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# PRINCETON ALUMNI WEEKLY

SPECIAL  
ISSUE

# THE BRAIN

An abstract, colorful visualization of a brain, rendered in a wireframe, geometric style. The brain is composed of various colored regions (red, orange, yellow, green, blue, purple) and is overlaid with a complex network of white lines forming a wireframe structure. The overall shape is roughly spherical but with irregular, flowing internal structures.

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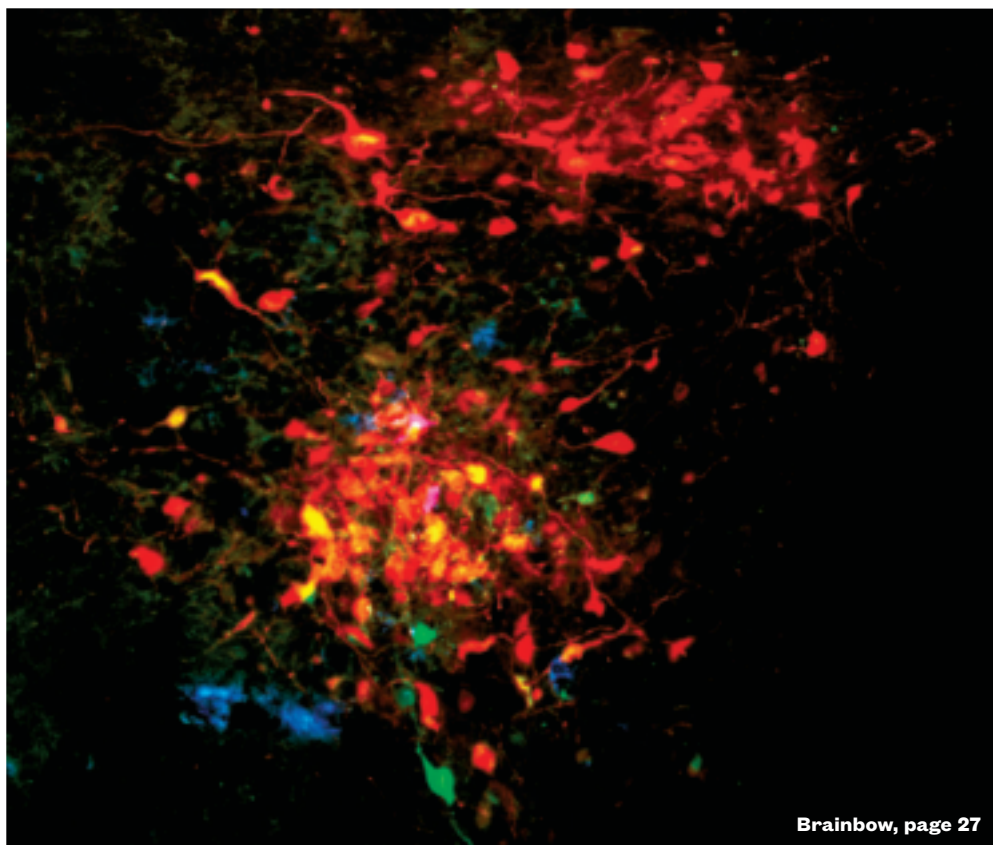
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# PRINCETON ALUMNI WEEKLY

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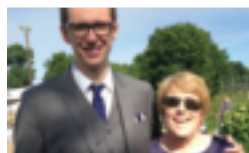


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## THE BRAIN: SECRETS OF THE MIND, AND WHY THEY MATTER

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## PAW.PRINCETON.EDU



**Thinking Personally**  
Columnist Gregg Lange '70 shares a family story about humanity and neuroscience.



**Spotless Mind**  
Matthew Liao '94 considers the ethics of erasing memory in a Big Think video.



**Q&A: Mental Illness**  
Dr. Laurie Watson Raymond '73 answers questions about parenting young adults with mental illness.



**Voices of Protest**  
Watch and read about the December student demonstrations against racism and police violence.



**Digital Dawn**  
Brian Kernighan \*69 recalls computer science in the '60s in the new episode of PAW Tracks.

## Strengthening Ties with Asia

During World War II, a pair of Princeton students from enemy nations began an unlikely friendship. Newspapers chronicled the close bond that Chinese student Richard (Dick) Eu '44 and Japanese student Kentaro (Ken) Ikeda '44 forged as classmates, Lockhart Hall residents, and Key & Seal Club members. They remained lifelong friends, attending four Reunions together, and eventually becoming family when Dick's son married Ken's daughter.

Dick and Ken were notable figures on campus not only because they were allies from warring countries — they were the only Asian students in their class. When Dick returned to Singapore, where he was born, he was one of very few Princeton alumni there for many years. The number was still in single digits when Dick's daughter, Helena Eu '74, followed in her father's footsteps by matriculating at Old Nassau.

I learned more about Dick's remarkable time at Princeton over lunch in late October while I was in Singapore to meet with alumni. Hearing his tales led me to reflect on how much Princeton's ties to Asia have strengthened over the years — and why they are so vital to the University's future in our globalized society.



Sohee Hyung '16 leads an English class in Jishou, China, in the summer of 2013 as a Princeton in Asia intern. Study abroad programs and internships enable our students to engage their many scholarly and cultural interests in Asia.

Enhancing Princeton's presence in Asia and strengthening our scholarly focus on the region have been linchpins of our internationalization efforts in recent years. In contrast to Dick's era, today we have a thriving community of Asian undergraduate and graduate students, and our alumni population in Asia is growing and engaged. We have established formal partnerships with more than a dozen universities across Asia, supporting student exchange and study abroad programs and opportunities for our faculty and research staff to collaborate with their counterparts across the globe. And we have assembled a formidable roster of scholars in multiple departments and programs whose research and teaching illuminate aspects of life in Asia through the study of history, language, literature, art, politics, economics, anthropology, and other fields.

Since taking office as president in July 2013, I have traveled twice to Asia and seen firsthand Princeton's vibrant presence there. In Hong Kong, Seoul, Beijing, Tokyo, and Singapore, 750 alumni, parents, and guests turned out for receptions and

dinners to discuss the University and to connect with fellow Princetonians. (This includes 132 attendees in Singapore, where Dick Eu now has plenty of company in gaudy orange and black clothing.)

I also visited some of our key scholarly partners. At the University of Tokyo in the fall of 2013, our Princeton contingent met with students and toured the extraordinary facilities of the National Astronomical Observatory of Japan (Princeton astrophysicists have enjoyed longtime collaborations with their Japanese counterparts). A year later, President Junichi Hamada brought his own delegation to Princeton for "University of Tokyo Day," a wonderful celebration of our institutions' strategic partnership.

In our fall 2013 visit to China, we signed a collaboration agreement with officials at Beijing Normal University and met with leaders of Peking University and Tsinghua University. Tsinghua University now houses the recently opened Princeton Center in Beijing, our first administrative center abroad, which was established to help Princeton community members with a range of services in China, including travel and housing, translation arrangements, and access to research resources.

Our relationships with these and other institutions in Asia are examples of Princeton's distinctive approach to internationalization. Rather than investing in satellite campuses to beef up our presence overseas, Princeton stresses flexibility by focusing on partnerships and collaborations with distinguished institutions worldwide — providing opportunities to pursue emerging areas of scholarship and to be nimble in supporting exchanges of people and ideas.

Our efforts in Asia reflect the strong interest in the region among our students and faculty. In the past five years, for example, more than 800 students have participated in study abroad programs and internships in Asia. The Global Seminars program of the Princeton Institute for International and Regional Studies (PIIRS), established in 2007, has immersed students in a variety of summer courses in East Asia and South Asia, as well as other parts of the world.

To augment an already stellar group of faculty focused on Asian studies across the disciplines, we recently have made some exciting appointments. For example, Yu Xie, a renowned expert on the social transformation of China, will join our faculty next fall with a joint appointment in sociology and in PIIRS. Rory Truex '07, who as an undergraduate launched an English immersion program for college students in rural China through Princeton in Asia, returned in July as an assistant professor of politics and public affairs, with a focus on Chinese politics and institutions. Two assistant professors of East Asian studies came aboard this academic year: Erin Yu-Tien Huang, who focuses on modern Chinese literature and visual studies, and Franz Prichard, who works on contemporary Japanese literature and visual studies.

These snapshots provide just a glimpse of Princeton's growing, wide-ranging connections with Asia. As the world continues to evolve, we will sustain our dynamic approach to bolstering ties throughout the region, recognizing that encouraging scholarly and cultural exchanges in Asia is a critical facet of the increasingly global character of the Princeton community.



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January 7, 2015 Volume 115, Number 6

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*Princeton Alumni Weekly* (I.S.S.N. 0149-9270) is an editorially independent, nonprofit magazine supported by class subscriptions, paid advertising, and a University subsidy. Its purpose is to report with impartiality news of the alumni, the administration, the faculty, and the student body of Princeton University. The views expressed in the *Princeton Alumni Weekly* do not necessarily represent official positions of the University. The magazine is published twice monthly in October, March, and April; monthly in September, November, December, January, February, May, June, and July; plus a supplemental Reunions Guide in May/June.

*Princeton Alumni Weekly*, 194 Nassau Street, Suite 38, Princeton, NJ 08542. Tel 609-258-4885; fax 609-258-2247; email [paw@princeton.edu](mailto:paw@princeton.edu); website [paw.princeton.edu](http://paw.princeton.edu).

Printed by Fry Communications Inc. in Mechanicsburg, Pa. Annual subscriptions \$22 (\$26 outside the U.S.), single copies \$2. All orders must be paid in advance. Copyright © 2015 the Trustees of Princeton University. All rights reserved. Reproduction in whole or in part without permission is prohibited. Periodicals postage paid at Princeton, N.J., and at additional mailing offices.

Postmaster: Send Form 3579 (address changes) to PAW Address Changes, 194 Nassau Street, Suite 38, Princeton, NJ 08542.

CYRIL BLACK INTERNATIONAL BOOK FORUM

## Ukraine in Crisis

Andrew Wilson  
European Council on Foreign Relations

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Mark Beissinger, PIIRS Director and Henry W. Putnam Professor of Politics, Princeton  
Harold James, Claude and Lore Kelly Professor in European Studies, Princeton  
Stephen Kotkin, John P. Birkelund '52 Professor in History and International Affairs, Princeton

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# Inbox

## A WAY WITH WORDS

Joel Achenbach '82, you've made The Master proud (cover story, Nov. 12). I read this beautiful piece alternately laughing and tearing up. You have made his wisdom, humanity, and mentoring skill come alive in a manner that I am sure resonates with all his students. A gem of the brilliance of John McPhee '53 is enough to feel proud of Princeton and envious of those who could be taken to task by him.

**Max Morrow '65**  
Somerville, Mass.

I read with interest and a great deal of enjoyment the article about professor and author John McPhee. The article proved both enlightening and to a certain extent scary, as in 2009, I sent Mr. McPhee a copy of my memoirs covering my years as a student-athlete at Princeton in the mid-'50s. Earlier, I had read his article in *The New Yorker* (and later the book) about Bill Bradley '65 titled "A Sense of Where You Are."

I was somewhat critical of a comment made in the article — that Mr. McPhee seemed very impressed that Bill Bradley could identify a basketball rim that was slightly off the mark as it pertained to its precise height. As an ex-hoopster myself, it was my experience that even a subtle deviation from the correct height was immediately obvious to the seasoned player. Other round-ballers I have questioned confirm this perception.

Now that I have read the article about Mr. McPhee, his approach

to teaching, and his precision and expertise as a wordsmith, I am amazed that I had the chutzpah to send such a marginally crafted piece to such an expert. Ignorance is bliss! Beyond that, I went back into my personal archives and found his response, which was generous far beyond the merits of my recollections. Nice to have him "cut me some slack." Thanks, John!

Kudos to PAW for recognizing the wonderful talent and humanity of this gifted author. I'm only glad that I read the article after the fact.

**Dave Fulcomer '58**  
Naples, Fla.

Enjoyed the John McPhee profile. Just for the record, the 1977 version of that class, taught by Robert Massie, generated a remarkable number of writers and editors: Jim Kelly '76 (*Time* managing editor), Susan Korones '79 (*Cosmopolitan* editor), John Marcom '79 (*Time* International president), David Michaelis '79 (biographer), Ned Potter '77 (ABC science reporter), Scott Redford '78 (Islamic art professor, author), Randy Rothenberg '78 (*New York Times Magazine* editor, author), Carol Wallace '77 (historical novelist), Alex Wolff '79 (*Sports Illustrated* senior writer, author), and Rob Goldberg '79 (*Wall Street Journal* columnist, filmmaker, author).

Apologies for synthesizing great careers, and no doubt leaving someone out. But for sheer prose output, this group has published more than three dozen books, and enough column

## CATCHING UP @ PAW ONLINE

More than 500 tech-minded students were on campus in November for HackPrinceton, a 36-hour hackathon. Teams developed ideas that included an automatic gear-shifting bicycle, right. Read more about the event at [paw.princeton.edu](http://paw.princeton.edu).



## FROM PAW'S PAGES: 10/25/66

### Admission By Bicker

Dear Sir:

The letters in the September 20 issue, together with those which appeared last year on the admissions problem, impel me to offer a suggestion (which may have been adumbrated before) for a radical revision of the mechanics of admission.

Why not have all candidates for admission to Princeton gather on the campus for a week, to be bickered by the clubs? Those selected by the clubs under rules adopted by the graduate boards (club membership to be deferred for two years, of course) are to be automatically admitted to the University. The remainder will be culled by a faculty committee empowered to admit as many as can be accommodated by Woodrow Wilson Lodge.

The result will be a freshman class a fraction roughly 16/17 of which has been selected under criteria apparently regarded as determinative by a majority of the alumni, and 1/17 of which has been selected according to faculty desires.

To avoid confusion as to one's role at Princeton, members of one group might wear a distinguishing mark. Perhaps it would be appropriate for the club-admitted group to wear freshman dinks throughout the four years.

ROBERT J. MCGEE '53  
Boston, Mass.

inches to choke a writing professor.

**Rob Goldberg '79**  
Chatham, N.J.

## TIGER INN TURMOIL

I am disturbed to have read the recent *New York Times* article about inappropriate and offensive emails among Tiger Inn members (see page 21). As the first woman admitted to Tiger Inn in 1991, I've always had conflicting feelings about my inclusion in the club. My best girlfriend and I were initially wary to join an institution that had been forced by law to include women at its dining tables. On the other hand, many of our closest friends were in Tiger Inn, and we didn't want to miss the opportunity to hang out with them.

For the two years that I was in Tiger Inn, I had no regrets. The integration was smooth and respectful. I was proud to be a part of a new era and was welcomed by the club members.

*continues on page 9*

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*continued from page 5*

Twenty years later, I am saddened to hear that this crass activity is taking place among the officers of Tiger Inn, given what I know about sexual violence on college campuses. But it is certainly enraging to think that any progress has been eroded. I am now the mother of two boys and married to one of my Tiger Inn colleagues. My first reaction was to question if I wanted my boys to attend Princeton, never mind be a part of Tiger Inn.

There has always been an odd "church and state" separation between the eating clubs and the University, but these students are Princeton students, not just Tiger Inn members. This is an opportunity for the school to step up and deem this behavior by its students to be inappropriate. Their actions need to be treated with more gravity by the University.

**Jamie Gordon '92**

**New York, N.Y.**

### ADDRESSING SEXUAL ASSAULT

Princeton erred grievously by accepting the Department of Education's Office for Civil Rights (OCR) policy on sexual assault in return for federal government funding for the University (On the Campus, Oct. 8 and Dec. 3). The Obama administration's policy is blatantly illegal. Because rape and sexual assault are considered criminal acts, every American citizen enjoys the presumption of innocence beyond a reasonable doubt, which rules out any standard of "preponderance of evidence." The confrontation clause of the Sixth and 14th amendments to the Constitution guarantees that the accused shall enjoy the right to be confronted with the witness against him in clear view, precluding the confidentiality of an accuser. The Fifth Amendment prohibits double jeopardy, where a defendant once proclaimed innocent cannot be retried a second time. This means that complainants cannot appeal a decision that effectively would retry the respondent. Furthermore, Title IX policy itself is discriminatory based on gender, since virtually all the respondents would be male. How can President Eisgruber '83 address sexual misconduct fairly, given these facts?

## Inbox

The rights of American citizens afforded by the Constitution trump any agreement by OCR and the University, any vote by University faculty, and any interpretation by the current federal administration. There is no heroism here by accusers, no feel-good Title IX media events, and no student should ever feel comfortable accusing a person of a felony. If my son were accused of a sexual assault at Princeton, I would insist upon a jury trial in court, and if acquitted, insist upon litigation against both the complainant and the University, reinforcing the seriousness of trivial accusations. If Princeton is to be a great university in the future, it needs to make principled decisions to protect all the members of its community. It can do much better than this.

**Mark Bennett Smith '74**  
**Bath, Maine**

I read with great interest the Oct. 8 article about Princeton's new sexual-assault discipline policy. Although I

am glad to see that my alma mater is doing serious thinking on the subject of how to address campus sexual assault, I fear that this policy review may have overlooked a fundamental question: Why does the University disciplinary committee, an organization designed for censuring undergraduate hijinks and campus pranks, have a role in what should be a matter for law enforcement? In terms of the seriousness of the crime, rape is roughly the equivalent of murder. Nobody is suggesting that university disciplinary committees should be meting out punishment to murderers, so why do we accept it as a matter of course that they are punishing rapists? Additionally, keeping sexual-assault investigations at the campus level makes the justice system vulnerable to campus pressures; that is one reason why Jerry Sandusky got away with victimizing so many young men for so long, to name just one example. Rape is a vicious act of predation, not a youthful indiscretion. Allowing disciplinary committees to

continue in their role as the first line of action against campus sexual assault equates rape to a campus prank in terms of severity, rather than elevating it to the seriousness that it serves.

I recommend that Princeton re-examine its sexual-assault policy again, and this time question the basic premise that the University has any role in sexual-assault discipline other than full cooperation with law enforcement.

**George Schwartz '07**  
**Tacoma, Wash.**

### NOTABLE NEUROSCIENTISTS

As an alumnus who has gone on to pursue a career in neuroscience, I congratulate the administrators, faculty, students, and benefactors that have made the recently dedicated Princeton Neuroscience Institute a reality. I think it is important to note, however, that neuroscience has deep roots at Princeton. During my undergraduate years a number of excellent neuroscientists were

## We recognized her potential. She's realizing it.

Anushka is a classic Stuart girl. She thrives at Stuart because she is encouraged to discover her passions, pursue her interests, and make a difference in the world.

Anushka excels as a leader of the Model UN, Dance, and Business Clubs. She challenges herself with AP courses, has won the Rensselaer Award for Math and Science, and was recently named a National Merit Scholar Semifinalist. Inspired by her work on a Stuart service project in Appalachia, Anushka founded a chapter of Uplift Humanity India, taking Hindi-speaking American students to work with victimized children in the Indian town in which she was born.

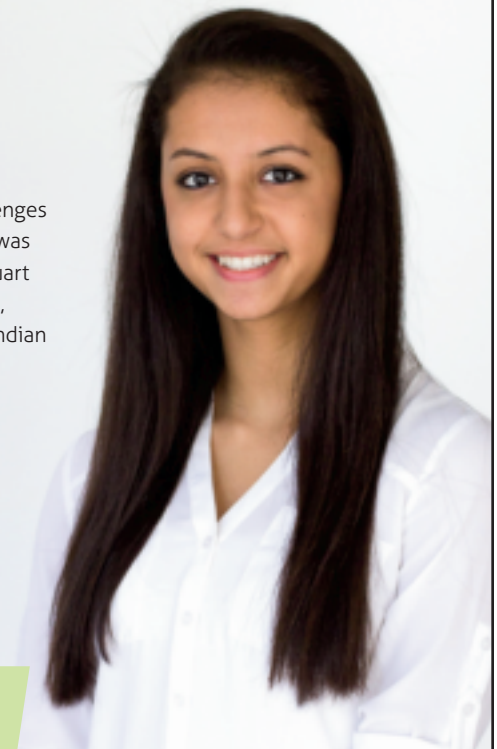
Anushka Makhija is a member of Stuart's Class of 2015 and one of 455 Stuart girls.  
***Each one of them is amazing.***



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involved in cutting-edge research, and most continue to do so today. These include my adviser, Martha Constantine-Paton (mechanisms of neurodevelopment), William “Chip” Quinn (neurogenetics), Charlie Gross (visual perception and learning), Robert Lisk (neuroendocrinology), John Buntin (behavioral neuroendocrinology), Jonathan Copeland (neurobehavior), and Margaret Law (neurodevelopment), just to name a few. While it is important to celebrate progress, it is equally important to recognize the foundation on which that progress is based.

**Arthur J. Weber '78**

**Professor**

**Department of Physiology  
Michigan State University**

### TACKLING TOUGH ISSUES

I read with much interest “Opening Exercises: Meaning in Life — and at Princeton” (President’s Page, Oct. 8), which President Eisgruber ’83 introduces most promisingly and eloquently: “There is something about the human condition that causes us ... to wonder whether there are better uses for our time on this earth.” He talks about “that desire to make the best of ourselves and the world,” and asks “what will make your own life meaningful.” However, he ends by merely suggesting to the new class to “get to know your professors. And, more generally, get to know the people around you,” a safe-enough proposal. With his introduction I had hoped — nay, expected — that he would take on the difficult issues, such as using Princeton to get a job making as much money as possible versus using Princeton for some other purpose that (to use his phrase in the introductory section) “gives humanity its dignity.”

President Eisgruber seemed willing to take on difficult issues in his equally eloquent message describing the beginning of a strategic-planning process that is intended to be completed in 2015, so let us hope he and his colleagues will find the determination to follow through to the roots of the problems, including the soaring cost of college education and its consequences.

**Nick Angell '54**  
**Garrison, N.Y.**

### FROM THE EDITOR

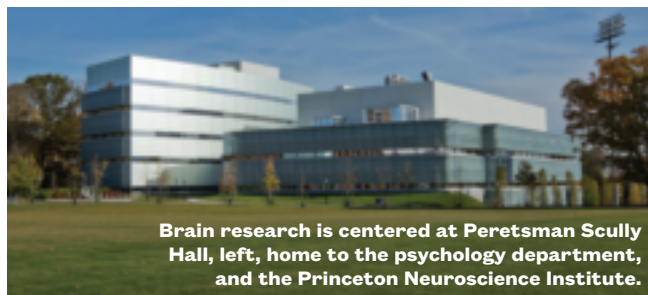
## In Our Heads

When PAW first considered doing an issue about neuroscience and the brain, I visited Jonathan Cohen, co-director of the Princeton Neuroscience Institute, to discuss what we might write about. Cohen was ebullient about the advances being made in his field. He rattled off half a dozen Princeton professors whose research on how we think, learn, remember, and behave could someday change our lives for the better: Ways to overcome traumatic memories. A sort of mind-reading that could provide insight into the minds of coma patients. Tools that could increase concentration and aid in learning. (See articles on pages 32 and 38.) That all sounded amazing — full speed ahead!

A few weeks later, I visited Matthew Liao ’94, an ethicist at New York University who specializes in the ethics of neuroscience technologies (page 42). He, too, was excited; he, too, rattled off research underway in labs around the world — indeed, some of the same things Cohen had mentioned. But at one point, Liao picked up a dinner knife from the table. Some people would use a knife to cut an apple, he said. But others would use it for violence. The question of “dual use” technology has been around since humankind invented tools, he said, noting some questionable uses of the emerging technology. Scientists and philosophers, he suggested, should talk to

each other more.

Neuroscience has become one of the world’s hottest disciplines, including at Princeton, where the Princeton Neuroscience Institute was



launched in 2005. Contributions to the Aspire campaign created new research centers, brought in faculty members, and increased student support. And last month, Princeton’s faculty endorsed an undergraduate concentration in the field (it must be approved by trustees). Until now, neuroscience has been strictly a certificate program, and its popularity has grown dramatically: About 50 students graduated with certificates in neuroscience last year, up from two at its inception.

Under the new plan, Princeton will offer both the concentration and the certificate, which is expected to draw humanists and social scientists with interests in neuroscience. That could help spark exactly the kind of conversations Liao proposes — between those students poised to make extraordinary discoveries about the brain’s secrets, and those who help us think about where they all could lead.

— Marilyn H. Marks ’86

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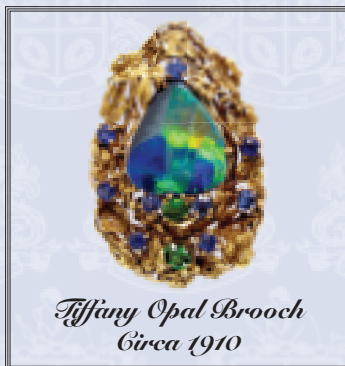
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## Inbox

### GOOD GRADES VS. REAL LEARNING

I am dismayed by the letter from Jay Granzow '93 and his wife seeking change in the grading policy at Princeton (Inbox, Oct. 22). Our student "customers" and their families are putting huge pressure on schools and their faculties to give good grades so they can get into good schools and get good jobs, and real learning is suffering as a result. If it is normal for law firms and medical-school faculties to focus on GPAs for hiring lawyers or filling residency positions, then it is not surprising that our political, business, and health-care institutions are in such bad shape. When will such institutions learn to focus on other, more meaningful accomplishments, such as apprenticeships and research experiences that teach problem-solving skills and prepare our students to meet the challenges that lie ahead? It is time that parents, admission officers, and employers realize that this focus on GPA and other quantitative measures of "success" is destroying the quality of the educational experience that we want our children to have.

I applaud my alma mater for working hard to prevent continued grade inflation and to ensure that the value of a Princeton education is not diminished.

**David W. Pratt '59**  
*Vergennes, Vt.*

### WILCOX HALL'S HIDDEN GEM

The photo in the Oct. 22 issue (That Was Then) featured the original Julian Street Library as it appeared in 1961. Shown here is a current view of the same space,



**Julian Street  
Library: Now**

transformed through 2011 renovations designed by New York architect Joel Sanders. This space is now one of Wilson College's proudest facilities, comfortably supporting collaboration groups, quiet study, a sound studio, and audiovisual features as well as the same books seen in the PAW photo, arranged in modern shelving throughout the room. This hidden gem strongly supports the 2007 University initiative to create a four-year residential-college alternative (to Prospect) by increasing programming opportunities throughout the six residential colleges.

**David Howell**  
*Program Manager  
Office of Design & Construction  
Princeton University*

As the 1962 chairman of the Woodrow Wilson Society, I enjoyed "A Refuge from Bicker." In the photo of the Julian Street Library at Wilcox Hall, I recognized the late Bruce Dunning '62 (standing) and myself, wearing a sweater and sitting at the table. Last year I wrote a retrospective piece called "Richness of Community — A Look at the Creation of the Woodrow Wilson

### YOUR COMMENTS ONLINE

## Plaudits for Taslitz '79's Latest Musical



Readers responded warmly to the "Life: 35 Years Out ..." story in the Nov. 12 issue and a related video at PAW Online about Lauren Taslitz '79 and her most recent musical, *After They've Gone: A Tale of Emptynesterhood*. Following are among the comments posted at PAW Online:

"Lauren's song so nicely captures mixed feelings of trepidation and commitment," wrote **Andy Fies '79**.

"I hope I can wind up as clear-eyed as her characters do when our family reaches 'emptynesterhood!'"

**Glenn Paul '79** commented that he was part of a small cast that sang through the show at Reunions last year. "Lauren's observations about how people truly feel about their children and their post-child lives are refreshing," he said.

**Patty Shaw Sprague '80** wrote: "This show really speaks to our generation, and I hope it will be performed to large audiences, who will love it!"



Society” for the Class of ’63’s 50th-reunion yearbook.

The Woodrow Wilson Society had its origin some 55 years ago and evolved into Wilson College as part of the fulfillment of Woodrow Wilson 1879’s vision for the transformation of residential-college life. It originated in the desire to have a viable alternative to Bicker; to allow undergraduates to choose a noncompetitive, inclusive social life; and to establish a college setting where intellectual, social, and entertainment activities could be integrated.

Within a small band of students, Darwin Labarthe ’61 was the prime

mover whose actions and courageous decisions created the critical mass of student awareness and interest for the movement to take root, expand, and blossom. The strong moral and financial support of President Robert Goheen ’40 \*48 and his administration was indispensable. Faculty support also was vital, including many who were active participants in WWS activities.

I was not aware of any desire to eliminate the eating clubs and their traditions — quite the contrary, we just embraced personal choice and the opportunity to have a viable alternative.

We feel proud and fortunate to have participated in historic changes in student life at the University, changes evident in the fabric as well as the architecture of campus life at Princeton today.

**Jerome Missel ’63**

*Woonsocket, R.I.*

*Editor’s note: Jerome Missel’s history of the creation of the Woodrow Wilson Society can be found at PAW Online.*

## FOR THE RECORD

A Dec. 3 story on the development of a nitric-oxide sensor for medical diagnostics by Professor Gerard Wysocki incorrectly described his collaboration with Rice University researchers. That collaboration was on early proof-of-concept systems for atmospheric monitoring.

## WE’D LIKE TO HEAR FROM YOU

**Email:** [paw@princeton.edu](mailto:paw@princeton.edu)

**Mail:** PAW, 194 Nassau St.,

Suite 38, Princeton, NJ 08542

**PAW Online:** Comment on a story at [paw.princeton.edu](http://paw.princeton.edu)

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*Letters should not exceed 250 words and may be edited for length, accuracy, clarity, and civility. Due to space limitations, we are unable to publish all letters received in the print magazine. Letters, articles, photos, and comments submitted to PAW may be published in print, electronic, or other forms.*

# Help Build Africa’s Next Generation of Exceptional Businesses



Volunteer Business Coach Kweku Fleming (left) with Coby Asmah, CEO of Type, Ghana

**How often do you dream of challenging yourself and making a meaningful impact on the lives of others?**

Welcome to the Stanford Institute for Innovation in Developing Economies (SEED). We’re looking for a select group of experienced business leaders for our **SEED Volunteer Business Coaching Program**. Coaches are typically senior executives with at least 10 years of leadership experience in small, midsize, and/or large enterprises, with an urge to help scale businesses, spur growth, and transform the lives of people in poverty.

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# News from the Alumni Association

The Alumni Association of Princeton University: over 85,000 served

## Aluminaries

**Jane Farrington \*13**  
Chair, 2015 Reunions  
Association of Princeton  
Graduate Alumni



**Reunions 2013**

To learn the many ways to stay connected to Princeton, contact the Office of the Alumni Association at 609-258-1900 or [www.alumni.princeton.edu](http://www.alumni.princeton.edu)

For someone who has just turned 30, Jane Farrington \*13 has had an impressive number of accomplishments. She graduated from Emory University magna cum laude and Phi Beta Kappa, she was a Rotary Ambassadorial Scholar in Morocco, and she holds joint JD and MPA degrees from Stanford Law School and Princeton's Woodrow Wilson School. Last year, Jane served as a law clerk for the Honorable T. S. Ellis III '61 on the U.S. District Court for the Eastern District of Virginia, and she is now clerking for the Honorable M. Margaret McKeown on the U.S. Court of Appeals for the Ninth Circuit in San Diego, CA.

Surely, though, Jane's most recent appointment rivals all of the above. She is serving as the 2015 Reunion Chair of the Association of Princeton Graduate Alumni (APGA).

Jane first attended Reunions when she graduated in 2013 – she was hooked and volunteered for APGA's 2014 Reunion Committee. In 2014, the APGA Reunion moved to Cuyler Courtyard (a larger location), and for the first time had dinners and parties all three nights. Attendance among graduate alumni and their guests was up 20% over the 2013 Reunion. This year, the APGA Reunion will remain in Cuyler Courtyard and will continue to host meals and parties all three days of Reunions.

When Jane was asked to take on the role of Chair for 2015, she hesitated – but only for a moment – before she agreed. In explaining why she accepted the position, Jane shared: "Not only are Reunions a great time, but assuming a leadership role in APGA gives me an opportunity for management experience early in my career." Jane is eager to build on last year's success and to make APGA's 2015 Reunion an even bigger hit. "This year we're hoping to further increase participation, especially among younger graduate alumni," Jane said. And she added, "We want to build APGA enthusiasm for the P-rade and to show everyone that the APGA tent knows how to throw a great party."



# Graduate Alumni

## Congratulations to Martin Eakes \*80 Winner of the 2015 Madison Medal

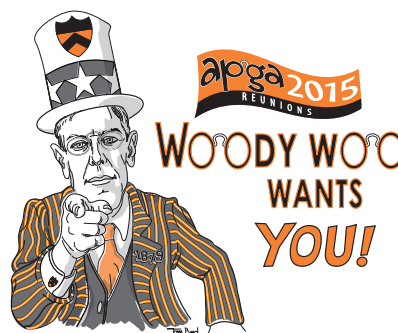
Join us in celebrating Madison Medalist Martin Eakes \*80 (WWS), CEO of Self-Help and the Center for Responsible Lending, at the 100th Anniversary of Alumni Day, February 20-21, 2015. Learn more about this year's Medalist and register for Alumni Day activities at: <http://alumni.princeton.edu/alumniday/2015>

## Meet Dean Kulkarni

Dean of the Graduate School Sanjeev Kulkarni has been visiting regions throughout the year to connect with graduate alumni, provide an update on what is happening on campus, and listen to thoughts and ideas from alumni on the future of graduate education at Princeton. Share your insights at an upcoming event in one of the following locations: Washington, D.C.; Philadelphia; and Boston. For more information, visit: <http://alumni.princeton.edu/graduate/dean>

## APGA Reunions 2015: Woody Woo Wants You!

All graduate alumni are invited to campus for Reunions **May 28–31**, when the Association of Princeton Graduate Alumni (APGA) will celebrate all things Woo with the theme, *Woody Woo Wants You!* Come for the whole weekend and enjoy three days of delicious meals with fellow graduate alumni, engaging academic programming, and fabulous entertainment. We hope to see you there!



## Princeton Global NetNight 2015:

On **March 3, 2015**, Princeton regional associations around the world will host in-person networking events for alumni who are interested in connecting with fellow Tigers to further their career development and strengthen their network. This year, the Alumni Council Committee on Careers is pleased to announce that we will be partnering with the Office of Career Services and Princeton's new Executive Director of Career Services Pulin Sanghvi for "Career and Life Vision: Define Your Legacy."

GNN 2015 is scheduled to take place in cities around the world, including:

<b>Baltimore</b>	<b>The Hague</b>	<b>Minneapolis</b>	<b>Portland (OR)</b>	<b>San Francisco</b>
<b>Boston</b>	<b>(Netherlands)</b>	<b>Mumbai</b>	<b>Princeton</b>	<b>Seattle</b>
<b>Chicago</b>	<b>Honolulu</b>	<b>New York City</b>	<b>Quebec</b>	<b>Tokyo</b>
<b>Denver</b>	<b>Lexington (KY)</b>	<b>Paris</b>	<b>Raleigh/Durham</b>	<b>Toronto</b>
<b>Detroit</b>	<b>London</b>	<b>Philadelphia</b>	<b>Rochester (NY)</b>	<b>Vancouver</b>
<b>Greenwich</b>	<b>Los Angeles</b>	<b>Pittsburgh</b>	<b>San Diego</b>	<b>Washington, DC</b>
				<b>Wilmington (DE)</b>

For information on how to participate and an updated list of cities, please visit <http://alumni.princeton.edu/calendar/gnn/>.

Sponsored by the Alumni Council Committee on Careers and the Committee on Regional Associations.

## March 3, 2015 – Save the Date

# 100<sup>th</sup> ANNIVERSARY of ALUMNI DAY

**FRIDAY,  
FEBRUARY 20, 2015  
Evening (5:00 p.m.)**

- **Academic Intersections:  
Princeton on Language**

Be a part of this performance-like educational session that brings together multiple members of the faculty and students—representing a range of disciplines and interests—to reflect on the concept of language in their fields.

- **100th Anniversary Celebration**

Enjoy food, drinks, and entertainment to commemorate this special anniversary.

**SATURDAY,  
FEBRUARY 21, 2015  
Morning (9:00 a.m.)**

- **Madison Medal Lecture**  
by Martin Eakes '80,  
Woodrow Wilson  
School

- **Woodrow Wilson Award Lecture**  
by Her Majesty Queen  
Noor, Class of 1973

- **Interactive Enrichment Sessions** including:

- Puzzling: Multiple Ways to Solve Problems
- A Cappella Deconstructed
- Alumni-Faculty-Student Forum
- Hands-On Outdoor Action Wilderness Training Highlights

**SATURDAY,  
FEBRUARY 21, 2015  
Afternoon (11:30 a.m.)**

- **Alumni Day Reception**
- **Awards Luncheon**
- **Service of Remembrance**
- **Keller Center for Entrepreneurship e-Lab Student Presentations**
- **Department of Chemistry Demonstration**
- **Interactive Career Services Workshop**
- **All-Alumni Evening Reception**

**February 20-21, 2015**

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Register online at [alumni.princeton.edu/alumniday](http://alumni.princeton.edu/alumniday)  
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# On the Campus



Melting snow gave the stones of Firestone Plaza a reflective sheen in this view Thanksgiving morning toward the arches of East Pyne.  
*Photograph by Ricardo Barros*



Students blocked the paths outside Frist Campus Center Dec. 4 in a 45-minute “die-in” to protest racial injustice.



# Concerns About Race

**As students protest racial inequality, University to review ‘inclusion’ policies**

In the wake of student protests following the decisions not to indict police officers in the deaths of unarmed black men in New York and Ferguson, Mo., President Eisgruber ’83 announced a new effort to strengthen the University’s policies and practices “regarding diversity, inclusion, and equity on campus.”

At a Dec. 8 meeting of the Council of the Princeton University Community (CPUC), Eisgruber asked the CPUC’s executive committee to recommend ways to enhance the University’s policies and to provide opportunities to discuss national events. “Princeton has a responsibility to bring its scholarship and teaching to bear on these urgent problems,” he said.

About 150 students attended the CPUC meeting, and during a 90-minute discussion, several pressed for quick action on diversity-related issues. “A lot of us have been having conversations since we set foot on this campus, and right now we are very upset — we’re angry, and we want action,” Achille Tenkiang ’17 said.

“We’re having this conversation because we know we can do better,” Eisgruber said. “The measures that

we take that are going to make a difference are measures that are well thought-through and measures that have the support of the community behind them, and not just a set of people in this room ... a collective decision by the University to do things differently than it has done.”

The CPUC meeting took place a day after the Undergraduate Student Government called on the University to establish concentrations in African American studies and in Latino studies, hire more faculty members of diverse identities and backgrounds, and implement mandatory training in effective interaction with people of different cultures for all University employees.

Eisgruber said a training program would have to be voted in place by the faculty before it could be established as mandatory for professors, but that he

**“A lot of us have been having conversations since we set foot on this campus ... we want action.”**

— Achille Tenkiang ’17

and his cabinet already had decided to take part in such training. Asked about a concentration in African American studies, he said this would require faculty and trustee approval. When the Center for African American Studies was created, he said, it was envisioned that “there might well come a time when the center would make a proposal for either the creation of a concentration or a department or both.”

Students handed out fliers listing suggested changes to the University policies that the students said “promote a campus culture acceptant of racial animus and insensitivity.” Their recommendations focused on three areas: transparency, awareness, and support. The CPUC executive committee met later in the week and created working groups to address each of those broad areas, promising a “comprehensive report” by May 2015.

The actions came after two campus protests. Several hundred students walked out of classes Dec. 4 to take part in a “die-in” outside Frist Campus Center to protest the decision by a grand jury not to indict a New York police officer in the death of Eric Garner. A week earlier, students had held a late-night demonstration along Prospect Avenue to protest the decision of a grand jury in Ferguson, Mo., not to charge a police officer in the death of Michael Brown. ♦ By A.W.



# Divestment Debate

## Petitions clash over University's role in response to Israeli-Palestinian conflict

**A** call by dozens of tenured faculty members for Princeton to divest from companies that “contribute to or profit from” Israel’s occupation of the West Bank has stirred up the campus since early November, with hundreds of students and faculty signing dueling petitions and debating what role the University should play in shaping public policy.

Although the Resources Committee of the Council of the Princeton University Community (CPUC), the body charged with assessing divestment proposals, quickly decided that the original faculty petition did not meet University guidelines for consideration, organizers of the campaign — which has drawn support from 76 tenured faculty members — say they plan to press on.

“Not five years ago, having this conversation in such an open and honest way would have been much more difficult,” said Max Weiss, associate professor of history and Near Eastern studies, one of five faculty authors of the divestment petition. “What we’re seeing is a real shift in the public discourse on the limits of what I think is legitimate criticism of the state of Israel and its policies.”

Supporters see divestment as a way of pressing Israel to end what they describe as violations of human rights and international law, exemplified by last summer’s 50-day Gaza war, in which about 2,100 Palestinians and 71 Israelis died. But opponents say divestment is the wrong way to encourage compromise between parties locked in a complex, protracted conflict.

“Divestment assigns absolute blame and demonizes one side and ignores the fact that there are failures and faults on both sides of this conflict,” said Sam Major ’16, president of Tigers for Israel, a student group whose anti-divestment petition has drawn more than 450 student signatures. “Singling out one party for blame is not going to get us anywhere.”

**“Not five years ago, having this conversation in such an open and honest way would have been much more difficult.”**

— Max Weiss, associate professor of history and Near Eastern studies

The Princeton divestment controversy arises amid an ongoing international effort to pressure Israel economically in its decades-old conflict with the Palestinians, a campaign known by the shorthand BDS, for boycott, divestment, and sanctions. Supporters of the Princeton effort note that, unlike some broader BDS initiatives, the

University campaign targets only Israel’s involvement in the West Bank and Gaza, not Israel as a whole.

Campuses from New York to California have argued for years over divestment efforts aimed at influencing Israeli policy, but no American university has made the decision to divest.

Because Princeton does not publicly discuss its investments, neither side in the divestment debate knows whether University holdings include companies that might meet the criteria laid out in the faculty petition. But proponents say even a symbolic gesture by a high-profile institution like Princeton could carry weight.

Symbolism “is intimately linked to eventual practical effects,” said Katie Horvath ’15, a board member of the Princeton Committee for Palestine, a student group whose pro-divestment petition has drawn nearly 500 student signatures. “The ultimate goal is

*continues on page 20*

### DIVESTMENT STANCE AT ISSUE

## Students Call for Neutrality by CJL



**Maya Rosen '17:**  
“The Jewish community’s position on Israel is not monolithic.”

A few days after a group of tenured faculty members published an ad in *The Daily Princetonian* calling for the University to divest from companies involved in Israel’s occupation of the West Bank, Rabbi Julie Roth, the executive director of Princeton’s Center for Jewish Life, sent her email list a message describing the CJL’s response. “I am confident that we are taking the best, positive strategic approach to defeat this action,” Roth wrote.

But the involvement of the CJL, whose mission, Roth said, is to provide a campus home for all Jewish students — whatever their religious or political views — sparked its own controversy-within-the-controversy.

“The Jewish community’s position on Israel is not monolithic,” said Maya Rosen ’17, who co-authored a subsequent open letter, signed by 38 Jewish students, calling on the CJL to remain neutral. “The CJL taking an institutional position opposing boycotts of the settlements creates a space in which there can’t be robust conversation about the issue of boycotts.” The students’ letter did not take a stand on divestment itself.

The discussion within Princeton’s Jewish community mirrors similar disputes taking place on campuses nationwide, as college-age Jews find themselves torn over the rights and wrongs of the Israeli-Palestinian conflict. Hillel International, the organization of Jewish campus groups with which Princeton’s CJL is affiliated, prescribes guidelines on Israel programming that some see as designed to mute criticism of Israeli policy.

Roth said the intent of her email was misconstrued, and in retrospect she wishes she had phrased it differently. “We always welcome a multiplicity of views, both individually and programmatically,” she said. “Our intention was never to limit conversation.” ♦ By D.Y.

## On the Campus

*continued from page 19*

to create a downward spiral, where investment in companies complicit in human-rights violations becomes increasingly more risky and increasingly less palatable. Then that really creates the pressure for change.”

Princeton’s divestment guidelines, adopted by the Board of Trustees in 1997, stipulate that divestment be considered only when consensus has emerged on an issue that provokes “considerable, thoughtful, and sustained campus interest” and involves “a central University value.”

To demonstrate that no such campus consensus exists on Israel-related divestment, officers of the University’s Center for Jewish Life followed up the faculty petition with their own anti-divestment letter, which said the “unproductive and unfair” divestment effort “raises questions as to the reason for submitting Israel to such unique pressure” in a region, and a world, filled with injustices. Six hundred faculty, staff, alumni, and parents of Princeton students have signed, said Rabbi Julie Roth, executive director of the CJL.

At its Nov. 21 meeting, the CPUC Resources Committee decided that the current debate, launched when the faculty petition was published as an ad in the Nov. 5 issue of *The Daily Princetonian*, had given rise to no consensus and was too recent to have provoked “sustained” campus interest, said Karen Jezierny, the University’s director of public affairs, who staffs the committee.

The petitioners are free to revise and resubmit their divestment request, Jezierny said. Weiss said the faculty campaigners are considering their next move.

President Eisgruber ’83, who has met with partisans on both sides of the issue, said divestment is a distraction from the work the University should be doing on the Israeli-Palestinian conflict: promoting teaching, scholarship, and public discussion.

“I don’t think this is a petition that meets our criteria, and I think there are much better ways of having conversations about the issues in the Middle East that are obviously of critical importance,” Eisgruber said. ♦ *By Deborah Yaffe*

## IN SHORT



Former president **JIMMY CARTER**, above, addressed issues of gender equality and sexual violence around the world when he spoke in the University Chapel Dec. 3. But what may have resonated most with the campus crowd of 800 were his comments about sexual violence on college campuses.

Carter, who has been lecturing about his new book, *A Call to Action: Women, Religion, Violence and Power*, spoke critically of college administrators who fail to address the prevalence of sexual assault on campuses in order to protect the public image of their institutions, citing the underreporting of assaults and a lack of punishment for the assailants. “This university is not immune from that. And neither is Yale or Harvard or Emory, where I teach,” he said.

Carter’s words struck a chord with students who support reforms at Princeton. “I’m happy to see him take a really strong stance on this important issue,” said Zhan Okuda-Lim ’15, who served on a committee to revise the sexual-misconduct section of the University handbook *Rights, Rules, Responsibilities*. “I’m happy to see that there’s a public leader like Jimmy Carter who, among others, is taking this issue very seriously.”

Supreme Court Justice **ELENA KAGAN** ’81 visited campus Nov. 20 for a discussion with President Eisgruber ’83 that ranged from the divisions on the Supreme Court to her hunting trips with Justice Antonin Scalia to the good-natured “hazing” that she’s experienced as the junior justice. Kagan described the frustrations of being in the minority on court rulings: “It’s hard to lose. ... The worst thing about my time on the court is coming back from a conference and not being in the majority on an issue that you think is important and have strong views about.”

She mixed her comments with anecdotes and humor. After seeing her thesis adviser, history professor Sean Wilentz, in the audience, Kagan said she was worried he might “take out his red pen.” Eisgruber quickly responded: “Don’t worry, we’ve repealed the grading policy.”

The University offered **EARLY-ACTION ADMISSION** to 767 students Dec. 15 — 19.9 percent of the 3,850 candidates who applied. There were four fewer early-action applicants than last year, when the acceptance rate was 18.5 percent. Of those admitted, 10 percent are first-generation college students, 15 percent are legacies, 47 percent are women, and 41 percent are U.S. students from minority backgrounds.



**IN MEMORIAM HENRY N. DREWRY**, one of Princeton’s first black administrators and the first director of the Program in Teacher Preparation,

died Nov. 21 in Skillman, N.J. He was 90. Drewry taught history at Princeton High School before joining the University faculty in 1968 to teach its first courses in black history and culture and to head the Teacher Preparation Program. From 1972 to 1975 he served as master of Wilson College. In 1988 he joined the Mellon Foundation, where he co-founded a fellowship program to promote diversity on university faculties. Drewry co-authored seven books dealing with race and education.

# Trouble at Tiger Inn

**Officers' emails trigger reforms at club; several students face University charges**

**S**everal students have been charged with violating the University's sexual-misconduct policies following the distribution of a photo that reportedly showed a sexual act at the Tiger Inn eating club.

University spokesman Martin Mbugua said the disciplinary process would be "prompt as well as full and fair."

The Dec. 11 announcement capped a tumultuous series of events at Tiger Inn that began with a pair of October emails to club members, sent by two different Tiger Inn officers.

The first email, according to reports in *The New York Times* and on the Planet Princeton website, included a sexually explicit photo taken on the dance floor and a reference to a woman in the photo as an "Asian chick."

The second email was sent the same night, a day before a campus event on student activism that was to include Sally Frank '80, whose lawsuit had forced the last three all-male eating clubs — including Tiger Inn — to accept women. "Looking for someone to blame for the influx of girls? Come tomorrow and help boo Sally Frank," the email said in part.

The University and the Princeton Police Department opened separate investigations after the first email surfaced, and grad board president Hap Cooper '82 said the club "fully cooperated" with them. The criminal investigation was closed without charges being filed, police said.

In mid-November, "Rape Haven" was spray-painted on the wall in front of Tiger Inn. A day later, Cooper described the graffiti as "both inexcusable and understandable" in an email to club members. Terming events at the club "deeply disturbing," he said a more serious concern was "the prevalent attitudes and mindset within the club that allow these behaviors to take place." Any behavior or communication "that makes other members feel disrespected, uncomfortable, or unsafe must stop now," he said.

The grad board surveyed club members, and in a Nov. 24 letter reported its findings: The two officers who sent the emails had been removed because of conduct "offensive, disrespectful, and in direct violation of our core values"; the club membership of one was terminated. Bicker and initiations will become "safer, less demeaning, and more fun," the grad board said. With few women serving as club officers in recent years, the board promised an election process "more transparent and representative."



**Hap Cooper '82:**  
"This is a slippery slope that can lead to real tragedy."

The grad board also pledged to create a safe process for members to report incidents and concerns, to eliminate "sexist or inappropriate" theme nights, and to reach gender equality on the grad board itself.

On Dec. 5, the *Prince* published a letter to the grad board signed by more than 100 Tiger Inn alumni expressing "dismay and disgust" at behavior by club members and demanding "swift and strong action to demonstrate that any kind of bias, harassment, exploitation, or assault will not be tolerated."

Cooper told PAW that the club's "sense of humor and laid-back approach have made men and women feel comfortable" for many years. But the membership survey made it clear that demeaning language has become commonplace in communications, chants, and party themes, he said.

"Each was meant as a joke, but collectively have had the effect of communicating that 'anything goes' at TI," Cooper said. "This is a slippery slope that can lead to real tragedy, and we will not allow that to happen." ♦ By W.R.O.

 **READ MORE:** The full text of the alumni letter to Tiger Inn's graduate board at [paw.princeton.edu](http://paw.princeton.edu)

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# Mapping an Argument

## Learning to think like a philosopher while sharpening critical-thinking skills

**R**eading philosophy is not easy. If you've ever sloggled through, say, Kant's *Prolegomena to Any Future Metaphysics*, you'll know just how dense it can be.

Simon Cullen, a postdoctoral fellow in Princeton's philosophy department, watched students struggle with Kant and other difficult philosophers two years ago, while leading an undergraduate precept in moral philosophy. Cullen was starting to despair when he recalled the brightly colored argument "maps" he'd seen back home in Melbourne, where they were used to teach critical thinking. "Basically," Cullen said, "[they offer] a way of expressing concisely the content and structure of an argument."

At first he would draw up the maps himself and hand them out at the beginning of each class. "[The students] would get a little packet, which they thought of as a cheat sheet," Cullen said.



**"Engaging with argument is a lot like learning to play the guitar. If you practice and get the right feedback, you can improve."**

— Postdoctoral fellow Simon Cullen

Cheat sheet or not, the improvement was startling, leading him to wonder what progress might be made if the students themselves sketched out the maps.

His freshman seminar, "Philosophical Analysis Using Argument Maps," is

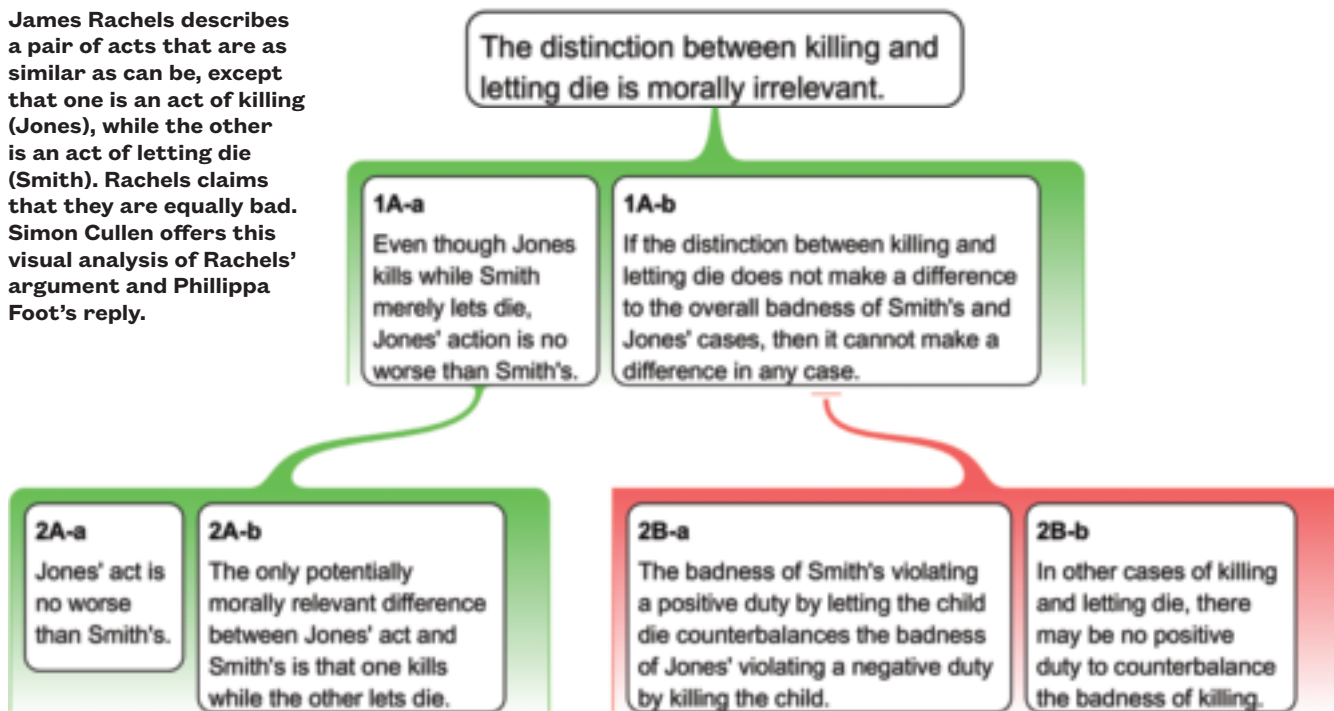
partly an introduction to all those juicy philosophical questions that keep you arguing into the night: Is euthanasia ever justified? What, if anything, do we owe the poor? If we can make ourselves immortal, should we? But at least as important is the seminar's promise of improving one's reasoning skills by practicing a "mapping" strategy.

"The main pitch in our advertising to students is that engaging with argument is a lot like learning to play the guitar," Cullen said. "If you practice and get the right feedback, you can improve."

The students sit in pairs at a computer terminal, and after reading Cullen's synopsis of a particular argument, they try to map it. The room fills up with whispered suggestions, lines tested and rejected, double negatives made positive. Most of the boxes into which they enter text are red or green. The green ones contain evidence supporting the above premise; the red ones offer arguments against it. No doubt you could achieve a similar effect using brightly colored sticky notes, but it's much quicker mapping an argument with the help of a software program called Rationale, which generates the boxes and assigns

## An Argument Map: How It Works

James Rachels describes a pair of acts that are as similar as can be, except that one is an act of killing (Jones), while the other is an act of letting die (Smith). Rachels claims that they are equally bad. Simon Cullen offers this visual analysis of Rachels' argument and Phillippa Foot's reply.



Images courtesy Simon Cullen

them colors.

Thus the premise shown in the diagram on page 22, “The distinction between killing and letting die is morally irrelevant,” is supported by two supporting claims, labeled 1A-a and 1A-b.

In just its second year, the class proved to be the most sought-after freshman seminar: 200 students submitted an application essay for one of the 15 openings. “Everybody is interested in this class,” said Fiona Furnari ’18, who serves as a sort of “town crier” for the seminar, keeping students who aren’t in the class up to date.

Anecdotal evidence of the seminar’s success is easy to find. “Whenever I think about things now, I try to break them down, especially more complicated ideas,” says Gavin Hall ’18. “Your understanding of how you can attack more complicated ideas really grows.”

But Cullen wanted an objective measure of the course’s success, too. With help from the people who create the LSATs, he designed a controlled experiment using the class and a control group. Using the “most rigorous standardized test of critical-thinking skills available,” the two groups were given exams deemed to be of equal difficulty. At the end of the term, the two halves swapped tests. The results were convincing: The group that had practiced argument mapping was considerably stronger than the control group. “An equivalent improvement on the IQ scale would be about 15 points,” he said.

Despite such proof of success, argument maps have not been widely used to teach philosophy, but that may change. Cullen is exploring whether argument mapping might be incorporated in the online philosophy program Wi-Phi, and Rutgers University plans to introduce an argument-mapping class next year.

One of last year’s students offered a personal view of what the seminar can teach: “I think this class has made me a better person, not because of the articles I have read, but because of the new way I have learned to think,” the student wrote in an anonymous survey. “I find myself being much more cautious about what I say, and a bit more humble.” ♦ *By Merrell Noden ’78*



## Path to Democracy

**As Myanmar emerges from military rule, MPA students assess 2015 election plans**

**I**n Myanmar during fall break, 10 Woodrow Wilson School master’s-degree students met with government officials in Naypyidaw, the new capital city notable for its elaborate government buildings, luxury hotels, and wide boulevards. But the grandiosity of the setting belied the poor construction they saw inside — missing floor tiles and chipped plaster — and for much of a meeting with the country’s election commissioners, lights and air conditioning were off because of a power outage.

The experience was “a testament to Burma’s ongoing struggles with development,” said Sam duPont, one of the students who visited Myanmar (formerly Burma) for the “Election Management in Fragile States” policy workshop taught by Jeffrey Fischer, a visiting lecturer with election-management experience in Albania, Bosnia, Kyrgyzstan, and Ukraine, among other places. The juxtaposition of luxury in the capital of Naypyidaw and poverty in the countryside reflected the seesaw that is Myanmar as it transitions from military dictatorship to fledgling democracy.

The students spent a week investigating Myanmar’s preparations for its October 2015 elections, meeting with

members of international organizations and representatives of the media, government, and the two major political parties. A highlight was meeting Nobel laureate and opposition-party leader Aung San Suu Kyi, who spent most of the two decades ending in 2010 under house arrest because of her outspoken views on Myanmar’s military dictatorship. Suu Kyi was not very positive about the nation’s democratic progress during the meeting, duPont said, but softened her tone when the government subsequently abandoned its plans to amend the electoral system in its own favor.

The students came home with a cautiously optimistic view of where the country is headed. Though the international community hopes Myanmar will follow the path of Indonesia to democracy, duPont said, the country’s political system is still opaque and it’s hard to gain insight on what will happen.

The last national elections were held in 2010, but Suu Kyi’s opposition party, the National League for Democracy, boycotted them, citing fraud.

In December the students provided briefings on Myanmar’s evolving political climate to the UN Electoral Assistance Division in New York and USAID in Washington. ♦ *By F.H.*



STUDENT DISPATCH

## Learning American Culture Can Be Big Test for International Grad Students

*Daniel Munczek Edelman GS*



At a recent language workshop meant to help international students work effectively in groups, several graduate students puzzled over when it made sense to start a sentence with “How about” rather than “What about.” Andrea Villamil, a Woodrow Wilson School master’s degree student from Mexico, observed, “The language makes no sense sometimes, but that’s the least of it. The huge difference in cultures is what really matters!”

Such is the life of doctoral and master’s candidates from other countries — some 40 percent of all Princeton graduate students — who must meet the same demanding academic and social expectations as their American-born colleagues while contending with significant cultural and linguistic obstacles. To international students, American culture can seem downright, well, *foreign*.

Living in an English-speaking environment is a common cause of frustration. Inés Cruzalegui, a Wilson School master’s student from Argentina, said her personality doesn’t come through in English: “I can’t be sarcastic, even though I am really sarcastic in Spanish. ... You feel shy — it’s harder to express yourself, and that’s frustrating.”

Hugging? There’s way too much for Takehiko Ito, a psychology Ph.D. student from Japan, and far too little for Villamil. American food? Dongwon Oh, a psychology Ph.D. student from Korea, loves it, while Cruzalegui hates it.

And several students agreed that Americans are far more ready to voice opinions and ask questions in class than students in their home countries.

The residential university is itself an oddity. Student dorms, Villamil said, remind her more of the gymnastics camp she attended for three weeks at age 9 than of her undergraduate university in Mexico City, where most students lived at home.

Ito, a frequent visitor at Terrace Club, said he enjoyed the fact that, unlike in Japan, “even though people are not good at it, they are dancing. In Japan, people are often too shy to dance.”

Overall, the grad students said they are happy to be here. As Tsung-Lin Hsieh, an atmospheric sciences Ph.D. student from Taiwan, put it, “Before coming here, I thought that there is just one big popular culture, and in order to adjust, I would need to do the same things, watch the same movies, and listen to the same music. But now I think no. Everybody has their own thing, and it’s OK to be yourself.” ♦

## FIVE WIN RHODES, SACHS AWARDS

Four Princeton seniors and one alumnus have been selected to continue their studies next year as recipients of the Rhodes and Sachs scholarships.



The Rhodes scholars are **Sarah Yerima ’15** of Los Angeles, a sociology

major who will pursue a master of philosophy degree in politics at Oxford next



fall; **Rachel Skokowski ’15** of Palo Alto, Calif., who is majoring in French and

Italian, and plans to study for a master of philosophy degree in modern languages



at Oxford; and **Joseph Barrett ’14** of Port Washington, N.Y., who

majored in history and earned a certificate in South Asian studies. Barrett also will attend Oxford, where he will work toward a master of philosophy degree in economic and social history.

The Sachs Scholarship, given to Princeton students and named for Daniel Sachs ’60, was awarded to **William Beacom ’15** and **Brett Diehl ’15**. Beacom, from Calgary, Alberta, is majoring in the Woodrow Wilson School. He will spend a year in five Asian countries studying Chinese influence on authoritarian regimes. Diehl, a history major from Charlottesville, Va., plans to complete two master’s degrees at Oxford — in economic and social history and in criminology and criminal justice. ♦





## SPORTS MEDICINE

# Making an Impact

**Princeton athletes provide data for research on health concern**

**B**efore the start of each practice and game this fall, members of the Princeton men's and women's soccer teams visited University Health Services research specialist Stephanie Amalfe for one final piece of equipment: a small sensor, about the diameter of a quarter, affixed with an adhesive patch behind the right ear.

Volunteers from the two teams took part in a season-long study of head impacts on the field using the sensors, which are equipped with an accelerometer and gyroscope. "Essentially, the sensors detect, measure, and record the accelerations of an athlete's head," Amalfe said.

Amalfe and principal investigator Dr. Margot Putukian, Princeton's director of athletic medicine, hope the study will give a scientific estimate of the number and severity of impacts to the head that soccer and lacrosse players experience in a typical practice or game. (The men's and women's lacrosse teams began wearing sensors last year, and athletes at the University of North Carolina are participating as well.) The research also might contribute to an understanding of what types of impact cause concussions,



**The Princeton research uses sensors created by X2 Biosystems in Seattle.**

but so far, no Princeton player wearing a sensor has sustained a concussion.

Putukian, a former soccer player at Yale, said that while helmet-mounted sensors have enabled similar studies in football and ice hockey, collecting data without the use of a helmet is a relatively recent development — and one that enables researchers to take a closer look at non-helmeted sports. "We are filling a gap, in terms of what we know about those sports," she said.

Amalfe and Putukian are just beginning to tackle the vast amount of data collected during lacrosse season last spring and soccer season in the fall.

**Myles McGinley '15, shown heading the ball, was one of several players who participated in a season-long study of head impacts.**

Impacts to the head are marked with a time stamp that can be matched to video footage from the practice or game, to glean more information about the type of contact (heading the ball versus making contact with an opponent's elbow, for example). Participating students also completed neuropsychological testing before and after the season, to determine any change in cognitive function.

Princeton's involvement in concussion research stems largely from Putukian, who said that she took an interest in mild traumatic brain injury early in her career after encountering a few challenging cases while working at Penn State, long before concussion became a widely discussed topic outside the sports-medicine community. In addition to her research and her regular duties on the sidelines, she has served on advisory committees for the NFL, U.S. Lacrosse, and the Ivy League.

Putukian also is leading Princeton's participation in a major multi-institution study of brain injury: the NCAA and U.S. Department of Defense Concussion Assessment, Research, and Education (CARE) Consortium. The University will be one of 12 core research sites for the \$30 million initiative's longitudinal clinical study, projected to be the largest-ever study of its type. ♦ *By B.T.*



Swimmer Andrew Helber '16 also serves as performance director of the Nassoons.

EXTRA POINT

## A Walk-On Who Hits All the Right Notes: Swimmer and Singer Helber '16

*Brett Tomlinson*



Even on a campus where students routinely manage a multitude of activities, Andrew Helber '16's schedule sounds

overwhelming: A varsity swimmer and member of the Nassoons, he has taken five courses in each of the last four semesters to stay on track as a music major and complete the science courses he'll need to apply for medical school.

A cappella rehearsals end at midnight, tightening Helber's window for sleep before 6:30 a.m. swimming workouts, but he insists he has learned to make

the most of naps. And while he admits that being an athlete and singer can add stress during already-hectic times like midterms week, he also highlights stress-relieving perks, including training trips to Florida and summer singing gigs at a mountainside resort.

Helber has just one juggling act that he tries to avoid: A few times each year, his teammates ask him to sing the national anthem before a home meet, which is a tricky commitment for someone who also swims in the opening relay event. "I don't mind doing it," Helber said with a laugh. "It's just a quick turnaround — high-pressure situation to

high-pressure situation."

In the last three years, Helber has given more than his voice to Princeton's successful swimming and diving program. He has emerged as one of the Tigers' top backstrokers and a strong freestyle swimmer as well. Not bad for someone who, in the words of assistant coach Mitch Dalton, "wasn't even on our radar" when he applied to Princeton.

Helber is one of a handful of walk-ons, or nonrecruited athletes, on the men's swimming team. The group also includes Conner Jager '15, who posted two top-10 finishes at last year's Ivy League Championships. Head coach Rob Orr has a history of welcoming walk-ons, Dalton said. In Helber's case, the coaches saw a capable athlete who was charismatic and committed to the sport. "As a swimmer, he really has taken off," Dalton said, noting that in Helber's strongest event — the 100-yard backstroke — he has cut three seconds from his personal best in high school.

Though his extracurricular interests are varied, Helber maintains a narrow focus in the pool, listing two near-term goals: Beat Harvard at the H-Y-P meet later this month, and earn one of the 17 sought-after spots on Princeton's Ivy meet roster. (Last year, he was the first alternate.)

"We brought in some really fast freshmen, nobody's left the team, and everyone trained hard over the summer," Helber said. "It's going to be tough [to make the Ivy team], but that makes everyone get better." ♦

### SPORTS SHORTS



First lady Michelle Obama '85, above, was on hand to cheer for her niece, Leslie Robinson '18, and the **WOMEN'S BASKETBALL** team when Princeton defeated

American in Washington, D.C., Nov. 23. The Tigers opened the nonconference season 9-0 — the best start in program history.

**MEN'S BASKETBALL** defeated Stony Brook

Dec. 6 to improve to 3-6 in nonconference games. Steven Cook '17 scored 28 points in the game, doubling his previous career high.

Former **WOMEN'S GOLF** standout Kelly Shon '14 earned her LPGA Tour card by finishing in a tie for ninth in the tour's qualifying tournament Dec. 3-7. Shon is the first Princeton woman — and third Ivy League

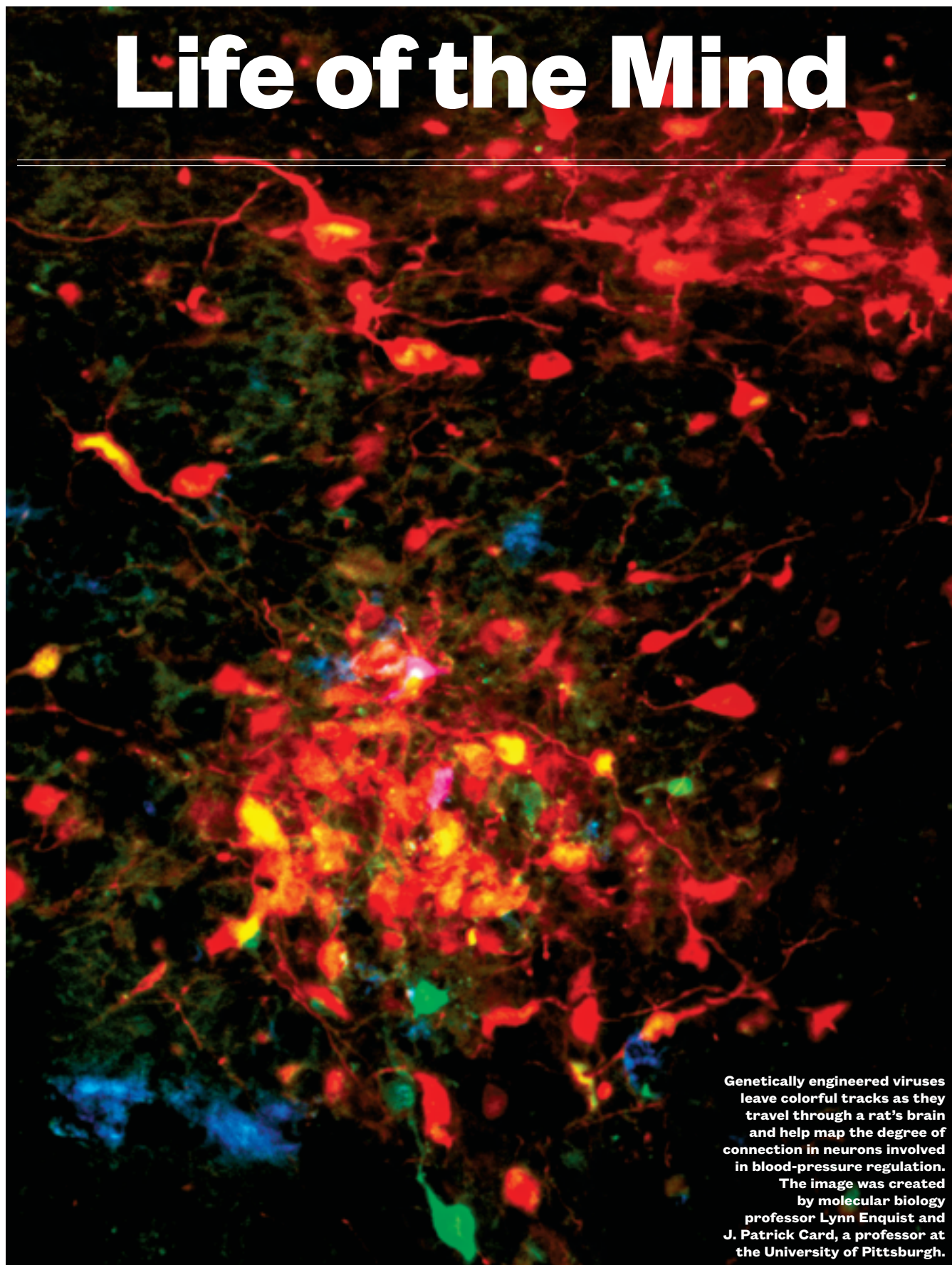
alumna — to qualify as a regular member of the professional golf circuit.

**FOOTBALL** linebacker Mike Zeuli '15 and Harvard lineman Zack Hodges shared the Ivy Defensive Player of the Year honors, presented at the Bushnell Cup ceremony in New York City Dec. 8. Princeton finished the season 5-5 after dropping its final two games to Yale and Dartmouth.



# Life of the Mind

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Genetically engineered viruses leave colorful tracks as they travel through a rat's brain and help map the degree of connection in neurons involved in blood-pressure regulation. The image was created by molecular biology professor Lynn Enquist and J. Patrick Card, a professor at the University of Pittsburgh.





PSYCHOLOGY

# Baby Steps for a Baby Lab

## A new facility will examine how the infant brain develops, one cute kid at a time

**T**he academic buzz that normally fills Peretsman Scully Hall will be mixed this spring with a sound that's new to the Princeton campus: the pitter-patter of little feet. Princeton's psychology department is expecting ... a Baby Lab.

Two new psychology professors — Casey Lew-Williams and Lauren Emberson — are creating what will be called the Princeton Baby Lab, building the University's role in the field of developmental psychology. "We don't have a lot of information about how the infant brain works moment to moment, let alone over time," Emberson says.

Construction of the facility, which

will occupy part of the second floor of Peretsman Scully, was scheduled to begin shortly after the first of the year and to be completed by April. A temporary website is up (<http://princetonbabylab.wix.com/home>), and Lew-Williams and Emberson recently unveiled a Baby Lab logo after an online competition in which they received 134 submissions. It would be safe to say that of all Princeton's websites and logos, these win for adorableness.

Psychologists have studied early childhood development for decades, but technological advances have opened new fields of research into the age-old debate about nature and nurture. Human brains

develop at a staggering rate during the first several years of life. The Baby Lab's co-directors want to learn how.

Lew-Williams ran a childhood-development lab at Northwestern University before joining the Princeton faculty this year and is the author of a dozen journal articles on the development of language skills in infancy and childhood. His research aims to "simulate a child's language experience in lab-based studies and by examining a child's language experience out in the world."

Children are bombarded with stimuli from the time they are born. Psychologists believe that cognitive development, including the development of language, takes place as a child learns to focus attention on those stimuli, and many of Lew-Williams' tests attempt to observe and measure attention, which he believes can in turn open a window into what infants know about sounds, words, and sentences.

In one type of test, known as an

eye-tracking study, infants are shown pictures or images while listening to words and sentences as a camera records their eye movement. Researchers measure their attention by what their eyes focus on, and for how long.

In another test, known as a head-turn preference test, a child sits on an adult's lap in a small cubicle. A green light in front of them begins to flash, and when the child turns her gaze toward it, the light goes off and red lights on a side wall begin to flash. When the child turns to look at the flashing red light, a speaker begins to play words or made-up speech sounds, which will continue as long as the child continues to look at the light. If the child looks away for more than two seconds, the lights and the sounds stop. These tests, Lew-Williams says, "use boredom as a tool" to measure the child's attention span.

Babies, he writes on the Baby Lab website, "are very skilled at two things: focusing, and getting bored. They look at something if they're interested, and they look away if they don't care. We are very interested in what makes babies *un*interested, because their boredom has the power to reveal a lot about development and learning."

Lew-Williams also studies how learning takes place in children from different backgrounds, including those with developmental disabilities, children who live in poverty, and children who grow up in bilingual families or in families in which English is not the primary language. Little research has been done on early bilingualism, and much of what parents think they know may be wrong, he says. "Attitudes against early bilingualism are often based on myths and misinterpretations, rather than scientific findings," he wrote in "Bilingualism in the Early Years: What the Science Says," a 2013 article he co-authored in the journal *LEARNING Landscapes*, which is aimed at educators, parents, and community leaders.

For example, bilingualism does appear to promote cognitive development, but not nearly as much as parents pushing their infants into baby Mandarin classes think it does. It does become harder to learn a second language as we get older, but this is

largely because we typically are less immersed in it as adults — or even as adolescents — than we are as infants. A high school student sitting in a Spanish class for a few hours a week, in other words, has nothing on a baby who is surrounded by the language all day. "In the end," Lew-Williams says, "proficiency comes down to practice listening and looking and speaking, and infants get vastly more practice than adult second-language learners."

Lew-Williams is interested in learning how poverty, particularly in infancy, shapes cognitive abilities. To ensure that he has access to children from different cultural and socioeconomic backgrounds, whose parents might lack the ability or inclination to bring them to more affluent Princeton, Lew-Williams plans to open a small lab in Trenton.

### Technological advances have opened new fields of research into the age-old debate about nature and nurture.

"Every kid is on their own learning trajectory," he says, "and we are very interested in how those trajectories develop."

Co-director Emberson, a postdoctoral research associate at the University of Rochester who will join Princeton's faculty next summer, has spent much of her career studying the development of perception. Adults use memories of sensory experiences to navigate the world; we can spot a familiar face even if it is partly hidden behind a mask, or find our way around our old neighborhood years after we lived there. Infants are not born with this capacity, and Emberson has devoted much of her work to probing how it develops — seeking, as she puts it on her website, "to uncover the interrelationships between perception, memory, and experience."

Technology can help uncover those relationships. Functional magnetic resonance imaging (fMRI) scans, for example, can reveal changes in brain activity, as evidenced by changes in blood flow, but it is difficult to use them

to study infants because the subjects must remain absolutely still. A relatively new neuroimaging technique called functional near-infrared resolution spectroscopy, or fNIRS, can measure the same physiological changes as an fMRI, but without many of the limitations.

The fNIRS machines can be very expensive — up to half a million dollars apiece, Emberson says — and Princeton's will be one of the few university psychology departments in the country to use them for studying early-childhood development. In an fNIRS scan, beams of near-infrared light penetrate the skull and, like an fMRI, provide information about blood flow in the cerebral cortex. It is the same technology used in the pulse oximeters that patients wear clipped to their fingers during hospital stays to monitor blood flow — but in an fNIRS device, these lights are woven into a lightweight cap that slips over the child's head, with long optical wires attached (wireless versions may come on the market soon), freeing the child to play or move around while being studied.

Emberson has conducted fNIRS scans on hundreds of children over the last three years. The scans are approved by the FDA and expose children to less near-infrared light than they would receive in the time it would take to go from a car to the house, even on a cloudy day, Emberson says. Tests typically last five to 10 minutes — about as long as young children can remain engaged. For their effort, participants will receive \$10 and what Emberson calls "some Baby Lab swag" like a T-shirt and a tote bag. Parents will not receive individual diagnostic reports on their children's cognitive development, although Lew-Williams and Emberson say they can help parents find support if they have particular concerns. The professors expect to see as many as 2,000 children in Princeton and Trenton within the first two years.

Lew-Williams believes that the presence of so many small children will infuse a "fresh, youthful energy" in Peretsman Scully Hall. But he acknowledges that the ordered, scholarly atmosphere may be in for a change. "Babies," he notes, "can be unpredictable little people." ♦ *By M.F.B.*



PAW senior writer Mark F. Bernstein '83, left, and astrophysics professor David Spergel '82 discuss the science in *Interstellar*.

ASTROPHYSICS

# Holes in Space

## David Spergel '82 answers the question: Did *Interstellar* get the science right?

**D**avid Spergel '82, the Charles A. Young Professor of Astronomy on the Class of 1897 Foundation, is an astrophysicist, author, and MacArthur Fellow, but PAW asked him to put on a new hat: film critic.

It is the first of an occasional feature called "PAW Goes to the Movies," in which we will invite a faculty member to see a current movie of particular relevance to his or her field of expertise and then play Roger Ebert for us. In this case, we chose *Interstellar*, the new film about space travel starring Matthew McConaughey and Anne Hathaway. (The film was inspired by Kip Thorne '65, an astrophysicist at the California Institute of Technology.)

Spoilers follow, so read with caution if you haven't seen the movie.

*Interstellar* begins a few decades in the future, when climate change threatens to wipe out life on Earth.



Cooper (McConaughey), a former astronaut, scratches out a living on one of the few surviving farms. His young daughter, Murph, begins finding unexplained messages scrawled in the dust by gravitational waves, including map coordinates that lead him to a secret facility where scientists have been sending astronauts to other galaxies in search of planets that might sustain human life. They dispatch Cooper and several others through a wormhole, a shortcut through spacetime, to learn if any previous missions have succeeded. Cooper eventually descends into a black

hole, where he is able to travel across time and use gravity to communicate with his daughter.

Not only has *Interstellar* received positive critical reviews, it has been praised for depicting complicated scientific subjects accurately. Did it? In order to find out, senior writer Mark F. Bernstein '83 bought the tickets and popcorn, and then discussed the movie afterward with Spergel and his wife, Laura Kahn '02, a health-policy research scholar in the Woodrow Wilson School. Here are some excerpts from that conversation:

**MFB:** The first half-hour of the movie showed the effects of climate change on Earth. Did they get that right?

**DS:** I thought that was very well done. Climate change doesn't physically destroy the Earth, but what it does, potentially, is just what the movie shows, which is make it much less habitable for humans. They did a good job conveying the ways in which society breaks down.

**MFB:** Do we know if wormholes actually exist?

**DS:** No. Wormholes would take the equations of general relativity and introduce something with negative mass. Now, we don't know of anything with negative mass, but we didn't know that there was such a thing as dark energy until 15 years ago. In theory, wormholes are certainly plausible. If you were going to travel to a distant galaxy, they would be the way to go.

**MFB:** What other scientific concepts did the movie get right?

**DS:** Think of our universe as a sheet of paper, a three-dimensional surface embedded in a higher dimensional universe. String theory has been an exploration of the way gravity behaves in a higher dimensional universe. We may live in a universe where atomic particles and electromagnetic forces can only propagate in three dimensions but gravity can propagate in other dimensions. They talk about this in the movie, that you could communicate across dimensions using gravity. That's all built on our current speculation.

**MFB:** Was the depiction of black holes realistic?

**DS:** The idea that time slows down as you go into a black hole, that's all



**Am I physically cut out for space travel? No. I don't handle variable G-forces well. ... I'm more interested in the science than in the exploration side.**

real. They made really high-quality simulations of what the environment is like around a black hole.

**MFB:** Could there be habitable planets in other galaxies?

**DS:** We now know that planets are as common as stars. There are probably millions of Earth-like planets in Earth-like orbits in our galaxy alone.

**MFB:** You didn't like the ending?

**DS:** I thought it would have been more dramatic if Cooper had died in the black hole. He is behind the event horizon, where nothing can get out, yet somehow he was able to survive. They didn't explain that. The movie could have ended 10 minutes earlier and been just as good.

**MFB:** Was there anything else you didn't like?

**DS:** Radiation around a black hole is pretty harsh. It's not a place where humans could go; the X-rays would cook you. But I think Kip wanted to convey what it would be like to approach a black hole, and if you want to convey that, the humans have to survive. They did capture a lot of black-hole physics.

**MFB:** Would you want to be Cooper?

**DS:** You mean, am I physically cut out for space travel? No. I don't handle variable G-forces well. I am quite prone to seasickness, and I don't like going on roller coasters. I'd be the guy with a lot of Dramamine. I've always been fascinated with space, but I'm more interested in the science than in the exploration side.

**LK:** Thank goodness.

**MFB:** Will *Interstellar* get people interested in astrophysics?

**DS:** What I hope it succeeds in doing is exciting people about general relativity and the physics of black holes.

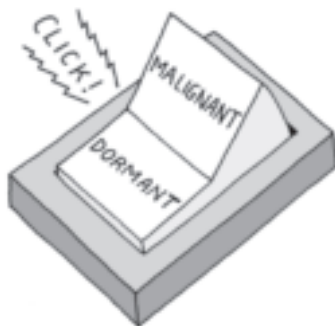
**MFB:** And that we need to do something about climate change?

**DS:** Oh, that would be even better.

**LK:** It's a lot easier to save our planet than to look for another one. ♦

## IN SHORT

Cancer researchers long have sought to understand what makes a **TUMOR** switch from dormant to malignant. A new computational model developed in the laboratory of chemistry professor Salvatore Torquato may help provide an answer. Through a series of simulations, researchers generated a diagram that can be used to predict when a tumor will be in a dormant state and when it will proliferate. The model will let scientists test scenarios and may provide insights for early cancer treatments. The findings were published in *PLOS ONE* in October.



Feeling dissatisfied with your life? It may be related to your age. For those in high-income, English-speaking countries, **LIFE SATISFACTION** dips around middle age (between 45 and 54) and rises in older age. One reason? Middle age typically is a high point for earnings, so people work more, researchers say. Residents of other regions — such as the former Soviet Union, Eastern Europe, Latin America, and sub-Saharan Africa — are less satisfied at older ages.

The researchers also found a connection between physical health and general well-being: Poorer health leads to lower ratings of life satisfaction among the elderly, but higher life satisfaction seems to stave off declines in physical health. The study, co-authored by economics and international affairs professor Angus Deaton, was published in *The Lancet* in November.

Politics always has been divisive in America, but new research shows that **PARTISAN ANIMUS** may be stronger than racial hostility. Studies by Sean Westwood, a postdoctoral research associate at the Woodrow Wilson School, and Shanto Iyengar,

a political scientist at Stanford University, showed that partisanship had a bigger impact than race on how people behave in situations involving race and partisanship. The findings are forthcoming in the *American Journal of Political Science*.



Fewer jobs lead to fewer children, according to a recent study. The results suggest that women who were in their early 20s during the 2008 recession were more likely to **POSTPONE HAVING CHILDREN** in the short term and to have fewer children in the long term. The findings, by Woodrow Wilson School professor Janet Currie \*88 and postdoctoral associate Hannes Schwandt, were published in the *Proceedings of the National Academy of Sciences* in September.

Americans are wary of researchers seeking funding for their work and **DISTRUSTFUL OF SCIENTISTS** they believe are pushing a specific agenda. That's the finding of a study by Susan Fiske, a professor of psychology and public affairs, and graduate student Cydney Dupree. Scientists are viewed as competent but not entirely trustworthy, the researchers found. The study was published in the *Proceedings of the National Academy of Sciences* in September.





# Keys to the Mind

New tools are helping scientists  
unlock mysteries of the brain

BY CARMEN DRAHL \*07

ANYONE WHO STEREOTYPES video gaming as the pastime of slackers might be surprised by how Princeton professor David Tank and his research team delve into the neuroscience of navigation. Two floors below the entrance to the new Princeton Neuroscience Institute (PNI) building, behind a heavy black curtain, lies a virtual-reality game fit for a mouse. During a typical experiment, researchers project a maze, similar to what appears in 1990s-era video games, onto a small curved screen. The mouse, alone in its very own IMAX theater, becomes the star of the game, navigating the moving maze by scuttling on a Styrofoam sphere about the size of a bowling ball. As the mouse turns every which way, the ball follows, while the animal's brain is viewed using a specialized microscope.

The microscope zeroes in on specific groups of cells. A favorite target is a type of neuron in the hippocampus region of the mouse's brain that fires when the animal is in a particular location in its environment. The readout appears on a nearby computer screen: a flurry of small white circles, each a single nerve cell, lighting up and going dim, each to the beat of its own drum. Now, for Tank's team, comes the fun part: translating the dynamic patterns of nerve-cell firing into the mouse's sense of place as it moves through the maze.

Scientists have known about the importance of these so-called place cells for decades. In fact, the researcher who discovered them, John O'Keefe of University College London, was just awarded a share of the Nobel Prize in Physiology or Medicine. Yet it is only recently that neuroscientists like Tank have demonstrated that it's possible to record patterns of chemical activity across a whole network of these neurons at once — a finding that ultimately could help us understand motion, navigation, and other complicated mental activities.

**N**euroscience is undergoing a transformation, enabled by new tools and new collaborations. The field has been hot for some years, but since 2013, it has been positively sizzling. The European Commission debuted its 10-year Human Brain Project. Similar efforts emerged in Japan

and other nations. In the United States, President Barack Obama announced his BRAIN Initiative, a major research effort aimed at exploring how the brain works. BRAIN stands for Brain Research through Advancing Innovative Neurotechnologies, and Princetonians are working at the center of the effort. Princeton might not have a medical school, but it is drawing upon two traditional strengths: fundamental experimental research and cutting-edge theoretical work about the brain and mind. Tank, a physicist by training and a co-director, with Jonathan Cohen, of the PNI, helped plan the BRAIN Initiative's scientific strategy. He compares the current state of affairs to the first times astronomers peered at the sky through a telescope. "My graduate students are

doing experiments today that I only dreamed about doing 10 years ago," he says.

Ever since humans have understood that the brain is the body's information processor, they have sought answers about how it directs everyday activities: behaviors such as forming new memories, making decisions, and planning things. For all the current excitement about neuroscience, nobody is saying that researchers are close to figuring out the brain, or that cures for diseases like schizophrenia are in the offing. Still, scientists now realize that their questions are within reach of being answered. It's like being a physicist or chemist at the turn of the 20th century, explains Cohen, a psychiatrist and psychologist. "There were principles that were starting to reveal themselves that were beautiful and cool, and everyone knew that if they committed to understanding things, there would be useful applications in the future," even though they couldn't necessarily envision nuclear power or the Internet.

The human brain is a fiendishly complicated organ, a three-pound mass of tissue containing roughly 86 billion neurons. Scientists understand some levels of its organization much better than others. At the highest levels of complexity are the large sections of the brain — the familiar names in anatomy textbooks, such as the cerebellum or the cerebral cortex. Students who take introductory psychology are almost



Princeton Neuroscience  
Institute co-directors  
David Tank, left,  
and Jonathan Cohen.



always told the tale of Phineas Gage, the 19th-century railroad worker who lost much of the frontal lobe of his brain in a freak accident, reportedly becoming more impulsive and far less sociable as a result. How much the damage truly affected Gage's personality remains a matter of debate, but there's no disputing that his story is about connecting a large brain region to human behavior.

Inside the three-pound mass are the molecules that relay signals from one neuron to another, traversing the microscopic gaps, or synapses, between nerve cells. In the early and mid-1900s, scientists began identifying and understanding these messenger molecules: acetylcholine, dopamine, and many others. Psychiatric drugs as we know them today would not exist without this level of brain understanding.

It is the levels of brain organization in the middle that have remained the biggest mystery. Networks consisting of anywhere from tens of thousands to 1 million of the brain's neurons work together in navigation, in vision, or in decision-making. Neuron networks are wired together with synapses to form what neuroscientists call circuits. One estimate puts the number of connections in the brain at a staggering 100 trillion. But the electronics analogy of wires and circuits only goes so far in a living brain — the “wiring” connections have varying strengths, and they might change as a result of a new experience. Neuroscientists use words like “mind-blowingly complex” to describe this fluid connectivity.

This middle level — the brain's networks — is the focus of the BRAIN Initiative, and the focus of neuroscience's snazzy new toolkit. These new technologies are monitoring nerve-cell networks, manipulating them, and mapping their connections. And importantly, the tools aren't generating data in a vacuum — they are feeding information to ever-improving models that attempt to link brain activity to human behavior. (See article page 38.)

**T**he Tank lab's video-gaming mouse is the star of a monitoring experiment: watching what circuits of nerve cells do during a behavior or action and trying to discern patterns. The nerve cells going off like flashbulbs under the microscope contain an important tool that debuted in the mid-2000s — a glowing protein called GCaMP. This protein glows brightly when calcium floods into nerve cells, which happens every time a nerve sends a signal. In other words, the protein helps neuroscientists watch a proxy of nerve-cell chatter — it's not quite the chatter itself, but it's close enough

**If monitoring neural circuits is like eavesdropping on cocktail-party conversations, then manipulating circuits is like butting in, changing the subject, and seeing how guests react.**

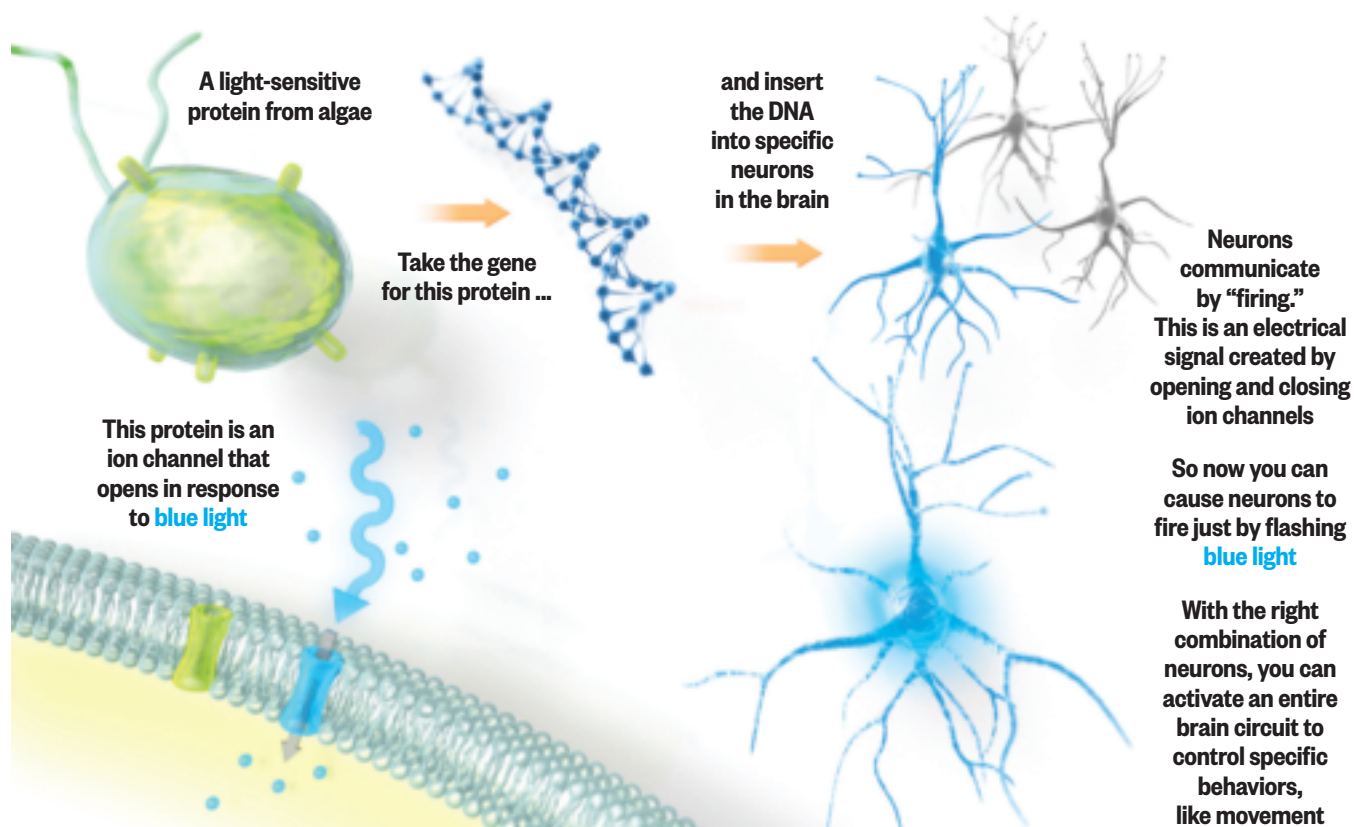


to be useful. With some genetic tricks, the lab can selectively produce the luminescent protein only in the neurons it wants — for example, those neurons that control navigation. The end result is like being able to eavesdrop on a specific conversation amid the din of the brain's proverbial cocktail party. The tool works in several of the animals that neurobiologists study, including mice, fruit flies, and roundworms, so labs worldwide use it in their experiments.

This is a sea change from traditional neuroscience approaches. Terrence Sejnowski '78, who, like Tank, is both a physicist by training and an architect of the BRAIN Initiative's strategy, worked a postdoctoral stint surrounded by colleagues studying one neuron, or a handful of neurons, at a time. Animal experiments relied on injected chemicals or tiny electrodes to follow changes in electrical charge in active neurons. Though tremendously exciting at the time, the approach had limitations, explains Sejnowski, a professor at the Salk Institute in California. “Imagine you had to look at the world through a soda straw,” he says. “You can move the straw around, but you can only see a tiny piece of what's going on. That's what neuroscientists experienced by studying one neuron at a time.”

The picture wasn't much different when Mala Murthy was an MIT undergraduate in the 1990s, nearly 20 years after Sejnowski's postdoc days. Murthy, today an assistant professor at Princeton, says that even though electrical probes can be powerful, they lack the resolution to associate brain

## How Optogenetics Works This technology, employed by Professor Ilana Witten '02, uses light to generate nerve impulses on demand.



structure with brain function. The most dextrous surgeon can't consistently poke the same neuron with an electrode, but the neuroscientist armed with genetic techniques will know exactly what neurons or circuits she's watching. Murthy's domain is the fruit-fly brain, and she says the glowing GCaMP protein has made it easier for her lab to determine, for example, how fruit flies sing courtship tunes to potential mates.

If monitoring neural circuits is like eavesdropping on cocktail-party conversations, then manipulating circuits is like butting in, changing the subject, and seeing how guests react. Ilana Witten '02 uses a technology called optogenetics for manipulating nerve-cell activity, which was pioneered by her postdoctoral adviser, Karl Deisseroth of Stanford. Now back at Princeton as an assistant professor, Witten and her lab prod specific types of neurons with light to learn how a reward, such as a tasty treat, might motivate a rodent to start a good behavior or break a bad habit. The approach is powerful, she says, because it allows her team to manipulate neurons quickly, at the same speed at which they'd normally converse. Many labs have begun to use this approach in animals to investigate the underpinnings of epilepsy, addiction, depression, and other conditions, though many hurdles would have to be overcome for the technique to be used in humans.

When Witten is manipulating nerve circuits, she focuses on a particular area in the brain — for example, a reward center called the ventral striatum. She uses genetic tricks to label particular neurons in a living rodent's ventral striatum with

specialized light-sensitive proteins. A slender fiber-optic cable delivers bursts of light at the appropriate wavelength to the animal's brain. When triggered by the light, the special proteins generate nerve impulses on demand. Along with Tank and other Princeton researchers, Witten has been awarded a share of the first round of BRAIN Initiative funding to study short term "working" memory, which employs some of the same brain circuitry as reward behavior.

For all the talk of networks or circuits of neurons, scientists have only a piecemeal understanding about how all the neurons in the brain are connected to one another. Mapping the human brain's connections is so complex that it has its own major research initiative, the Human Connectome Project. The goal is to build maps of the functional connections in human brains with the help of brain-scanning technologies. The key word is "functional" — just because neurons are anatomically connected doesn't guarantee they work together.

If there is a mapping technique that has whipped researchers into a frenzy, it is Clarity, the method that allows scientists to peer into an entire animal brain — removed from the body and no longer living — and generates stunning three-dimensional views of nerve-cell connections. Neuroscientists used to have no choice but to digitally piece together images from microscopically thin slices of a brain to get that kind of information.

Like Witten before her, Christina Kim '11 works with Karl

Deisseroth at Stanford, who announced Clarity to great fanfare in 2013. The aptly named Clarity technique renders brains transparent: It replaces the brain's fatty molecules, which block the passage of light, with a clear, mesh-like material that holds the brain together. The result is a three-dimensional, transparent brain with all its neurons in place, which can be tagged with markers for specific nerve-cell types and reused again and again. In other words, Clarity is an opportunity to examine the entire brain at once and see that crucial middle level of brain organization: neuron networks. "The simplicity of Clarity — the ability to do a visual reconstruction of the whole brain — is something everyone can appreciate," Kim says.

Clarity has yet to be performed on an entire human brain because the relatively large volume slows down the process. And it's a stretch to claim that Clarity can map each neuron's connectivity in the brain. With glowing labels, Clarity can map where certain nerve-cell types reside in the brain, and then trace connections between those groups.

The technique's potential has not been lost on the U.S. Department of Defense, which is interested in understanding how traumatic brain injury and extraordinary stress in soldiers affect nerve circuitry. The department's Defense Advanced Research Projects Agency (DARPA) aims to speed up the Clarity process and to combine its mapping ability with information from other technologies. To accomplish that goal, the agency is funding a project called Neuro-FAST — which stands for Neuro Function, Activity, Structure, and Technology.

Both Kim, who conducted her thesis research with Tank, and Daniel J. O'Shea '09 are involved in the project. With Stanford professor Krishna Shenoy, O'Shea studies how neurons in the brain's motor cortex produce the patterns of activity that drive movement. "Clarity and other new tools open a new class of experiments up," says O'Shea, "but you still need to think of the right questions to ask."

**T**hat, says PNI co-director Cohen, is where theoretical work comes in. "Neuroscientists are getting excited about all the new things they can measure, and that is fantastic," he says. "If you think about the brain as a massively complex computer, you have to know about transistors and circuits to understand it. On the other hand, it's not just how the transistors are connected, but it's the computer's overall architecture, and the software it runs."

**"Now that experimentalists have handed us a telescope," just as Galileo got centuries ago, "we can ask burning questions our computer models have been feeding us for years," Botvinick says.**



**Terrence Sejnowski '78 has witnessed a sea change in neuroscience technologies during his career.**

The experimental monitoring, manipulating, and mapping become even more powerful when guided by a testable theory — about how brain function gives rise to mind and behavior. "If you think about what science is, it's about having a model, a hypothesis, that you can test," Cohen says. "What that says to me is that neuroscience needs theoreticians side-by-side with the experimentalists."

Many psychology and neuroscience researchers, including Cohen and Sejnowski, are employing mathematics and computer science to develop theories about how the brain links to behavior. Professor Matthew Botvinick, for example, is one of a cadre of researchers using computer models to recognize patterns of brain activity in collections of whole brain images obtained by placing living, thinking human volunteers inside a specially configured MRI scanner. His team is getting better and better at analyzing the scans obtained with this technique, known as functional magnetic resonance imaging, and figuring out what words people have in their minds, such as the words "furniture" or "table," based on what the volunteer was thinking about during the brain scan. This kind of elementary brain-reading exercise is very far from practical applications, but it is already useful for researchers determining how patterns of neural activity encode language, whether word-by-word or letter-by-letter. "Now that experimentalists have handed us a telescope," just as Galileo got centuries ago, "we can ask burning questions our computer models have been feeding us for years," Botvinick says.

"Thirty or 40 years ago, scientists didn't know what the best approach was to break down the brain," Cohen says. They tended to split off into psychology, studying behavior; or neuroscience, studying the brain. "And rarely did the twain meet," he adds. The cultural divide between psychology and neuroscience has been softened, Cohen says, but it isn't totally gone. PNI's gleaming new building connects to the Department of Psychology's new home, and is steps from the departments of molecular biology, physics, and chemistry. That, Cohen says, is by design. "We want the Princeton Neuroscience Institute to embrace everyone's tools," he says, "whether they come from



psychology, biology, engineering, or physics.”

Back at Princeton’s mouse virtual-reality headquarters, physics graduate student Alexander Song and imaging specialist Stefan Thiberge are developing a next-generation microscope. Song points out that the movie of flashing neurons, while unimaginable 10 years ago, keeps tabs on only a few hundred nerve cells at a time. That’s just a fraction of the tens of thousands of neurons that likely are involved in controlling a behavior. So if Song can increase the number of neurons that can be imaged at once, and increase the number of areas in the brain that can be monitored, he will have more comprehensive data. Also coming online is an experiment that not only will monitor mouse-brain circuits, it also will manipulate circuits to test whether they

truly do control the behaviors scientists think they do.

“Ideally, you’d like to monitor a whole brain at once, while manipulating one neuron at a time,” Song says. “For now, that’s still a pipe dream.”

Tank and his fellow neuroscientists have bigger dreams still: “If we could do that mouse-brain movie in the human brain,” Tank says, “that would be revolutionary.” ♦

*Carmen Drahl '07 is a Washington, D.C.-based writer. She most recently worked at Chemical & Engineering News.*



**WATCH:** What does cutting edge neuroscience data look like? View video examples at [paw.princeton.edu](http://paw.princeton.edu)

## Crowd-Sourced Science

“Work as a game master and advance neuroscience!” the job ad began. “Are you a modern-day Leonardo DaVinci with a talent for Tetris?”

The candidates were applying for jobs in Professor Sebastian Seung’s new Princeton lab, where neuroscientists are mapping the connections from one brain cell to another. He’s starting by tracing the mouse retina — the part of the central nervous system at the back of the eye that brings the visual world into the brain. When the entire brain is mapped, the result will be a wiring diagram called the connectome, which Seung believes encodes an individual’s identity. Seung described his vision in a popular 2012 book, *Connectome*.

The brain is a dense place: A space the size of a sugar cube has more connections than the Milky Way has stars. The data required to store a

connectome will fill an estimated 75 billion iPads, at 16 gigabytes each. A team of 100 scientists working around the clock would take 500,000 years to map a human brain, Seung’s lab calculated.

To speed up the work, Seung has marshaled thousands of amateur citizen-scientists to do what computers can’t. They are playing an Internet game called EyeWire, developed by Seung’s former MIT graduate student Mark Richardson and launched in 2012. Thin slices of mouse retina have been visualized by microscope at the Max Planck Institute in Germany, and digitized as cubes enclosing a tangled neural jungle. Players compete to connect the branches of the retina’s 1 million neurons.

It’s science, but with an online social culture — including chats and happy hours, special competitions to map the



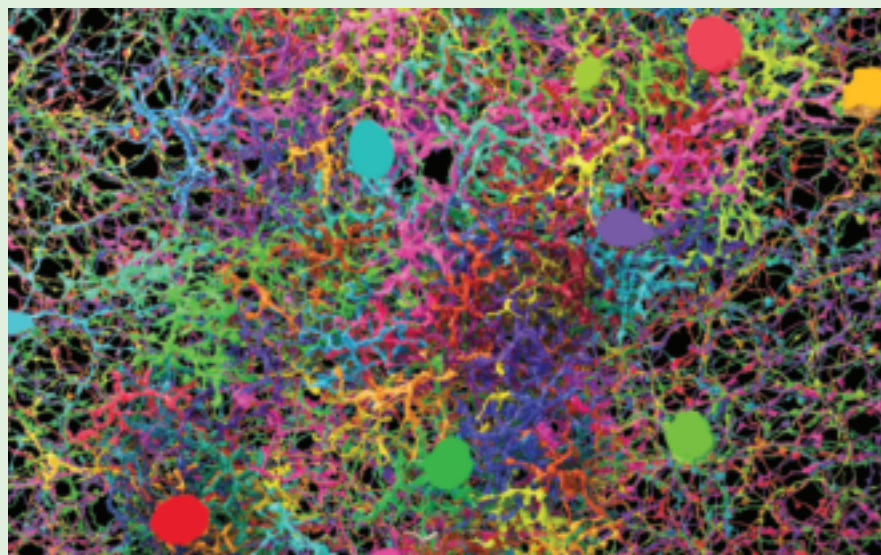
Sebastian Seung

trickier cells, prizes, and even neuron naming rights. About 130,000 people from 145 countries have participated so far. “Most of our effort goes into developing our technology,” Seung says, suggesting that his lab more resembles an Internet startup or gaming company than a typical brain lab. “Our work is 1 percent scientific discovery,” he says, “99 percent developing the tools.”

EyeWire’s crowd-sourced brain mapping has resulted in a recent paper in *Nature* showing how movement is detected by a type of retinal cell in the eye, even before the information goes to the visual cortex. Retinal cells are the brain’s first line of defense: If they process a threat, you can react quickly, before conscious awareness.

Knowing something about how the visual system is implemented, Seung says, informs scientists’ hypotheses about how the brain works. The high-resolution portrait of the retina his lab is drawing will help theorists understand if the algorithms they propose are feasible in the brain’s real circuits, and one day could shed light on mental illness. *By Taylor Beck '07*

**To participate in EyeWire, go to <https://eyewire.org>.**



**DENSE NEURON CELL CARPET:** Ganglion neurons, bipolar cells, and starburst amacrine cells mapped by gamers in EyeWire.



# Decoding the Brain

One day, scientists will be able to “see” the images and memories in our minds

BY TAYLOR BECK '07

REMEMBER YOUR LAST DATE at the movies? Your memory of that night is a web of associations: The popcorn smell of the theater. Your giddiness. The blue sweater worn by your date. The aftertaste of the work you were doing earlier — a client meeting, an email from your boss. Memory is that web: the moods, sensations, and thoughts of a moment in time. All these coincident details are bound together by the hippocampus, a seahorse-shaped brain region under your temple. Later, the hippocampus plays back the memories to the cortex, stitching place, mood, images, and goals together into a pattern. Professor Ken Norman, head of Princeton’s Computational Memory Lab, explains that this is how free association happens: Remembering one strand of that web (say, the blue sweater) leads to another (the movie, or the taste of the popcorn). When you remember a moment, your brain replays a pattern from the past. Norman’s lab, using algorithms to recognize your brain at a moment in time, is fishing for those neural echoes of experience.

This is one snapshot of the growing field of computational neuroscience. Matrices of neural activity flickering across your cortex encode your every thought, mood, and memory. Scientists are aiming to crack the brain’s code. What hacking the mind may one day mean is a world in which your car would know when you’re sleepy, your dreams could appear on a screen, and should you find yourself in a coma, your brain could make your thoughts known. Today, this is science fiction — but in principle, when the brain’s code is decrypted, all would be possible.

Some researchers at the Princeton Neuroscience Institute are using mathematical models to simulate neural processes like learning and attention, allowing them to test hypotheses that can’t be studied in a live human brain. Others apply the algorithms of machine learning to brain patterns, to predict mental states like memories and mental images. Understanding the brain’s code could help scientists develop therapies for conditions like autism, post-traumatic stress

disorder (PTSD), and depression; means for amputees to operate robotic prostheses with their brains; and ways for all of us to remember, focus, and communicate better.

“The idea is to make something invisible visible by attaching something to it,” Norman says, explaining how his lab tracks memories in the brain. Snapshots of memories appear on brain scans, encoded in patterns of neural activity and recognized by algorithms tracking mental replay as subjects lie in a functional magnetic resonance imaging machine, or fMRI.

The trick is to track an image that is clear on brain scans. Faces and scenes, for example, are represented in specialized brain regions packed with cells sensitive to them, helping with social interaction and navigation. So thoughts of faces and scenes can be identified in fMRI scans by their characteristic brain activity. By showing

you face photos, scientists tag your memory with a tracer they can see on brain scans. Just as movie scenes may link to the memory of your date, these tracers can be tracked, like the GPS on a car.

Why do people misremember? You think you heard about 9/11 on TV, when you really heard it on the radio; you think your love was at first sight, though the feelings really came later — why? In one recent experiment, Princeton researchers in Norman’s lab investigated why an event gets misattributed to a time or place. First, they showed subjects undergoing fMRI a series of images of objects, interspersed with pictures of scenes that served as the thought tags, or tracers. Later, the researchers showed the same people another series of pictures; this series showed only objects to be memorized, without scenes. Back in the fMRI machines later, the subjects were asked to recall which series each image came from. People were more likely to misremember images from the later series (objects only) as coming from the first series, in which

Peter Murphy





**Professor Ken Norman leads Princeton's Computational Memory Lab, which tracks memories in people's brains.**



**The media sometimes call this kind of work **mind-reading**: reading out memories, mental images, even dream content from brain patterns, as a lab in Kyoto, Japan, recently did. Norman balks at the term. “The appeal of fMRI is its **non-invasiveness**,” he says, and the neural decoding he works on requires the **subjects’ cooperation**.**

the scenes — serving as tracers — were in their brains. The scientists found that brain-activity patterns could predict which items would be misremembered, based on when the tracer was in the brain. We experience that kind of misremembering in everyday life. For example, if you have been talking about a friend, and then you hear about a movie you’ve seen, you may recall — incorrectly — that you saw it with that friend.

The media sometimes call this kind of research mind-reading: reading out memories, mental images, even dream content from brain patterns, as a lab in Kyoto, Japan, recently did. Norman balks at the term. “The appeal of fMRI is its non-invasiveness,” he says, and the neural decoding he works on requires the subjects’ cooperation. Here, fMRI decoding is used not for eavesdropping, but to understand how the mind is encoded in the brain. Such knowledge has clear medical potential, to help people with troubled mood, concentration, or communication — to build tools for the psyche.

**I**n another lab, down the hall in the PNI’s new home on the southern edge of the campus, assistant professor Yael Niv applies similar technology to explore a different aspect of brain function: learning. “Learning is overwriting an old thing,” Niv explains. “Memorizing is protecting the old thing from being overwritten. There’s a stream of experience coming by all the time, and you have to decide for each new event: Do I learn or do I memorize?”

The battle between learning and memory is the balance between expansion and consolidation, exploration and safety. Memory is a trace of the past maintained in the brain. Learning is change: updating those traces.

Our brains infer patterns easily, Niv explains. If you’re waiting to cross a street, you watch the color of the stoplight but ignore the color of cars. You learn what to filter. If you’re trying to hail a cab, you see the scene differently: Yellow cars pop out. In class, you speak differently to your professor than you do when you meet him at a party. Computers have trouble seeing these patterns; robots are awful at learning this kind of flexibility.

Imagine you’re meeting with your former college adviser for the first time in years. You have an image of what he is like: bearded, smiling, with a distinctive voice. Now you show up, and he’s clean-shaven. What happens to the professor in your head?

Abrupt change tends to create a new memory, while gradual, subtle change modifies the memory already in your head. Niv’s lab has come to this insight in a series of studies using computer simulations and human behavioral tests. The computer models learn by reinforcement, updating when their predictions about outcomes are wrong. In her experiments,

Niv found, sudden change prompts people to cluster their memories into two separate blocks. But when the change is gradual, memories blur into one block.

In the case of the beard, you’ll overwrite: The professor updated to have no beard is not fundamentally changed, so it’s fine to

overwrite, as if saving a file on a computer. But there are examples where the thing to do is to make a separate memory.

Remember Pavlov’s dogs? The bell, the food. In 1901, Russian physiologist Ivan Pavlov showed that if you pair something of value, like a meal, with an initially meaningless stimulus, like a bell or light, an animal associates the conditioned stimulus with pleasure or pain: Dogs salivate to bells; mice freeze to light once paired with a shock, as later studies showed. So do we. Niv’s computational work on reinforcement learning, as this process is known, is aimed at unlearning such traumatic associations.

Sam Gershman \*13, a soon-to-be Harvard assistant professor of neuroscience, recently started translating Niv’s basic findings into practical areas, focusing his work on modeling memory and fear: How does a person overwrite a toxic mental trace and learn to move on without fear, when others get stuck in a negative loop? As many as 75 percent of American adults, by one estimate, are exposed to severe trauma in their lifetimes, yet only 7 percent show symptoms of PTSD. We all go through tragedy, but each year, only 6.7 percent of adults react with a depressive episode, according to the National Institute of Mental Health. What kinds of therapy might help people recover from traumatic memories?

People with phobias and PTSD often are treated with “exposure therapy.” If a person is afraid of spiders, for example, the therapist might coax him out of his fear by showing him pictures of spiders in a safe environment. After repeated exposures, the patient stops responding with fear.

But the effect of the therapy often doesn’t last — the fear



**Sam Gershman \*13**  
studies memory  
and fear.

Yael Niv



**Yael Niv uses computer simulations and behavioral tests to study memory and learning.**

memory remains intact, buried but raw, and often returns over time or in a new place. The reason, Niv believes, is the mismatch of context: Since the atmosphere of the psychologist's office is so remote from the trauma itself, the brain forms a new memory, and leaves the toxic one intact.

Using computer models, Gershman is out to test this prediction. Collaborating with a rodent lab at the University of Texas, Austin, Gershman came to a conclusion that challenged the way we commonly think about learning and unlearning fear. First, the animals were taught that a tone was accompanied by a shock. When scientists suddenly stopped pairing the tone with the shock, the animals' fearful reaction to the sound eased, but only temporarily. After a delay, in a new context, or when given a "reminder shock," the fear of the tone returned. But when the shock was phased out gradually, the animals formed a sturdy safety memory: They no longer froze when they heard the tone. Gershman's interpretation is that the gradual approach changes the old fear memory directly — updating it to include new "safety" information, rather than forming a distinct memory. A similar approach might be used in human therapy: a gradual withdrawal of fear.

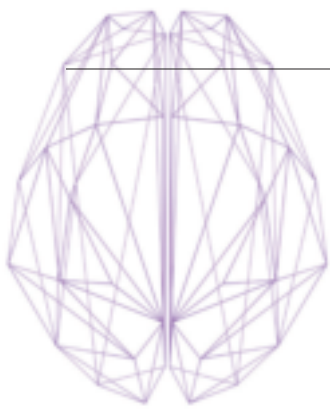
Addiction is another space where this model is expected to apply. Abstaining from drugs, for an addict, is abrupt. "Until now you've had all these associations between the drugs, your

mates, the cues, and the high state," Niv says. "And now you abstain completely." Since the context is new, the memory that's formed when a person quits drugs cold turkey also is new — and "indeed, the great problem with addiction is the relapse rate" of 60 percent or more.

"We're thinking that maybe gradual withdrawal from the drug is going to be more effective, because you're going to take whatever you've learned before and modify it, rather than protect the old memory by changing things quickly," she says.

**T**he difference between madness and imagination may lie in how well we keep track of where we are: how much our attention is driven by the outer world versus our inner moods and memories — those equations written on the private window of our minds. "We live together," Aldous Huxley once wrote, "but always, and in all circumstances, we are by ourselves." His view captures the isolation of mental disorder: trapped inside a broken brain, untranslatable. The Princeton Neuroscience Institute's goal is to crack the codes that hold those moods and memories — to map this secret world, like outer space or the ocean floor. If they succeed, those isolated minds won't be so stranded anymore. ♦

*Taylor Beck '07 is a writer in New York.*

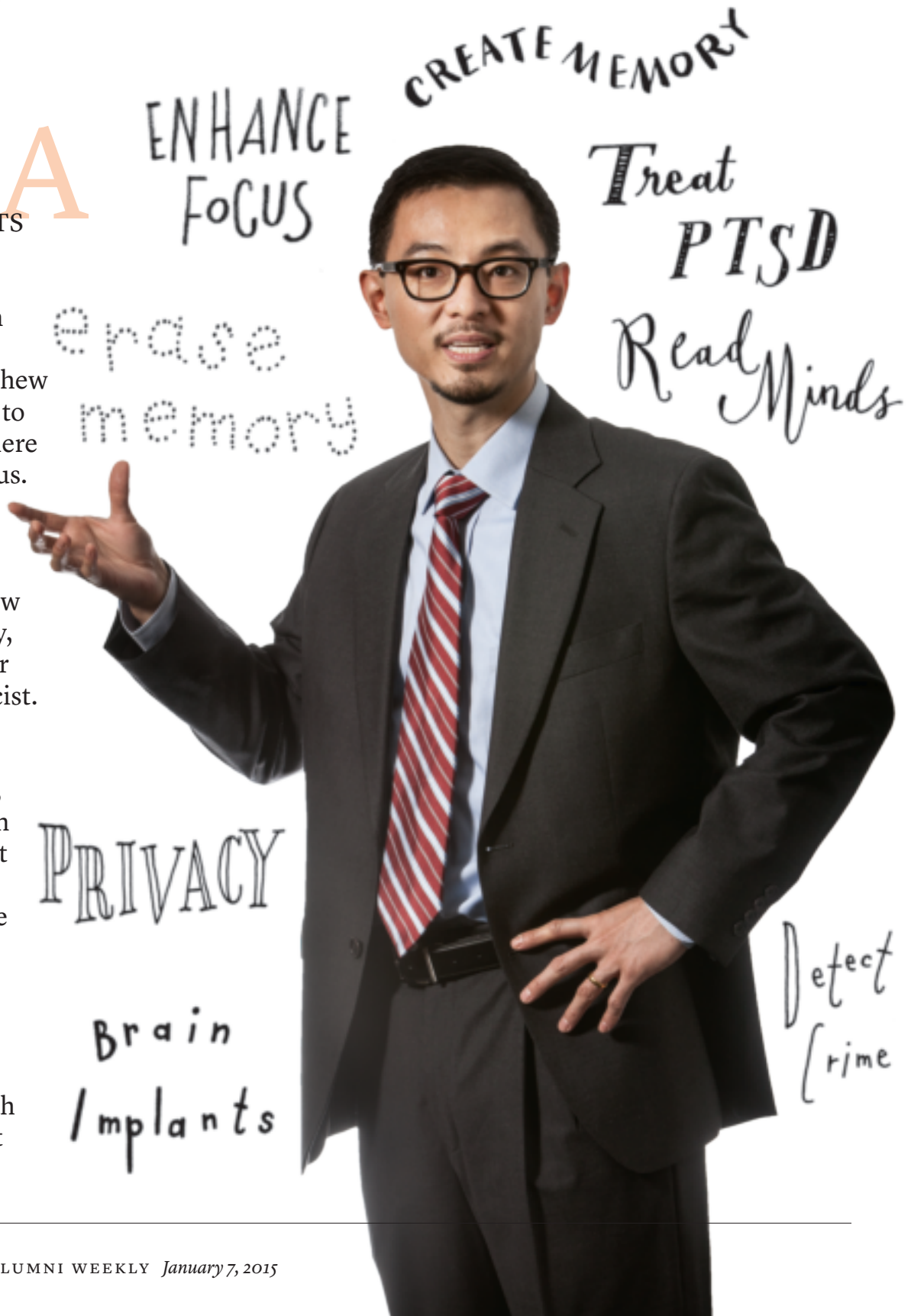


# The Ethicist

Neuroethicist MATTHEW LIAO '94 ponders the consequences of new technologies

## Q&A

AS SCIENTISTS at Princeton and elsewhere make strides in understanding the brain, Matthew Liao '94 works to understand where they may lead us. Liao, director of the master's program in bioethics at New York University, is a philosopher and neuroethicist. Scholars of neuroethics, a new discipline, focus largely on two areas: what happens in our brains when we make ethical decisions, and the ethics of neuroscience technologies. PAW spoke with Liao about that second aspect of his work.





## Why neuroethics?

I got interested in this area because a couple of my colleagues were taking things that enhance your cognition — drugs like Ritalin and modafinil. There was a survey in *Nature* that said something like one in five *Nature* readers were on cognitive enhancement. And we're not talking about coffee. Modafinil — it's a drug that the U.S. government has been interested in. It basically allows you to go for a long period without sleep. The government wants pilots to be able to go on missions for, like, 18 hours without feeling tired. The drug is used for narcolepsy, but they've found that it can also help normal subjects function really well without sleep.

There are also mood enhancers — things that make you feel better, like Prozac. There are people taking an antidepressant for depression. But, some people take it to make themselves feel happier — better than well, even if they are not clinically depressed. And so that raises issues about authenticity: Do we change ourselves, or our perception of ourselves, when we take drugs like that? We're altering our personality — what does that mean? And then it gets into issues about our perceptions of the world — does it affect the way you see the truth, the way you perceive things? Maybe you're sad because things are really bad! But this will make you think, no, everything is fine! And then you don't have to do anything about it. It can affect your responses.

## What are some of the other issues you're looking at?

One of the things I wrote about is memory modification. A lot of soldiers are coming back from war with post-traumatic stress disorder, PTSD. There's a drug called propranolol; it's a beta-blocker that they give to soldiers with PTSD to dampen the emotional memory. So that memory doesn't get consolidated as strongly into long-term memory. It works to block the process of consolidation, when the memory moves from short-term to long-term memory.

There's another drug, ZIP, which stands for zeta inhibitory peptide, which affects reconsolidation of memory. It can erase particular memories. Reconsolidation means that every time we try to recall something, certain proteins have to come together, and they put together that memory again. It's not like a computer memory, where once you have it, it's right there and you can access it each time. Reconsolidation puts a memory back together and updates it, based on your current way of thinking. So in that way, the memory is always changing.

## Is that how you can make yourself believe things that didn't happen in a certain way?

If you keep thinking about it, you can change the memory, and it will evolve. You'll remember the big

things, or misremember the big things, and then leave out the details.

## And that's how you forget the pain of childbirth, right?

That's right! You remember all the great things, and you forget the pain. That's exactly what happens.

## How does it work?

The theory is that the protein kinase M zeta, which is called PKMzeta, is often needed for the storing of long-term memories. But when ZIP is used, it inhibits PKMzeta and blocks the memory from being reconsolidated. And if you do that, the memory stops existing completely. There was an experiment with mice where scientists first taught mice a memory — that they would be shocked each time they went into a certain zone. Some mice would be given ZIP to inhibit the PKMzeta. There were also control mice that did not get ZIP. A day later, the control mice would avoid the shock zone. But the mice given the ZIP would keep going back and getting shocked.

You can target a particular memory and erase it. The scientists also teach the mice a maze, in addition to the shock zone. They try to trigger the memory of the shock zone to see if they can erase it. And then they see if the mice also forgot the maze. If all the mice can run the maze, you can infer that the drug hasn't erased the maze memory. What you don't want is a drug that erases everything.

The theory is that because the drug targets reconsolidation, it only targets memory that you're trying to recall. So one danger is: Suppose you're trying to recall another memory while you're recalling this memory. You might forget that one, too.

## How might this be used in humans?

Well, one application is addiction. The old theory of addiction is that once people get addicted, there are certain triggers, so you try to get addicts to avoid the triggers. With this, the idea is to try to recall the triggers. You might purposefully try to trigger the triggers. And then at that point, erase the trigger. That set of memories gets erased.

You could use it to erase memory of a very traumatic event. And some people may also think about using the technology on the enhancement side. DARPA [the military's Defense Advanced Research Projects Agency] is really interested in repairing memories and restoring memories. But once you can repair and restore memories, you should be able to create memories.

## But they're not real memories!

Exactly. You can create fake, you know, pseudo memories. And it's very easy, actually, to create fake memories. There's a law professor, Elizabeth

*continues on page 46*

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**Do we  
change  
ourselves,  
or our  
perception  
of ourselves,  
when we  
take  
drugs like  
Prozac?**

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“The experience  
left me wanting another  
**Princeton Journey.**”

*Michael Tourtellot '71, participant on 2014 Alaska Overland*





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PRINCETON JOURNEYS  
*A World of Learning*



*continued from page 43*

Loftus, who did pioneering work on inserting false memories into people. She told people they were participating in an advertising study for Disneyland, and showed them an ad with Bugs Bunny and a cardboard cutout of Bugs Bunny. Then she asked whether people had ever met Bugs Bunny in Disneyland, and said, “Tell me about your experience with Bugs Bunny.” And some people said, “I don’t remember that.” But about 20 percent said things like, “Oh, yeah, Bugs Bunny touched my ear and gave me a big hug” — they tell this really elaborate story. But of course that never happened. Bugs Bunny is owned by Warner Bros., not by Disney. He would never have been in Disneyland.

### **So is it a good thing or a bad thing to pursue?**

I ask two questions. One is, how far are we in developing this technology? Usually the technology hasn’t been perfected, but we’re getting there. And the second question is the ethical question: Let’s suppose we could develop it — should we be doing that? The question there becomes more complex, because it depends on the situation. You can imagine that some people have had really traumatic experiences and feel they can’t live anymore, like a soldier with PTSD. If the alternative is that you want to kill yourself, then maybe it’s OK to take a drug, even if it creates false memory.

But in other cases, we have to worry: What would happen if it gets into the wrong hands? One of my jobs is to think ahead and try to map out the ethical arguments: Should we be using these technologies, and under what circumstances?

### **It seems that once you start going down that road, it would be hard to pull back.**

Totally. Once you let the genie out of the bottle, everyone will want to use it. And some people will misuse it.

### **Ethicists are talking about these things, and scientists are in the lab. Do the scientists talk to the ethicists?**

We try to talk a lot about it. [Here, Liao noted that he was planning a conference with ethicists and scientists about “borderline consciousness” — using fMRI to determine if patients in a “persistent vegetative state,” or PVS, actually are conscious. He referred to a 2010 study in which scientists concluded that some patients could “answer” yes-no questions because a certain region of the brain lit up.] So that raises the question: Is this patient in PVS conscious? Clinically, by our current definition, these people are completely unresponsive; they don’t have consciousness. They are brain-dead. But by fMRI — and this is disputed territory — they appear to have consciousness.

What does it mean for a family when you

find out that your loved one could appear to be able to answer questions? That might affect your decision about end of life. It’s going to affect public policy.

### **This sounds like mind reading.**

It is mind reading.

### **Do we really want other people to know what we’re thinking?**

There are labs where they show subjects clips of movies, and then, on the basis of what’s firing in your cerebral cortex, the scientist can kind of reproduce it. The scientist tries to re-create what the subjects are seeing. And you should see how close it is. If the subject sees a bird, the scientist has a kind of fuzzy picture of a bird. With statistical significance, they can figure out what the subject is thinking, which words they’re thinking about. But the technology is not perfected yet.

They can’t just figure out what you’re thinking without having a lot of data. For example, they get 50 people to look at a cup, and see what happens in the brain when the people see the cup. Then, when you are under a scanner and what’s happening in your brain matches what happens in the other 50 images, they know you are looking at a cup.

Right now we just don’t have the data for many things. You would have to get a bunch of people to look at a lot of things to say you’re reading people’s minds.

### **Will that always be the case?**

Not always. But that’s a big limitation right now.

The other thing that fMRI might be used for is crime detection. That raises questions about whether you’re testifying against yourself, for example — you’re not talking, you’re not testifying, but they could use that image. ... They actually prosecuted a woman in India by using the fMRI. She was accused of lacing her boyfriend’s coffee with arsenic. She was convicted.

There was a case in New Jersey where they tried to get fMRI images to be admitted as evidence. The judge very sensibly said, “We’re not there yet.”

### **Suppose we could do it — what are the issues?**

One worry is privacy. It’s bad enough governments can read our phones; now they could be able to read our minds. Some people are suggesting that maybe we can have mind scanners in airports, so that we scan brain waves to see which people are thinking about certain words: bomb bomb bomb bomb. But think of this hypothetical: The government sometimes engages in torture to extract information. Imagine if you can extract information without torturing the subject. Just put the subject in an fMRI. Wouldn’t that be better?

### **Do we have to do either one?**

Well, if we had to do one, it seems like the more

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**In other cases, we have to worry: What would happen if the technology gets into the wrong hands?**

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preferable way — you violate the person's privacy, but at least you don't torture the person to death.

#### **Did you see the movie *Minority Report*?**

Yes, with the “precogs” [people who foresee crimes before they are committed]. There is a whole literature in neuroethics about whether there really is free will. Scientists have done several experiments. They get you to look at a clock. And as the clock moves, they tell you to flick your wrist. And before you even do it, they can tell when you're going to do it. They do it on the basis of what's called the readiness potential — they know you're going to make a decision a couple of seconds before you're even aware of your decision.

In another experiment they got subjects to press the left button or the right button. Up to seven seconds before the subjects picked a button, they could figure out whether the subject would pick right or left, depending on the brain signature. So that's getting very close to *Minority Report*. That raises questions about free will.

#### **How do the scientists feel about the philosophers?**

Scientists I know are so into their research, it's hard to say, “I'm not going to pursue this because the disadvantages outweigh the advantages.” They sometimes think we're pests. The initial reaction is that as long as they have gotten it past their institutional review board, they say, we've done our ethics. But I think after talking to us, they realize the importance of it. Because science sometimes goes bad. When it turns out that the science has not been done in an ethical way, it actually sets the science back by 10 to 15 years.

There's a view that technology is inherently neutral. You can use it for good; you can use it for bad. Nuclear energy can be used for good and for bad. If we don't use that technology, we've shut ourselves off from a lot of good things. Or, take this knife. Some people say, “Great — we can cut apples”; other people say, “Let's stab people.” That issue has been with us ever since we started inventing tools. What neuroethicists are trying to do is avoid doing the bad thing first.

#### **How about DARPA? Talk a little about where DARPA's neuroscience technology is today.**

Deep-brain stimulation exists. That's where electrodes are implanted in the brain, and the electrodes produce electrical impulses. About 100,000 people today use it for Parkinson's.

DARPA is very insistent that they only want these technologies for treatment, to treat people and repair the memories of soldiers with PTSD. But it goes back to my point about dual use: Once you have the technology, you don't have to use

it only for treatment. You can actually use it for enhancement for soldiers. And then it can be used for the enhancement of others. It just seems so tempting ...

Take drugs like Ritalin, which is supposed to be for people with attention-deficit disorder. But kids without ADD use it in high school.

#### **What's your biggest worry?**

I think the privacy is one big worry. Suppose you're on the job, and we know how to erase your memory. Suppose you work for a company with proprietary technology, and they want to make sure you don't give it away. This is a bit science fiction, but it's worth asking: Can they, each day, erase whatever you've learned, so you can't divulge secrets?

#### **How far away are we from some of these technologies being part of our lives?**

Well, some of them are here already. I think about 10 to 15 years. The deep-brain stimulation is already available. We just need to make a closed-loop system — a system that monitors brain activity itself, just like we have thermostats that monitor room temperature. An implant could show that activity is spiking when something important is taking place in your brain, and someone can figure out what you're thinking.

The biggest challenge is they have to give you an implant. But, you know, a lot of people are using already these “wearables” to play video games — things that send electrical pulses to your brain to help you play better. I know people who wear them while they're studying — to give them cognitive enhancement by sending small electrical pulses.

So here are people voluntarily giving Google all kinds of information, voluntarily taking Ritalin, putting wearables on their heads, and giving their 10-year-olds drugs. It's pretty easy to imagine that people could be convinced to do these things. You tell them that you'll be better at games; you'll be better at school. Instead of taking 10 hours to learn math, it will take you two. People will say, “Sign me up!” There can be a pay service and a free service. For the free service, you agree to give us access to your brain, just like you provide access to your email for advertisements. And once they have the information about you, they can figure out things about other people. So even if you didn't sign up but everybody else did, they can figure you out.

#### **That's a little unsettling.**

It is. But that's how these technologies will be rolled out and adopted. ♦ *Interview conducted and condensed by Marilyn H. Marks \*86*

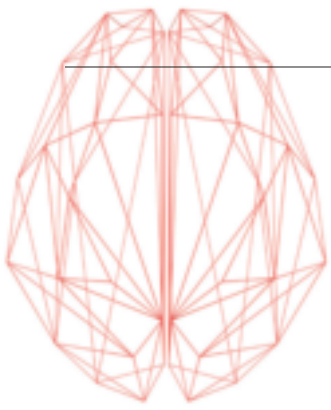


**WATCH:** Liao '94 discusses the technology and ethics of “erasing memory” at [paw.princeton.edu](http://paw.princeton.edu)

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**There's a  
view that  
technology  
is inherently  
neutral.  
You can  
use it for  
good; you  
can use it  
for bad.**

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# Brain Boosters

Sex, exercise, and sleep seem to change the brain's very structure — at least in rats

BY KATHERINE HOBSON '94

FOR A LONG TIME, scientists believed that a mammal's brain stopped adding neurons — the building blocks of the nervous system — soon after birth. When children, teenagers, or adults learned and formed new memories, it was thought, there were changes in the connections between existing neurons, not the creation of new ones.

That once-basic tenet of neuroscience has been toppled over the past few decades, and Elizabeth Gould, the Dorman T. Warren Professor of Psychology and Professor of Neuroscience, has been in the vanguard, thanks initially to her research on the growth of new neurons — neurogenesis — in adult rodent and primate brains. Her lab at Princeton has pushed beyond neurogenesis and now looks at how different experiences — from exercise to living in a given environment to stress to being obese — can change the brain's function and structure in myriad ways. And while Gould's work has not been in humans, it has implications for the more complex human brain, as well — possibly leading to an understanding of problems that can beset it, helping us to remember and learn better and to have healthier lives.

Gould didn't set out to challenge scientific dogma. But as a postdoctoral student in Bruce McEwen's lab at Rockefeller University, studying how hormones influence the brain, she noticed something curious. While performing an experiment that removed the adrenal glands of a rat, she observed a massive die-off of cells in the brain's hippocampus, a region tied to memory formation and learning. But there wasn't a net decrease in the number of cells, suggesting the dying neurons were being replaced. "I thought, 'This isn't happening,'" she remembers.

That was in 1991, so Gould's search for an explanation took her elbow-deep into printed volumes of scientific literature. "I remember going to the Rockefeller library, and looking through these physical databases," says Gould. She found that a handful of scientists had observed new neurons in adult mammalian brains as far back as the early 1960s, but their work had been ignored or attacked. She already knew about the work of Fernando Nottebohm, another Rockefeller professor, who had shown starting in the 1980s that the brains of adult songbirds living in naturalistic conditions generated new neurons. Encouraged by those precedents and by her own findings, Gould switched her research focus and persisted —

even when conventional wisdom was that the whole idea was nonsense.

For a while, Gould's work was ignored, too, recalls Heather Cameron, who studied neurogenesis with Gould at Rockefeller and is now a senior investigator at the National Institutes of Health. But Gould continued her

research. "She rediscovered this phenomenon of neurogenesis that had been reported by several investigators and then pooh-poohed by others," says her former adviser McEwen, a Rockefeller professor of neuroendocrinology who focuses on the effects of stress on the brain.

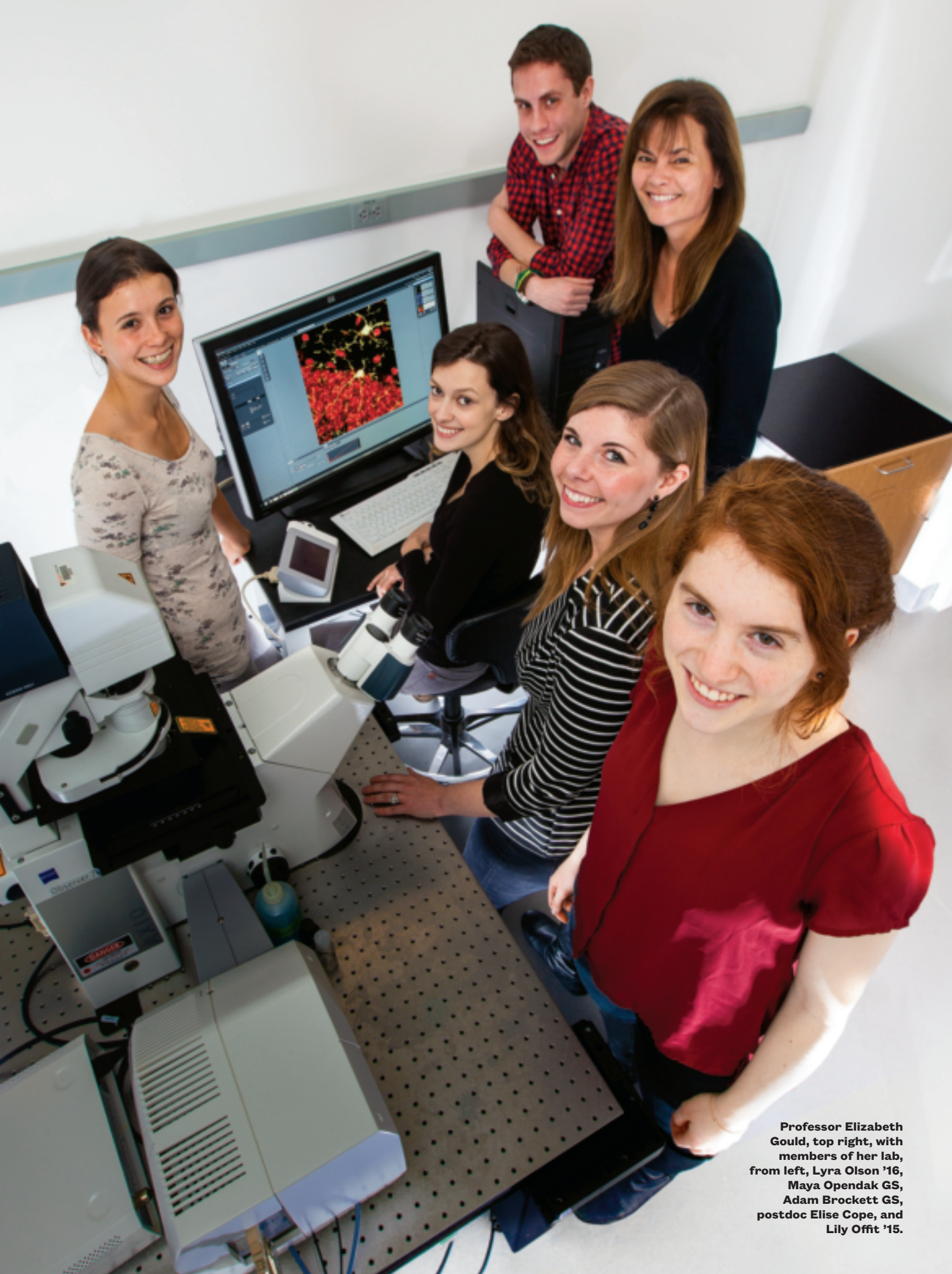
In 1997, Gould moved to Princeton. She and McEwen published papers showing adult neurogenesis in the hippocampus of the tree shrew (a small mammal) and the marmoset (a tree-dwelling primate). And in 1999, she and Charles Gross, now a professor emeritus at Princeton, described adult neurogenesis in several different types of monkeys, including macaques, that are more closely related to humans. In a paper published in *Science* that same year, she and Gross described neurogenesis in the cerebral cortex — the outer layer of the brain involved in higher thought, language, and other complex functions — of those monkeys. The findings were startling.

Over time, with more studies, neurogenesis in the primate hippocampus became generally accepted. Recent post-mortem studies by other researchers even suggest that middle-aged humans generate new neurons in the hippocampus. Neurogenesis in the cerebral cortex is still controversial; the issue is hard to settle in part because current lab techniques make it difficult to study.

Now, Gould's lab is investigating more widespread forms of adult-brain plasticity — the brain's ability to modify its own structure or function in response to changes in the environment of the body. For example, there are changes in the number, size, and shape of dendritic spines, which are like tiny antennae on a neuron that receive signals and transmit them to the neuron's center. The number of synapses, the junctures where electrical and chemical signals pass between cells, also can change. In addition, her lab is investigating changes in glial cells, previously thought to not do much more than hold the brain together, but now suspected to be involved with cognition and other brain functions.

What sort of experiences — rewarding, stressful, enriching —





**Professor Elizabeth Gould, top right, with members of her lab, from left, Lyra Olson '16, Maya Opendak GS, Adam Brockett GS, postdoc Elise Cope, and Lily Offit '15.**

produce these changes to the brain's architecture? How do they relate to the way an animal behaves? Those are the questions Gould and her lab members are pursuing, with an ultimate goal of devising strategies to reverse cognitive or emotional problems that may be sparked by experience.

The lab uses rodents because their brains are good models, biologically and anatomically, for those of humans. But trying to connect a specific rodent experience to a human's can be tough. A study published in 2013 by Gould and Erica Glasper, a former postdoctoral fellow, for example, found that middle-aged rats with sexual experience (sex is a rewarding experience for rats) will grow new neurons and see a restoration of some cognitive function. (It's not known whether the neurogenesis actually causes the improvement.) That doesn't mean 50-something humans should prescribe themselves constant sex for the sole purpose of boosting their brainpower — but it does raise the possibility that certain rewarding experiences for humans also might have cognitive benefits.

Running also is rewarding for rodents. Give a rat unlimited access to an exercise wheel, and he'll spend many hours on it. Exercise has been shown to increase neurogenesis in rodents and to have many other positive health effects in both animals and people. Gould's lab is trying to decipher the mechanics of exercise's beneficial effects on the brain.

In a 2013 study, Gould and Timothy Schoenfeld<sup>\*12</sup> investigated a paradox of exercise: It reduces anxiety in both animals and people, but in animals, it's been shown to spur the growth of neurons in the hippocampus that would seem to set the stage for anxiety. When mice were allowed to run as much as they wanted, their brains did produce many new, "excitatory" neurons — brain cells that activate other neurons they communicate with — more so than in sedentary mice. But the brains of the runners also showed an increase in activity in neurons known to inhibit other neurons. When the mice were exposed to cold water, the brains of the sedentary mice appeared to fire off those excitatory cells in response to the stressful experience. But in the running mice, the inhibitory neurons calmed the excitable ones. Exercise, the authors concluded, can insulate the brain from the anxiety associated with a stressful event.

A study presented at a meeting of the Society for Neuroscience in 2013 showed that rats allowed to run for 12 days better discriminated between objects in a task that depended on the medial prefrontal cortex — a part of the brain involved with object memory — compared to sedentary rats, explains graduate student Adam Brockett, who presented the work. The brains of the running rats also were different from sedentary ones, showing an increase in the number of dendritic spines and in the size of astrocytes (a type of glial cell) in the medial prefrontal cortex. So it appears that neurons are working with other types of brain cells to provide some of the cognitive benefits associated with exercise. "This highlights that brain functioning involves all cell types, not just neurons," says Brockett.

Another major question for Gould's lab: What do bare-bones surroundings mean for the brain, compared to those with more opportunities for stimulation? The former is the more common experience for lab animals. There's evidence that rodents living in more enriched environments show increases in neurogenesis in the hippocampus as well as increases in the connections

between neurons and in the number of glia, Gould says.

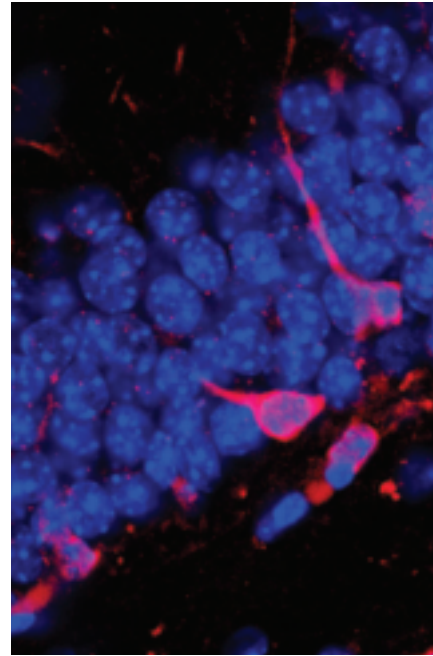
The same seems to go for primates. A 2005 study led by former Gould lab member Yevgenia Kozorovitskiy<sup>\*01</sup><sup>\*07</sup> compared the brains of marmosets who lived in a standard laboratory cage to those housed in larger cages filled with branches, straw nests, vegetation, and other objects of interest to monkeys. The brains of the animals living in the enriched environment showed structural changes that are typically tied to brain development.

More recently, Gould collaborated with Andrea Graham, an assistant professor in the Department of Ecology and Evolutionary Biology, to investigate an environment that was even closer to nature. In 2013, Graham adapted a special facility to study mice at the Stony Ford Center for Ecological Studies, a 99-acre parcel about 4½ miles from campus. Trailer-home-sized enclosures housed seven female rodents each and included "dirt and all kinds of New Jersey weeds and grasses," says Graham. Mice were released into a miniature log cabin within each enclosure, and they had to learn to navigate the larger space and seek out the rodent chow and water provided by researchers over a three-week period.

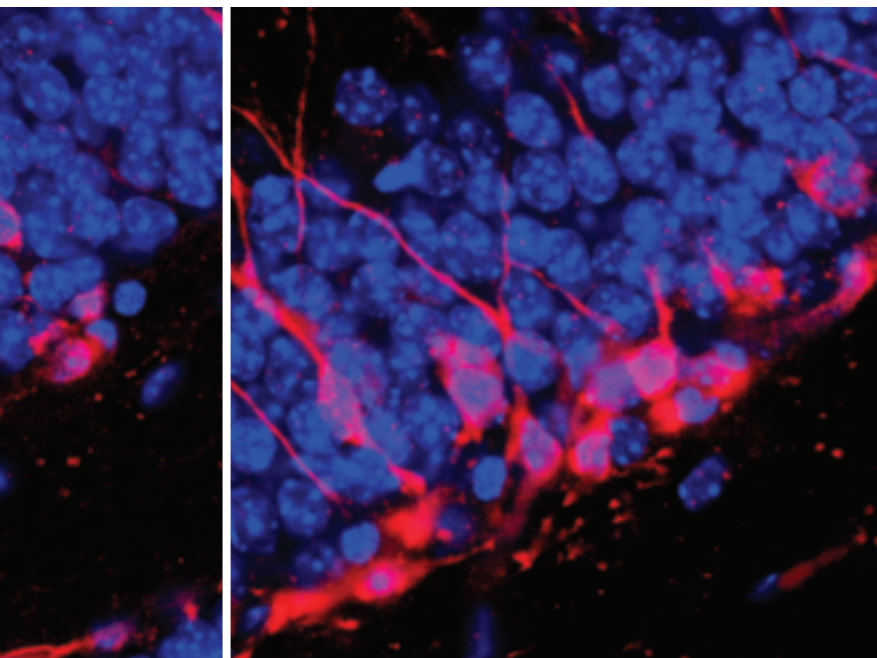
As "clean" mice bred for the lab, "it had been tens of thousands of generations since their ancestors were outside," Graham says. "It was sensory overload." They eventually began behaving more like mice in the wild. Graham is interested in how the mice's gut microbiome — the bacteria and other microbes that live in the digestive system — and thus the immune system are changed by the experience of living in a semi-natural environment.

When Gould heard about the proposed experiment, she realized it would be a great way to study the effects of that environment on the brain. After the experiment, she received the brains of the mice and found that "there was a massive increase in neurogenesis," Gould says. The mice learned to navigate their surroundings, they burrowed, they scouted food — and it all added up to new neurons.

Life experience, of course, also includes how one relates to others, for example, in a social hierarchy. Gould's lab has shown that the brains of dominant rodents show more neurogenesis in the hippocampus than subordinates. More recently, researchers looked at what happens when that hierarchy is shaken up. They effectively cast 12 rats into a season of something akin to "Real World: Rodentville." Two separate groups of four males and two females living in the lab had their activities constantly recorded, even in darkness. The structure featured clear tunnels and the equivalent of an "open field" where they could burrow, "run around, chase each other,







**The image on the right shows new neurons (in pink) in the brains of adult mice after spending time in naturalistic settings at the Stony Ford Center. At left are the brains of mice kept in control conditions, showing less adult neurogenesis.**

and engage in naturalistic behavior,” says Maya Opendak, a graduate student in the lab. Those conditions enabled the animals to form the sort of hierarchy seen in nature.

Once a dominant rat had established himself in each group, in about three days, they were swapped between communities. After the switch, the dominant rat lost his position and a subordinate took his place. But chaos reigned. “We didn’t see a decrease in fighting after four to six days,” says Opendak, who presented the study at the 2013 neuroscience meeting.

When the scientists studied the rats’ brains, they saw that the disruption suppressed the growth of new neurons in the hippocampus. As far as neurogenesis goes, the shakeup caused the dominant rats “to lose any benefits of being dominant,” says Opendak. And all of the animals had less neurogenesis than control animals that weren’t subject to the disruption.

Despite that, the disrupted rats didn’t seem to lose any function when put through their paces on tasks like social recognition and object location, which are dependent on the hippocampus. In fact, when tested on the rat version of anxiety, they were less anxious than controls, suggesting resilience, says Opendak. But when tested on social preference — basically, whether they’d rather hang out with a rat they’d previously met or a new one — they preferred the familiar, which may be an adaptive, “street-smart” behavior. That’s in contrast to the usual rat behavior, which is to spend more time with the newcomer, she says. Now researchers are trying to see whether suppressing neurogenesis without using social disruption as the mechanism produces the same behavior changes.

It’s a leap to map this work directly onto people, cautions Opendak. (Human social hierarchies are usually more subtle and complex, after all.) But one of the early takeaways for rats, at least, is that “even if you have some sort of disruption, it doesn’t have to be a life sentence.”

**S**till, Gould’s work also has suggested that certain disruptive events during a crucial window, in early life, may have much more lasting effects. A lab study

published in 2004 showed that separating baby rats from their caregivers for extended periods suppressed neurogenesis far beyond the initial stressful event. When those rats were adults, even low levels of stress hormones seemed to suppress neurogenesis. This did not happen to adult rats that had not experienced early-life trauma. It’s not known whether reduced neurogenesis contributes to the ill effects of early-life stress seen in humans, but it may be one part of the puzzle.

The lab also is investigating obesity, which shrinks the brain and is associated with cognitive decline both in lab animals and in people. The shrinkage seems to come through the loss of synapses. “What we really want to understand are the mechanisms for why we see those reductions in brain volume and structural changes,” says Elise Cope, a postdoc in the lab who is leading the research.

The scientists are looking at the possible role of microglia, a type of glial cell that essentially acts as a central-nervous-system culture. The cells scout the brain and spinal cord for damaged cells or synapses, infectious agents, or other debris, and then engulf or destroy them. (Recent research shows they’re also involved in sculpting neural circuits, by pruning weaker synapses in order to reinforce the stronger ones, says Cope.) In obesity, the microglia might be releasing inflammatory chemicals that cause neurons to degenerate. Or they might be prematurely engulfing synapses, and causing cognitive impairment that way. Cope is trying to find out whether those microglia actually cause synapse loss and cognitive decline. And if they do, can drugs inhibit the microglia and in turn prevent the decline?

In November, Gould’s team published a paper in *The Journal of Neuroscience* looking at the role played by electrical synapses — the electrical connections between neurons — in anxiety. The study showed that, in mice, blocking those electrical connections in certain parts of the hippocampus and prefrontal cortex decreased anxiety-like behavior. The connections seem to be important for anxiety regulation under some conditions. That raises the possibility of developing drugs targeting the connections as a way to treat anxiety disorders.

The work of Gould and her lab members is dedicated to the idea that the brain indeed can be changed, even in adulthood. What we do and what we experience matters to our brain’s very structure and function. And in turn, the keys to healing some forms of damage may also lie in experience.

“Behavior and experiences change the architecture of the brain,” says McEwen. And so stress and lifestyle factors such as sleep and exercise “are as important as our genes in terms of health,” he says. Gould’s work, he says, “has provided a foundation for understanding this.” ♦

*Katherine Hobson ’94 is a freelance writer specializing in health and science.*





# What We Didn't Say

A struggle — parenting children with mental illness — is finally shared

BY ROBIN HERMAN '73

I'D SEEK OUT MY FRIEND — standing in the crush at the edges of the P-rade — the one classmate I could talk to each year at Reunions who would understand. We'd turn our backs to the line of marchers and whisper under a tree the latest updates about our young-adult kids. I'd tell him how my daughter, at the mercy of dark moods, periodically would overdose on prescription medications and how my son had suffered an unexplained breakdown at college. Some days my son couldn't get out of bed, yet he had resisted engaging in treatment. My friend would tell me about hospitalizing his son to pry the young man away from the grip of alcoholism and underlying depression.

We'd been meeting discreetly like this for nearly a decade, since the first hints of our kids' troubles, whispering our fears, our desperation, our sympathies, and then leaving one another with a big hug and hopes for a better year ahead.

When we'd turn our faces again to the crowd, you would hear my friend say how well his business was doing and, from me, what a grand transition I'd made from a high-profile journalism career to being a dean at one of Harvard's graduate schools. We had great spouses, great families, great lives! Doesn't everyone at Reunions?

I did not expect that my biggest and most painful challenge as a parent would come so late. I thought the hardest years were behind my husband and me: the toddler tantrums; the worries over childhood diseases, school progress, sexual relationships and health; the tamping down of terror as we watched our daughter and then our son drive away in the family car for the first time.

Measured against the mental illnesses that have struck each of our kids in young adulthood, those earlier tests now seem problems of limited magnitude with straightforward strategies and solutions. Where we are today is a foreign land with no markers or exits, and where we question our own competence.

I know my family's experience is not an aberration. The major mental illnesses — bipolar disorder, schizophrenia, and depression — typically manifest in the late teens and early 20s. According to the National Institutes of Health, just over 4 percent of all U.S. adults aged 18 to 25 have a serious mental illness.

It is thought that the biologically based illnesses, which produce a vulnerability in mood regulation and thought

processes, are stirred to the surface by external stressors. That young adults may break down in their first year or two of college or graduate school is no accident. Away from the safety and structure of the family, presented with distractions and choices and enormous expectations to succeed, any student with a vulnerability may falter. Many students with incipient mental illness can be propelled by the chaos and pressure into a frightening struggle to maintain their stability.

Also unsettling, especially to parents, is the fact that our kids are no longer minors, and the health-care system

allows them to choose whether to participate in their own treatment and medications. (Try making a 20-something take a pill!) Every developmental instinct these young adults have tells them to push aside authority and go their own way. Only with maturing may young adults be better able to accept responsibility for their own health and act on it.

In the early years of my daughter's struggle with a mood disorder, I did not talk to others about the turmoil. At the office I became immersed in work and proud of the creativity and effectiveness of the unit I led. I felt competent. But part of me was always on alert, never knowing at what moment a crisis could hit and I'd be summoned to the high school or hospital. Or perhaps it would be my daughter herself calling, crying for me to help her. Whenever I heard a ringtone — anyone's ringtone — my adrenaline would spike, my heart pound, and my brain freeze. At night I began to have panic attacks, waves of feeling that something terrible was about to happen.

My husband and I are educated and resourceful people, devoted to our children's happiness and well-being, and yet we couldn't protect them. We are financially secure, I was well connected through my job, and we were able to provide my daughter with top doctors and facilities in Boston, this renowned epicenter of medical care. But it didn't matter. Still she wrestled with her moods and her self-destructive impulses. I began to question my competence and worth as a mother, as a person. I was failing, and I was scared. My daughter's life was at risk.

A psychiatrist helped me talk about my distress and learn to manage it. Anti-anxiety medication was effective. Strategy sessions allowed me to feel less helpless. After a while I was



able to tell my work staff why the boss sometimes had to drop everything and dash out of the office. Even then I couched the situation in euphemisms: “My daughter is having a bad day.” Bit by bit, as the years passed, I allowed myself to explain what was happening to those closest to me — my sister, my cousin, the girlfriends in my book group — especially after the relentless anxiety impaired my very ability to read.

But there was a time of year when I would not speak of these things, and, I now know, neither would an untold number of our classmates. When mental illness robs your children of their abilities and their prospects, a parent mourns. My husband and I had ambitions for each of them, a specific imagined future particular to our peer group. Was it somehow our fault that this vision was dashed? What paths were open to our children now? Could they be happy? Could we be happy? Could we ever see our lives and theirs as anything but diminished?

At Reunions, in the company of our high-achieving Princeton alumni community, the story of my family’s distress stayed locked up tight. I’d never read about my kind of struggle in Class Notes. There were entries about families facing a loved one’s cancer or recovering from a heart attack. But no one mentioned this.

I was as guilty of Class Notes silence as anyone. Amid the crowings of my classmates about their children’s Ivy League acceptances, I kept quiet about my daughter’s disastrous first semester at an obscure college and sent word to PAW only when she transferred to a prestigious art school — neglecting to follow up with news of her quick emotional descent there.

Similarly, I let everyone know that my son won early acceptance at a highly competitive college based on his poetry, but not that he ended his freshman year with an inexplicable nervous breakdown and spent the following year mostly in our house before having a similar experience at another college. A hospitalization followed, and we learned that he was suffering from bipolar illness, a thought disorder that impairs cognition and the processing of external information. The door to his academic life seemed to close with a slam.

We now had two kids with mental illness. What were the chances? Our children are not related genetically: We’d adopted our daughter as an infant, and our son had been a surprise pregnancy.

In the midst of his suffering, my son turned a sympathetic gaze on his parents. “I guess you wish that you had other kids instead of us,” he said. My heart fell. I told him no, that there were no imaginary, ideal other kids out there whom I preferred. What I wanted was for my kids to feel better.

And it was true. I had let go of vicarious ambition and trivial matters. When your kid is coping with mental illness, you get to the bottom line fast: He’s alive. If you have that, you can start feeling ambition for the child to be healthy and then happy. That’s all that counts.

**M**y selective silences ended abruptly at my 40th reunion. I sat down at a table under the tent to catch up with a classmate I hadn’t seen for many years. He told me eagerly about his two sons — one finishing at an Ivy college, the other in a terrific job in New York. Then he asked me about my family. I was about to fudge things, but then, with an unexpected feeling of freedom, I plunged ahead and told him that my daughter was stable now after years of

hospitalizations and that we’d just learned my son had bipolar disorder. Sadly, neither kid had been able to finish college.

Then the most shocking thing happened.

A look of chagrin came over my classmate’s face. He hesitated for a moment, then bent toward me. Actually, he said, his young adult daughter was still living with them at home. She, too, was mentally ill.

Had I not been forthright about my own situation, my classmate would have kept the very existence of his child a secret. I decided then and there that this silence had to end — for everyone who comes to Reunions.

So it was that last May, with the help of the University, I organized a Reunions panel: “Parenting Young Adult Children With Mental Illness.” It drew a standing-room-only crowd of 70 people, many leaning against walls and sitting on the floor in a McCosh Hall classroom. The audience participation was fervent and heartfelt. The overall emotion was relief. Many parents told wrenching stories, asked for help, and were given advice and resources from those in attendance and from the panelists — psychologist Calvin R. Chin, director of counseling and psychological services at Princeton; and my friend and classmate, Laurie Watson Raymond ’73, psychiatrist and former director of advising resources at Harvard Medical School.


Attendees spoke of having avoided Reunions in past years. One alumnus’ story of long self-exile from campus for fear of being asked about his ill daughter brought the room to tears. Others had made peace with their change in life expectations for both themselves and their kids. One couple spoke movingly of how much their son added to the home life of the family, now that they’d decided he was better off living permanently with them. One mother could not get her ill daughter to speak with her and didn’t even know for sure where she was. Another family could not control their son’s outbursts. Many people stayed long afterward for additional discussions in small clusters. It was, in some sense, a mini-reunion of people who hadn’t known until then that they had this in common with such a large group of fellow Princetonians.

I can tell you that lately my daughter is relatively stable. She has an apartment, a job, a fiancé, a dog, and a vision for the future. My son has not had a hospitalization in quite a while and is living at home. While he still is depressed, he is participating (albeit reluctantly) in treatment. My Princeton friend’s son is much better, lives independently, and runs his own company. He continues to attend AA meetings.

My husband and I still feel on alert, not sure when the next kid crisis might come or whether we can plan our own future, sell the house, and live on the downsized scale that we’d prefer and would help secure our retirement. The probability of having to support our kids indefinitely is real. There’s a lot we don’t know and a lot we only dare to hope for. But I’m through with whispering under the trees, and that sure feels good. ♦



*Robin Herman ’73 is retired from the Harvard School of Public Health, where she was assistant dean for research communications.*

 **READ MORE:** For information and resources on parenting young adults with mental illness, see a Q&A with Dr. Laurie Watson Raymond ’73 at [paw.princeton.edu](http://paw.princeton.edu)



# PRINCETONIANS



KUNAL SARKAR '00  
AND MIKE SCANLON '01

## A GYM FOR YOUR BRAIN?

*The founders of Lumosity say games can boost your memory and attention*

When Mike Scanlon '01 moved to California after college to study neuroscience at Stanford, he got in touch with Kunal Sarkar '00, then living in San Francisco and working at a private-equity firm nearby. The friends got together often and talked about an intriguing area of Scanlon's studies: how to take advantage of the brain's plasticity to improve cognitive abilities. In 2005, Sarkar quit his job and Scanlon took a leave of absence from Stanford to create a palette of online games said to help sharpen memory, attention, and other brain functions.

Today their company, Lumosity (co-founded with Dave Drescher), has 67 million registered users. Since its launch in 2007, Lumosity's games have been played more than 2 billion times in 180 countries. Its mobile app, which debuted in 2010, has been downloaded 30 million times.

*continues on page 56*

### FOLLOWING: COFFEELANDS.CRS.ORG

**Blogger:**  
**MICHAEL SHERIDAN '02**  
**Chronicling**  
**the lives of**  
**coffee farmers**



As director of the Borderlands Coffee Project, Sheridan works to improve the sustainability of the coffee industry in Colombia and Ecuador. His blog

chronicles the impact of political strife and global warming on the lives of small coffee farmers. **“All over the Americas, aging**

**farmers are watching their children leave the farm for the city to pursue higher education and employment opportunities.”**

*continued from page 55*

The games, which adapt to a user's skill level, test memory, attention, flexibility, and other abilities. Users must solve basic arithmetic problems before raindrops falling from the sky touch the ground; remember the names and food preferences of animated characters ordering meals at a restaurant; and recall the locations and patterns of highlighted tiles within a matrix of squares, among other tasks. Some of the games are free, but a premium service that offers more selection and tracks a user's progress costs \$80 a year.

### **Lumosity's games have been played more than 2 billion times in 180 countries.**

Does it work? In October, 70 leading cognitive psychologists and neuroscientists signed a statement about brain-training companies (none are mentioned by name) that says "scientific literature does not support claims that the use of software-based 'brain games' alters neural functioning in ways that improve general cognitive performance in everyday life, or prevent cognitive slowing and brain disease."

Lumosity says its games are "engineered to train a variety of core cognitive functions." The company's research, "as well as that of independent university scientists, has found that Lumosity can improve cognitive abilities when people train as directed on a regular basis," Scanlon says.

While Lumosity is best known for its brain games, the company also has created software tools to study cognitive performance. Lumosity scientists conduct research and collaborate with academics at 60 labs across the country. "We provide them with free access to Lumosity's tools," says Sarkar, who is the company's CEO. The scientists are studying topics ranging from cognitive impairment in cancer patients to memory loss and the aging process. In December, Lumosity released its first child-focused program, called LumiKids, geared to children ages 2 to 5. ♦ *By A.W.*

 **PLAY:** Find links for sample games at [paw.princeton.edu](http://paw.princeton.edu)

**Obery M. Hendricks Jr. \*95 with his granddaughters Mariam, left, and Diata.**



## **LIFE: 20 YEARS OUT...**

*A child of segregation, Obery M. Hendricks Jr. \*95 left Wall Street behind for the academy*

At 33, Obery M. Hendricks Jr. \*95 was making a good living at the Wall Street firm Kidder Peabody when he realized that working in finance "was destructive to my spirit," he says. "The focus on making money was not good for me. I'd gotten to the point where I wasn't able to see anybody or anything apart from their financial value."

While standing in a church pulpit to give a eulogy at his father's funeral, Hendricks found his true calling. He enrolled at the Princeton Theological Seminary, then earned a Ph.D. in religion at Princeton, and later became the president of Payne Theological Seminary in Ohio, one of the oldest African American seminaries. He now serves as a visiting scholar in the religion department at Columbia University.

Hendricks had dreamed of becoming a professor while earning his undergraduate degree at Rutgers, but talked himself out of it. "No one in my family had ever done anything like that," he says. His mother was a school secretary; his father worked as a brick mason. They moved the family from Prince Edward County, Va., to East Orange, N.J., when Hendricks was 4, after the county closed the schools rather than desegregate them.

#### **PHILOSOPHY:**

**"Whenever I do anything important, I make sure my granddaughters are there. That is the legacy I want to give them."**

"My family came north to give my sister and me an education," he says. "It's an amazing journey, to be born in segregation and be blessed to matriculate at the greatest university in the nation."

Today, Hendricks writes and lectures on the intersection of religion and politics, and teaches about Martin Luther King Jr.'s views on economics and democracy. He hopes to contribute, he says, "to the ongoing struggle for justice and deeper democracy in this nation." ♦ *By J.A.*



## ESSAY

# WRITING CAROLE KING'S LIFE, THANKS TO TRIANGLE CLUB

Douglas McGrath '80



Douglas McGrath '80 is a playwright, filmmaker, and essayist who lives in New York City with his wife and son.

Six years ago, I found myself sitting across from legendary singer-songwriter Carole King. I was one of several writers being considered to adapt her life story for the Broadway stage. Until then I'd had a long career in TV and film. I started out as a writer for *Saturday Night Live* right out of college, and later wrote screenplays and humor pieces for magazines until Woody Allen asked me to co-write the screenplay of the 1994 film *Bullets Over Broadway*. After that, I wrote and directed the films *Emma*, *Nicholas Nickleby*, and *Infamous*.

As King and her fellow songwriters Barry Mann and Cynthia Weil, also to be featured in the show, sized me up, one of them said, "You've never written a musical before. Why should we trust you to write ours?" My answer: the Princeton Triangle Club.

In fact, I *had* written musicals before, but they were performed closer to Wawa than Sardi's: I wrote two Triangle shows.

After landing the job to write the book for the musical *Beautiful*, which tells the story of how King became one of the most successful singer-songwriters of her time, I realized that apart from the budget, having written two musicals for Triangle was not much different from doing *Beautiful*. In fact, they made it possible.

Everything I used to write *Beautiful*, I learned from my Triangle shows: sitting in the audience and listening for what works and what doesn't and when it doesn't, quickly finding a way to change it. It was at 185 Nassau St. and McCarter Theatre that I first learned not to be sentimental about something just because I wrote it.

At Princeton, I performed in several Triangle shows before writing one. The first show I wrote, *Happily Ever After* — for which I did the book and co-wrote the lyrics with David E. Kelley '79 — received a fairy-tale reception from *The Daily Princetonian*. My second show, *String of Pearls*, which I wrote senior year, was more string than pearls. Our first run-through ran longer than *Lawrence of Arabia*. The officers of the club brought me into a room that in my memory had one lightbulb hanging from a fraying cord. They told me I needed to

cut the show — a lot. I was shocked by this impertinent notion. Of course, they were right. This lesson stayed with me — by the time *Beautiful* opened, it was 20 minutes shorter than when we started.

*String of Pearls* was scathingly — and rightly — dismissed in the *Prince*. And that is its own necessary training. Whether it's the *Prince* or *The New York Times*, you have to learn to leave your room and either hold your head up or keep it down — but keep going.

For *Beautiful*, I interviewed the songwriters about their lives over many hours, then selected the most interesting period and wrote the story and dialogue, choosing songs of theirs that helped the narrative. During the five years we worked on the show, I always was rewriting. When *Beautiful* was performed at the Curran Theater in San Francisco for four weeks in the fall of 2013, I rewrote every day, fixing jokes that didn't work, rearranging the order of the songs, adding new scenes, ditching old ones. On our opening night on Broadway, my wife gave me a T-shirt that said 58, the number of drafts I had done.

Since opening in January 2014, *Beautiful* has broken the box-office record at the Stephen Sondheim Theatre 14 times and earned seven Tony nominations, including one for my book. I lost to Robert Freedman's highly praised *A Gentleman's Guide to Love and Murder*. He was expected to win, but I prepared a speech just in case. (I can't stand those people who come to an awards show and then act shocked when they win.)

The Tony people are strict about your speaking time — you have 90 seconds from the moment your name is called. I have been blessed with many mentors, teachers, and fellow writers, supportive friends and family, all of whom made my script possible. There were so many people I wanted to thank, and every time I practiced the speech it was too long. So the odious task of cutting began. But one name I knew I could never cut was the Triangle Club. I owe an unpayable debt not only to the inspiring students who made up the casts and crews, but to the generous and visionary board of directors who underwrote my shows on faith, just because that's what the club stands for. ♦



# CLASS NOTES

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Online Class Notes are password protected. To access, alumni must use their TigerNet ID and password. [Click here to log in: http://paw.princeton.edu/issues/2015/01/07/sections/class-notes/](http://paw.princeton.edu/issues/2015/01/07/sections/class-notes/)

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# MEMORIALS

**PAW posts a list of recent alumni deaths at [paw.princeton.edu](http://paw.princeton.edu). Go to "Web Exclusives" on PAW's home page and click on the link "Recent Alumni Deaths." The list is updated with each new issue.**

## THE CLASS OF 1940



### Walter F. Pettit '40

Known to us as "Wig," Walter died June 26, 2014, at his home in Piedmont, Calif. Raised in Princeton, he prepared at the Asheville School for Boys. At Princeton he majored in history, lettered in tennis, and ate at Elm Club. He roomed with Marshall ("Sherwood") Forrest.

Following Princeton he served in the Navy Air Corps, emerging in 1945 as a lieutenant commander. After earning his law degree from Hastings College of Law, he practiced for more than 45 years at Pettit & Martin, retiring as a senior partner. He was a pioneer in government contract law and was awarded the American Bar Association's Lifetime Achievement Award in 2004.

A champion tennis and squash player, Wig spent a great deal of time in the civic and philanthropic communities in and around San Francisco. He was also active in the class, serving in many leadership positions over the years.

For 62 years he was married to the late Cherie Sutton. He is survived by three daughters, Anian Tunney, Lindsay Pettit, and Cherie Arkley; six grandchildren; five great-grandchildren; his brother, William '41; and a sister, Mary Funk.

## THE CLASS OF 1943



### Robert Delatour '43

Bob died April 5, 2012, at his home in Berkeley Heights, N.J.

Bob graduated from Great Neck (N.Y.) High School, where he was president of the general organization and business manager of the yearbook board. At Princeton, he majored in modern languages and won the Percy Alden Memorial Prize. He roomed with Ridgely and Craig.

After serving in the Navy aboard the USS *Antietam* and USS *Milwaukee*, Bob went to work in the insurance industry. He was a manager in the systems-and-records department of Arrowpoint Indemnity Insurance Co. before retiring in 1985 after a 40-year career.

To his wife, Mary, three children, and five grandchildren, the class extends its sympathy.



### John F. McCarthy '43

"Murph" died at home June 22, 2012, after a long illness.

He prepared for Princeton at the Hun School, where he was on the baseball, basketball, and tennis teams. At Princeton, he played varsity basketball and captained the 1942 undefeated baseball team. During a game against Cornell, he hit a home run over the right-field fence. The only other person known to have done this was Lou Gehrig. Murph majored in politics and graduated with honors. Our class voted that he had the "best sense of humor."

He served with the 87th Field Artillery as forward observer and was wounded twice. He was awarded a Purple Heart and Bronze Star for bravery in the rescue of six stranded enlisted men.

After the war he received a law degree from the University of Pennsylvania. From 1970 to 1973 he served as chairman of the New Jersey State Commission of Investigation and practiced law in Princeton for 64 years.

When former New Jersey Gov. Brendan Byrne '49 spoke at the 250th anniversary of Princeton University, he said, "Princeton is the home of three famous people: Albert Einstein, Woodrow Wilson, and Jack McCarthy." Survivors include his wife of 64 years, Kathleen; two sons, Jack '69 and Kevin; and five grandchildren. The class offers its sympathy to them.



### William Morcom '43

Bill died May 31, 2012, in Hartford, Conn.

He attended high school at Kingswood School, where he was on the football team. At Princeton, he was manager of the fencing team and a member of the engineering society and Tower Club. Following graduation, Bill joined the Army Air Force, where he was a first lieutenant.

His long career as a mechanical engineer began with Pratt & Whitney and ended many years later at Spencer Turbine Co. Bill's career

was marked by his commitment to high standards and a strong work ethic.

Bill was a docent at the New England Air Museum, and he enjoyed building ship models, reading, playing golf, taking walks, and doing crossword puzzles. He was devoted to his family, which included his wife, Betty; three children; and three grandchildren. To them, the class extends its sympathy.



### Sandy Pringle '43

Sandy died Feb. 19, 2012, in Woodbridge, Va.

Sandy left Princeton in 1942 to join the Army and served as a noncommissioned officer in the

Pacific. After graduating *summa cum laude* in 1947, Sandy began a long career in the Foreign Service. In 1955, he returned to Princeton and spent a year of advanced study at the Woodrow Wilson School. This was followed by assignments in Washington, D.C., the Netherlands, and Costa Rica, where he served as deputy chief of mission.

After retiring, Sandy and his wife, Julie, moved to Spotsylvania, Va., where he was involved with Christ Episcopal Church. He later moved to Woodbridge to be near his daughter. Despite his problems with failing eyesight, he maintained a positive outlook and showed remarkable courage.

Sandy is survived by two children and two grandchildren.



### Stuart Skinner '43

Stu died April 14, 2012, in Lansdale, Pa.

Stu graduated from St. Louis Country Day School, where he was on the football, soccer, and track teams. He majored in engineering at Princeton and was member of Cottage Club. His extracurricular activities included Triangle Club, the cheerleading team, and gym team. He also played on the undefeated soccer team. Junior and senior years he roomed with Broderick, Radcliffe, Supplee, Allen, Wellington, and Schwarz.

During World War II, Stu was an officer in the Army Air Force and was stationed at Wright-Patterson Air Force Base in Ohio.

Stu worked for many years as an industrial engineer, involved heavily with the early days of design and management of corporate mainframe computer-information systems for McDonnell Aircraft in St. Louis. He also worked for Thiokol Chemical and Anchor Darling Valve Co. in Philadelphia. He was very active in his church, and served as a vestryman for St. Paul's Church in Chestnut Hill, Pa.

His survivors include Peg, his wife of 68 years; three children, including Stuart '68; seven grandchildren; and four great-grandchildren. To them all, the class extends its sympathy.



## THE CLASS OF 1944



### Gordon R. Hamilton '44

Gordy died Sept. 15, 2014, in a Rockville, Md., nursing home.

He was active in band and track in high school and was an Eagle Scout. At Princeton, Gordy participated in band and track and was a member of Dial Lodge. He roomed with John Foster and Scott Robinson and accelerated to graduate in 1943, after which he served as a radar specialist in a destroyer squadron in the South Pacific.

Following graduate work in physics at Columbia, he married Victoria McKibben in 1948 and moved to Bermuda to establish a research lab specializing in underwater acoustics. His crowning achievement was to help the Navy locate the wreckage of the USS *Scorpion* after it went down in 1968. In 1972, he moved to Falls Church, Va., to lead the ocean-science department of the Office of Naval Research. He supervised some 30 program managers in basic marine research, which involved 100,000 travel miles a year visiting facilities around the world. In 1969, he was honored with the Military Oceanographic Award.

Predeceased by Victoria, his wife of 45 years, he married Mickey Wilson, who survives him after 20 years of marriage, along with his children, Elizabeth and Gregg '75; three grandchildren; and brother John.

## THE CLASS OF 1945



### Kenneth N. Bacon '45

Ken died July 30, 2010, but the information was not relayed to the class until last year.

Ken entered Princeton from East High School in Rochester, N.Y., and joined Charter Club. His Princeton career was interrupted for service with the 4th Marine Regiment, where he saw combat in the Pacific. After returning to Princeton, he graduated *summa cum laude* in economics in 1946 and was elected to Phi Beta Kappa.

He received an MBA from Dartmouth, after which he joined Young & Rubicam, the New York advertising agency. In our class books, he noted that he was briefly married and divorced, leaving no children.

Ken left Madison Avenue for Wall Street, joining an unnamed bank as advertising director. His early homes were an apartment in New York and a home in Westhampton, followed by a move to Madison, Conn., and frequent visits to Portugal, where we believe he was located at the time of his death. We have no other details of his life.

Since there are no known survivors, we can refer classmates to his philosophical submissions to our class books over the years for an insight into Ken.



### Peter M. Flanigan '45

Peter Flanigan died July 29, 2013. He prepared for Princeton at Portsmouth Priory, and entered Princeton ahead of his brothers, John '45 and Robert '52, both of whom predeceased him.

At Princeton, Peter joined Cap and Gown, but his studies were later interrupted for service as a fighter pilot with the Navy, where he saw combat in the Pacific. Upon returning to Princeton, he graduated *summa cum laude* with a degree in economics in 1947. In 1954 he married Brigid Snow and began a career with Dillon Read.

After serving as executive director of volunteers for Richard Nixon's presidential campaign in 1968, he joined the White House staff as assistant to the president, focusing on economic and financial matters. He later became director of the Council of International Economic Policy. From 1975 until 1992 he served as managing director at Dillon Read. Space does not permit us to copy the full column that appeared in *The New York Times* concerning Peter's accomplishments in the New York area in the educational field.

Brigid predeceased Peter in 2006. Surviving are his children, Sister Louise Marie, Brigid, Tim, Megan, and Bob; 16 grandchildren; and his second wife, Dorothea. The class expresses its sympathy to the family on the loss of this devoted servant of his church, community, and nation.



### Richard M. Huber '45

Dick Huber died May 19, 2013.

Dick entered Princeton from St. George's, joined Cap and Gown, and played varsity baseball. In addition, he reported for *The Daily Princetonian*.

His studies were interrupted for service as a navigator with the 15th Army Air Force in Europe, where he saw combat.

In 1950, he married Cintra Carter and they had three children. They later divorced and in 1968, Dick married Princeton's first tenured female professor, Suzanne Keller. He remained in the Princeton community after earning a doctorate in American studies at Yale, maintaining a long association with the University library and serving as head of the Friends of Princeton University Library for years.

His scholarship was evidenced by his many publications and educational programs on Channel 13 in New York. Dick also served as dean of continuing education at Hunter College in New York before joining the National Endowment for the Humanities in Washington.

In addition to Cintra, Dick is survived by his brother, Jack; his son, Richard Jr.; two daughters, Cintra and Casilda; and four grandchildren. His marriage to Keller, who died in 2010, ended in divorce, though they remained close. The class expresses its sympathy to the family.

## THE CLASS OF 1946



### Walter F. Chappell III '46

Involvement — that could have been Walter's middle name. He was involved in the New Orleans community as president of the Louisiana

Association of Business and Industry, chairman of the Faubourg St. Mary Corp. (a preservation group), vice chairman of the Vieux Carre Commission (maintaining the distinctive architectural, historic character, and zoning integrity of the city's French Quarter), secretary of the state council for Vocational Education, and treasurer of the Longue-Vue House. He also was a board member of Planned Parenthood of New Orleans, Trinity School, and Metairie Park Country Day School. And for 30 years Walter was president of Engineered Equipment Inc., a crane-rental and industrial-contracting company that he founded.

Walter's family included several Princetonians: his father, Walter F. Chappell Jr. '20; his brother, Hayward H. Chappell '51; and his father-in-law, Greer Zachry '25.

When Walter died Jan. 15, 2014, he left his wife, Jean Zachry Chappell; his daughter, Linda Chappell Walker; and two grandchildren. To them all, '46 expresses its sincere sympathy. We have lost a busy, public-minded classmate.



### George W. Morris '46

We knew George was headed for the Broadway stage when he sang John MacFadyen's "As I Remember You" in the 1942 Triangle show *Time and*

*Again*. He also starred in the 1946 and 1947 Triangle Club productions, made his Broadway debut singing in *As the Girls Go* in 1948, and sang on radio and early television. This led him into advertising, and he worked for 10 years at Batten, Barton, Durstine & Osborn, handling brands such as Campbell's Soup, Revlon, and an ethyl gasoline additive.

George left Madison Avenue to help spark Knudsen-Moore, a small, well-respected ad agency headquartered in Fairfield County, Conn. His years there were punctuated by volunteer hours as a substitute teacher in Armonk, N.Y., where he lived and could not venture downtown without harvesting excited greetings from devoted former pupils.

At the time of his death May 28, 2013, he was survived by his wife, Joan, and sons Chris '78 and Brian '78. His son Tim predeceased him. All '46ers miss this talented classmate who said of his golf game, "What's the big deal about shooting your age? I do it every time I go out, sometimes in just three or four holes."

## THE CLASS OF 1948

### William T. Windsor Jr. '48

Bill died Sept. 8, 2014, in Media, Pa., at



the age of 87.

A graduate of the Peddie School, he started college in the Navy, probably as a participant in the V-12 program. He later joined Quadrangle, was treasurer of the *Nassau Lit*, and graduated in 1949 with a degree in economics.

Bill earned an MBA at the University of Pennsylvania and a law degree at Temple University. His professional career began in banking, which led to a legal career of 34 years, mostly in "banking and commercial law and then, inevitably ... bankruptcy."

He retired in 1992 from partnership in a Philadelphia firm. "Princeton provided the classical foundation that made life worth living, even after retirement," Bill said. That life included "hunting, fishing, and loafing [in a] cottage on the west bank of the Susquehanna."

He is survived by his wife, Ann; daughter Judith; sons William III and David; and five grandchildren.



#### **Bruce B. Winter '48**

Bruce died at age 92 in Pensacola, Fla., Aug. 1, 2014. Born and raised in Orange, N.J., he had lived in Florida for 44 years and had an active career

in real estate, mostly in the Sarasota area.

During World War II, Bruce was a navigator in Army Air Force B-24 bombing raids over Germany and later was awarded the Distinguished Flying Cross. Before the war he had attended Williams College, but after his military service he entered Princeton and graduated with a degree in mechanical engineering.

Bruce was predeceased by his wife, Evelyn. For his daughter, Heidi, who also predeceased him, he established a memorial endowment at the University of Virginia. His survivors include three sons, Eric '72, Dugald, and Todd; and five grandchildren.

#### **THE CLASS OF 1949**



#### **Herbert A. Davis '49**

Herb Davis died April 22, 2013, at Keswick Assisted Living in Baltimore, Md. He was 87.

A lifelong Baltimorean, he was a prominent real-estate agent and broker as well as a licensed real-estate mediator. Herb graduated from the Friends School in 1943 and came to Princeton after serving in the Army. He was in the Battle of the Bulge and later received two Purple Hearts and a Bronze Star for gallantry, although he never said very much about this experience.

He worked for the *Nassau Sovereign*, was a member of Quadrangle, and ended up as chair of the Quadrangle Alumni Board. Herb's career in real estate earned him many friends. As one of his closest associates put it, "Herb was a

gentleman who ... was genuinely interested in people, and you could see how he drew them out." He was interested in their needs, and worked hard to help them.

We remember Herb with affection and admiration and send our condolences to his family. He is survived by his wife, Ruth Anne (Rufus), and their children, Paige, Lynn, Sally, and Bruce. His daughter Carey '73 predeceased him.



#### **Michael A. deCamp '49**

Mike deCamp died April 9, 2013, in Edenton, N.C., after a long, fascinating, and creative life. It's not easy to describe all the amazing things he accomplished, but much of his work will be long remembered.

Mike entered Princeton in 1945, rowed on the varsity crew, and joined the Outing Club. He belonged to Cap and Gown, majored in psychology, and graduated in February 1949 with the first group of '49ers to graduate after the war.

He married Wesley Martin Feb. 18, 1949. Mike was a pioneer in underwater shipwreck exploration, his lifelong obsession. In addition to his leadership on many shipwreck investigations, including his leadership of the first sport dive to the sunken *Andrea Doria*, he was a renowned art photographer with many photographic records of the sunken wrecks he explored. Several of these are included in Chick Kracht's 50th yearbook, *To 1999 and Beyond*.

Mike's achievements in underwater exploration have led many to describe him as "the father of East Coast wreck diving." His art photographs can only add to his renown, and 1949 is proud to have known him. Wesley survives him, along with their two children, Carly and Jock, and three grandchildren.



#### **Ira S. Siegler '49**

Ira Siegler, an active and loyal '49er, had planned to attend the 2013 Yale game, but at the last moment sent word that he couldn't make it. He died Nov. 28, 2013, within days of that event, in Washington, D.C. He and Gerry would have marked their 60th wedding anniversary the following February, an event their three children would have celebrated with them.

Ira majored in SPIA, graduating with high honors and election to Phi Beta Kappa. He went on to Harvard Law School, where he was editor of the law review. He served in the Army JAG Corps in the early 1950s before he entered private practice in the Washington area, where he practiced law for the next 57 years. He specialized in estate and trust planning.

Ira was active for years in class affairs, serving as our president from 1984 to 1989. He

was particularly proud that all three of his and Gerry's children went to Princeton: John '77, Eugenia '78, and Douglas '83. They (as well as Gerry) all survive him.

In our 50th yearbook, *To 1999 and Beyond*, Ira wrote about his happy life and said, "I envisage more of the same." We will miss this cheerful '49er.

#### **William G. Webster '49**

Bill Webster died Aug. 12, 2013, in Rancho Palos Verdes, Calif.

Originally from Cleveland, Bill spent 40 years with Parker Hannifin Corp., first in Ohio, and then in California, where he retired in 1991 as president of Parker's Biomedical Group.

After two years in the Navy, Bill arrived on campus in 1946. He married Patricia Allen in 1948, and although living off campus, he joined Terrace Club and participated in several campus bands. He graduated with honors and received a bachelor's degree in mechanical engineering. He joined Parker Hannifin soon after.

Aside from his work, Bill loved music and led many bands over the years, including one that played for our 40th reunion. He also formed several close-harmony vocal groups, perhaps the best-known one being The Close Encounter, which he and Pat founded. Many of their songs were arranged by Bill.

As Bill wrote in our 50th yearbook, "Music has been an important part of Pat's and my life together." Who could ask for a better memorial?

He is survived by Pat; their children, Julie W. Haynes and Bill Jr. '73; and five grandsons.



#### **Lowell D. White '49 \*56**

Lowell White died May 23, 2013, in Irvine, Calif.

Lowell entered Princeton after two-plus years in the Army. While in the service, he

was wounded and captured by the Germans. They provided excellent care for his wounded hands, and he always credited them with saving his life. He eventually received a Purple Heart with two clusters.

At Princeton, Lowell joined Court Club and majored in physics. He graduated with high honors and was elected to Phi Beta Kappa. He subsequently received his doctorate in physics from Princeton in 1956. Shortly after, he joined Bell Laboratories, retiring after 35 years. His work involved research on various projects such as quartz oscillators and undersea optic cables.

At Commencement in June 1949, Lowell delivered the traditional class salutatorian address in Latin. It ended with the following words: "*Itaque, amici, avete atque valet!*" Translated, the words mean "Friends, hail and farewell," and they are indeed still appropriate for all of us in '49 as we celebrate Lowell's life.

He is survived by his daughter, Mary



Thomsen, and his sons, David and Douglas. His wife, Ethel, died in 2001.

## THE CLASS OF 1950



### Lewis W. Hicks III '50

Lew died April 24, 2014, in Cape Cod Hospital with his two daughters and beloved dog, Sophie, at his side.

After graduating from the Lawrenceville School in 1944, Lew enlisted in the Army Air Force, where he served in armament and gunnery schools. He was discharged as a sergeant in 1946 and enrolled at Princeton, following the footsteps of his father '25 and uncle '19.

Lew left Princeton during his sophomore year to enter a partnership operating the Princeton Airport. After being recalled by the Air Force during the Korean War and a brief stint at the airport, he moved to New York City, where he became operations manager of WABD/WNEW Channel 5. In 1966, he joined the advertising agency of his brother, Harry '54, and at one time had a detective agency.

He lived in Princeton until the early '70s. Lew moved to Lawrenceville, where he served for more than 20 years in the Emergency First Aid Squad, both as an emergency medical technician (EMT) and an EMT instructor. He moved to Chatham, Mass., in 2004.

We extend our sympathy to his daughters, Jennifer and Martha; two granddaughters; and Harry. His wife, Bernice, whom he married in 1949, died in 1996.



### Robert D. Stevens '50

Bob died July 10, 2014, in Reading, Mass.

He entered Princeton from Groton. Bob was a member of the United World Federalists and Prospect Club. He graduated with honors in biology and was elected to Sigma Xi.

After service in the Army Medical Corps, he earned a Ph.D. in agricultural economics from Cornell. Among his many career highlights were working as an economist in Peru, an assistant professor at the American University in Beirut, a visiting professor at the National College of Agriculture in South Vietnam, and finally professor of agricultural economics for 25 years at Michigan State.

Bob retired in 1990 and settled in his family home in North Andover, Mass., where he became involved with its historical society. He was honored with its Lifetime Preservation Award in 2014 and showed his commitment by donating land for preservation in North Andover and New London, N.H.

Bob's interests included local history, photography, world news, and cultural events. He held fond memories of time spent at Lake Sunapee, N.H., where he was a lifetime

summer resident.

Our sympathy goes to Bob's second wife, Anne; his children, Samuel, Amelia, Edmund, and William; five grandchildren; and Anne's family. His first wife, Nancy Lee, whom he married in 1959, died in 2004.

## Otto Robert Theurkauf '50

Bob, an avid horseman who rode until he was 70, died June 16, 2014, in Greenwich, Conn.

He graduated from Montclair (N.J.) High School in 1944. The day after his 17th birthday, he enlisted in the Navy Air Corps, where he trained as a pilot. After a few semesters at Duke as part of his naval training, he enrolled at Princeton. He was an economics major and belonged to Court Club. He said his best Princeton legacy was meeting his wife, Tina, at a Princeton-Smith ski weekend in Vermont. They married in January 1954.

After graduation, Bob joined the investment-counseling firm of Scudder, Stevens & Clark in New York, where he spent his entire 50-year business career. He chaired the firm's investment-policy committee, served on its board of directors, and was president of the Japan Fund, which was acquired by Scudder.

Bob learned to ride horses as a child and became deeply involved with showing when his job took him to Los Angeles for 10 years. Back in Connecticut, he once was president of the Greenwich Riding and Trails Association.

Our sympathy goes to Tina; children Sarah, Susan, and Amy; six grandchildren; one great-grandchild; and his brother, Edward '50.

## THE CLASS OF 1951

### John W. Adams '51

John was born April 25, 1929, in Boston, the son of Jane Edmunds Adams and John Durrell Adams '27.

He graduated from Phillips Exeter in 1947. At Princeton he majored in history and belonged to Colonial. He left college before graduation to work at the Museum of Modern Art Film Library, the Cinematheque de Belgique, and the Cinematheque Française. As reported in *The State*, his interest in ethnographic film ultimately led him to anthropology, and he earned a Ph.D. in social relations from Harvard in 1970.

Research among Native Americans on the west coast of Canada formed the backbone of his book, *The Gitksan Potlatch*. He taught at Fordham University and served as curator of the Northwest Coast Collections at the National Museum of Man in Ottawa, Canada.

John then accepted a position at the University of South Carolina, where he taught anthropology for 30 years. He and his wife, Dr. Alice Kasakoff Adams, compiled a unique body of research documenting 300 years of American family migration dating back to the Mayflower landing.

John died July 14, 2013. He is survived by Alice; his daughter, Kaya Adams Steele; sister Jane Adams; two nieces; and a nephew.



### Calvin R. Ledbetter Jr. '51

Cal was born April 29, 1929, in Little Rock, Ark., the son of Virginia Campbell and C.R. Ledbetter. He went to Little Rock High School and

majored in SPIA at Princeton. Cal belonged to the Arkansas Club, Cloister Inn, and Whig-Clio while on campus. He roomed with John Bradley, Ellery Gay, and Bill Robinson.

In 1953, he and Mary Brown ("Brownie") Williams were married. Cal received a law degree from the University of Arkansas Law School in 1954 and a Ph.D. in political science from Northwestern University in 1960. He served two years in the Army's JAG Corps.

He joined the faculty of the University of Arkansas at Little Rock and taught political science there from 1960 to 1997, serving as department chair and dean of the college of liberal arts. He retired as professor emeritus of political science. He served five successive terms in the Arkansas House of Representatives and ran for Congress in 1976 but was defeated; he was a delegate to the Democratic conventions in 1968 and 1984.

Cal died in Little Rock Aug. 10, 2013, and is survived by his son, Grainger; daughter Snow Moen; and five grandchildren. Brownie and their son Jeffrey predeceased him.



### W. Neill Schaller '51

Neill was born in Stamford, Conn., Jan. 2, 1929, to Katherine Elkin and Carleton Schaller 1912. He came to Princeton from Episcopal High

School and majored in sociology. He was a member of Tower, co-manager of 150-pound football, and roomed with Tim Barclay and Bob Rogers.

After graduation, Neill served in the Army Counter Intelligence Corps. He attended the University of California, Berkeley, earning a Ph.D. in agricultural economics in 1960. He then went to work for the Department of Agriculture in Washington, D.C.

In 1961, he married Karen Decker. They moved to Chicago in 1969 when Neill became the associate director of the Farm Foundation. He returned to the USDA in 1976 to become administrator of the Cooperative Extension Service, the agriculture secretary's assistant for consumer affairs, and the head of the low-input sustainable-agriculture program. In 1990, he left government service to become associate director of the Wallace Institute for Sustainable Agriculture, from which he retired in 1998.

Neill died of dementia Oct. 30, 2013, in Alexandria, Va. He is survived by Karen; their

children, Emily, Matthew, and Diana; and two grandsons. He was predeceased by his sister, Peggy. His brother, Carleton Schaller Jr. '45, died April 23, 2014.

### THE CLASS OF 1952



#### Howard B. Wentz '52

An extraordinarily successful corporate executive, Howie prepared for Princeton at The Principia. His leadership qualities were evident on

campus: He was president of the Christian Science Organization, the Institute of Aeronautical Sciences, and the Engineering Council. He also served as vice president of Cannon Club, lettered in lacrosse, and was a member of the undergraduate council and NROTC. His roommates were Steve Rogers, Marty Battestin, Clif McClure, Bob Morley, and his brother, Sidney '54.

After Navy service, Howie earned an MBA at Harvard. He went on to be chairman and CEO at Amstar, chairman and director at Esstar, chairman and CEO of Tambrands, and a member of numerous boards of directors.

He and his wife, Judy, created a Junior Faculty Award in engineering at Princeton, as well as a pre-engineering program at the Kent School.

Howie died Sept. 19, 2014, leaving his wife and children Howard B. III, Roger, and Elizabeth. Sidney predeceased him. Howie's brother-in-law is William W. French III '53. The class salutes our accomplished classmate and Navy veteran.

### THE CLASS OF 1953



#### W. Loeber Landau '53

Loeber, one of our most brilliant members — class valedictorian, winner of four debating prizes, three English awards, and election

to Phi Beta Kappa — died Sept. 1, 2014, at his Manhattan home. He would have observed his 83rd birthday Sept. 9.

A New Orleans native, he graduated from Newman High School. Loeber arrived at Princeton on Southern Railroad's "The Southerner," as did many classmates from the South, including Charlie Barham, Will Gregg, Jim Green, and Ned Slaughter. He lived in Brown Hall as a freshman and in 44 North West his senior year. He majored in the special program in the humanities and took his meals at Quadrangle Club. He wrote for the *Nassau Lit*, and belonged to the pre-law society and advertising forum.

While at Harvard Law School in 1954, he married Barbara Gordon, a Connecticut College student. He graduated *summa cum laude* and spent three years at the Pentagon in the office of the general counsel of the Air Force. His entire career was with New York

City's Sullivan & Cromwell law firm, where he concentrated on corporate, business, and securities law. He served on numerous corporate and nonprofit boards.

Upon retiring, his life was centered on his treasured wife, Barbara; daughters Donna and Blair; son Gordon; and four grandchildren.



#### James Desmond

**McCracken '53** James, or "Des," as he liked to be called, spent his entire career as a respected and admired educator at the Darrow School

in New Lebanon, N.Y. He died Sept. 8, 2014, at Berkshire Medical Center after a long illness. He was 83.

Born in Edinburgh, Scotland, he was the son of the Rev. and Mrs. Robert James McCracken. Des entered Princeton from Horace Mann School in the Bronx and roomed with Lowell Lentz, Gordon Marshall, and Hank Bothfeld. Hank, All-American hockey captain of the 1953 team that won the Pentagonal League Championship, recalls that Des was quiet and rather shy, but had a fantastic statistical knowledge of all things hockey despite the fact that he didn't play the game, and was better informed than Hank and the Tiger team.

Des specialized in modern languages, belonged to Quadrangle Club, and fulfilled his military obligations before joining the Darrow School faculty. For more than 40 years he was a fixture at the school, where he was housemaster, chaired the French department, coached hockey, and was school librarian.

Des' survivors include his brother, R. Norman; Norman's wife, Eleanor; and their children. Des never married. His "children" were the innumerable students whose lives he greatly touched.

### THE CLASS OF 1954



#### Guillermo E. Gonzalez Jr.

**'54** Guillermo "Billy-Gonzo" Gonzalez died Sept. 23, 2014, in San Juan, Puerto Rico. At Princeton, he was a history major, a member of Cap and Gown, and assistant editor of the *Princeton Tiger*.

After graduation, he entered the Navy and served on the USS *Valley Forge* for two years as an operations analyst with the Sixth Fleet. Following his discharge, he returned to Puerto Rico to help with the family business, Caribe Motors. He then joined Jim Ryder to organize Ryder Transportation, based in New Orleans. He returned to Puerto Rico to expand the business there with a fleet of more than 1,500 trucks and tractors. From this early beginning, many current trucking companies were launched.

Guillermo next joined with W.J. O'Neill to found Leaseway Transportation. In 1976, he served as a consultant to Prince Turki Al

Faisal '67 in Saudi Arabia. From 1976 to 1982, he was vice president and manager of the Centrocaciones Division of Ford Motor Co. In 1982, he co-founded Caremco Inc. and served as its chairman and CEO. That company evolved into Resort Transportation Services. Most of these companies survive to this day.

Guillermo is survived by his wife, Teresita; their children, Guillermo III, Tomas, Maritere, Miguel, and Margie; 11 grandchildren; and three great-grandchildren. The class is honored by his service to our country.

### THE CLASS OF 1958



#### Donald M. Alcock Jr. '58

Donald Alcock died of colon cancer July 11, 2014, in Albuquerque, his home for the last 17 years.

Don came to Princeton from Greenhills High School in Cincinnati. He majored in psychology and joined Tower Club. He was known for his calm and measured approach to everything — unflappable under all academic and social pressures.

After graduation, Don earned a master's degree at Columbia Teachers College, and then taught at Isadore Newman School in New Orleans. He earned a Ph.D. in English at Northwestern and taught there before becoming an assistant professor at Elmhurst College. In 1976, Don entered the Oregon civil service, from which he retired in 1996.

Don's life was varied. He played trombone and trumpet, wrote fiction and poetry, worked the Wildcat Mountain Ski Area in New Hampshire, dug latrines at Woodstock, and built a cabin in the Wisconsin woods.

He married Carolyn Lindgren in 1959, and they had two sons. After the two boys were grown, they adopted two girls from India and raised another family before Carolyn tragically died of a brain tumor. Later Don married Phyllis Kraus, after reconnecting with her at a high-school reunion in Cincinnati. Retiring to New Mexico, they traveled extensively and Don continued to write.

The class extends condolences to Phyllis; Don's sons, Gregg and Jeff; daughters Angelina and Rehana; and eight grandchildren.



#### Francis C. Brown Jr. '58

Frank died Aug. 11, 2014, after a valiant 15-year battle against Parkinson's disease.

Frank prepared for Princeton at the Peddie School. At Princeton, he entered the Woodrow Wilson School, writing his thesis on federal court reform. He was a member of Whig-Clio and the Undergraduate Schools Committee, as well as a writer for the *Nassau Herald*. He roomed his last two years with fellow Charter Club members Tom Burdette, Larry Glass, and Al Muse.



Armed with a Harvard law degree, Frank joined White & Case in New York in 1961. After six years of big-firm practice on Wall Street and in Paris and Brussels, and a brief period in the antitrust division of the Justice Department, he started his own practice. Frank specialized primarily in corporate matters, many of which were of an international orientation.

To Frank, the most important event of all took place in his last year of law school, when he married his childhood sweetheart, Nancy. Frank wrote in our 25th-reunion yearbook, "Such honors and pleasures and benefits as I have achieved in life are all set in the context of joy of my family." Frank served on the board of regents of Georgetown University and on the boards of the Convent of the Sacred Heart and the New York Eye and Ear Infirmary.

The class extends deepest condolences to Nancy; children Caroline, Buck '85, James, and Jennie; and nine grandchildren, including Adeline Brown '13.



#### **Robert B. Winslow '58**

Bob died July 14, 2014, near Sacramento, Calif.

He came to Princeton from Deerfield Academy and majored in biology. He was a member of the yacht club and the premed society. During his senior year, he roomed with Hank Stoeber in Tiger Inn.

After graduation, Bob graduated from Columbia Medical School in 1962 and then went to Yale-New Haven Hospital and Mary Hitchcock Hospital at Dartmouth to complete his surgical training. He attended Temple in Philadelphia for his plastic-surgery training. He was in the Air Force from 1964 to 1967, stationed in Turkey. Bob also served on Operation Second Chance, performing reconstructive surgery on the victims of the war in Croatia.

From 1971 to 1975, he practiced at the University of North Carolina's Memorial Hospital in Chapel Hill and then went into private practice in the Raleigh area until the early '90s when he moved to California, where he practiced until his retirement. He was a diplomate of the American Board of Surgery and the American Board of Plastic Surgery and a fellow of the American College of Surgeons.

Bob is survived by his wife, Joanne; his son, Bradford; daughters Elizabeth and Sarah; and eight grandchildren. To them all, the class extends deepest condolences.



#### **Leonard A. Yerkes '58**

Leonard died peacefully Sept. 2, 2014, from complications related to prostate cancer.

He attended St. George's School prior to Princeton. A politics major, his thesis was topic was about

present-day Kenya. Leonard joined Colonial Club and later was elected its president. He rowed on the 150-pound crew, which won the Thames Cup at Henley in 1956. During his senior year he roomed with Toby Clyde, Dave Robb, and Lew Ross.

After graduation, Leonard served three years in the Navy and then embarked on a distinguished career in wealth management with Wells Fargo, Sutro & Co., and Trust Company of the West. Leonard remarried in 1997 and moved to Seattle to open an office for Canterbury Consulting, a financial-advisory firm from which he retired in June 2014. Over the years Leonard was a dedicated trustee and board member of Planned Parenthood, the Rainier Club, Seattle Symphony, and the Seattle Girls' School.

Leonard was a natural leader, a good listener, and thoughtful in his responses. He passed along his wisdom while remaining open to that of others. He was serious when appropriate but had a quick sense of humor and loved to laugh until he cried. He was incredibly proud of his association with Princeton and was delighted to become president of the class.

The class extends deepest sympathy to his wife, Jane; his daughters, Amy '84 and Faith '87; son Philip; and Jane's children, Charlotte and Thatcher.

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#### **THE CLASS OF 1959**



#### **Frank A. Peluso '59**

Frank died suddenly May 14, 2014, of congestive heart failure at home in New York City with his beloved wife, Emi (née Yamamoto), at his side.

Born into a devoted Italian family and raised in Brooklyn, Frank was an exceptional tap dancer in his youth, performing regularly on major television networks. But he went on to far greater heights.

Coming to Princeton from Lafayette High School in Brooklyn, where he was senior-class president, Frank majored in physics and joined Wilson Lodge. He graduated *magna cum laude*, earned a Woodrow Wilson Fellowship to study at Columbia, and then studied mathematical physics at Princeton on a Putnam Fellowship. This led to his interest in the mathematical vagaries of the stock market, and in 1970, he founded Market Systems Research, designed to capture the wave structure of the marketplace. The firm remains a vibrant resource for money managers.

In his spare time, he had leading roles in major productions in New York as an operatic tenor. It was in this pursuit that he found himself rehearsing with a lovely young Japanese woman — she who was at his side when the curtain drew closed.

The class extends its sympathy to Emi; Frank's daughter from a previous marriage,

Desirée Hoffman; and his grandchildren, Christian, Ariel, Jean Luc, and Axel.



#### **W. Thomas Thach Jr. '59**

William Thomas Thach Jr. died July 1, 2014. He was 77.

Tom was born in Oklahoma City, Okla., Jan. 3, 1937, to Mary Elizabeth Edwards and William Thomas Thach '21, the oldest of four children. He graduated from Cassidy School and after earning his bachelor's degree at Princeton, graduated from Harvard Medical School. Tom married Emily Otis June 12, 1963, and they had three children. They divorced in 1980.

Tom was a pioneering researcher on the function of the cerebellum, a part of the brain responsible for coordination of movement. Tom was recognized internationally for his scientific contributions. He and his brothers all worked at Washington University.

Tom loved hiking, camping, canoeing, hunting, reading literature and poetry, and playing music with family, friends, and postdocs in his band, Taum Sauk.

He is survived by his siblings, Bob '61, Brad '64, and Maychai Brown; his children, Sarah, Will, and Scott; and three grandchildren. Memorial donations may be sent to: The Peter Halstead Hudgens Award, Washington University School of Medicine, Campus Box 1247, 7425 Forsyth Blvd., St. Louis, MO 63105.

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#### **THE CLASS OF 1960**



#### **Ira B. Silverstein '60**

Ira died Oct. 9, 2013, in Seoul, Korea, from complications of a hip fracture that he suffered while on an overnight stop en route to Cambodia.

Ira came to Princeton from Hillside (N.J.) High School. At Princeton he majored in English while preparing for a career in medicine. His thesis topic was "Elements of the Biblical Job Theme in English Literature." He also worked on the Student Christian Association committee, which made weekly visits to the New Jersey Diagnostic Center to provide diagnostic services for children with neurodevelopmental and behavioral disorders.

After Princeton, Ira graduated from the University of Pennsylvania medical school, interned at Yale, and took a residency in psychiatry at Columbia. In New York City he practiced psychiatry, was senior attending psychiatrist at St. Luke's Roosevelt Medical Center, and taught psychiatry at Columbia.

In 1988, having fulfilled his goals, he said he "abandoned the stimulating, frenetic, high-energy lifestyle of New York" and moved to Southern California. From there, he practiced psychiatry and indulged his hobby of painting and love of travel, exploring the historic and beautiful places on the planet.

He is survived by his life partner, Paul Martin; several cousins; and many friends. The class extends sincere sympathy to them.

#### THE CLASS OF 1961



##### **Peter W. Hyde '61**

Known to us as "Pete," Peter died July 8, 2014, from complications of Parkinson's disease in Prairie Village, Kan.

A son of Benjamin Hyde '24, Peter grew up in Kansas City and came to us from Pembroke Country Day School. At Princeton he majored in history, graduating *cum laude*. He was active in the Outing Club, the Young Republicans, and the pre-law society. Pete took his meals at Key and Seal and roomed with Chuck Frisbie, Paul Putney, Jim Zirin, and Mike Stonehill.

After earning a law degree at Michigan and an MBA at Harvard, Peter was a corporate attorney for 40 years at Stinson Morrison Hecker in Kansas City. His special projects included the IRS building in Kansas City, the Arkansas Dam, Children's Mercy Hospital, and Kemper Arena. For the last 10 years, he worked principally on derivatives. Peter served on the boards of the Lyric Opera, and, having battled Parkinson's for the last 19 years of his life, the Parkinson Foundation of the Heartland.

He is survived by his wife of 33 years, Janet; his sons, David and Peter; three grandchildren; a brother and a sister; and his first wife, Ann.

#### THE CLASS OF 1965



##### **Kent E. Mast '65**

Kent Mast died April 24, 2014, after an extended illness.

Born in Media, Pa., Kent majored in politics, took his meals at Cottage Club, and was a four-year member of the swim team. He attended Duke Law School, where he was editor of the *Duke Law Journal* and a member of the Order of the Coif.

After working at several major law firms in Atlanta, he joined Equifax as corporate vice president and chief legal officer until his retirement in 2012. He also served two years as president of the Consumer Data Industry Association. He was a member of Emory University Hospital Advisory Board and the Georgia Board of the Appleseed Center for Law and Justice.

He is survived by his wife, Deborah; children Roger, Grier, Jensen, Jeffrey, Robert, and Kriston; brother Kurt; and eight grandchildren. To them all, the class sends its condolences.

#### THE CLASS OF 1967

##### **Charles A. Friedman '67**

Charley Friedman died Jan. 26, 2014, in Houston after a long struggle with leukemia.

He came to Princeton from Memphis Central



High School. Charley belonged to Terrace Club, majored in chemistry, and roomed with A.G. Kasselberg, Dean Pope, and Bruce McConnell.

Following graduation, he earned a medical degree from Johns Hopkins. After service with the National Institutes of Health and training at Boston Children's Hospital and Duke, Charley had a distinguished career as a neonatologist. He constantly devoted himself to finding new ways to save the lives of the very young.

Charley conveyed his passion for medicine as service to others to his two sons, Judah '97, and Adam '01, and they followed him in careers as distinguished physicians. His intellectual interests included Civil War history, automobiles, and Latin. He had a wonderful eye and ear for the absurd. From his days at Princeton and throughout his life, friends and family were buoyed by his keen and delightful observations of the pompous and the pretentious. Even in his illness, his good humor and wit never failed him.

Charley is survived by Ruth, his wife of 42 years; his brother; his two sons and their wives; and two grandchildren.

#### THE CLASS OF 1970



##### **Christopher W. Brooks '70**

A heart attack claimed Chris on Aug. 19, 2014.

He came up to from the McDonogh School in Maryland. While an undergraduate, Chris coached the lacrosse team at the Peddie School. He was one of our few classmates who married during our undergraduate years.

Commissioned in the Army, Chris earned a doctorate from Linacre College at Oxford. He commenced an auspicious career in teaching and research in the history of the law.

Chris focused on the English Civil War. An expert in the history of law and lawyers, he concentrated on the "middling sort," the new middle class and their lawyers, as law practice moved from being conducted in Latin to English. His interest was in the growing relevance law was to have for everyday English life.

Chris published numerous books and essays during his life. A founding board member of the *Law and History Review* as well as a Mellon and Leverhulme fellow, Chris recently had spent a year in the Huntington Library in California, where he renewed class connections while working on the Civil War volume of the *Oxford History of the Laws of England*.

To his wife, Sharyn; his son, Gavin; and daughter Tracy, the class offers condolences.

##### **James M. Flaherty '70**

Jim died April 10, 2014, of a heart attack.

Following interests that began at Loyola



College High School in Montreal, Jim was a hockey player and member of Whig-Clio. Law school was followed by 20 years in private practice.

In 1995, Jim was elected to the Ontario Legislative Assembly, and he held a succession of cabinet-level positions before becoming Canada's 37th minister of finance in 2006.

Jim was a champion of tax reform, higher education, homelessness remediation, and savings plans. He presided over the discontinuation of the penny in 2012.

In 2009, *Euromoney* magazine named him Finance Minister of the Year, noting he "enhanced his country's reputation for sound fiscal policies that take full account of social justice, while a strong regulatory regime has kept the financial sector out of the chaos."

Jim always was prepared to do the hard work to achieve what he believed was right. He also served as president of the Head Injury Association of Durham Region in Ontario.

To his wife, Christine Elliott, and his triplet sons, John, Galen, and Quinn, the class offers its sincerest condolences.

#### GRADUATE ALUMNI

##### **Gerald G.L. Henderson \*53**

Gerald Henderson, a geologist who became the first Canadian-born president of Chevron Canada, died peacefully March 14, 2014. He was 87.

Henderson earned a bachelor's degree and a master's degree in geology from McGill University in 1948 and 1950, respectively. In 1953, he received a Ph.D. in geology from Princeton, and not long after began his career with Chevron Canada. His first position was as a field geologist, where he spent May through September leading field parties, mostly on horseback, in the Rocky Mountains.

Rising steadily within the company, Henderson became chief geologist in 1963, vice president of exploration in 1967, and concluded his career as president. Under Henderson, Chevron had major exploration discoveries (including at Hibernia, the largest offshore oil development in Canadian history). In 1986, he retired at age 60.

Among Henderson's many honors, he was elected a Fellow of the Royal Society of Canada in 1973 and was the 1994 recipient of the prestigious Slipper Award from the Canadian Society of Petroleum Geologists. In retirement, he served for 10 years with the executive leadership of the World Petroleum Congress, and on the boards of several charitable societies.

He is survived by Beverley, his wife of 59 years; two daughters, Lynna and Tara; and four grandsons, Andrew, Stephen, Christopher, and Rohan. His daughter Gail predeceased him.

**Robert W. Rafuse Jr. \*64**

Robert Rafuse, an internationally recognized expert on government finance and tax policy, died March 13, 2014. He was 77.

Rafuse graduated in 1958 from Harpur College in upstate New York (now Binghamton University). He earned a Ph.D. in economics from Princeton in 1964. After a year of teaching economics at the University of Illinois, he moved to the Washington, D.C., area where he remained until retiring in 2007.

He held positions with the U.S. Treasury Department, the Brookings Institute, the National Planning Association, and the U.S. Advisory Commission on Intergovernmental Relations. He advised the federal government, states, and localities throughout the country on public-finance issues.

From 1979 to 1987, he was the deputy assistant secretary of the treasury for state and local finance, and a key figure in such policy areas as the Revenue Sharing Program, federal loan assistance to New York City, and the ending of Washington's dependence on the Treasury for short- and long-term financing. In the 1990s, he was a senior adviser on USAID-sponsored projects assisting Macedonia, Poland, and the Russian Federation as they reformed their tax and fiscal policies.

Rafuse is survived by Diane, his wife of 52 years; three sons; and two granddaughters.

**Joseph Kerman \*50**

Joseph Kerman, retired professor of music emeritus at UC, Berkeley, eminent musicologist and, at times, provocative critic, died March 17, 2014. He was 89.

After graduating from NYU in 1943 with a bachelor's degree in physics and working for the Navy in World War II, Kerman entered Princeton and earned a Ph.D. in music in 1950. He then worked as a professor at Berkeley from 1951 until he retired in 1994. He was the Heather Professor of Music at Oxford University from 1971 to 1974, in addition to being a visiting fellow at Princeton, Cornell, and Cambridge.

According to the faculty of music at Oxford, "Kerman was a major voice in Anglophone musicology, and a ... founding figure in the emergence of the so-called 'new musicology.'" In his books and essays (admired for their intellectual and scholarly depth), he criticized what he viewed as the intellectual isolation of musicology and advocated a more multidisciplinary approach.

Among Kerman's honors, he was elected an honorary fellow of the Royal Academy of Music and a fellow of the American Academy of Arts and Sciences.

He was predeceased by his wife, Vivian, in 2007. He is survived by two children, Peter and Lucy, and five grandchildren. A son died in 1993.

**Murray L. Weidenbaum \*58**

Murray Weidenbaum, retired Mallinckrodt Distinguished Professor in Economics at Washington University in St. Louis, died March 20, 2014. He was 87.

Weidenbaum graduated from the City College of New York in 1948, and received a master's degree from Columbia in 1949. In 1958, he earned a Ph.D. in economics from Princeton. After positions at Boeing and the Stanford Research Institute, he joined Washington University in 1964 as an associate professor. In 1966, he became a full professor and chair of the economics department. He was appointed the Mallinckrodt Professor in 1971.

From 1969 to 1971, Weidenbaum was Richard Nixon's assistant secretary of the Treasury for economic policy. In 1975, he founded the Center for the Study of American Business at Washington University, and was its director. At his retirement in 2000, the center was renamed the Weidenbaum Center.

A fiscal conservative, he was a key economic aide to Ronald Reagan and was his chair of the President's Council of Economic Advisers. In supporting the president's tax cuts, Weidenbaum championed corresponding reductions in federal spending. Reagan's increased military outlays meant rising U.S. deficits, which Weidenbaum couldn't support. He quietly resigned in 1982. Reagan remained a friend.

Weidenbaum is survived by his three children, Jim, Susan, and Laurie; and six grandchildren. His wife, Phyllis, died in May 2014.

**Stanley P. Leibo \*63**

Stanley Leibo, noted biologist and professor at the University of New Orleans (UNO), died of cancer March 25, 2014. He was 76.

Leibo graduated from Brown in 1958 and earned two master's degrees from Vermont before his Ph.D. in biology from Princeton in 1963. That year, he joined the Oak Ridge National Laboratory. In 1972, Leibo and two colleagues successfully preserved embryos of mammals that had been frozen, using liquid nitrogen and helium — the foundation for the current worldwide use of freezing embryos in human fertility clinics.

In 1981, he became head of research and development at Rio Vista International. There, he invented a one-step process for the transfer of cattle embryos, revolutionizing the industry. Then he worked at Baylor Medical School (1988–1990) and the University of Guelph (Canada, from 1990–2000). He joined UNO in 2000. Posthumously, UNO honored him for his undergraduate teaching. He was also a well-regarded mentor of adult students.

In 2009, Leibo received the Lifetime Achievement Award from the International Embryo Transfer Society. His daughter, Beth, described him as a down-to-earth, giving, and

genuinely humble human being.

Leibo was predeceased by Bette, his wife of 46 years. He is survived by two children and two grandchildren.

**Samuel W. Lewis \*64**

Samuel Lewis, former U.S. ambassador to Israel, died of lung cancer March 10, 2014. He was 83.

Lewis graduated from Yale in 1952, and received a master's degree from Johns Hopkins in 1954. That year he joined the Foreign Service, and served in several posts abroad. From 1963 to 1964, he was a mid-career fellow at Princeton's Woodrow Wilson School.

In 1977, Jimmy Carter appointed him ambassador to Israel. In 1978, President Carter hosted Israeli Prime Minister Menachem Begin and Egyptian President Anwar el-Sadat at Camp David. Lewis was key to the peace accords reached there, ending 30 years of war between the two nations.

Lewis privately challenged Carter when the president questioned Begin's sincerity in seeking peace. As revealed in a 1990 oral-history project, Lewis told how he persuaded Carter that Begin and all Israelis wanted peace above all. The problem, he said, was not the objective of peace, but the price the Israelis were prepared to pay in addition to the domestic political risks to Begin.

He remained as ambassador under Ronald Reagan into 1985. Later, he was the policy-planning director at the State Department under Bill Clinton.

He is survived by Sallie, his wife of more than 60 years, and two children.

**Thomas J. Nelson \*68**

Thomas Nelson, retired dean of engineering at the University of Portland, died May 6, 2014, at the age of 80.

Born Tamas Janos Neubauer in Hungary in 1934, he and his family survived Nazi persecution and came to the U.S. in 1947. In 1952, he entered the engineering program at MIT, and in 1957 he graduated with joint bachelor's and master's degrees in electrical engineering.

Nelson then moved to New Jersey to work in computer research and development for RCA Laboratories. In 1968, he earned a Ph.D. in electrical engineering from Princeton. That year, he became a faculty member at the University of Michigan.

In 1974, he joined the faculty at the University of Portland, and became dean of engineering in 1977. He remained dean for 19 years until he retired in 1996.

Nelson's wife, Mary Baker, whom he married in 1957, predeceased him in 2002. He is survived by two sons.

*This issue has an undergraduate memorial for Lowell D. White '49 \*56.*

*Graduate memorials are prepared by the APGA.*



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**Italy/Todi:** Luxurious 8BR, 7.5BA villa, amazing views, infinity pool, olives, lavender, grapes, vegetable garden, daily cleaner, WiFi. For photos/prices/availability: VRBO.com, #398660. Discount Princeton affiliates. 914-320-2865. MarilynGasparini@aol.com, p'11.

**Paris, Tuileries Gardens:** Beautifully-appointed, spacious, 1BR queen, 6th floor, elevator, concierge. karin.demorest@gmail.com, w\*49.

**France, Dordogne-Lot.** Dream house, mythic village. Wonderful restaurants, markets, vineyards, bicycling, swimming. (Alumni Discount). maisonsouthernfrance.com, 617-608-1404.

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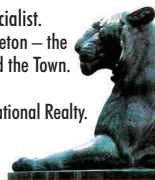
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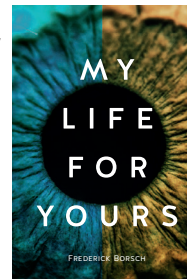
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Chester Conklin, left, and Charles "Buddy" Rogers in the 1928 movie *Varsity*, filmed at Princeton.

## Hollywood Surrenders to Nassau Hall

W. Barksdale Maynard '88

Today the scenic University appears regularly as a backdrop in Hollywood movies, but an early foray went badly when Paramount was granted permission to film a comedy called *Varsity*.

Written and directed by two Yalies, the film capitalized upon the '20s vogue for all things collegiate. Former Keystone Kop Chester Conklin starred as a salty janitor whose son, Duffy, enrolls as a student. Conklin tries to rescue Duffy from his sordid habits — the humor lying in the fact that the son doesn't know the janitor is his dad.

Triangle Club actors played minor roles as undergrads, including Erik Barnouw '29, later a well-known historian of

television, who commiserated onscreen with Conklin regarding "Duffy's growing tendency to dissipate."

Shot as a silent film around Nassau Hall, by ninth-entry Blair and elsewhere, *Varsity* was re-released almost immediately as a part-"talkie," including Princeton songs and dialogue poorly synchronized with the actors' mouths. But what horrified President John Grier Hibben 1882 was the drinking.

One student appears ready to read *As You Like It*, then unscrews a corner of the book and sips whiskey hidden inside. Undergrads sneak away to bars in Trenton, where Duffy falls in love with the cowgirl in a Wild West show.

"It is unfortunate that the only side of Princeton life on view smells so strongly of alcohol," *The Daily Princetonian* fumed. The one scene suggesting the place was an educational institution and not "a youthful Racquet Club" — students hurrying to class in McCosh — was left on the cutting-room floor. *The New York Times* concluded: "Sons of Harvard will be intensely amused."

With *Varsity* showing in 1,200 theaters nationwide, Hibben wrote to Paramount, demanding that it yank the film — such was the sway of Ivy presidents then. The movie giant complied in January 1929, and there has been no trace of *Varsity* since. ♦

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