate a rich shadow-texture on the surface of the wall and make the experience



of seeing the work perpetually new.

“For this project, the university was very interested in reflecting the community that was nearby,” says Heiss. “These 1,000 faces of Chico are a response to that and an open reflection of the population. What’s more unique than someone’s silhouette? A silhouette is both a beautifully abstract thing and very specific to each individual. We don’t look at silhouettes as often as you think. Sometimes you can identify who it is, but it isn’t as easy as seeing someone from the front. There’s a nice balance there.”

Heiss adds that people of all ages are included in the project. The artists asked volunteers to stand in front of sheets of Mylar, then used a video projector to cast light onto the sheet, creating silhouettes of faces. Heiss and Walczak then photographed the images on the sheets.

“We took over 1,400 profiles, which unfortunately we had to reduce to 1,000, but we took only one photo per person. There were no retakes because someone didn’t like their photo. That provided some self-editing to the process. It was a little heart-breaking

because everybody who came was so excited about the piece.”

The artists use Adobe Illustrator and CAD to laser-cut the photographed silhouettes from ¼-inch stainless steel. The steel is then sanded to an even, silver finish. Every person selected for “Facewall” had a numbered photo, so anyone stopping at the wall can scan a quick response, or QR, code at the base of the installation with a smartphone, which will take the visitor to a legend of the faces.

“If your name is on the list, you can find your silhouette on the wall,” says Heiss. “It’s a key to help find where people are located. We love the democracy of it. The guy who mows the lawns is on the wall in the same way as the president of the university. We didn’t want to know who was who when we took the photos so there’s this real sense of community about it.”

“Facewall” is scheduled for installation in January 2016.

MUSIC

A Child's Requiem

A Child's Requiem, an oratorio written by Lehigh composer Steven P. Sametz to honor the 20 children and six adults who were killed during the shooting at Sandy Hook Elementary School in 2012, was performed for the first time in two concerts last March.

On March 5, at the University of Connecticut’s Jorgensen Center for the Performing Arts, the university’s Symphony Orchestra and Concert Choir joined the Chorus Angelicus Children’s Choir, soprano Janani Sridhar and tenor Gregory Zavracky to give the work its premiere under the direction of Jamie Spillane.

The same musicians joined forces again on March 7 to perform *A Child's Requiem* in Stamford, Conn.

Sametz, the Ronald J. Ulrich Professor of Music and director of Lehigh University Choral Arts, wrote *A Child's Requiem* with a commission he received in 2013 from the University of Connecticut when he won the 10th Raymond and Beverly Sackler Music Composition Prize. The competition, organized by the University of Connecticut’s School of Fine Arts, is an international award that supports and promotes composers and the performance of their new musical works. Every second year, entrants are asked to compose a piece for a specific area of the musical arts, chosen by the head and other faculty of the UConn music department, such as a jazz ensemble, choir, opera, wind ensemble or chamber ensemble. This year’s prize is for chorus and orchestra, and entries were received from seven nations and 17 states. The prize carried an award of \$25,000.

In an interview conducted by Silagh White, director of arts





Steven Sametz

engagement and community cultural affairs at Lehigh, and Andrew Cassano, administrative director of the university's Zoellner Arts Center, Sametz described *A Child's Requiem* as "a response to child's loss and grief."

The Sandy Hook Elementary School shooting occurred on Dec. 14, 2012, in Newtown, Conn., and was the deadliest mass shooting at a high school or grade school in U.S. history.

Sametz, a native of Westport, Conn., said *A Child's Requiem* "revolves around a libretto, much of which was written by children."

"It's paired with lines from (the American poets Ralph Waldo) Emerson and (Emily) Dickinson and H.D. (Hilda Doolittle, who was born in Bethlehem). It's kind of a collision between the adult world and the world of innocence," he said.

"I hope to offer this piece as a gift to the town of Newtown as they heal from their tragic loss."

Sametz, who is also the artistic director for the Princeton Singers, an elite singing group, has received commissions from the National Endowment for the Arts, the Connecticut Council on the Arts and the Santa Fe Music Festival. He has also composed music for Chanticleer, the Dale Warland Singers, the Philadelphia Singers, the Pro Arte Chamber Choir, the Santa Fe Desert Chorale, the Connecticut Choral Artists and the king of Thailand.

His recent guest-conducting invitations include appearances with the Taipei Philharmonic Foundation, the Berkshire Music Festival, the New York Chamber Symphony and the Netherlands Radio Choir.

THEATRE

The Winter's Tale

The Winter's Tale, Shakespeare's tale of a royal family separated by tragedy then reunited, was performed July 29-Aug. 2 by Philadelphia's Shakespeare in Clark Park (SCP). Scene design for the outdoor production offered challenges and an exciting design opportunity for Melpomene Katakalos.

In *The Winter's Tale*, Leontes and Polixenes are the best of friends, until a jealous madness tears their families apart. Katakalos, assistant professor of theatre, worked with director Kittson O'Neill, puppeteer Aaron Cromie and artist Christina May to stage a celebration of life, love and the power of family.

"The fun thing about the project is that it is in the park, so it's outside, it's interactive," says Katakalos. "It's a found space and you have to accommodate for that, so although the scenery is minimal, it's important in terms of creating the environment."

Shakespeare in Clark Park is committed to presenting free, outdoor productions of Shakespeare's plays, creating a cultural event accessible to the public. More than 1,000 people often attend with their picnic baskets for performances under the stars. Katakalos' relationship with O'Neill developed from a previous collaboration at Philadelphia's InterAct Theatre. O'Neill, the dramaturg and artistic associate at InterAct, asked Katakalos to be part of the production.

In developing the scenery, Katakalos knew the set had to adapt to the environment. Her design uses large swaths of fabric

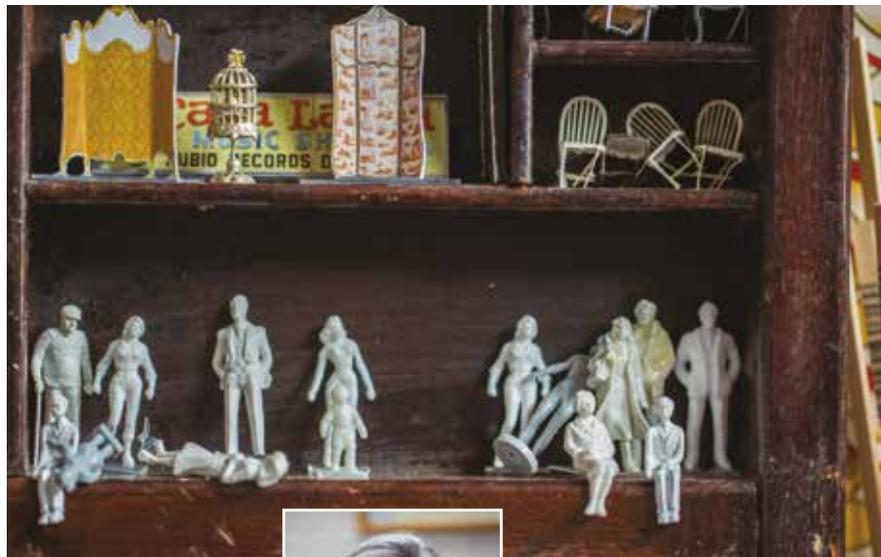
that the actors manipulate with their bodies or poles to create and change the environment. The scenery becomes part of the action and helps tell the tale, she says.

As part of her design process, Katakalos is often involved early in the production process. Her research explores the development of new work and/or devised work, in which she serves as a generative artist working collaboratively with the writer and director.

"I'm in the room early, and that's not always typical," she says. "I talk to the director about what I see, what I think, and that can change how the play is staged. I

that doesn't exist if I'm not there."

Her process-oriented approach to design is also influencing an upcoming project with director Mei Ann Teo on *Shape of a Bird*, an adaptation of *Antigone* by Jean Tey, a celebrated Singaporean playwright, to be staged at the Singapore Fringe Festival Jan. 13-24, 2016. The Singapore Fringe Festival is an annual festival of theatre, dance, music, visual arts and mixed media created and presented by Singaporeans and international artists. Katakalos has a strong artistic relationship with Teo. She was scene designer for Teo's 2014 production of *Wake* in



Melpomene Katakalos (left) takes a process-oriented approach to design.



New York City and co-devisor of 2015's *Labyrinth: Defining Humanity* in China.

The work she does professionally seeps into the classroom, influencing the work of her students, Katakalos notes.

"With this process-oriented approach, the process is just

see how the design fits in better and how the language I use and the things I see parse out what is useful. It's visceral. It's about total environment. When I have input or an observation, it's this other layer

as important as the result. As a teacher, it's made me even more aware of the process and exposing students to this idea of process as the value. That's where the value of the learning is happening."

ENGLISH

Beachy Head

Beachy Head, the chalk headland on England's southeastern coast, has for centuries been the subject of stories and songs. In 1807, Charlotte Smith's complex poem about the cliffs appeared, and an interpretation of her work is the focus of a new project by Beth Dolan.



Smith (above) took an innovative approach with her narrative technique when she penned *Beachy Head*.

Dolan, associate professor of English, spent the summer of 2014 in England on a monthlong fellowship at the renowned Chawton House Library, where Jane Austen lived for part of her life. There she met musician Amanda Jacobs, who was setting Austen's prayers to music. The pair were intrigued by Smith's most complex poem, *Beachy Head*, which depicts the landmass of the same name. Scholars credit Smith with major contributions to Romantic-era poetry, including starting the sonnet revival, celebrating subjective experience as a legitimate poetic topic and boldly experimenting with poetic form. Writing the poem during England's long war with France, Smith invokes themes of separation and continuity. The poem also explores the geographical, paleontological and botanical histories of this landform. Several lonely figures populate the landscape, including a hermit who recovers bodies from shipwrecks and suicides and buries them in the cliff. Although some of Smith's sonnets have been set to music, Dolan says no one has attempted *Beachy Head*.

"The 731-line poem is known not only for its formal variety, but

also for its thematic complexity and range of voices. These qualities make *Beachy Head* an excellent source text for a song cycle."

Discussing the poem over several months, Dolan and Jacobs identified and named 26 songs, organized into five song cycles. The pair then went back through the poem and extracted lyrics for the individual songs—only omitting some of Smith's

language, never adding words. The "Beachy Head Cycle" contains a prologue and four songs, followed a long, single song interlude, "Historical Contemplation." Next Dolan and Jacobs take up "Happiness" in a five-song cycle and then begin the seven-song

"Nature Cycle," which includes lines that speak back to "Historical Contemplation." Five songs make up "The Stranger's Cycle," one of which harkens back to the "Happiness Cycle." Finally, *Beachy Head* ends with three moving songs that comprise the "Hermit's Cycle."

"Smith did not explicitly identify these sections, but you can see these songs in there," says Dolan. "Although some scholars argue that the posthumously published poem was unfinished when Smith died, the deep structure scholars discovered suggests that *Beachy Head* is a complete, refined and complex work."

The pair performed excerpts from the song cycle as a lecture recital—the culminating event of the Romantic Studies Association of Australasia meeting in July—the theme of which was "Re-reading Romanticism." Dolan introduced the song cycles with short lectures. Jeannie Marsh, an accomplished mezzo soprano based in Melbourne, sang

Smith's words while Jacobs accompanied on piano. *Beachy Head* was also performed at Lehigh's Zoellner Arts Center in September with mezzo soprano Kathryn Cowdrick of the Eastman School of Music performing with Jacobs and Dolan.

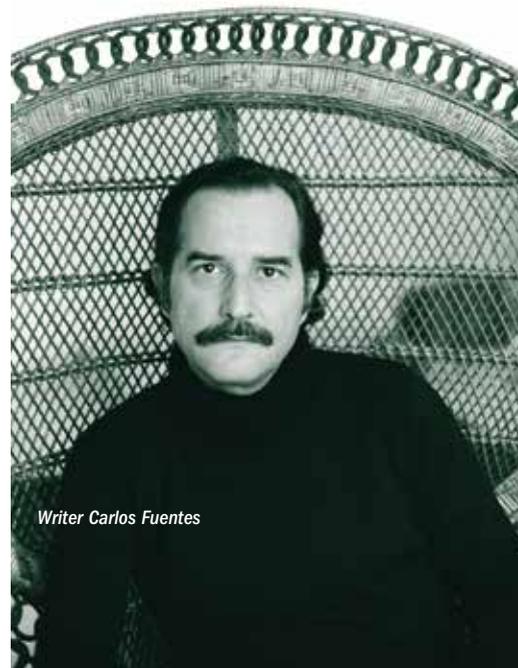
MODERN LANGUAGES AND LITERATURES

Melodrama and the Social Imagination

Melodrama, says Matthew Bush, does not get the respect it deserves in the world of literature.

In books and movies, Bush acknowledges, a melodramatic work typically favors broad strokes over subtlety. Its plots are often contrived and its characters stereotyped. It makes a transparent appeal to the emotions and relies heavily on exaggeration, even sensationalism.

Nonetheless, Bush, an assistant professor of Spanish in the department of modern languages and literatures, confesses to a longtime fondness for melodrama. He especially enjoys the theatricality of the telenovelas, or soap operas, that are popular throughout Latin America and increasingly in the United States as well.



Writer Carlos Fuentes



Bush is the author of *Pragmatic Passions: Melodrama and Latin American Social Narrative*, which analyzes novels by five Latin American writers. In *Pragmatic Passions*, Bush maintains that melodrama is utilized in high and low culture alike to highlight injustices while chronicling and reflecting trends in society and politics.

"People tend to think that melodrama is simplistic," says Bush, "and that it is just for passive consumption, which supposedly typifies popular culture. That's not necessarily the case. Melodrama plays on people's anxieties and on their thinking about the way society works."

Pragmatic Passions focuses on several popular books: *The Death of Artemio Cruz* by Carlos Fuentes of Mexico, *Gabriela, Clove and Cinnamon* by Jorge Amado of Brazil, *Doña Barbara* by Rómulo Gallegos of Venezuela, *Tungsten* by César Vallejo of Peru and *Bewitched by Love* by Roberto Arlt of Argentina. Most of these works have inspired either telenovela, film or theatrical adaptations, says Bush, and several have been adapted to the screen more than once.

"The authors whom I analyze in my book are some of the most renowned in Latin America," says Bush. "Many readers would probably hesitate to categorize these works as melodrama because melodrama is seen as being cheap; it can't be high art.

"But melodrama is not just employed in popular genres; it's also employed by the so-called great authors. 'High' and popular culture both use similar elements to tell a story. I'm not trying to save or validate melodrama, but to say that it operates in a serious way, even if we're not conscious of it, that is something central to our social imagination."

Bush sees "important and evident connections" between the Latin American novels he

analyzed and the novels of such 19th-century British authors as Charles Dickens and Jane Austen.

"The settings and social conditions may be totally different," he says, "but all the authors use sentimentality as a means of examining social practices and conventions—the effects of industrialism in Dickens' case, the role of manners and feminine agency in Austen's case."

Like their Latin American peers, says Bush, Dickens and Austen wrote novels that not only convey an emotionally fulfilling story, but also move readers to think about different social trends while they obtained pleasure from the text.

"Whether it's a book by Dickens or Gallegos, Austen or Arlt, readers can take something more than just sentimentality from a melodrama. They read a book that reflects the society the characters live in."

RELIGION STUDIES

Sufism and the Web

As an Islamicist and a South Asianist, Rob Rozehnal has focused on the history and practice of Islam within Pakistan and India, with a particular emphasis on Islamic mysticism (Sufism). His research has recently taken a new path, exploring cyberspace as an alternative platform for communication, identity politics and community building among diverse groups of American Muslims.

Supported by a New Directions Fellowship, Rozehnal's current

project charts the theological, geographical and cultural diversity of four prominent Sufi orders in the United States. He examines these prominent Sufi communities to document how the current generation of American Muslims uses the Internet to expand networks, rethink tradition and refashion identity. These traditional Sufi orders have long histories outside the United States and now are rooting themselves within the American immigrant landscape. Each has a very different history, particular dynamic and a distinct approach to how it employs cyberspace, he says.

"While there has been some research on cyber-Islam and especially the Internet usage of extremist jihadi networks, the growing web presence of Sufi communities has received little scholarly attention," says Rozehnal, associate professor of religion studies and director of Lehigh's Center for Global Islamic Studies. "There is a rapidly expanding literature on digital religion. This work is coming out of communications and media studies, cultural anthropology and religion studies."

Rozehnal sees Sufi web pages as alternative forms of religious texts and a novel platform for religious experience. "Web pages are, by nature, complex. They are fluid. They

are visual and auditory. They are hyperlinked. These things are always changing. A web page is put up, and six months later, you go back and it's totally transformed. Despite this transience, the technology is ubiquitous. Like the printing press once did, the Internet is reshaping religious life in the 21st century."

Rozehnal hopes his research will provide scholars with new perspectives on how web pages operate as religious texts and sacred spaces for American Muslims in the digital age.

"In many ways, cyberspace represents a profound challenge to these Muslim groups," he says. "Traditionally, Sufism is all about a personal connection with a spiritual teacher. In the absence of that direct, face-to-face connection

'on the ground,' is it possible to create a vital religious community online? Are chat rooms useful for spiritual learning? Can a web page ever replace that one-to-one connection with a spiritual master? Can you have a virtual Shaykh?

If you are physically unable to travel, can you participate in a virtual Hajj, the pilgrimage to Mecca? As digital technologies continue to evolve, can cyber environments become real places for conversation, for social interaction or for religious practice? These are the kinds of questions that intrigue me."

In the past year, Rozehnal has presented this research in several national and international conferences. His work will culminate in a book titled *Cyber Sufis: Virtual Expressions of the American Muslim Experience*. In addition, he plans to develop several new Lehigh courses that will explore these themes.



Rob Rozehnal

BIOLOGICAL SCIENCES

Neurogenesis of Sea Anemones

The starlet sea anemone, *Nematostella vectensis*, is a species of small sea anemones that occupy an essential position in the tree of life. They are primitive animals with epithelial cells, neurons, stem cells, complex extra-cellular matrix and muscle fibers, and they have extensive regenerative ability. Although the *Nematostella* is a “primitive” animal, the sea anemone genome is more closely related to the human genome than the current invertebrate animals used to model human biology. Understanding the neuroregenerative properties of *Nematostella* is the current interest of biologist Michael Layden.

Layden’s research focuses on understanding how the mechanisms that regulate regeneration of the anemone’s nervous system may vary from mechanisms that generate the nervous system during development.

“Traditionally, people have looked at the process of neurogenesis during development (when a fertilized egg develops into an adult animal), but now the goal is to understand the same process during regeneration of adult bodies,” says Layden, assistant professor of biological sciences. “There is a clear indication that when animals regenerate, the mechanisms are similar to those used during development. You don’t reinvent the wheel to regenerate a limb, for example, but regeneration does not use the exact same molecular program as development. In order to understand the significance of differences observed between development and regeneration, you need to study them in the same animal.”

Most current research on regeneration uses model systems that are not suited for investigating both animal regeneration and development. It is difficult to compare the

neural development and neural regeneration directly because they are investigated in two different animals, says Layden. *Nematostella* is one of the few animal models that allow researchers to easily access and manipulate gene function during both development and regeneration. Understanding the similarities and differences in how developmental programs are redeployed during regeneration will provide researchers with critical clues needed to design better regenerative therapies for human neurological disorders.

Layden examines achaete-scute homologs (ash), a type of gene that regulates formation of a subset of the *Nematostella* nervous system during embryogenesis. He and his team disrupt this gene’s function and analyze neural phenotypes at the *Nematostella*’s larval and juvenile polyp stages. In conjunction with this, he is improving methods



Michael Layden (above) examines the neuroregenerative properties of Nematostella.

to disrupt genetic function during regeneration. The goal is to assess whether this ash gene regulates formation of the same neurons that it does during development, regulates neural development using the exact same molecular program and/or regulates distinct neuron sub-types that are not regulated by this gene during development.

Using *Nematostella* allows researchers access to the neural processes in an invertebrate model that is inexpensive to study when probing regenerative properties. Layden can obtain thousands of embryos daily and his team can dissect anemones at any stage of their lives, including during regeneration. By examining sea anemones, he and his colleagues are laying the groundwork for future studies in vertebrates, such as zebrafish and mice.

Additionally, because *Nematostella* is a primitive animal, Layden’s research will also provide insight about molecular programs that regulated formation of the ancestral nervous systems that gave rise to more complex nervous systems, such as the human brain.



CHEMISTRY

The Efficacy of pHIP

Effective therapies for the treatment of cancer rely on the localized delivery of drugs. Targeted drugs attack the cancer while reducing the impact the drugs have on the rest of the body. A unique delivery peptide that can selectively target tumors in mice and translocate and release cargo molecules intracellularly based solely on the acid levels inherent to cancer cells is being investigated in the laboratory of Damien Thévenin.

Funded by the National Cancer Institute, the research by Thévenin’s team investigates the efficacy of a pH-sensitive peptide to target and deliver the microtubule inhibitor monomethyl auristatin E (MMAE) to cancer cells and breast tumors. Many cancer-targeting therapies intended to improve the effectiveness and diminishing off-target cytotoxic effects have been developed and hold the promise of being therapeutic options for certain types of cancers. However, preclinical and clinical studies found that therapy strategies based on the targeting of specific proteins are significantly hampered by tumor heterogeneity, which can promote tumor evolution, leading to the loss of cell surface proteins and, eventually, to therapy resistance and disease progression. Moreover, targeted cancer biomarkers tend to be over-expressed in a tumor-associated, not tumor-specific, manner.

Acidity is a general hallmark of tumors. While normal tissue pH is



about 7.4, pH in tumors range from 5.5 to 7. Thévenin's lab uses the pH (low) insertion peptide (pHLIP), a peptide that can selectively target tumors in mice solely based on their acidity rather than on any specific biomarker. pHLIP circulates in the blood supply until it anchors to the cell membrane of acidic tissues. Headed by graduate student Kelly Burns, the team's recent study has shown that pHLIP-MMAE combinations are very effective at killing a breast cancer cell line that is resistant to current targeted therapies in a concentration- and pH-dependent manner after only two hours of incubation without any apparent disruption of the plasma membrane.

Thévenin, assistant professor of chemistry, is collaborating with Matthew Robinson at Fox Chase Cancer Center. Using mice bred with a reduced immune system as a model, Fox Chase researchers insert breast cancer cells into the animals. After several weeks, a tumor develops, and once it reaches 5 millimeters in size, the pHLIP-MMAE conjugate is injected intravenously. The study shows, for the first time, that pHLIP can effectively home the clinically relevant MMAE to tumor in animals.

These peptides can be used to target other types of cancers or conditions, says Thévenin. "We know that we can target metastases and viral infection in the lung, or even arthritis in the knee. Unlike other strategies that are developed to target few specific types of cancer, our approach is extremely simple and relies on a feature that is common to most solid tumors.

"Right now, we are now trying to find a lead compound that we could move to preclinical trials. Since the publication of the pHLIP-MMAE study, we have found a pHLIP-drug combination 100-fold more effective than pHLIP-MMAE. We are extremely happy with these results, but we want to do better."

EARTH AND ENVIRONMENTAL SCIENCES

A Sharper Image of Climate Change

The Earth's climate has changed throughout history. Most of these changes are attributed to very small variations in Earth's orbit that change the amount of solar energy our planet receives. Yet, recent glacier research has shown that our planet is responding to changes in greenhouse gases, and those changes are happening quickly, geologically speaking. As the concern over global warming continues to grow, the work of Joan Ramage is providing insights about climate change in the arctic.

Ramage, associate professor of earth and environmental sciences, studies changes in modern glaciers and seasonal changes in snow cover and how they are affected by climate. Funded by the National Aeronautics and Space

"The arctic is one of the fastest-changing parts of the world, and this area is fast for the arctic," she says.

Studying such a remote region of Russia prevents Ramage from conducting field work, so she examines melt dynamics and the interactions between glaciers, sea ice characteristics and weather using satellite data. For the past four years, she has used figures provided by Brigham Young University's Microwave Earth Remote Sensing Laboratory to get a high-temporal resolution picture of climate change. These satellites measure microwave radiation, indicative of snow properties. Since the microwaves are capable

Ice loss might enhance glacier melt by exposing larger open ocean water to evaporation or amplifying regional temperature.

"The holy grail of what you want to know is how much mass of ice has either melted or accumulated. You're looking at the change in the accumulation compared to melt, evaporation or sublimation," she says.

The data are showing that a number of glaciers in the region are changing rapidly and the change



Administration (NASA), Ramage uses satellite data to examine high arctic glaciers located on the Russian archipelagos of Novaya Zemlya and Severnaya Zemlya. These islands are located in one of the most rapidly changing areas in the world if gauging sea surface temperatures.

of penetrating cloud cover and can be used at night, researchers are able to gather data that cannot be seen by the eye. Periods of freezing provide different signals than periods of melting, giving Ramage and her students a better understanding of glacier surface conditions.

started recently. The satellite imagery gives researchers information about the glaciers' daily melt dynamics, which provides important information about glacier and hydrological changes. Ramage's research will document changes in seasons and the effects they have on other aspects of the environment. Her study showed the snow melt has been getting earlier and longer on Severnaya Zemlya. On Novaya Zemlya, the number of melt days also increased, but onset timing was highly variable. Ramage's work also showed that as regional late summer sea ice extent declined, total melt days increased on both archipelagos, suggesting that sea ice loss might enhance glacier melt on Novaya Zemlya and Severnaya Zemlya by exposing larger open ocean water to evaporation or amplifying regional temperature through ice-albedo feedback and water vapor greenhouse effect. Shrinking sea ice is likely enhancing terrestrial ice snow melt in the Arctic.

HISTORY

Zionism and Melancholy

In 1920s Palestine, author Israel Zarchi was a well-known figure among the first Jewish artists and intellectuals, but his name and work are today largely unknown. Zarchi's writings were recently discovered by historian Nitzan Lebovic and are the subject of his forthcoming book, *Zionism and Melancholy: The Short Life of Israel Zarchi*.

Born in Poland in 1909, Zarchi immigrated to Palestine in 1929, where he worked as a pioneer building roads and farming. During this period he wrote his first novel, *Youth*. Over the next 18 years, Zarchi published six novels and seven collections of stories and translated Heinrich von Kleist, Joseph Conrad and Janusz Korczak to Hebrew.

"He found he was too smart to just build roads, so he began writing about them. The first stories are about his life as a pioneer, about other pioneers and the riches of Zionism in the 1920s," says Lebovic, assistant professor of history and Helen and Allen Apter '61 Chair in Holocaust Studies and Ethical Values.

Lebovic's research is supported by a grant from Lehigh's Humanities

Center, and he spent last summer combing through archives in Israel. He discovered a personal archive that had never been opened, with thousands of pages of letters and diaries, even some unpublished manuscripts. Lebovic found that Zarchi had connections to leading cultural and political figures from the Zionist movement of the 1920s and 1930s. Melancholy is a fundamental theme in Zarchi's work, he says, which was also a central tenet of life in Palestine in the 1930s. Zionism needed to convert large groups of Jews from religious Judaism to secular Zionism and persuade them to immigrate to Palestine to build a nation out of nothing.

"I didn't know what to expect when I started this, but what I found was an author who conceptualized and made the relationship between the Zionist national movement and melancholy affect a theme of everything he wrote. It was different from anything I'd read from that period because he reflects the blind spots of Zionism at the time. Melancholy is the leading voice. Everything fails, and when you focus on the failure instead of the victory, you find the blind spots we tend to ignore."

INTERNATIONAL RELATIONS

The Domestic Inspiration for China's Foreign Behavior

Protesters in Hong Kong demand the release of Liu Xiaobo, a Chinese human rights activist who is serving an 11-year prison sentence. Yanan He, associate professor of international relations, argues that domestic



Chinese People's Political Consultative Conference at the Great Hall of the People in Beijing.

politics plays a key role in China's official rhetoric toward the United States and other Western nations.

The first part of this century was a time of contradiction in China, says He. China endured a succession of trials: An earthquake in Sichuan killed more than 80,000 people, ethnic riots in Tibet and Xinjiang left hundreds dead, government corruption caused unprecedented social unrest, and dissidents published a human rights manifesto demanding an end to one-party rule.

Yet, while other countries struggled, China enjoyed record economic growth and surpassed Japan in 2010 to become the world's second-largest economy. And the 2008 Beijing Olympics stirred a deep sense of national pride. He believes that a careful reading of China's domestic politics can help explain its occasionally aggressive behavior in the international arena and can apply to much of Chinese history.

He explains this dynamic in her

forthcoming book, which will relate domestic turmoil to the anti-foreign rhetoric employed by Chinese leaders from the late 19th century until modern times. She argues that China's domestic political considerations motivate much of its international conduct, especially its occasionally harsh criticism of Japan, the United States and other Western nations. By reading *People's Daily*, the official newspaper of the

Chinese government, He says it is possible to establish a "causal link" between spikes of anti-Western rhetoric and increases in domestic tension.

The conventional wisdom would argue that China's leaders lash out against the West and other countries when they feel the country's security is threatened. He disagrees and cites as one example the case of Liu Shaoqi, the second most powerful man in China under Mao who

spoke out against the excesses of the Cultural Revolution, was placed under house arrest and died there in 1969.

He says the accusation against Shaoqi—someone too closely allied with the Soviet Union and the United States—is part of another pattern in Chinese history: the linking of domestic "trouble-makers" with foreign "others."

SOCIOLOGY

Giving Back?

Short-term volunteer service trips across national borders are increasingly popular in Europe and in the United States. Hundreds of thousands of people travel annually from wealthier to poorer countries, most often for one to two weeks, to participate in programs intended to improve the health and well-being of citizens in underserved communities. Whether such volunteer efforts actually contribute to improvements



Jewish pioneers harvesting grain.



Young Portuguese Red Cross volunteers attend an summer school of this humanitarian organization.

She found that sponsoring organizations usually have other goals in addition to promoting health in poor countries, and these other goals may conflict with creating the greatest benefit for host communities.

Lasker's work provides a new understanding of the scope and nature of the volunteer industry—where

volunteers go, for how long, at what cost and what they do; the benefits and costs to the recipients of service; the ways in which they could be evaluated specifically with regard to their value for host communities; and the characteristics of the best programs in terms of benefits for both communities and volunteers.

PSYCHOLOGY

Racism and Implicit Bias

Intergroup attitudes have changed dramatically over the past 60 years. As viewers of Mad Men are keenly aware, prejudices that were commonplace in the 1960s are now widely considered archaic and

offensive. Nevertheless, despite improvements in opinions, many intergroup disparities—in education, employment, health and justice—remain much as they were.

To explain this disjunction, social psychologists have started to investigate “implicit attitudes”—attitudes toward groups that people may harbor unintentionally and sometimes even without conscious awareness. These implicit responses may cause otherwise unprejudiced and well-meaning people to nevertheless make biased decisions that perpetuate inequalities.

In a project funded by the National Science Foundation, Dominic Packer is examining what sorts of things affect implicit attitudes. In the course of this investigation, Packer, associate professor of psychology, and his team have identified something of a paradox—implicit attitudes appear both to reflect the legacy of very long histories of discrimination but are also highly sensitive to events in the present.

Packer's team developed a state-by-state map of implicit bias in the United States using data from approximately 1.8 million white

participants who took an online black/white implicit attitude test (IAT) on the Project Implicit website between 2003 and 2013. There is a spatial logic to the bias, with some of the highest levels grouping in the South. Statistical analysis revealed that implicit bias is greater in former slave-holding states,



Dominic Packer

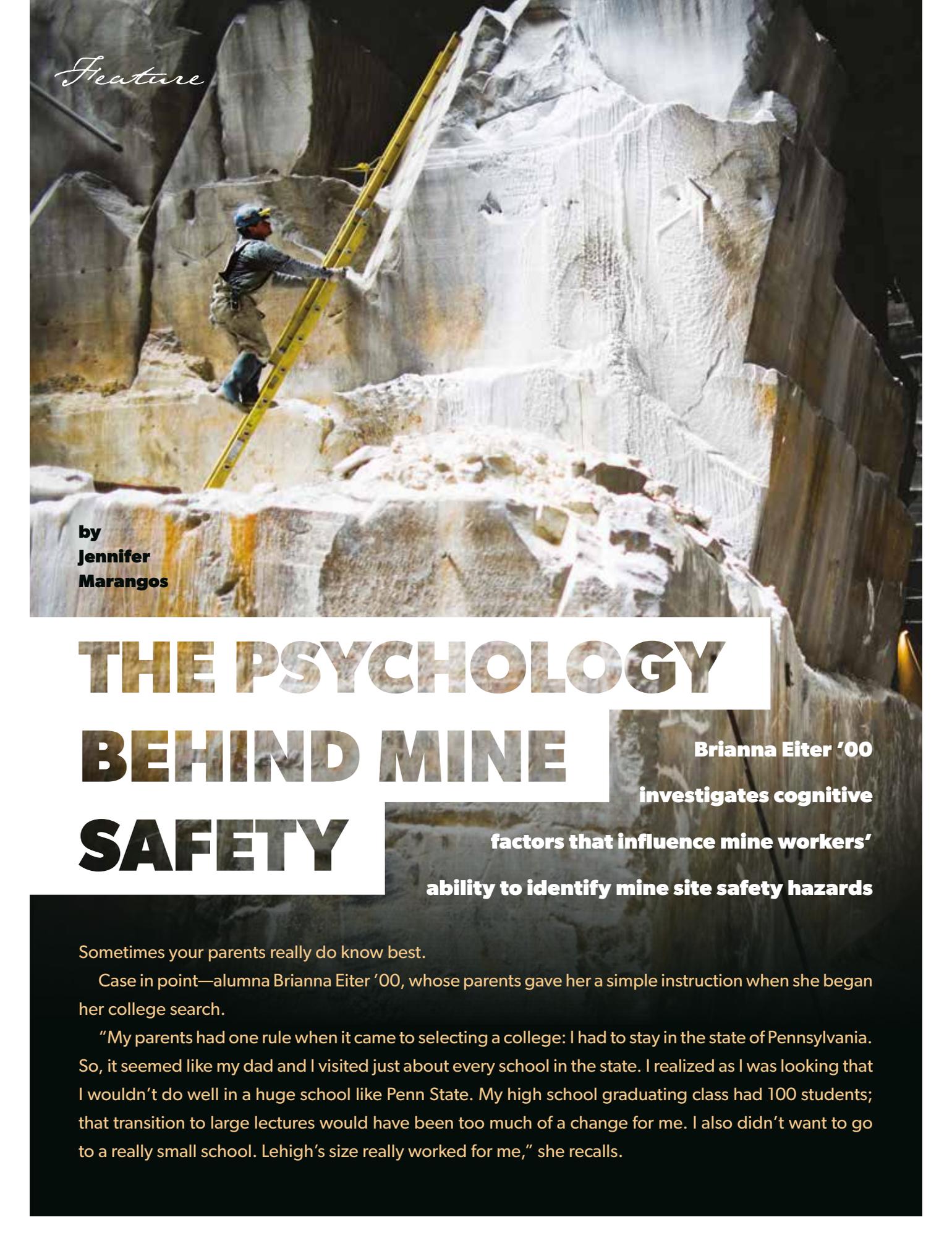
as well as in some perhaps less-expected locations, such as New York, Illinois, Pennsylvania and Ohio. Packer suggests that implicit bias tends to be heightened in locations where the abolition of slavery and, later on, the end of the Jim Crow era posed significant political and economic threats to white interests. The more people felt threatened, the more their attitudes hardened.

However, in a series of studies conducted in the Group Processes Lab at Lehigh University, Packer's team has also found that relatively subtle factors can rapidly reduce implicit biases. Structuring situations so that it is easy to trust and cooperate with others, for example, seems to immediately reduce white participants' implicit biases toward African Americans.

Although histories of slavery and oppression cast long shadows, overall this project provides reason for optimism. Although they may be unintentional and unconscious, implicit attitudes are not immutable.

“If we understand the factors that shape implicit responses in the present,” says Packer, “perhaps progress in addressing intergroup disparities will begin to catch up to our consciously felt egalitarian principles.”





Feature

by
**Jennifer
Marangos**

THE PSYCHOLOGY BEHIND MINE SAFETY

Brianna Eiter '00
investigates cognitive
factors that influence mine workers'
ability to identify mine site safety hazards

Sometimes your parents really do know best.

Case in point—alumna Brianna Eiter '00, whose parents gave her a simple instruction when she began her college search.

“My parents had one rule when it came to selecting a college: I had to stay in the state of Pennsylvania. So, it seemed like my dad and I visited just about every school in the state. I realized as I was looking that I wouldn't do well in a huge school like Penn State. My high school graduating class had 100 students; that transition to large lectures would have been too much of a change for me. I also didn't want to go to a really small school. Lehigh's size really worked for me,” she recalls.

Eiter originally planned to major in engineering, but during her freshman year, she discovered cognitive psychology. After receiving a bachelor's degree in psychology, Eiter pursued graduate studies at Binghamton University, earning a Ph.D. in cognitive psychology in 2005. From 2005 to 2011, she was an assistant professor in the psychology department at Hofstra University.

About four years ago, Eiter says she was looking to shift her focus to applied research. A job search for positions that would provide her that opportunity led to her current role as a behavioral research scientist with the National Institute for Occupational Safety and Health (NIOSH) in the institute's mining division. NIOSH is a part of the Centers for Disease Control. And the rest, as they say, is history.

Today, Eiter is leveraging her cognitive psychology background to study the manner by which mine workers recognize mine site hazards. The goal is to ultimately develop better training materials for miners that can help to reduce the number of mining accidents and fatalities. In particular, Eiter focuses on the stone, sand and gravel mining industry.

For the past nine months, she has been the primary investigator for a multi-year project designed to examine how cognitive factors such as attention, risk perception and risk tolerance, as well as individual factors like experience level, affect a mine worker's ability to identify mine site hazards. To do this, Eiter explains, her team will bring stone, sand and gravel mine workers to a research facility in Bruceton, Pa., which is in the South Hills section of Pittsburgh.

"One of the onsite facilities houses a virtual reality center that includes a 360-degree theater," Eiter says. "We are going out to the field to take panoramic pictures that depict typical locations at a surface stone mine site—for instance, a pit, a shop and a plant. We plan to stage hazards at these locations and then photograph them."

"Once we have the panoramic pictures, we will invite the mine workers to our facility and have them search the panoramic pictures for the hazards. They will indicate finding a hazard with a button press. While they are searching the pictures, we will ask miners to wear a set of eye-tracking glasses so that we can record how they visually search the scenes," she says.

After the mine workers have completed this exercise, she adds, her team asks them to complete a demographics form to collect information about their previous work experience, as well as a risk perception measure and a risk

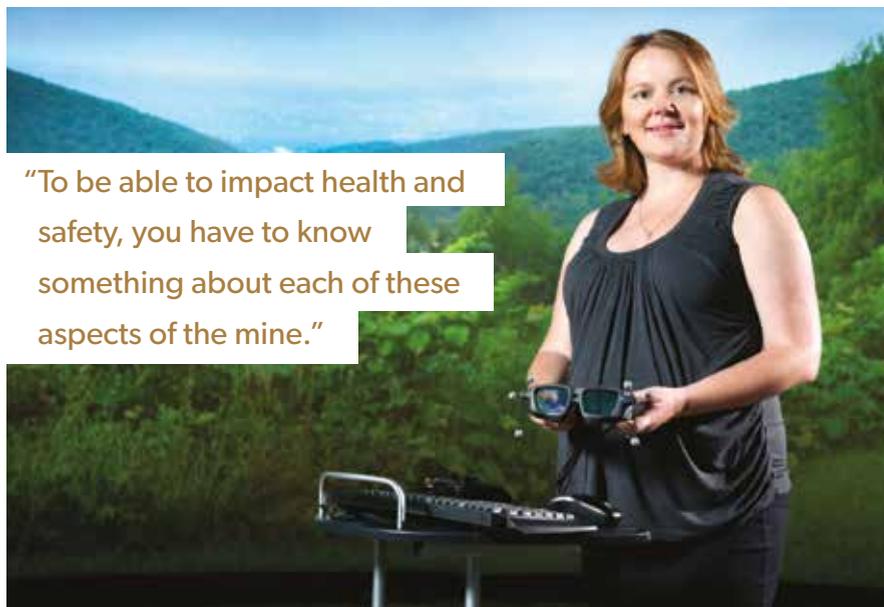
tolerance measure. The miners then respond to a series of open-ended questions designed to help understand why mine workers are able to identify some hazards but not others.

Data from the Mine Safety and Health Administration (MSHA) indicates that fatalities at mine sites in the stone, sand and gravel industry have risen over the past year compared to other types of mine sites. The goal of her team's project, Eiter explains, is to first identify which factors, such as the number of years of experience in mining, visual search, risk

of mines, including underground coal mines, underground limestone mines, underground and surface gold mines and surface stone quarries.

"The culture in each of these locations is different and the mining method and environment at each of these mine types are different," she says. "To be able to impact health and safety, you have to know something about each of these aspects of the mine."

Eiter didn't set out to study miners or mining. "Growing up in western Pennsylvania, I knew about mining," the Pittsburgh native



"To be able to impact health and safety, you have to know something about each of these aspects of the mine."

perception or risk tolerance, affect a mine worker's ability to recognize mine site hazards.

"Then, we will work to determine whether/how we can train mine workers to do something different—for instance, train inexperienced mine workers to visually search their work environment in a way that is consistent with how experienced mine workers visually search their work environment," she says.

Eiter says that one of the biggest challenges of her job also happens to be the part of her work she likes best.

"What I enjoy most about my job is how much the work changes depending on the project I'm working on," she says. "I'm constantly learning about different types of mines, using different research methodologies and techniques, traveling to new cities and meeting new people. That variability keeps it interesting."

Over the past four years, Eiter has visited mines in more than six states and many types

explains. "But I had no direct experience with it and I did not know anybody who worked as a miner. I think it's a job that few people actually think about—unless you know someone who is a mine worker or you live in a mining community. It's easy to not think about mine workers. Mines are typically in remote locations or are underground, so you don't see them."

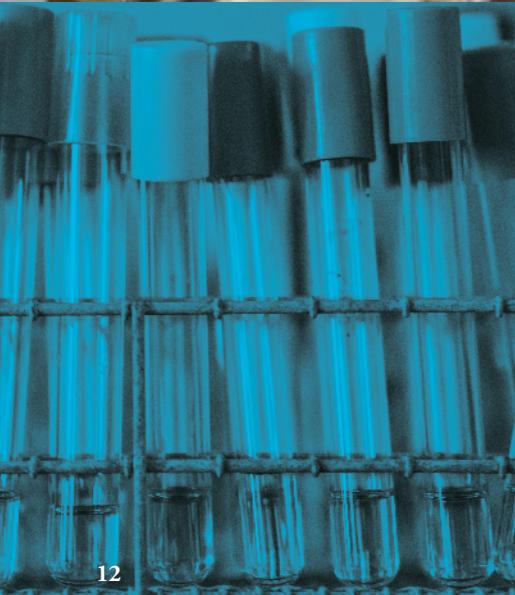
Returning to Pittsburgh is something that was always part of Eiter's life plan. She lives with her husband, John Heberger, whom she met at work. Heberger is an epidemiologist for NIOSH, also in the mining division.

"I think work is important, but my greatest accomplishment to date is my family. My husband and I are expecting our first child in October," she says. "The majority of my family still lives in Pittsburgh. It was important to me to live close to my parents and siblings. I moved away as soon as I graduated from Lehigh; my goal was always to make my way back." ●

FOSTERING A PASSION FOR THE LIFE SCIENCES

HHMI funding recognizes nationally renowned science education program for undergraduates

by JACK CROFT



Since the dawn of discovery, the very essence of science has been to ask a question that nobody has asked before and then set out to answer it. However, it's not often that the person asking the question is an undergraduate student.

Meet Joseph Teyim, a biochemistry major at Lehigh University, who—as a junior transfer student—asked a question after he saw something he didn't understand while doing lab research in the SEA-PHAGES program, sponsored by the Howard Hughes Medical Institute (HHMI). SEA-PHAGES stands for Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science.

Teyim, a rising senior, was doing experiments last fall on a novel mycobacteriophage—a virus that infects bacteria—that had been isolated and characterized by another student as part of the yearlong SEA-PHAGES course taught by Vassie Ware, professor of molecular biology and co-director of Lehigh's HHMI program. He noticed that other phages that had almost nothing in common with the one he was

studying were exhibiting the same immunity properties as his phage.

"I went back to Dr. Ware and said, 'This is what I'm observing. Why am I getting this?' She looked at it and said, 'I don't know.' That phrase, 'I don't know,' you rarely get that from someone like Dr. Ware," Teyim recalls, laughing heartily.

It turns out no one knew the answer. Teyim had discovered something nobody else had seen previously. Over the summer, he continued to pursue his question using an array of molecular and bioinformatics tools while taking part in Lehigh's Biosystems Dynamics Summer Institute (BDSI), a 10-week, interdisciplinary, research-intensive training program started with funding from HHMI in 2006.

And he had a national team of scientists working on the question with him through the HHMI-supported SEA-PHAGES program,



From a pool of 170 applications from major research universities nationwide, Lehigh was one of only 37 to be awarded funding.

led by Dr. Graham Hatfull's lab at the University of Pittsburgh. A major paper is being prepared for publication in which Teyim's research findings will be included, with Teyim credited as an author, Ware says.

"It's a really humbling feeling," says Teyim, a Cameroon native who came to the United States in 2010 and attended Lehigh Carbon Community College in Schnecksville for two years before transferring to Lehigh. "Something that started as a question in class has grown so big. It has been quite a remarkable experience, I would say."

Remarkable, yes. But the joy of discovery—and the love of research that it fuels in students like Teyim—represents the very essence of Lehigh's decades-long HHMI program. Since Lehigh received its first competitive grant from HHMI in 1989, the program has helped to radically transform Science, Technology, Engineering and Mathematics—known as STEM—education at the university.

"I've been here long enough to see things change in ways that I know would not have happened as readily, as quickly, had we not had these HHMI seed monies," Ware says.

The Howard Hughes Medical Institute, headquartered in Chevy Chase, Md., is a science philanthropy whose mission is "to advance biomedical research and science education for the benefit of humanity." In 2013, it invested \$727 million in U.S. research and provided \$80 million in grants and other support for science education. Since 1989, HHMI has had seven competitions among major research universities for science education awards, and Lehigh is one of only a handful of universities to be selected six times, says Neal Simon, Lehigh's HHMI program director.

The awards, totaling \$8.9 million, are recognition that Lehigh has "conceptualized and put forward models that make us leaders in curricular innovation and science education," Simon says. "That's why you get the Hughes awards."

MAKING A DIFFERENCE

From the late 1980s into the early 2000s, the three HHMI awards Lehigh received primarily funded retooling introductory courses in the biological sciences to provide more hands-on research experience for undergraduates and renovating laboratory spaces.

"The HHMI programs are a testament to the college's commitment to involving undergraduate students in meaningful research projects with real-world applications," adds Donald E. Hall, Herbert and Ann Siegel Dean of the College. "Awards such as HHMI recognize the college's innovative approaches to undergraduate research and instruction."

The curricular innovations have been a constant and critical component from the beginning.

"One of the things we did early on was shift the culture to take away the boundary between the classroom and the research laboratory," Simon says. "We saw integration as a way to enhance life science education."

In introductory courses, the old pedagogic model of lectures and repeating lab experiments out of textbooks gave way to project-

"That was probably one of the best things that we ever did, because not only did it give students a chance to work in a research area that was obviously of interest to the faculty instructor, but it also gave us a way to sustain the interest of the course from a faculty point of view," Ware says. "Faculty could see themselves teaching an advanced laboratory course that was always evolving because students were going to continue with a research problem that the faculty member was interested in. So the students could actually learn a set of skills and contribute to a research problem. And the faculty would also like doing that because the students were contributing to their research problem overall."

By the mid-2000s, it was clear that HHMI's main focus was on expanding interdisciplinary opportunities for STEM students and promoting a culture shift within academic settings from the traditional siloed approach to one that breaks down boundaries between departments, fields and even colleges. In the 2006 HHMI competition, Simon and Ware conceptualized the BDSI program, which brings together interdisciplinary teams of undergraduate students working with graduate students and faculty leaders.

"It's a really humbling feeling. Something that started as a question in class has grown so big. It has been quite a remarkable experience, I would say."

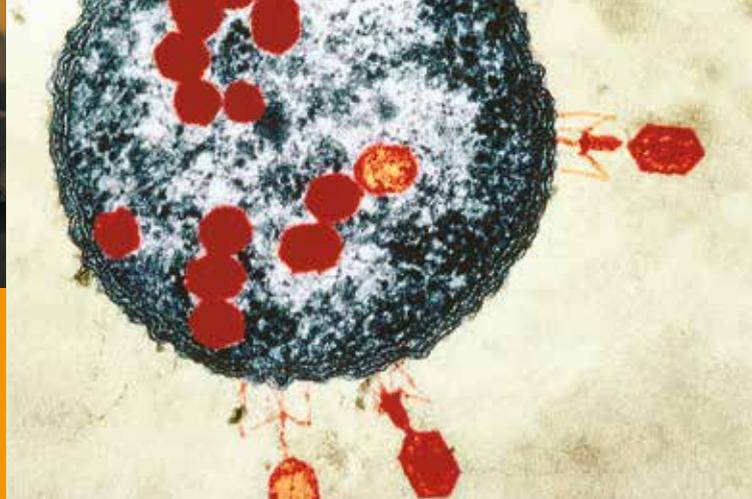
based or discovery-based learning, "or what is now called course-based research experience. That's the current term du jour," Simon says.

In advanced courses, the HHMI grants spurred biological sciences faculty to bring their research into the classroom, which has been a key to making the program successful for students and faculty.

"We have found that participation changes student and faculty approaches to science. As the number of individuals who have been through BDSI has grown, we see collaborations continuing on a long-term basis, joint papers coming out and new grant proposals submitted and funded," Simon says. "These reflect a cultural change in an institution."



Because of the HHMI grant, students are engaged in research, made part of a larger scientific community, and find success in a STEM field.



Another example is the Bioscience in the 21st Century course, which launched in 2007 with HHMI funding. Offered in the first semester and open to first-year students and the Lehigh community at large, the course brings in up to 30 faculty members representing a wide variety of disciplines to share their perspectives on biological problems. The class has grown from 40 to 50 students to more than 250.

For example, a neuroscience unit not only draws on the expertise of biologists, but also brings in electrical engineers and materials scientists, among others, working on neuroscience problems. Students learn about the fascinating work going on in other departments and some now avail themselves of research opportunities in departments outside their own major, Ware says.

“The course is an indicator of the culture change that has occurred here,” Ware says. “Students were not crossing into other departments or colleges to do research when they had their primary major in another department. We’ve got multiple, multiple examples of that now. And that really has been one of the wonderful outcomes of the interdis-

ciplinary approach. The curriculum and research have fed each other in ways that have changed culture, not only among faculty, but among students.”

“By the time I graduate, I’ll have had three-and-a-half years of research experience under my belt, whereas the others won’t have been as fortunate.”

ciplinary approach. The curriculum and research have fed each other in ways that have changed culture, not only among faculty, but among students.”

Emily Heckman, a molecular biology major and rising senior who has been involved in SEA-PHAGES and BDSI, says the early interdisciplinary course helped broaden her perspectives.

“It exposed to me what my personal strengths were and enabled me to use them

more effectively,” Heckman says. “It also taught me to ask for help where I needed it and not to rely just on my own strengths, which I think is an important lesson to learn.”

HHMI funding also supported a series of highly successful visiting scholars who shared the importance of interdisciplinary collaborations to their work and careers.

With the SEA-PHAGES program, Heckman says, she discovered her life’s passion: to pursue a career in scientific research.

“We were able to do an experiment not really knowing what the outcome was going to be and, based on the results, set up new experiments and ask new questions that have never been asked before,” Heckman says. “There’s something quite addictive about that. The pursuit of new knowledge is exciting, and as a freshman, it really opened my eyes to what potential I had for research opportunities.”

Lehigh joined the second cohort of the national SEA-PHAGES program in 2009. An outgrowth of Hatfull’s research efforts at Pitt, the program has enlisted students from more than 100 institutions to study phages in the hope that the research will lead to new diag-

nostic tools and therapeutics to mitigate or even cure tuberculosis.

Over the years, the SEA-PHAGES program has become an integral part of the university’s efforts to instill a culture that prizes interdisciplinary and discovery-based learning.

“When they’re working hands-on, a lot of these things stick better,” says Ware, winner of the 2015 Christian & Mary Lindback Award for Distinguished Teaching as well as the

College of Arts and Sciences Teaching Award. “They get out of the habit of ‘I have to memorize this, I have to know this formula.’ They’re working with it, so it becomes almost second nature. These are evidence-based practices that have been shown to have an impact. That’s why the SEA-PHAGES program works so well, because the students are actually ‘doing’ science, as opposed to reading about it.”

CREATING CONNECTIONS

Providing first-year students with what Simon calls “the opportunity to participate in the creation of new knowledge” is also a key part of Lehigh’s most recent 2014 HHMI grant, which continues support for curricular innovations while funding two new programs—BioConnect and RARE (Rapidly Accelerated Research Experience)—aimed at increasing retention of STEM students.

A 2012 report by the President’s Council of Advisers on Science and Technology warned that the United States could face a shortfall of one million STEM workers within a decade, an outcome that could be averted by increasing retention of STEM students. Only about 40 percent of STEM majors nationally wind up graduating with a STEM degree.

And even though Lehigh fares much better, with a STEM retention level around 70 percent, “we can do better,” Simon says.

The two new programs focus on students from backgrounds underrepresented in STEM fields. BioConnect builds bridges to community college students, with Northampton Community College (NCC) as the first partner institution. The BioConnect program provides opportunities for community college students identified as likely candidates to transfer to Lehigh to engage in bioscience interdisciplinary research, mentoring and STEM community-building experiences during the academic year and summer.



“I see BioConnect as a lifeline for students who transfer in,” Ware says. “It’s essential.”

During their first two years on campus, Lehigh students gain a tremendous advantage over transfer students in terms of research experiences, access to biosciences faculty and familiarity with the research culture.

To help assimilate students transferring in after two years, the BioConnect program will provide opportunities for NCC students to enroll in SEA-PHAGES and other inquiry-based courses in the biological sciences core curriculum at Lehigh and also to participate in the BDSI summer program. Students and faculty from the community college will be able to visit Lehigh labs and attend meetings and research symposia, and Lehigh faculty also will visit NCC. The program also includes a Scholar in Residence component for community college faculty.

RARE is an ambitious, pre-admission-to-graduation science immersion program designed to not only increase STEM retention, but create what Simon and Ware call “a community of scholars mentality” for the students involved. The first cohort of 16 students was chosen this spring and attended a two-week orientation organized in cooperation with the Office of the First Year Experience, the Office for Academic Outreach and STEM faculty. The program features introductions to life science, including responsible conduct of research, safety, the laboratory environment, the research enterprise, exposure to primary literature and information technologies; sessions

addressing campus culture, academics, resources and support services; and social activities.

The RARE program also adopts a team-based advising structure. Simon or Ware will serve as adviser for each student, aided by a “mentoring committee” that also includes another faculty member from the student’s major department and a successful junior or senior “peer mentor” who will provide professional development and career guidance. Regular meetings with Academic Transitions and Multicultural Affairs staff will round out the new advising approach.

“What we’re trying to do is identify practices from these two programs that can be adapted to the larger STEM community here at Lehigh and nationally,” Simon says.

As part of its grant-making philosophy, HHMI does not believe in funding programs in perpetuity. There is an expectation that institutions will step up to make programs started with HHMI funding sustainable. As Ware puts it: “Hughes is interested in lighting fires. They want it to spread.”

While course development is the first step in ensuring a program that will last in perpetuity, it is the experiential learning through programs like BDSI, RARE and BioConnect that are essential. In order to keep the fire going, Lehigh is seeking philanthropic partners to support the Life Sciences Systems Initiative, which incorporates the experiential learning components of the HHMI grants.

There is no question that HHMI has greatly enhanced Lehigh’s research opportunities. In addition to SEA-PHAGES, Heckman has gained invaluable research experience working in the lab of Julie Haas, assistant professor of neuroscience. Haas’ course on *The Ever-Changing Brain* captivated Heckman and, in addition to working in the professor’s lab during the academic year, she was accepted into the BDSI program to work on a related interdisciplinary project over the summer.

Heckman studies electrical synapses between cells in the brain, research that has implications for learning and memory. The BDSI project she worked on this summer focused on circadian rhythms and a potential drug to suppress jet lag.

She also participated in an interdisciplinary Mountaintop project last year related to her phage research that brought together a team of students majoring in molecular biology, bioengineering and materials sciences.

“I’ve had friends at other schools tell me about their experiences within their biology departments and how they haven’t been able to access research opportunities like this,” Heckman says. “By the time I graduate, I’ll have had three-and-a-half years of research experience under my belt, whereas the others won’t have been as fortunate. So I can really say that the Hughes grants have definitely equipped me and have provided such a tremendous experience thus far.” ●

Feature

Supporters of activist Anna Hazare protest and volunteers of the Rashtriya Swayamsevak Sangh organization drill. Deo examines the extent to which activists affect policy.



Mobilizing Social Movements **Nandini**

Deo's research examines feminism and the power of social activism

in India by Manasee Wagh

Nandini Deo has spent the past 10 years studying social movements in her native country of India. She started with the women's movement for equal status. "If I hadn't become a political scientist, I think I would have become a full time activist in the women's movement. It makes sense to me," says Deo, who has been at Lehigh for the past seven years.

This winter, Deo plans to publish "Mobilizing Religion and Gender in India," a book that explores the effectiveness of feminism as a social movement with roots that stretch at least to the beginning of the 20th century.

Her overall goal was to understand what makes social movements work. "How do a group of activists with an ideological commitment translate their deeply held ideas into something that others also come to support? That's the big question I'm asking," she says.

Her examination of feminism in India began with trying to understand how activists influence policy. "But they're actually not very successful in doing that. The question is, why? I wondered if there was more the women's movement could be doing. I thought it was useful to have a comparative case," she says.

Deo, associate professor of political science, chose to study the Hindu Nationalist political movement alongside the women's movement during the same 20th century time period. The political movement also had a defining set of ideals. "I tried to identify times when both movements were very successful and times when they were less successful. Then I tried to connect those particular instances to strategies that activists were using," she says.

While examining the women's movement, Deo found that it stagnated at times when there was very little coordination among the various groups involved. They did not have a coherent lobbying voice to lead them. The Hindu Nationalists, on the other hand, had a more organized method that led to successful action.

Besides having to contend with opposition from the status quo, social movements are pulled in different directions by a myriad of external influences, including economic, political and social. Deo parsed through the complex factors surrounding the evolution of both the Hindu Nationalist and the feminist movements.

She concluded that a social movement's fluctuations between success and failure don't depend on its ideology. Instead, a movement's ability to effect change through the decades depends on how well its members seize opportunities to build trust and mobilize support from the grassroots.

When she was interviewing activists in the women's movement, Deo was surprised to encounter only one instance of someone asking her to help the cause by inviting her to join a protest or raise some money.

"There was no attempt to pull me in. Yet, when I researched the Hindu Nationalists, almost every time I interviewed someone, they asked me to help," she says. Since Deo disagreed with their goals, she didn't participate. "It was striking to me that there was this difference. It speaks to one of the really important differences between the two movements. The feminist movement has become professionalized to a large extent, so it's not as savvy about how to recruit new activists," she says.

In other words, while women's movement supporters feel strongly about equal status, they are not as proactive about creating new ways to keep pushing for their goals.

When Indian Prime Minister Indira Gandhi declared a national state of emergency in the 1970s in response to political and economic

unrest, many civic groups, including women's organizations rejected working with what they saw as a corrupt and undemocratic state.

"Many of the groups that had been very well mobilized found their activists imprisoned. They were disillusioned by that, so they turned away from working with governments and got support from foundations and transnational agencies instead," Deo says.

However, those agencies have since increasingly chosen to throw their energies behind various non-governmental organizations (NGOs), resulting in fewer resources and support for still struggling women's groups. "I say that the women's movement would have done better staying connected with the government in the long run," says Deo. Meanwhile, the Hindu Nationalists were able to take advantage of the Emergency, as it came to be called. They used it as an opportunity to re-energize their constituents and their overall organization.

"It was a moment when the establishment was rejected by many people, so the Hindu right seized that moment to make themselves part of the bigger picture again," Deo says.

That's not to say that the women's movement in India is finished. No social movement develops in linear fashion. Enthusiasm may

or the Hindu Nationalists, is set in stone. It's really very much open."

For Hindu Nationalists, gaining control of the state seems to have been a smart strategy. "The emphasis on education and building schools has really paid off. The women's movement has moved away from an education emphasis, but it could always get more involved that way," Deo says.

She has seen feminists take some recent steps towards success. "A lot of feminists actually are becoming more creative about fundraising, which is a really positive sign and likely to revitalize the movement, as they are able to reach out to local supporters more," she says.

While her studies and findings are written for a scholarly audience, Deo hopes "Mobilizing Religion and Gender in India" is accessible and clear enough to appeal to the public as well.

Over the past six months, Deo has begun work on a new project, spurred by the Indian government's passage of the Companies Act, which lays out rules for corporations. She's interested in the directive that all companies of a certain size must set aside 2 percent of their annual profits for charitable causes. Deo is looking at which charitable causes are getting that money and how they are using it. June 2015 rang in the end of the first

"The women's movement has moved away from an education emphasis, but it could always get more involved that way."



dwindle, but it can also flare up again and effect real changes in a society's culture.

Over a century of social activism, the individuals involved can always make choices that will lead to their goals, Deo says. "Activists have lot of control over their own future. What they do today will lead to consequences 10, 20, 30 years from now. I don't think the future of either movement, the women's movement

fiscal year under the new act, so Deo took a team of students to India this summer to gather initial data about corporate donations.

"One of the arguments I make about the problem with the women's movement is that they were too dependent on external funds. If this corporate money is made available to them, I'd like to know what impact it may have on their work and what they will do with it," she says. ●

C O M M U N A L C O M P O S E R

Heather Gilligan '96 coordinates lively scenes for new aural adventures

BY GEOFF GEHMAN '89 M.A.

Heather Gilligan '96 once wrote an orchestral work that united Chinese musicians, the Grand Canyon and YouTube. First she watched online video to determine the playing capabilities of the high schoolers in Hong Kong. Then she composed a piece that challenged them gently yet firmly. Mixing familiar Asian tonalities with less familiar American strains, she steered them to simulate the sensations of soaring over the Grand Canyon and other national natural monuments.



The Chinese youngsters premiered *Flights Ascending* in April during an international music festival at another national monument: the Kennedy Center for the Performing Arts in Washington, D.C. For Gilligan, the cinematic soundscape capped a momentous year of adventurous projects. She debuted a choral work in Carnegie Hall, christened pieces for a string quartet and percussion septet and began recording the first CD of her compositions. All the while, she taught full time at Keene State College in New Hampshire, where she plays piano and runs a lively center for composers on and off campus. She doesn't just compose music; she composes communities.

Gilligan grew up in Germansville, Pa., the child of teachers, including Thomas Gilligan III '68. In high school, she played classical piano and field hockey, winning a state championship as a junior. At Lehigh, she majored in chemistry and minored in music, performing in various groups and sharing the university's first senior recital. She took one composition course and had two compositions premiered. She christened her piano trio with violinist Paul Chou, the founding conductor of the Lehigh Philharmonic Orchestra, and French horn player Michael D'Ambrosio '96, today a fellow teaching composer.

Gilligan received key advice from composition teacher Paul Salerni, a prolific writer of eclectic scores. The longtime Lehigh professor told her that she should pursue music professionally "only if it's your only choice." He guided her to the Longy School of Music in Boston, where she played in chamber ensembles while working as a research chemist. In 1999, she quit her chemistry job to enter the school's piano performance program. A course in writing for musicians compelled her to switch her major to composition.

Longy became Gilligan's first compositional laboratory. It was there that she wrote her first string quartet and her first work for mezzo-soprano and chamber orchestra, which was her only piece for narrator and computer. Her palette became more poetic while enrolled in Boston University's doctoral program in composing. She arranged poems by everyone from William Blake to E. Ethelbert Miller, an English professor, editor and African American archivist. One of her Miller settings was featured during a 2005 Lehigh celebration of the late composer Earl Kim, Salerni's mentor.

Gilligan finished her doctorate on time despite excruciating headaches and severely limited mobility caused by a tear in the dura matter, the membrane cushioning the brain and spinal cord. Unable to stand up straight, she wrote her dissertation, a piano concerto, on a laptop flat on her back.

Gilligan was teaching at Keene State College when surgery ended her three-year ordeal. Since then, her commitment to healthy collaborations has become healthier. She's had several significant works commissioned by the Boston Composers' Coalition, a five-year-old, seven-member group devoted to new American music. The coalition co-sponsored



“I have a pretty stable life so I don’t need to draw on instability or dysfunctionality. I prefer to deal with musical materials rather than deconstruct my life.”

Flights Ascending and *I’ll See You in the Morning*, which debuted during a 2014 choral festival at Carnegie Hall. Gilligan based the a cappella score on a children’s book that she and her husband read to their daughter every night during her first six months.

Gilligan has a sizable stable of musicians who double as exceptional soloists and teammates. She and soprano Margot Rood first collaborated in 2011, when Rood and seven other female singers performed new settings of a Latin Mass section by Gilligan and five other composers. Impressed by Gilligan’s “gorgeous” rendition of the *Dona Nobis Pacem*, Rood asked her to score poems by Sara Teasdale, the first woman to win a Pulitzer Prize for poetry. Their project, *Living in Light*, is the titular centerpiece of a CD of Gilligan’s compositions she plans to release in 2016.

Rood praises Gilligan as an open-minded, open-tuned, true-blue partner. Another Gilligan fan is Christopher Swist, the engineer of *Living in Light* and a fellow composing teacher at Keene State. Over six years, they’ve premiered each other’s works, founded a contemporary-music ensemble and expanded Gilligan’s initiatives. Launched in 2011, an annual call for scores based on themes—concert band, sustainability—has drawn as many as 70 submissions, 17 from overseas composers. Launched in 2013, a more demanding degree in composition has increased the number of student composers from two to 17.

Thanks largely to Gilligan’s ambassadorship, a small, rural state school has become a magnetic sanctuary for concerts of new works and workshops with veteran composers like Salerni.

“Heather’s dedication to collaboration has raised everybody’s game,” says Swist. “She has definitely put the program on steroids.”

Gilligan claims she’s at peace with composing, an often painful process. “I don’t always like what I write, but I don’t get myself into a dark abyss knowing the piece has failed to get to the other side,” she says. “I have a pretty stable life so I don’t need to draw on instability or dysfunctionality. I prefer to deal with musical materials rather than deconstruct my life.”

Gilligan has the same mission whether she’s writing *Eight Songs on the Progress of Women* or a “dialogue” for solo flute. “I’m trying to find the balance of boundaries without pushing them too far,” she says. “I don’t want my music to be only understood or appreciated by people in my field. I want it to be challenging and accessible, to live on its own.”

Gilligan plans to work on a piece that will be christened in March 2016 by a Lehigh woodwind quintet as well as new compositions by Salerni, D’Ambrosio, Tae Sakamoto ’02 and John Heiss ’60. She hopes to write a score inspired by her singing and dancing 3-year-old daughter, Gretchen, who loves to frolic at an organic dairy farm managed by her father, Alan Bettler, an environmental biologist Gilligan befriended in high school.

“I’m certainly not going to write music more accessible for her,” says Gilligan of Gretchen. “I’m more likely to write music to train her ears to make her appreciate music that’s less accessible. Pieces in response to her, about her. Pieces she might not listen to but that capture her movements and her moods.” ●

BREAKING NEW GROUND IN EARTHQUAKE RESEARCH

by MANASEE WAGH

Doctoral student Lillian Soto-Cordero examines seismic activity and its impact on the eastern United States

More than 100,000 people felt the earth shake in 2011, when an earthquake originating in rural Virginia raced through dozens of states, including Pennsylvania.

The magnitude 5.8 temblor took East Coasters by surprise. No deaths resulted, but some people were injured and buildings sustained damage. It was one of the largest quakes on the East Coast in 100 years, according to the U.S. Geological Survey, which released a report in July 2014 that upped the risk of damaging temblors on the East Coast and among 42 states across the country. "The eastern U.S. has the potential for larger and more damaging earthquakes than considered in previous maps and assessments," the report states.

While this part of the country isn't prone to as many damaging quakes as California, that also means the infrastructure in its many urban centers isn't ready for a major quake if it does happen, worries doctoral student Lillian Soto-Cordero.

A former Puerto Rico Seismic Network scientist, Soto-Cordero is delving into research at Lehigh that could increase hazard awareness of earthquakes on the East Coast and add to the knowledge of how and why earthquakes occur in seismically quieter regions of the Earth's crust. While scientists have a map of earthquakes around the world, they know far less about the distribution and origins of seismic waves in relatively passive zones. Soto-Cordero is studying how seismicity during earthquakes varies over time and space, and

she is especially interested in clusters of seismic activity in the mid-Atlantic.

Her data comes mainly from the 10-year NSF-funded USArray EarthScope project, a grid of 400 seismic stations throughout the nation, and from previously deployed seismic sensors. The USArray uses sensors that can distinguish the smallest background motions at the quietest of sites. A 70-kilometer spacing between seismic stations in Soto-Cordero's region of interest ensures good coverage of tremors from Virginia to New York and from the Appalachian range to the coast.

When an earthquake occurs, seismic waves propagate at varying speeds from the epicenter, depending on the characteristics of the material they pass through. Soto-Cordero wants to define the relationship between the velocity of the waves and the interior structures they encounter in the Earth's outermost layer, or lithosphere, as it has been continually molded and stressed by tectonic movements through the planet's history.

"For example, in a coastal plain with mostly sedimentary rocks, we expect that seismic waves travel at a different speed than in an area with mostly metamorphic rocks. When a seismic wave hits a boundary between the crust and the mantle underneath (which is hotter and has a different density and composition), you will have changes in the way seismic waves propagate, depending on the characteristics of the material and structures they are moving through," says Soto-Cordero. Structural aspects such as thickness, temperature and composition

may concentrate stress in parts of the crust and make seismic activity more likely.

"Understanding how an earthquake behaves will allow us to get a better sense of why they happen," she says.

In the mid-Atlantic United States, small seismic events of lower magnitudes tend to occur within close proximity of each other. "If we have that clustering, it's been postulated that they happen where you have weak zones in the crust. If this is true, then, according to hazard maps that have been developed, we can say these weak zones are areas of higher risk," she says. The other hypothesis behind clustering of small events is that the Earth's crust has a random distribution of strong and weak spots rather than weak zones. In that case, seismic events can occur anywhere, and clusters of small earthquakes may be aftershocks of large events that occurred long ago.

"If this is true, if the strain is randomly distributed and the seismicity is also random, we could have a large earthquake anywhere. In reality, we don't know which hypothesis is true, but it's probably a mix of the two," Soto-Cordero says.

Studying clustering of seismic events in the mid-Atlantic region is a challenging prospect because mining activity in the Appalachians registers as quakes, according to seismic instruments there. Soto-Cordero must first accurately identify the epicenters of real events by weeding mining blasts out of the data. One way she discriminates between them is by looking at the waveforms of the disturbances,

which appear different from true earthquakes. Another challenge she faces is to determine the existence of small quakes that permanent seismic sensors have not picked up; her use of the densely spaced USArray stations will provide invaluable data to address this issue.

After she straightens all of that out, she will work on formulating a velocity model that shows the relationship between crustal structure and wave speed. She will then be better able to define both the velocity and the location of the earthquakes, applying a double-difference tomography technique.

“That will allow me to identify where the faults in the earth’s crust lie in this region. That’s very important because, unlike California, where you can literally walk and see the displacement of the earth, events that happen in our passive region don’t usually rupture the surface. Even if there’s no visible rupture in the surface, we should be able to figure out how those faults are oriented, their depths and other aspects. Knowing that is important for determining the seismic hazard in any place. If you can better map the faults, you can better assess the seismic hazard,” she says.

The outer layer of the Earth, the lithosphere, is in motion, causing strain as different tectonic plates collide. Scientists understand the nature of seismicity at plate boundaries, where most earthquakes occur. Such events can cause massive devastation, with magnitudes as high as 9 or more, as occurred during the 2011 temblor off the coast of Japan. It triggered a powerful tsunami and killed nearly 18,000 people.

Among the mostly minor 900,000 earthquakes that occur across the planet each year, a few located in passive zones can still reach a magnitude of 8. The Mongolia earthquakes of the early 1900s reached magnitudes of 8.4, even though they were not at a plate boundary.

At various periods in the Earth’s geological history, land masses joined together and drifted apart multiple times, creating the modern land and sea formations we know today. It’s possible that ancient tectonic plate boundaries still strain the Earth’s crust. In eastern North America, the Appalachian Mountain range is evidence for a plate boundary that existed hundreds of millions of years ago. The range formed when the crust was lifted in a collision between two plates.

A first taste of learning about the Earth’s geological history in 10th grade was all it took to convince Soto-Cordero that she wanted to

be a seismologist. At age 15, she won a place in a highly selective program at the University of Puerto Rico at Mayagüez, spending a summer taking courses with university professors in math, logic and science.

“I fell in love with geology, and I was driving my mother crazy, bringing home rocks. I was totally excited about rocks, and one of the professors there was a seismologist. I thought, ‘This is so cool,’” she recalls. That professor became Soto-Cordero’s mentor during the following year, when she won first prize for a science fair project locating the aftershock sequence of the magnitude 7.3 earthquake in the Puerto Rico Trench in 1943.

Soto-Cordero went on to pursue work at the Puerto Rico Department of Environmental Protection and later at the Puerto Rico Seismic Network, where she monitored earthquake and tsunami activity in real time. In 2011, she was chosen among just 20 researchers and graduate students from throughout the Americas for an NSF-funded intensive two-week Pan-American Advanced Studies Institute Workshop on seismology. She was exposed to state-of-the-art techniques in seismology, and the interaction with international students and professors deepened her interest in serious research. During the program, she met with her present Ph.D. adviser, Anne Meltzer, who was the workshop’s scientific director. Meltzer encouraged Soto-Cordero to pursue a doctorate degree, and they reconnected.

Meltzer, professor of earth and environmental sciences and Francis J. Trembley Chair, says the results of Soto-Cordero’s current research will be invaluable to filling our knowledge gaps about seismic activity. “This work is like figuring out the pieces of a puzzle. Lillian is a fantastic student, doing a great job,” she says. “Her work has significance not only for the study of earthquakes and plate tectonics, but also for understanding the effects of induced seismicity, or earthquakes caused by human activity, such as filling dams or hydraulic fracturing, which changes pressures underground.”

Being the recipient of the College of Arts and Sciences Fellowship (2013) and the Marjorie M. Nemes Fellowship (2014 and 2015) in the department of earth and environmental sciences has allowed Soto-Cordero to focus fully on her research and academic work. She was recently selected as a scholar of the Hispanic Scholarship Fund. After she completes her Ph.D., Soto-Cordero would like to work with a federal or state agency or in a research lab. She also loves to teach and may consider becoming a college professor.

“I’m also interested in communicating science in a clear way to the public. At the seismic network, we developed a tsunami guide for the media and trained news reporters on scientific concepts. That was very enriching experience. The good thing about working with a government is that you can influence public policy and how to approach natural hazards like earthquakes and tsunamis,” she says. ●

“Understanding how an earthquake behaves will allow us to get a better sense of why they happen.”



Michael Hoben '61 heads alumni effort to ensure Lehigh students have access to ethical programs



INSPIRING
DECISIONS
TO LIVE BY

by Dawn Thren

MICHAEL HOBEN '61 BELIEVES that ethical decision-making is at the root of keeping a nation great. The essence of practical moral decision-making, when faced with choices such as good versus evil, virtue against vice and justice over crime, should be at the core of a steadfast society.

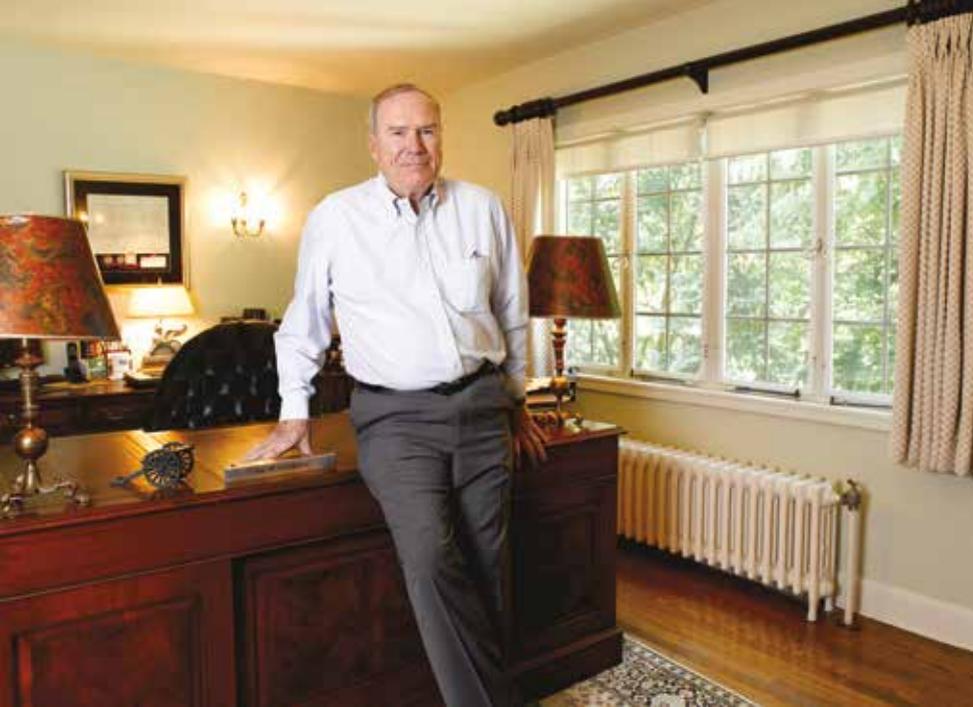
"Ethics is more than a philosophical concept to guide human behavior," said Hoben, who earned his Lehigh bachelor of arts degree in finance. "A resolute and continual adherence to ethical behavior strengthens our society. Its deterioration leads to trouble. I think, as a great nation, we have to be trustworthy and ethical in the way we deal with each other."

Hoben, with the help of some others in the Class of 1961, is attempting to make sure students have access to ethical programs at Lehigh. As part of the larger 50th reunion campaign, the class established an endowed fund for the teaching of ethical decision-making. The fund sponsors campus activities that present philosophical concepts to help guide human behavior. Hoben's Lehigh freshman roommate, Peter Hagerman '61, class President Paul Smith '61 and Chair of the 50th Reunion Fund campaign Joseph King '61 were integral in fundraising for the campaign.

"We thought, 'What kind of gift would be important to the class, the university and the country?'" said Hoben, retired chairman and CEO of Benefit Capital Management Corporation. "You get students who are so focused on their careers and the decisions they will be making that they may overlook the ethical content. By doing so, it could lead to fraud or even worse. We want to help prevent that by having them think about the ethical aspect in every important decision they are making."

Donald Hall, Herbert J. and Ann L. Siegel Dean of the College of Arts and Sciences, said it is imperative for students to have access to ethical thought-building platforms before they enter the working world. Even though current Lehigh courses study morality issues, Hall said, "We will consider any number of ways to expose students to ethical thinking."

Maximizing student involvement is a priority for Hoben, Hagerman and Smith, who are members of the Ethics Endowment Advisory Fund Committee. For three years, the endowment sponsored a speaker series on ethics that brought nine leading ethics educators to speak to the campus community. Topics included global



business ethics, protection of personal privacy and the biotechnological restructuring of life.

Another program initiative was the first annual undergraduate ethics symposium held on campus in April. The daylong event was student-planned and included 14 undergraduates presenting projects that examined ethical quandaries in their fields, at Lehigh or in society. Prizes were awarded to top presenters.

Journalism major Kelsey Leck '16, who grew up locally, was a symposium presenter and posed the question, "Is the Sands Casino a positive or negative influence on Bethlehem?" She said about her experience, "I feel so grateful for having the opportunity to present and improve not only my ethical reasoning, but also my public speaking skills. Being able to think critically, make ethical decisions and communicate those conclusions to others are such valuable life skills that I'm happy to have developed further at Lehigh."

Robin Dillon, the William Wilson Selfridge Professor of Philosophy and department chair, helped organize the symposium with Candice Travis '14 and Brandyn Bok '15. Dillon said the aim was to facilitate student reflection on ethical issues and to inspire that kind of thinking as a daily consideration. Symposium topics varied widely and included "The Ethics of Space Exploration and Colonization," "Athletics Before Academics" and "Zoos and Animals in Captivity."

Building Moral Fiber

Not only is having moral character very important to Hoben, but he believes that the ethical lapse of judgment that he is seeing in today's society "can lead to a sense of lawlessness across the country." He is concerned about the lack of ethical training that younger generations are

receiving, whether at home or at school.

Hoben reflected that his own life was full of learning experiences that helped guide him when making tough decisions. Raised in Connecticut by hard-working parents, he was taught to work for what he wanted and learned by example to make honorable choices. He was a newspaper boy at age 10 and saved enough money to pay for the things he wanted, such as a racing bicycle. More importantly, he saved enough money from his paper route to pay for his freshman year at Lehigh.

He praises his undergraduate education for providing him with a good academic groundwork. It taught him perseverance through many tough classes and helped enhance his social skills through activities that included intercollegiate

A LEHIGH PILLAR

Currently a member of the College of Arts and Sciences Advisory Council, Michael Hoben '61 received the Alumni Award in 2006 for his service, loyalty and dedication to the university. His volunteerism and support of students and programs are impressive and include serving on the Endowment Fund Investment Committee, being class secretary for the Lehigh University Alumni Association and being a member of his 35th and 50th Reunion Fund committees.

An Asa Packer Society and Tower Society member, Hoben and his wife, Joan, established a student scholarship in their namesake that has already helped six students obtain a Lehigh education. He also created the Joan and Michael Hoben '61 Teaching Fellowship in the Department of History Endowment Fund, citing Professor Joseph Dowling as the reason he minored in the subject.

"History can teach you a lot about human behavior," said Hoben.

track, the boxing club and serving as secretary of Phi Kappa Theta fraternity and as chairman of the Interfraternity Council judiciary committee.

Fulfilling his selective service duty after graduation, Hoben served four years in the Air Force as a first lieutenant. Stationed in Arizona, he attended graduate school at night and earned a Master of Science degree in economics at Arizona State University.

"The really great benefit of the military is that it gives young people significant responsibility in their early 20s and engenders a sense of leadership," he said.

After the Air Force, Hoben began a successful investment career that lasted for more than three decades. During that time, he was a senior executive with T. Rowe Price, Exxon and Union Carbide, where he was responsible for the management of large pension funds. These funds were invested in a wide variety of assets, including equities, fixed income, venture capital, real estate and options.

Hoben said that in an industry where you are dealing almost exclusively with money, temptation lends to self-serving behavior or even fraud.

"There is always the possibility of malefactors when money is involved. It is a real problem. Those bad decisions can destroy firms and people," he said, restating the need for Lehigh students to receive ethical exposure no matter what their field. "Strong ethics leads to a trust between people. That is vital in every career." ●



Unraveling Ghana's Social Fabric

Funded by a Strohl grant, Danielle Taitt '16 examines urban planning issues in a growing urban center

by Christina Holden '15

On July 16, Danielle Taitt embarked on her first journey to Africa to examine the effects of urban design on culture and social structure in Ghana. She focused on two cities, Accra and Tema, to determine if the physical structure of a city can impact the social interactions between residents.

Urban planning has become a focus of the Ghanaian government in recent years, as they struggle to deal with growing numbers of informal-settlement dwellers living in urban centers. Accra is growing at a staggering rate; according to current trends, the city's population of 4 million will double in five years, making urban management a clear and inevitable priority. Over the past several years, they have attempted to provide a comprehensive framework for urban development. Previously, planning in Ghana was focused on rural areas, where 80 percent

of the population once lived. Now, more than 51 percent of Ghana's population lives in urban areas.

Taitt, a senior with dual majors in science, technology, and society and economics, was awarded a Dale S. Strohl grant to conduct urban planning field research as part of her senior thesis. She envisions her investigation will be a capstone to her experience at Lehigh.

"More students should take advantage of the Strohl grant because it's amazing to be awarded 'x' amount of money to do research your area of interest," she says.

Conducting field research successfully required experience, and the New York City native credits a three-year course she took in high school with helping provide her with a background writing abstracts and developing surveys. Supported by the Strohl award, she spent three weeks living in a hostel just outside

Accra and traveled throughout the city conducting interviews with neighborhood residents, business owners and government officials to determine whether there are correlations between urban design and aspects of the Ghanaian social fabric, such as public health, education, and labor. Taitt used her data and compare it to previously published data collected in surrounding rural

areas to ascertain local perceptions of life in an urban area. Taitt says she was particularly interested to learn about the local people and their cultures, and how residents would accept her presence while conducting research.

"So many researchers go to Africa and it was an interesting experience to see how people received me when I attempted to interview them, if they did at all, and what hurdles I encountered to get them to talk to me," she says.

Taitt's interest in Africa has been steeping for years, and the opportunity to study this issue arrived in the fall of 2014 when she enrolled in a class, "Global Africa: Aid, Volunteerism, NGO's and International Studies," taught by Kwame Essien, assistant professor of history and Africana studies. The course explored various volunteer activities, the role of NGOs, missionaries, philanthropists,

medical practitioners, and global education in Africa. Taitt spoke with Essien about her future career goals and he suggested the idea of applying for the Strohl grant with the topic of urban planning. While in Africa, Essien mentored Taitt, made arrangements for her to meet various officials at the Town and Planning Office in Accra, as well as other government officials.

Taitt notes that her interest in urban planning creates bridges between public health interests and her dedication to the well being of a community in general.

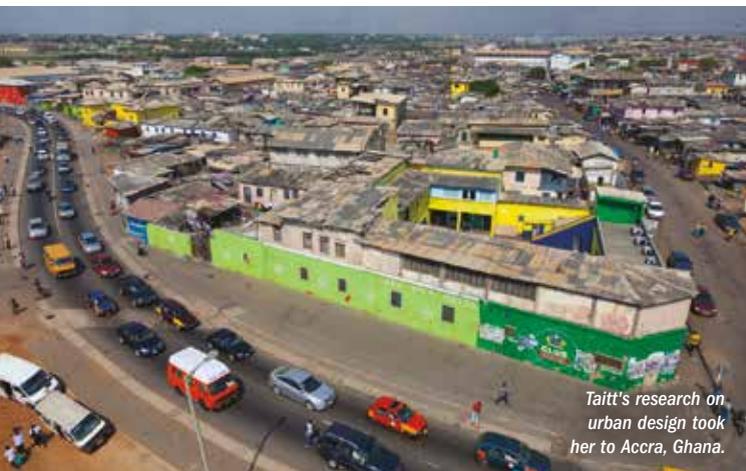


In addition to her dual majors, Taitt is completing a health, medicine, and society minor. Outside her academic pursuits, Taitt is an active member of the Lehigh community. She is a Gryphon for the UMOJA house, and chartered a new sorority on campus, Sigma Gamma Rho,

the first national Pan-Hellenic council sorority to charter a chapter at Lehigh.

In part because of the experiences garnered through the Strohl award, Taitt says she will continue to pursue her interests in urban planning after graduating from Lehigh.

"I wanted something to solidify the end of my academic career here at Lehigh, especially since Lehigh doesn't have an urban planning program and I want to go on for a master's degree in this field," she says. "The Strohl grant provided really a good opportunity to take advantage of the funds available for undergraduate research and turn it into something that both piqued my personal interest and combined it with something that helped strengthen my academic foundation. I am grateful for this award. I see this research as a work in progress and look forward to continuing my research in Ghana in the future."



Taitt's research on urban design took her to Accra, Ghana.

Leading the Way in Digital Humanities

by Robert Nichols

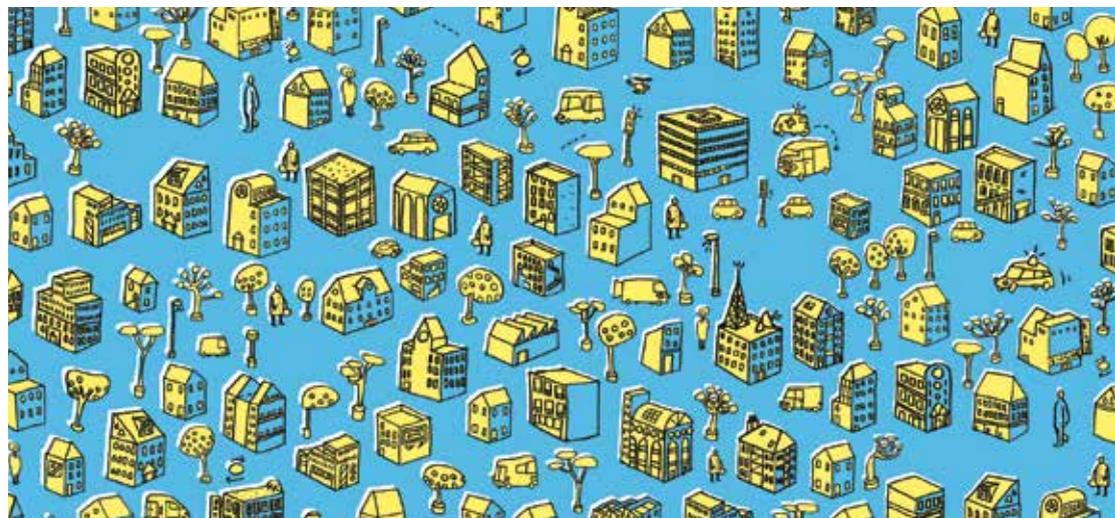
Lehigh University's College of Arts and Sciences will integrate emerging digital media with community engagement thanks to an \$800,000, three-year grant from the Andrew W. Mellon Foundation.

The grant supports the work of Lehigh's new Mellon Digital Humanities Initiative, whose work will focus on engaging undergraduates with the local community using new digital media. Like other American cities, Bethlehem confronts issues of immigration, education, religion, economic hardship and revitalization, and the Mellon grant supports chronicling the common issues of social justice and a city's evolving history.

"This grant from the Mellon Foundation is the culmination of years of hard work by Lehigh faculty, staff and students from departments and interdisciplinary programs across the College of Arts and Sciences," says Edward Whitley, associate professor of English and the project's director. "Thanks to the generosity of the Mellon Foundation, undergraduate students at Lehigh will have more opportunities than ever before to work closely with faculty and visiting scholars on research projects that will not only benefit the local community, but that will also give students hands-on experience with cutting-edge digital media."

Faculty in the College of Arts and Sciences have been telling Bethlehem's story using digital media to address issues

of social justice and the city's evolving history. The Mellon Digital Humanities Initiative expands efforts, often in close collaboration with Lehigh's surrounding neighbors, to bridge scholarship and community engagement.



Digital media workshops and a lecture series will bring outside experts to campus to work with faculty and students, training in the latest techniques and best practices. Postdoctoral fellows will offer digital humanities courses.

The grant also offers faculty and staff training workshops and work on an ongoing digital humanities project for each of the three years. Course development grants will allow faculty to expand a humanities curriculum that engages the community. Lehigh/community

partner grants will seed or kick-start collaboration between community organizations and Lehigh faculty and students. Undergraduate research grants will integrate digital media into undergraduate work by facilitating independent projects outside the classroom.

"We want to understand Bethlehem as a post-industrial city, as a city with a long past trying to reinvent itself," says Whitley. "We've been doing this kind of work for some time across various parts of campus, and this is an acknowledgement from Mellon as we keep moving forward."

The College of Arts and Sciences has a tradition of incor-

porating community interaction and emerging digital media into curricula. Students in the department of history increasingly study the past and focus on Bethlehem using digital media. A new graduate-level certificate in documentary film is offered through the American Studies program, while both the South Side Initiative and the Center for Community Engagement bring Lehigh together with the community to share knowledge, foster democracy and improve the quality of life on Bethlehem's south side. Other educational opportunities exist in area studies that focus on the Asian, Latino and African experience within communities.

Initiative names first postdoctoral fellow

Alison Kanosky joined the digital humanities project July 1 as its first postdoctoral fellow. Kanosky studies the lived experience of social and economic change in the United States. Her dissertation uses ethnographic, historical and spatial analysis to examine a midwestern American community with a closed military installation and a newly constructed but vacant prison. She explores how these institutions affect the community and focuses on how residents understand and respond to state power. Her dissertation focused on the experiences of residents in a rural county that has been shaped by these institutions. Her work traced the effects of the national security state at the community level. In her work, she emphasizes the connections between rural and urban areas—the cultures that bind and divide them, the policies and economic markets that unite and bifurcate them, and the stream of people and money that flows between them.

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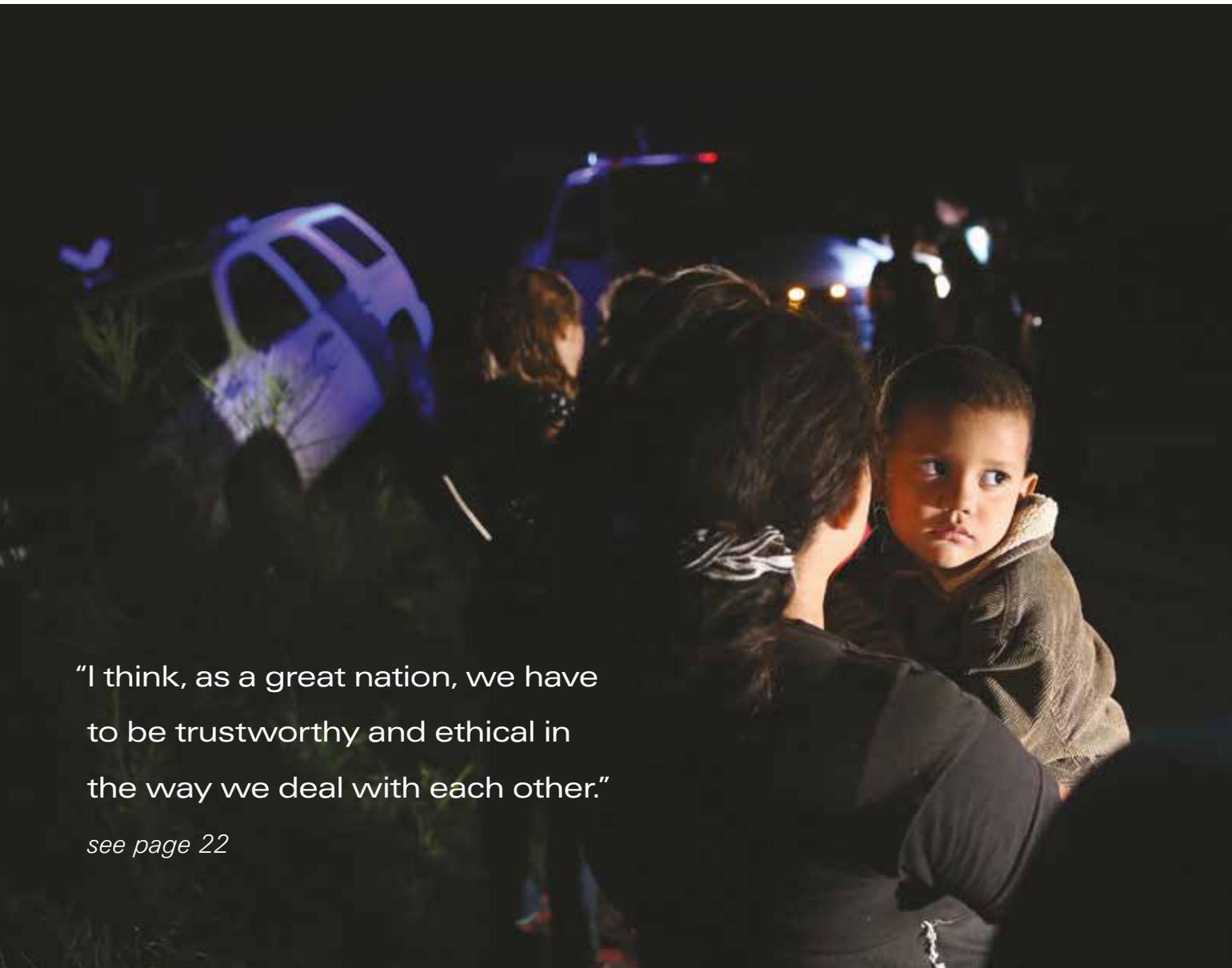
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“I think, as a great nation, we have to be trustworthy and ethical in the way we deal with each other.”

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