

ENDOWMENT RETURN  
TAKES A DIP

PRODIGY TERENCE TAO \*96  
STILL A MATH STAR

NOBEL PRIZE FOR  
PROFESSOR PEEBLES \*62

# PRINCETON ALUMNI WEEKLY



## CELEBRATING BLACK ALUMNI

At Thrive conference: good times,  
great talks, old friends

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# PRINCETON ALUMNI WEEKLY

An editorially independent magazine by alumni for alumni since 1900



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Professor Tom Griffiths uses computers to determine how we humans make decisions — and how we could do it more efficiently.  
*By Matthew Hutson*

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*By Mark F. Bernstein '83*

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**Man on the Moon**

Fifty years ago, Apollo 12 astronaut Charles "Pete" Conrad '53, left, became the third person to set foot on the lunar surface. On the PAWcast, historian of science Jordan Bimm discusses Conrad's legacy in the space program.



**Tigers of the Week**

Matt Wolf '05 makes his way in the NBA; Yvonne Ng '91 promotes STEM education.

**Football Updates**

Princeton faces Ivy rivals Dartmouth and Yale.

**Visual Lesson**

Alan Turing \*38's new portrait inspires a reflection by columnist Gregg Lange '70.

From top: Ricardo Barros; from left: NASA; Princeton University Art Museum

**On the cover: Vincent Naman '82 greets his classmate Sandra Stites at the Thrive conference in October; photograph by Tori Repp/Fotobuddy**



## Princeton Plasma Physics Laboratory: Responding to a Global Need

*Sir Steven Cowley \*85 became the director of the Princeton Plasma Physics Laboratory in 2018. His world-class physics expertise and demonstrated ability to lead large scientific projects make him the ideal director for the lab at this time. I have invited him to share his goals for the future of PPPL.—C.L.E.*

Ninety-nine years ago, in a public lecture, astrophysicist Sir Arthur Stanley Eddington concluded that the prevailing theories of the sun were wrong. Assembling the earliest evidence for our modern understanding, he surmised that the sun must be powered by converting hydrogen into helium. Today we call it fusion power. Eddington mused about fusion's potential, saying: "...we sometimes dream that [humanity] will one day learn how to release it and use it for [their] service. The store is well-nigh inexhaustible, if only it could be tapped."

Eddington was right on all counts. Fusion—the process powering the sun and stars—is the perfect way to deliver the carbon-neutral, safe, and abundant source of energy that the world needs. Millions of years of fuel is available in sea water and fusion will have minimal environmental impact. There's only one problem: we have not yet fully mastered the technology.

In 1951, Lyman Spitzer \*38, then director of the Princeton Observatory, was among the first to take up the challenge of making a controlled fusion reactor on Earth. Since that time, the Princeton Plasma Physics Laboratory (PPPL) has been at the forefront of fusion research. Much of the field of plasma science, the physics of hot ionized gasses, was invented here. Many of the pioneers worked at PPPL and our graduate students have gone on to become scientific leaders in the field. Over the years, key advances in fusion research took place at PPPL. Indeed, our Tokamak Fusion Test Reactor was the first experiment to generate significant fusion power—10 megawatts.

I returned to Princeton 15 months ago to become the seventh director of PPPL with two overriding goals. First, we aim to drive the science and technology innovations necessary for commercial fusion power—in a sense, to complete the job Spitzer started. While we know how to do fusion, we cannot yet make electricity from fusion at a reasonable cost. However, promising new research is underway. For example, the U.S. Department of Energy (DOE) recently approved the rebuilding of our flagship experiment, the National Spherical Torus Experiment-Upgrade (or NSTX-U, for short), to investigate smaller and less expensive reactor concepts. The recent flood of venture capital into fusion research is also helping fund new ideas and launch new initiatives at PPPL. To test these innovations at scale, the U.S. will need a major new fusion research facility before the end of the 2020s. The obvious place for such a facility is PPPL. We are working hard to ensure it comes here.

My second goal is to diversify PPPL's research by leveraging the connection to Princeton University.

We want to make PPPL a truly multi-purpose National Laboratory. The DOE and the University trustees have endorsed this goal and it has been incorporated into the June 2019 update to the University's strategic framework. Several specific initiatives are already underway.

The laboratory, with help from campus faculty, has begun a large collaboration with the microelectronics industry to develop the science of the next generation of plasma-fabricated computer chips. Our expertise in plasma science, largely developed in fusion research, makes us uniquely qualified to advance the field. PPPL's plasma and engineering expertise will enable Princeton faculty in related areas to take their research to a larger scale—a scale that requires the engineering and project management that the laboratory can provide.

Since plasmas are so common around the universe—from the vast plasmas in galaxy clusters to the highly energetic plasmas swirling around black holes—it is not surprising that an astrophysicist founded PPPL. Over the past decade, PPPL has strengthened its connection to the Department of Astrophysical Sciences to address some of the most compelling problems in the universe. For example, the explosive release of magnetic energy (such as solar flares) in astrophysical plasmas will be studied in the Facility for Laboratory Reconnection Experiments, which has been transferred from campus to PPPL and will become a national user facility.

To advance our vision, new laboratories and collaborative computing spaces are needed. The DOE and the University are supporting the modernization of the laboratory infrastructure, and the DOE has approved the mission need for a new research building. The next few years will challenge the laboratory's expansion capacities—but it is a challenge we welcome.

I first came to Princeton (and to PPPL) as a graduate student in the summer of 1981. It was thrilling to study and work alongside frighteningly smart people at the laboratory and on the campus. I experienced that same thrill returning last year, but with a new sense of urgency. Climate change is perhaps the most critical challenge facing humanity today and fusion energy—with millennia worth of clean fuel and no carbon emissions or nuclear waste—is the lasting solution that we need. Delivering it is the mission of PPPL.



Steven Cowley \*85, director of the Princeton Plasma Physics Laboratory

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# Inbox



## SHARE YOUR STORIES OF COMMUNITY HOUSE

**Community House was created by University students 50 years ago to support the academic success of disadvantaged youth in the Princeton public schools. PAW invites alumni to share their experiences in the program for publication in a future issue. Email [paw@princeton.edu](mailto:paw@princeton.edu) or write to the address at the bottom of this page.**

### THE VALUE OF A THESIS

Ariadne Mytelka '17 (Inbox, Oct. 2) questions the value of the mandatory senior thesis. I distinctly remember thinking after finishing my third junior paper in French literature — the first that I had ever written that was 20 pages long — that next I would have to come up with a research topic for my senior thesis where I would have to write three to four such papers and that they would have to be thematically related. This was a quantum leap for my intellectual development that could not have been equaled simply by the additional coursework that she proposes as an alternative.

Ms. Mytelka labels her senior thesis a “dud.” Yet the value of a senior thesis is not circumscribed by the time frame of the senior year. An alternative outlook would recognize that this unique exercise in independent thinking and time management may well prove to be extremely useful in addressing future challenges in any profession.

**Richard A. Etlin '69 \*78**  
New York, N.Y.

I believe the Princeton thesis requirement is an essential component of our unique educational experience. Original, deeply concentrated, extended study of a specific topic is very different from coursework. Princeton's requirement provides a unique opportunity for students to experience real scholarly research. Making the thesis optional would defeat three major benefits of the program: 1) introducing unsuspecting students to the joys of research, 2) providing a collaborative experience with faculty scholars, and 3) enabling all students to have research experience to better prepare them as educated world citizens.

The senior thesis enables students to become real experts in a field (however narrow) and to understand the twists and turns that ultimately lead us to knowledge. My thesis with Professor Masakazu Konishi was my most important educational experience at Princeton and prepared me well for my Ph.D., two dozen journal articles and book chapters, 49 U.S. patents, and a fascinating career in biological research and business.

**Douglas B. Quine '73**  
Bethel, Conn.

Until reading Ariadne Mytelka's letter, it never entered my mind to challenge the concept of the senior thesis.

Being a public high school graduate, I struggled my first year and a half and then, in tortoiselike fashion, improved steadily through my upperclass years.

My thesis subject, the Napoleonic

## FROM PAW'S PAGES: 2/11/1987

### Investment Strategy

I keep getting the most persuasive appeals for money for various costly functions of the university. I also read passionate arguments that educational emphasis should be on the development of thinkers, as differentiated from earners.

Since it can be demonstrated that earners have deeper pockets than thinkers, and could be hit for larger sums, I suggest we establish undergraduate majors in: takeover tactics, insider trading, commodity futures, dentistry, and casino management.

WILLIAM C. RINWICK '37  
Rosemont, N.J.

legend (yuck), was mercury in a bottle, and should have been challenged by my thesis adviser. It wasn't. I spent the entire year working diligently on it, including spring break. Each chapter was submitted to my adviser on schedule. As a scholarship jock who worked in the dining halls to offset expenses, I asked my mother to type my thesis, for which I remain grateful.

When I received my grade, my adviser's comments still ring in my ear: “Mr. Fulcomer, your title is awkward (he had approved it), the pages are not numbered, and the work is little more than a series of paraphrased quotes.” Of course he was correct, but that should have been pointed out much earlier. His “gift” to me was a 2 minus; not a bad grade, but it meant that honors had flown out the window.

As if that were not enough, I had a roommate who struggled all year with his thesis topic but had a compassionate and understanding adviser. Six weeks before the thesis was due, the topic was revised, the thesis rewritten, and he was awarded a 1 for his efforts; a lesson in reverse *schadenfreude*.

If given the option to pass on the thesis, I would have jumped at it.

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

### EXTINCT GEOLOGICAL TERMS

Warm thanks to Elyse Graham '07 for her portrait of Clara Mabel Rice and the 1933 *Dictionary of Geological Terms* (Princeton Portrait, Sept. 11). The passing of terms like “dead ground,”

### WE'D LIKE TO HEAR FROM YOU

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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.*

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## Inbox

“lob of gold,” and “mountain milk” has left us that much more precise and that much poorer.

**Diane B. Pleninger w'50**  
**Anchorage, Alaska**

### AN ADMISSIONS TALE

I so appreciate Gregg Lange '70's writings (Rally 'Round the Cannon, PAW Online) that I am forced to (belatedly) reply to his request for comments about the admissions scandal. I have been an alumni interviewer for years and have seen a great many talented applicants not be admitted. My goal is to prepare the applicant for disappointment if not admitted; assure the applicant and the family that their child will be a great success elsewhere and go on to a wonderful life; and, if accepted, to realize that Princeton is the greatest place in the world. I cite the admission rate (less than 6 percent), and explain that not even being a star athlete is a guarantee of admission, which is why the “Varsity Blues” coaches “selling” team slots really hurts.

As evidence, I tell this story: I was the senior manager for the varsity basketball team. After Princeton won the NIT in 1975, on Acceptance Day I was sitting in the stands watching a baseball game with Coach Pete Carril and half the team. Coach Carril was literally crying

in his beer because a top recruit was not accepted to Princeton. The real agony was that he was accepted to Penn and then destroyed us a couple of seasons later. I pledge my honor that I have neither given nor received assistance on this story ... but memories fade, and never let a few details get in the way of a good story.

So Gregg, I take pride in my belief that Princeton hasn't been tainted and won't be.

**Richard Seitz '75**  
**Manahawkin, N.J.**

### (NO) WOMEN IN THE PRESS BOX

In keeping with your series of articles about the early years of coeducation: I had an interesting experience during the first few weeks of my freshman year in 1970.

I was the statistician for the football team and had two tickets for the press box. I wanted to bring my date, Ginny Kamsky '74, to sit with me during the game. However, when we got to the gate, I was told in no uncertain terms that “no women are allowed in the press box.” Of course, this was quite humiliating to me since I had to be there to work while Ginny was consigned to the stands just outside the box.

I made a big stink about this, and a few weeks later the policy was changed.

## VIA PAW ON FACEBOOK

### Dressed to Impress



Alumni offered more than a dozen comments when PAW posted the photo at left on Facebook Oct. 10, along with a link to a campus fashion story from Oct. 22, 1979, that reported: “Students have dressed up.”

**Stan Freck '82** identified the two students as **Anne Renfrew Lepasant '82** and **Mark Goldstrom '79**, but said he “can't say I ever saw either of them dressed like this, much less dressed like this on their way to class.” **Virginia Shea '82** went even further, saying that during her four years on campus, “I'm fairly certain that I never saw any student go to class in a three-piece suit.” **Stacy Hoffhaus '81** wrote that “plenty of us public school kids weren't wearing preppie styles back then,” describing her own look as “a weird mix of what I will call Kansas City chic, disco, and clothes I'd sewn myself.” Lepasant posted this explanation: “Goldie had an interview that day. Not sure who I was trying to impress. I've been looking for this photo for years — makes me smile.” ♦



## Inbox

However, Ginny never would go out with me again, even though she handled the whole affair with great equanimity.

Years later, I asked her about the incident, and she had no recollection of it until I brought it up. We have since kissed and made up and become great friends again. She now calls me her FWBF (“freshman week boyfriend”).

**Rich Rampell '74**  
*Palm Beach, Fla.*

### A PROPOSAL: ‘PRINCETON WEST’

Might Princeton consider establishing another Princeton — call it “Princeton West,” perhaps? Resources and faculty could be shared between the two campuses, but admissions would be on rather different bases. Princeton West would aim to admit an “average” class — some very able, some moderately able, some not too able — reflecting an average American high school. It could be balanced to reflect the varieties of the American population and talents.

Princeton West would be, I think, an excellent academic and social contribution, demonstrating how much a difference a Princeton education makes on all sorts of people, not just on the most favored. It would also be a wonderful way to make Princeton as a whole less elitist and more in the service of everyone. And, of course, such a Princeton West would be good for the collective Princeton soul!

**Mark Janis '69**  
*Oxford, England*

### CALLING ALL BAGPIPERS

The Reunions issue of PAW reminded me of the little-known fact that it was I who transposed the music for “Old Nassau,” “Going Back to Nassau Hall,” and “The Princeton Cannon Song” into music for the Great Highland bagpipes. This was done for the York (Pa.) Kiltie Band, which was hired to lead the Class of 1959 in the P-rade. I played with the band at our 55th reunion but was unable to make it this year.

I would be pleased to send the music to any Princeton pipers. I also donated copies to the music section of Mudd Library.

**Ellis P. Waller '59**  
*Madison, Wis.*

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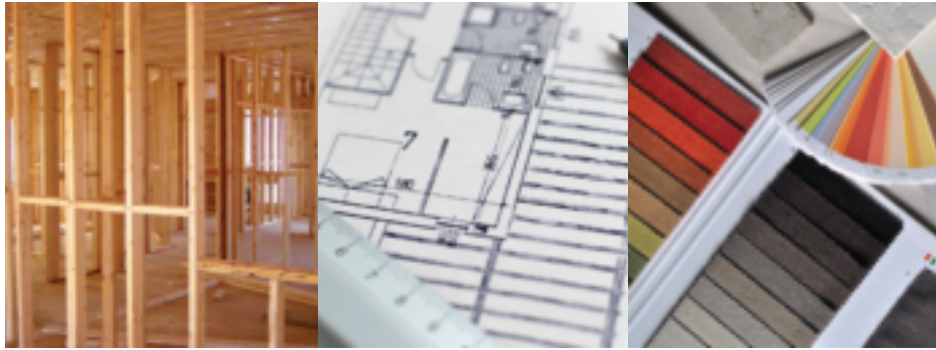


## Senior Associate Director of Class Affairs and Reunions

Reporting to the Director of Alumni Communities, this position is responsible for supporting Princeton’s undergraduate alumni classes spanning over 80 years from the Senior Class to the Old Guard. The Senior Associate Director is a highly visible role with a focus on strategic planning, cultivation, and oversight of alumni engagement through sound volunteer management, innovative programming and signature events for the University.

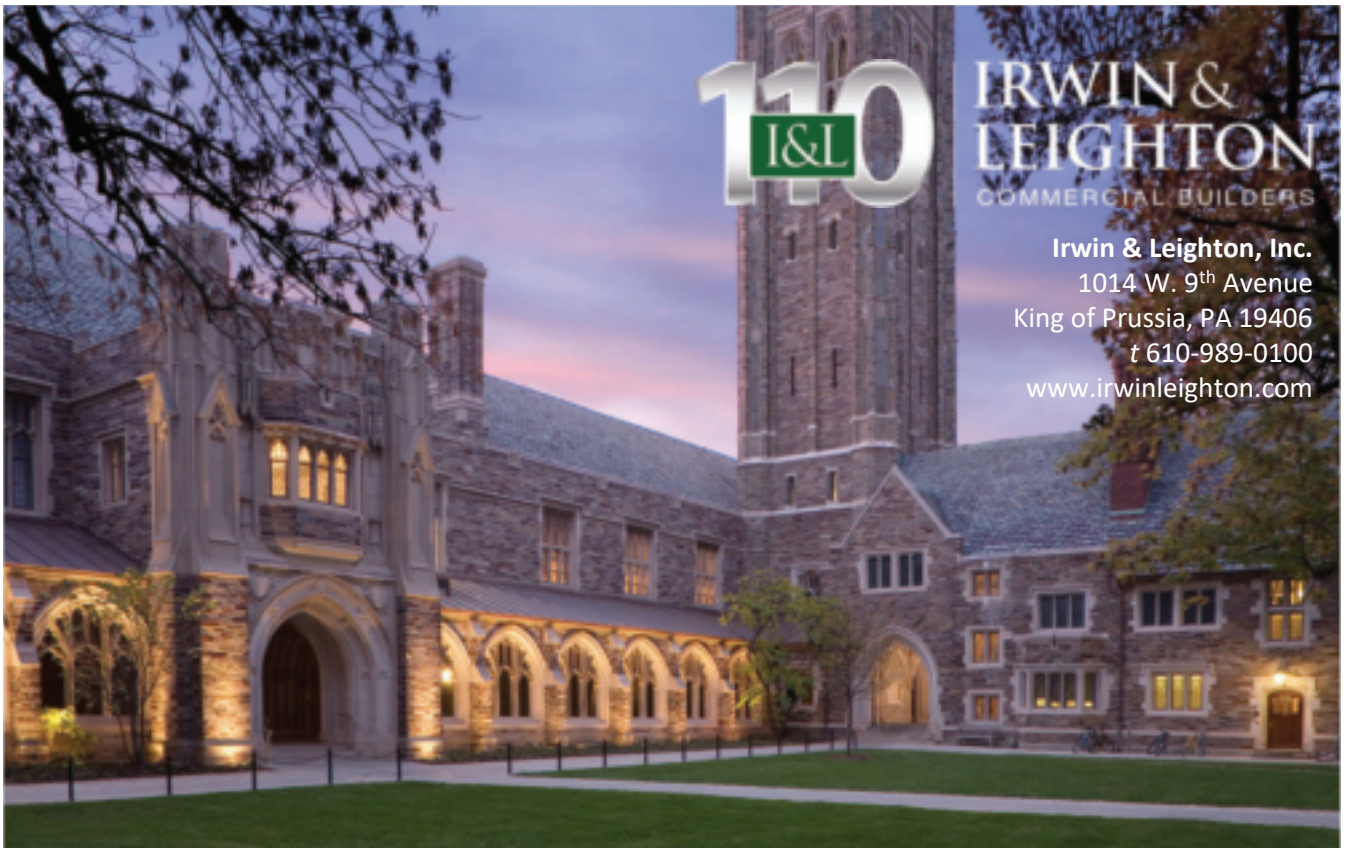
The Senior Associate Director manages a team responsible for collaborating with, advising, training and stewarding class leaders to optimize engagement of alumni with their classes and the University. Primary responsibilities include strategic planning, communications, and budgetary oversight for all activities of the team. The position oversees several of Princeton’s annual events for alumni, including the Pre-rade during Opening Exercises, the Tiger Tailgate during Homecoming, the Service of Remembrance during Alumni Day, as well as Reunions.

For more information and to apply visit:  
[hr.princeton.edu/careers/search-opportunities](http://hr.princeton.edu/careers/search-opportunities)



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2019 Guide to Alumni Architects &  
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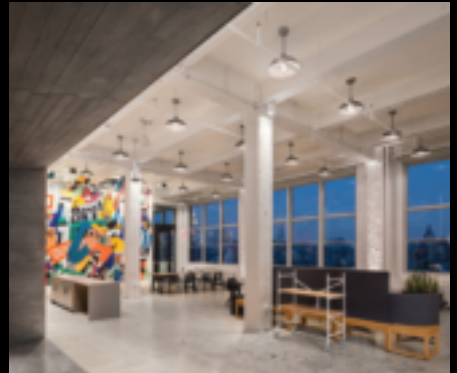
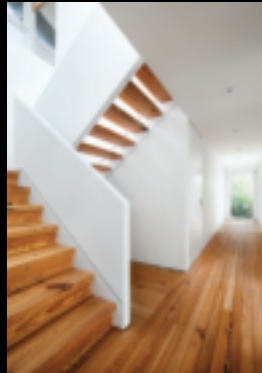
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## ALUMINARY

### Mary Newburn '97

*Vice Chair of the Alumni Council*

Photo by Sameer A. Khan / Fotobuddy

Every time Mary Newburn '97 sets foot on Princeton's campus, she feels captivated by its beauty and spirit and is momentarily transformed back into a basketball recruit from Green Bay, Wisconsin. She recalls how immensely excited she felt opening her admission letter from Princeton, and seeing a bold "Yes!" stamped at the top that announced her acceptance. "In that moment, Princeton said yes," Newburn says. "When I look back at my alumni journey, when Princeton has called and I've said yes, it has led me on the most incredible adventure."

After graduating with a major in politics and moving to Chicago, Newburn began her career in telecommunications at AmeriTech but maintained an interest in education. She led an effort at her company to partner with a local school to teach keyboarding and computer skills, and the program ended up winning an education award from the state of Illinois. "It was funny because somebody said to me, 'You clearly have a passion for education. Why aren't you working in education?'" Newburn says. "It was sort of an *a-ha* moment."

She shifted career course and went to Harvard, where she worked in the Office of the President and Provost and earned a master's degree in education. In 2007, she founded Vista Educational Consulting, working with individual students and nonprofits. She's retiring from Vista this year to devote more time to her own children. "To me, working in the field of education is just working in the currency of hope," she says. "It's inspiring and exciting."

It also dovetails with her passion for Princeton and the University's mission: In the nation's service and the service of humanity. "I do feel like in all sorts of different ways, we all try to live that out," she says. "I think that makes Princeton very special."

Sometimes, the call to service arrives at inconvenient times. In 2006, Newburn was resettling in Chicago and had recently become a new mom when her phone rang. The president of the local Princeton Club, Charlene Huang Olson '88, had noticed Newburn at a few alumni events and was calling to invite Newburn to become more involved in the regional association.



“

**I WOULD LOVE TO SEE OTHER ALUMNI FEEL INSPIRED AND GET ENGAGED LIKE I DID.”**

“At the time that she called, I had a baby and I was not exactly sure how Princeton was going to fit into my life,” Newburn says. “But I said yes. And I’m so glad I did.”

This year, Newburn became vice chair of the Alumni Council, working alongside chair Rich Holland '96. “Welcoming alumni back into the fold and bringing that spirit of Princeton to people is the honor of a lifetime,” she continues. “Rich’s motto for the next two years is ‘Princeton is where you are.’ I love the metaphor: it resides in spirit wherever you are. I was lucky enough to have a call from Charlene inviting me to join. That might not be possible for 94,000 others, but I would love to see other alumni feel inspired and get engaged like I did.”



# DEAR FELLOW ALUMNI



Rich Holland '96

Whether marching in the P-rade, attending regional events in Atlanta where I live, or simply seeing the '96 after my name, I am often overwhelmed with pride to be a Princeton alumnus. So you can easily imagine how humbled and energized I am by the responsibility to serve as president of *your* Alumni Association.

In my new role, I have the unique opportunity to help Princeton meet all alumni where they are. Imagine if all 94,000 living alumni felt like Princeton were just down the road. Better yet, imagine if all alumni felt like volunteering for Princeton or attending regional events were exactly where they are in their lives. *Is Princeton where you are?*

I have the distinct honor to serve alongside many wonderful Princeton volunteer leaders, including the officers of the Alumni Council: Vice Chair Mary Newburn '97 (opposite page), Treasurer Maria Carreras Kourepenos '85, and Assistant Treasurer Juan Goytia '00. We all share a deep gratitude for those alumni who volunteered tirelessly before us and set us up for success today. Through the Maclean Society, comprised of former Alumni Council members and University Trustees, we seek to honor many of those great Princetonians.

Our year is already off to roaring start, having welcomed back nearly 1,300 alumni and guests for THRIVE, a three-day conference focused on Empowering and Celebrating Princeton's Black Alumni in October. The conference steering committee lined up powerhouse speakers and inspiring programming, creating a truly special energy as alumni from around the globe reconnected with campus and one another. As we look forward to Alumni Day on Feb. 22 and then Reunions on May 28-31, this year promises camaraderie and great times!

As I recently told the newest Princeton students from the Class of 2023, "Speak Up!" We want your feedback. Help us ensure that *Princeton is where you are*. Drop me a line anytime at [rholland@alumni.princeton.edu](mailto:rholland@alumni.princeton.edu).

**Rich Holland '96**  
President, Alumni Association of Princeton University  
Chair, Alumni Council

**PRINCETON IS WHERE YOU ARE.**



**There are many ways to stay connected to Princeton through volunteer work.**  
To learn more, contact Alumni Engagement at 609.258.1900 or visit [alumni.princeton.edu](http://alumni.princeton.edu).

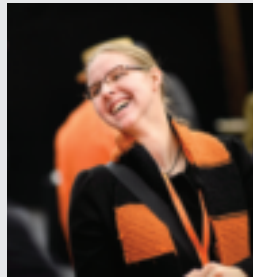


# Alumni Day

SAVE THE DATE  
February 22, 2020

Please save the date, **February 22, 2020**, for Princeton's annual Alumni Day celebration.

- **Reconnect** with friends, fellow alumni and Princeton families
- **Hear** from the recipients of the Woodrow Wilson Award and the James Madison Medal
- **Attend** the Service of Remembrance
- **Listen** to lectures, and so much more



## keep the energy from **THRIVE** going

Get Involved with the Association of Black Princeton Alumni

### HERE'S HOW:

- **Nominate** yourself or someone to serve on the ABPA board. Visit [abpa.tigernet.princeton.edu](http://abpa.tigernet.princeton.edu).
- **Become** a regional ABPA chair to help organize regional events.
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Let us know how you want to get involved by contacting the ABPA at [princetonabpa@gmail.com](mailto:princetonabpa@gmail.com).



association of black princeton alumni



# On the Campus



A view looking up from the base of *Double Sights*, a sculpture by Walter Hood in Scudder Plaza addressing Woodrow Wilson 1879's legacy. The glass surface shows images of Wilson contemporaries who were critical of his views, including Booker T. Washington; and protests of his policies, including women suffragists in front of the White House and a protest against lynching across America. (See story, page 13.)  
*Photograph by Ricardo Barros*

James Peebles '62 reacts to a standing ovation during a press conference after the Nobel announcement as President Eisgruber '83 looks on.



# Master of the Universe

## Peebles '62 shares Nobel Prize for insights into history of the cosmos

**W**hen James Peebles '62 first came to Princeton, he wanted to study particle theory. It was his mentor, Professor Robert Dicke '39, who steered him toward cosmology. “[He] told me with a wave of his hand, ‘Why don’t you go think about the theory?’” Peebles said, “and I’ve been doing it ever since.”

That advice paid off handsomely with the Oct. 8 announcement that Peebles had won the 2019 Nobel Prize in Physics. “His theoretical framework, developed over two decades, is the foundation of our modern understanding of the universe’s history, from the Big Bang to the present day,” the Royal Swedish Academy of Sciences said in a statement. Peebles also proposed the idea that a

majority of the universe is made of cold dark matter and is filled with dark energy.

Peebles shares the prize with Swiss astronomers Michel Mayor of the University of Geneva and Didier Queloz of the University of Geneva and the University of Cambridge. He will receive half of the award of 9 million Swedish kronor (about \$910,000).

Physical cosmology is a branch of physics and astrophysics that deals with the study of the physical origins, evolution, and structure of the universe. Peebles said that when he began his studies, he “was very uneasy about going into cosmology because the experimental observations were so modest.” His feelings eventually changed, he said, as “the field grew, and I grew with it.”

At a press conference in Richardson Auditorium the afternoon of the Nobel announcement, Herman Verlinde, the chair of the physics department, said Peebles’ work had created “the foundation for almost all of modern cosmology.”

President Eisgruber '83 praised Peebles for his impact on the field and on decades of Princeton students in the physics department, recalling his own experience in a class taught by Peebles.

“During my own time as a physics major, Professor Peebles was a popular teacher and a fixture in the undergraduate program. I’m among the many students who benefited from his superb instruction as well as his famous ice cream breaks,” Eisgruber said, referring to a tradition in which Peebles and students would take a break from class to get ice cream from a vending machine.

Colleagues also paid tribute to the professor’s character: Peebles is “generous to his students and colleagues,” said Bill Jones, associate professor of physics. “I doubt a kinder soul has ever been so recognized.”

At the conclusion of the press conference, faculty members, friends, students, and staff gave a standing ovation and Peebles remarked, “Now I know how rock stars feel.”

Possibly even more so: Peebles is a big fan of Bob Dylan, who won the Nobel Prize for literature in 2016 but skipped the awards ceremony, waiting several months to accept the award at a private ceremony in Stockholm. “I’ve always loved Bob Dylan ... [but] I can’t forgive him for not showing up to the scene of [his] Nobel Prize,” Peebles said.

The astrophysicist plans to make sure he picks up his prize. ♦ *By C.S.*

### A NEW CALL TO DIVEST FROM FOSSIL-FUEL COMPANIES

A group of students and alumni has called for suspending donations to Princeton until the University divests its endowment holdings in fossil-fuel companies.

The group, which calls itself **DIVEST PRINCETON**, cited “the devastating effects of rapid climate change” in an open letter and petition to President Eisgruber '83 posted at Medium.com Oct. 20. “Profiting from fossil fuels, at this point, is incompatible with acting in the nation’s service or the service of humanity,” the group said.

Princeton spokesman Ben Chang said the University “maintains a general presumption against taking stands on political issues as an institution” to provide

an unbiased forum to explore issues. He added that Princeton’s divestment policy requires “disassociation” from a company if a decision is made to divest — in Eisgruber’s words, “to disassociate from it in all other aspects of our operations.”

Citing University ties with energy companies that range from research to recruiting to purchasing products to sustainability advice, Chang said these companies “do not meet the disassociation standard.”

In 2015, the University’s Resources Committee determined that a proposal to divest from fossil-fuel companies had not met the necessary criteria. ♦ *By C.S.*



ARTIST: 'IT'S NOT A MONUMENT'

## Born Out of Debate Over Wilson's Legacy, Marker Is Dedicated Amid Protest

A debate that was central to a student takeover of President Eisgruber '83's Nassau Hall office four years ago was rekindled in October, as the University dedicated a sculpture commissioned to address the good and the bad of the legacy of Woodrow Wilson 1879.

The 39-foot-high installation, called *Double Sights*, "is disruptive by design," Eisgruber said during the Oct. 5 ceremony. He said it "exposes the profound contradictions in Wilson's life and character, and in so doing it challenges us to confront the fault lines in our society and the tensions within the human soul."

Those fault lines were evident as more than 100 protesters, many holding signs citing Wilson's racial views, gathered silently around the marker in Scudder Plaza during the dedication. After the ceremony concluded, they filled the area to speak with a bullhorn about what some said was a monument to Wilson.

"We are here today because there is nothing complex about a white supremacist," said KiKi Gilbert '21, a student organizer and protest leader. "We are here because the University



**"This should be a place of protest. ... A beacon of hope, I hope; a beacon of strength."**

— Walter Hood, *Double Sights* artist

has decided to commemorate a racist without any regret."

The installation, designed by 2019 MacArthur Fellow Walter Hood, features a slanted white column rested on a straight black column etched with quotes from Wilson as well as faces and quotes from figures who were critical of him. (The full text can be found at [doublesights.princeton.edu](http://doublesights.princeton.edu).)

A special committee of the University trustees recommended that a marker addressing Wilson's legacy be constructed as a response to concerns raised in 2015 by the Black Justice League, a student group that protested Wilson's history of racism and called for his name to be removed from the Woodrow Wilson School of International and Public Affairs.

Brent L. Henry '69, vice chair of the board of trustees, explained how the marker came to be during a public conversation before the dedication titled "Woodrow Wilson's Legacy: Wrestling with History." "We decided that on balance, rather than erase [Wilson's] name from Princeton, that we should preserve it, but also explain it," Henry said. "And that's what we're doing today."

Hood and Michele Minter, vice provost for institutional equity and diversity, participated in the conversation, which took place during the Thrive conference celebrating black alumni.

Hood said the project was one of the most difficult of his career, and he acknowledged the role of student activists in leading to its creation. "It's a spatial piece — it's not a monument," he said, describing it as an "anti-monument."

"This should be a place of protest," Hood added. "This should be a place where you go to be heard. And at night, it should become a gathering space. A beacon of hope, I hope; a beacon of strength."

*Double Sights* does not mark the end of the work that needs to be done, Minter said. "We have to keep talking about Woodrow Wilson forever," she said. "And if we ever get comfortable, then we have failed."

Alumni had mixed feelings. "We live in a world filled with contradictions, and how we work through them matters," Rahsaan Harris '95 said. "I'm glad the conversation is ongoing, that the University has responded, and that students are responding."

But some like Mariel Calloway '11 found the series of events to be unsettling. "I'm really surprised at the level of passion and intensity and how raw this still is," she said. "The fact that it is still so inflamed is troubling to me." ♦

By C.S and Mahishan Gnanaseharan '20



Students hold signs targeting Woodrow Wilson's racial views in front of the Wilson legacy marker at Scudder Plaza.

Photos, from top: Princeton University/Office of Communications/Denise Applewhite; Ethan Sterenfeld '20



ESSAY: CONSIDERING THE COUNTERCULTURE

# It Was Everything, It Was Nothing

By Raymond Arsenault '69



Princeton recently held a conference on the Counterculture of the 1960s and '70s, and PAW asked Raymond Arsenault '69 — a

conference participant who was around for the real thing — to share his reflections on the gathering. Arsenault is the John Hope Franklin Professor of Southern History at the University of South Florida.

In the popular lore of the 1960s and 1970s, the “Counterculture” was everything, and it was nothing. Like an ethereal cloud it drifted in sometime around 1967, probably during Haight-Ashbury’s Summer of Love, drenching the cultural landscape with a hailstorm of acid trips, hippie communes, and free love, with a downdraft of Eastern mysticism thrown in. And then — mercifully, for those who longed for a return to the security of order and

tradition — it all just floated away during the cultural drought of the Reagan years. Or so it seemed.

Of course, for scholars who study the Counterculture as a social and political phenomenon, and for those who came of age as I did during this tumultuous period, the calculus of change was never that simple. Here, as in virtually every aspect of cultural history, the basic questions of definition, causality, and timing are always challenging and sometimes confounding. What exactly was the Counterculture? Was it anything beyond a popular fixation with sex, drugs, and rock ’n’ roll? Where did it come from, and why did it

**What exactly was the Counterculture? Was it anything beyond a popular fixation with sex, drugs, and rock ’n’ roll?**

emerge when it did? What was the Counterculture’s relationship with radical New Left politics? With feminism, environmentalism, and the African American freedom struggle? With New Age religion? With the movement to end the war in Vietnam?

These and many other questions were on full display at a Princeton conference on countercultural history Sept. 27–28. Organized by the Program in American Studies, the conference brought together more than two dozen scholars from a variety of disciplines and a number of American universities. All were specialists in the study of the United States during the 1960s and 1970s, but otherwise there was diversity all around. The participants were as eclectic as the subjects they were discussing, ranging from professors of architecture and theater arts to a Black Lives Matter activist, a 22-year-old 2019 Princeton graduate studying women’s health reforms since the 1960s, and Harvard Law School’s venerable critical race-theory sage Mark Tushnet.

In six 90-minute sessions titled “In Search of a Countercultural Moment,” “An Economy of Tools and Knowledge,” “Movements and Alliances,” “Scarcity and Abundance,” “Expertise and Radical Cultures,” and “Anxiety and Spirituality,” the presenters left no stone (or stoner!) unturned. Countercultural topics up for discussion included Stewart Brand and *The Whole Earth Catalog*; San Francisco’s Diggers, an influential band of anarchist street performers; “New Wave” food cooperatives; architects involved in the Community Design movement; the Boston Women’s Health Collective’s production of *Our Bodies, Ourselves*; the New Age artist Carlos Villa; the British playwright Tom Stoppard’s historical drama *Rock ’n’ Roll*; internationalism, World Federalism, and the planetary citizens movement; Martin Luther King Jr.’s reliance on Gandhi-inspired nonviolent direct action and his search for the “beloved community”; and the early experiments in globalized media known as the “Satellites of Love.”

The keynote speaker was the longtime democratic and environmental activist Frances Moore Lappé, the author of the 1971 classic *Diet for a Small Planet*.

Illustration: Robert Neubecker; photo: Sudsy Tschidener



Fittingly, the first day of the conference concluded with a dinner featuring vegetarian and organic recipes from Lappé's seminal book. The intellectual feast that stretched across two days was no less nourishing, as the exchanges among paper-givers, commentators, and members of the audience provided plenty of food for thought.

In keeping with the spirit of the Counterculture, the tone of the conference was as informal as it was informative. One of the distinguished Princeton professors presiding over the gathering wore open-toed sandals throughout, and a young scholar sported a bright blue bandana as he held forth on the Diggers of San Francisco. No one would have been surprised to see a tie-dyed T-shirt or two. The whole scene was open and freewheeling, and even a bit groovy at times.

In discussion that was both broad and deep, the conference undoubtedly raised more questions than answers. Yet out of the mix of scholarly research and personal reflections came a tentative synthesis of ideas about the character and meaning of the Counterculture. As the conference drew to a close, nearly everyone seemed to agree that the traditional separation of culture and politics is misleading, and that the "texts" of the Counterculture can only be understood when placed in a historical context that goes beyond the narrow confines of the late 1960s and early 1970s. Adopting the notion of a "long counterculture" that stretches back to earlier decades, and perhaps even to prior centuries, several participants stressed the importance of undertaking additional research on the roots of the post-1965 cultural flowering — and on the considerable legacy that followed.

**One promising** but largely unexplored topic of local interest is the impact of the Counterculture on Princeton. When I entered the University in September 1965, there were few hints of impending change. Complacency and cultural conservatism dominated the campus, and the only controversy that seemed to stir the student body was the harassment of an entering freshman sporting a longish Beatles-style haircut.

That several fellow students took it upon themselves to restore cultural homogeneity by threatening to shave his head — and that more than a few others applauded this proposed intervention — speaks volumes about the state of mind on campus in 1965.

Fortunately, by the following spring there were signs of a new attitude toward cultural and political dissent. When President Lyndon B. Johnson visited the campus to dedicate the new Minoru Yamasaki-designed Woodrow Wilson School building, a dozen faculty members, including the future Librarian of Congress James H. Billington '50, marched in protest of his escalation of the war in Vietnam.

During the next two years, expressions of antiwar sentiment became more common on campus, fostered in part by an increasingly active local chapter of Students for a Democratic Society (SDS). The creation of a campus underground newspaper, *Prism*, distributed to 35 New Jersey high schools and colleges, heightened the profile of radical students, as did ongoing protests against ROTC, Dow Chemical recruiters, and the Institute for Defense Analyses.

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**Caught on the cusp between the Age of Eisenhower and the Age of Aquarius, I could never quite embrace the full range of cultural freedom that others of my generation enjoyed.**

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Then, long-haired and bearded students were no longer an object of curiosity, and among some young Princetonians tweeds and loafers had given way to denim, leather jackets, and sandals. The campus soundtrack had shifted from Elvis and the Beach Boys to Joplin and Jefferson Airplane, as acts of dissent and countercultural expression now punctuated student life. At one point, a mass, coed "sleep-in" designed to challenge Princeton's *in loco parentis* dormitory policies brought the student body's ongoing sexual revolution out into the open.

Civil rights were also becoming an

increasingly important issue on campus as the number of black students rose with each succeeding class (there were 16 black students in my class, which eclipsed the total number of black undergraduates — 15 — in the entire prior history of the University). By 1968, the Association of Black Collegians (ABC) was involved in a number of progressive initiatives, from a campaign to force Princeton to divest its South African investments, to the Trenton Action Project aimed at helping inner-city youth. Stokely Carmichael and Muhammad Ali delivered memorable campus lectures, and the ABC's brief takeover of the New South administration building in March 1969 signaled that the campus had become contested ground in a widening struggle for social and economic justice.

Looking back on these years a half-century later, it seems clear that my personal experiences with the Counterculture as an undergraduate were highly selective and idiosyncratic. Caught on the cusp between the Age of Eisenhower and the Age of Aquarius, I could never quite embrace the full range of cultural freedom that others of my generation enjoyed — experimentation with drugs, communal living, sporting shoulder-length hair, or hitchhiking to the West Coast. Other than eloping with my high school girlfriend at the tender age of 19 during the summer between my sophomore and junior years, my countercultural rebellion was strictly political. As an undergraduate research assistant for Sheldon Hackney, a young Southern history and civil-rights scholar from Birmingham with a close family connection to Rosa Parks, I was thrust into a world of courageous black and white activists previously unknown to me.

This Princeton experience initiated a passionate identification with the movement culture of nonviolent direct action — the topic of my paper at the conference — launching my career as a scholar and civil-rights advocate and altering my life beyond recognition. This is my personal Counterculture story, one of millions left over from a tumultuous time of reinvention and renewal. ♦

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## On the Campus

### SCHOLARSHIPS, FELLOWSHIPS PLANNED

## Seminary Pledges to Set Aside \$27.6 Million As Reparations for Its Ties to Slavery

Princeton Theological Seminary will set aside \$27.6 million from its endowment to fund a set of initiatives — including scholarships, curricular reforms, and community outreach — intended as atonement for the Presbyterian institution's historical entanglement with slavery, the seminary announced Oct. 18.

When fully implemented in 2024, the plan is expected to cost \$1 million a year, with that cost supported “in perpetuity” by the reserve of nearly 3 percent of the seminary's \$986 million endowment.

The seminary was created as an offshoot of Princeton University (Princeton president Ashbel Green 1783 led the seminary's board for its first 30 years), and the findings of the seminary's research into its ties to slavery closely track those of the University's Princeton & Slavery Project.

Although dozens of institutions of higher education have issued reports detailing their historical ties to slavery, and some have taken symbolic or concrete steps to acknowledge that history, the seminary's financial commitment appears to be the largest ever made.

“In our theological tradition, repentance is about turning to a new way of life,” said the Rev. Anne Stewart, the seminary's vice president for external relations. “It's about meaningful action, and I think that's what this plan represents.”

The seminary's action plan includes the establishment of 30 scholarships and five doctoral fellowships for students

who are descended from slaves or who are members of underrepresented groups.

The announcement came a year after the release of a report that determined that from the seminary's founding in 1812 until the Civil War, between 15 and 40 percent of the institution's revenue derived directly or indirectly from slavery. Although the seminary did not own slaves or rely on slave labor to construct its buildings, the audit concluded, founders and early faculty members owned slaves at some point.

**“In our theological tradition, repentance is about turning to a new way of life.”**

— The Rev. Anne Stewart, seminary vice president for external relations

In March, the Association of Black Seminarians, a student organization, launched an online petition calling for the seminary to dedicate 15 percent of its endowment — or about \$148 million — to “restitution of the benefits received ... from the immoral extraction of wealth from the labor of enslaved Africans.”

The Princeton & Slavery Project found that while the University itself did not own slaves or exploit their labor, there were many slaveholders among early presidents, trustees, and faculty members. Slave money also supported the finances of the fledgling institution.

◆ By Deborah Yaffe

## IN MEMORIAM



Professor emeritus of literature **SAMUEL HYNES** died Oct. 9 at his Princeton home. He was 95. Hynes joined the faculty in 1976 and retired in 1990. During World War II, Hynes flew 78 combat missions and received the Distinguished Flying Cross. He became known as an expert on the literature of war; that expertise informed much of his writing, including his 2018 book *On War and Writing* and his work as a contributor to two of Ken Burns' documentaries, *The War* (2007) and *The Vietnam War* (2017). Hynes taught in the English department and the Woodrow Wilson School, and wrote several major works of literary criticism. (PAW published an essay by Hynes from *On War and Writing* in the Nov. 7, 2018, issue.)



# A Not-So-Satisfying Year

## Endowment's 6.2% investment return puts Princeton in Ivies' lower tier

**T**he University's endowment notched a return of just 6.2 percent in the fiscal year that ended June 30, a result that Princeton's endowment chief conceded is "less than fully satisfying."

In a year when every Ivy League school's endowment posted smaller returns than in the year prior, Princeton's results were in the bottom half of the group. Brown's endowment performance led the Ivies in the past year with a return of 12.4 percent, followed by Dartmouth with 7.5 percent and Penn and Harvard with 6.5 percent. Trailing Princeton were Yale with 5.7 percent, Cornell with 5.3 percent, and Columbia with 3.8 percent.

Princeton's \$26.1 billion endowment, up about \$200 million from the previous year, remains the third-largest among the Ivies.

"The return leaves me wanting more," said Andrew Golden, president of the Princeton University Investment Co. (Princo). "Some years things break your way and some years they don't." Last year the endowment's 14.2 percent return on investment outperformed Princeton's peer schools.

During the past year, "diversification of any kind hurt," Golden said. Princeton's private-equity portfolio, which accounts for 39 percent of the school's investments, rose by about 14 percent. Investments in public equities in developed markets fell by 1 percent, while public equities in emerging markets rose by 4 percent. What is called "independent returns," such as some hedge funds, appreciated by 5 percent, the fixed-income category returned 3 percent, and the allocation to real assets essentially broke even.

"If you did anything other than show up in U.S. stocks and U.S. bonds, you created headwinds for yourself," Golden said. But he said the University is not broadly rethinking its strategy: Princo calculated that if it had done exactly that over the last two decades — just invest in U.S. stocks and bonds — then Princeton's

**During the past year, "diversification of any kind hurt. ... If you did anything other than show up in U.S. stocks and U.S. bonds, you created headwinds for yourself."**

— Princo president Andrew Golden

endowment would total about one-twelfth of what it is today.

The average annual return on the University's endowment for the past decade is 11.6 percent, which places Princeton among the top percentile of 500 institutions listed by the Wilshire Trust Universe Comparison Service.

The endowment is projected to provide about \$1.4 billion, or 57 percent, of the University's annual operating budget. Princeton said the endowment supports more than 80 percent of undergraduate financial aid, which increased 7.2 percent to \$187 million for the current year.

Some of Princeton's peer schools have tried to square their endowment's focus on returns with new calls for mission-driven investing. Harvard's endowment recently joined Climate Action 100+, an investor group pushing for more aggressive measures on climate change.

Golden said Princo would not be part of that effort. "We've looked at various entities — and all of them come up short in terms of having a meaningful impact in the way that we do business," he said. He worries that by joining, Princo could end up making political advocacy statements: "You somehow lose control over the messages that we make or don't make." ♦ *By Teddy Schleifer '14*

### FOCUS ON NEW INVESTING TEAMS

## With a Change of Strategy, Princo Adds Diversity to Its Portfolio Managers

For more than a decade, the University tried to increase the diversity of the people who manage its \$26 billion in assets. But the school was "making no progress," admits Andrew Golden, the head of the Princeton University Investment Co. (Princo).

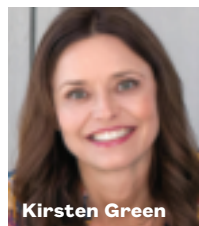
Princeton has been pushing its almost 50 U.S.-based managers — largely white and male — to add more women and people of color to its senior investing team. But a better strategy, Golden came to realize, was to seek out already diverse teams and add them to Princo's rotation. In the last year or so, the school has added seven new investing teams to its portfolio, three of whom show diversity in their leadership.

"I'm doing this to make money," Golden said. "If they are top-notch people and they happen to be diverse, that gives a turbocharge to that. We're not doing this for charity."

Princo is not dropping managers on the basis of their diversity record, he said, but is making that one of many considerations for all future relationships with new managers. For instance, the school recently began working with Forerunner Ventures, a Silicon Valley venture-capital firm founded by well-regarded retail and e-commerce expert Kirsten Green.

"The fact that they recognize the importance, and candidly advantages, of diverse investing teams is yet another demonstration of why this team has been and will continue to be as successful as they are in managing the endowment," Green told PAW.

Golden plans more mentoring of up-and-coming investors from diverse backgrounds. He's promised to meet with 50 of them this fiscal year as part of a new program that Princo is piloting. "I'm hoping that people will feel very safe and say what they have felt as impediments to their advancement," he said. "This is for us to really understand." ♦ *By Teddy Schleifer '14*



Kirsten Green



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Carla Berube at her introductory press conference in June



## WOMEN'S BASKETBALL

# A New Era in Jadwin

## As Berube takes over, defending-champion Tigers look poised for another big year

**T**his fall, basketball season started early for Carla Berube, the new head coach of the Princeton women. In the New England Small College Athletic Conference, where Berube built Tufts into a Division-III powerhouse over the last 17 years, practices began Nov. 1. By that point, Berube and her Tigers were already more than a month into their preseason.

Getting to know her new players has been a lot of fun, Berube told PAW: "They're soaking up everything that we're teaching them."

Berube, a player on coach Geno Auriemma's first national-championship team at Connecticut, arrived in Princeton in June, taking over for Courtney Banghart, who became the new head coach at North Carolina. Banghart's 12-year run with the Tigers included seven Ivy League titles and eight NCAA Tournament appearances — a record that put Princeton among the country's most successful "mid-major" programs. Meanwhile, Berube coached a perennial national-title contender in Division III, leading Tufts to the Final Four in four consecutive seasons (2014-17).

Berube said her staff has placed an

early emphasis on defense, stressing the ways in which sound defending can lead to scoring opportunities in transition. Princeton, the two-time defending Ivy champion, looks particularly strong on the offensive end, led by star forward and co-captain Bella Alarie '20, who averaged 22.8 points per game last year and is on pace to become the program's all-time leading scorer.

Alarie spent parts of her summer playing with USA Basketball in the Pan American Games and at international 3-on-3 tournaments, gaining experience that Berube said has sharpened her ball-handling skills and expanded her ability to create opportunities for open shots. "She's definitely taken her game to another level," Berube said. "I think she's playing — and leading — with a lot of confidence."

The Tigers also return All-Ivy point guard Carlie Littlefield '21, who improved her scoring average by nearly six points last season; three-point shooting threat Abby Meyers '22; and Grace Stone '22, who started 29 games in her freshman year. ♦ By B.T.

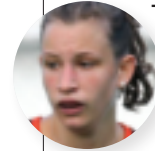
➤ **READ MORE** in PAW's basketball previews at [paw.princeton.edu](http://paw.princeton.edu)

## THE BIG THREE

**1** Field hockey's **CLARA ROTH '21** scored in five consecutive games

— all Princeton wins, including a 5-4 victory at No. 2-ranked Duke Oct. 6.

After trailing the Blue Devils 4-1 late in the second quarter, the Tigers mounted a steady comeback, capped by Roth's game-tying goal in the final minute. Teammate Hannah Davey '22 scored Princeton's game-winner in overtime.



**2** **DANNY HAMPTON '20** scored or assisted on goals in three consecutive games for the men's soccer team, helping Princeton win

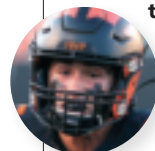
twice and secure a tie against Ivy League rival Brown. In the Brown game Oct. 12, Hampton's free-kick goal evened the score at 1-1 in the 87th minute. Three days later, he found the net in a 3-0 win over Lehigh. And

against Columbia Oct. 19, Hampton drove a free kick toward the left side of the goal, where Richard Wolf '21 headed it in for the opening score in a 2-1 win.



**3** **JACOB BIRME LIN '21** caught 12 passes for 186 yards and two touchdowns in Princeton

football's 65-22 win at Brown Oct. 19. Birmelin also fielded three punts, including a 35-yard return that set up a touchdown drive late in the second quarter. The Tigers scored 51 points in the opening half. ♦



➤ **READ MORE:** Football's games against Dartmouth and Yale at [paw.princeton.edu](http://paw.princeton.edu)

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# Life of the Mind



## TROUBLED WATERS

# Academic Anxiety

## Chinese scholars express uneasiness about the growing trend of federal scrutiny

**E**arlier this year, Yiguang Ju, a professor of mechanical and aerospace engineering at Princeton, was offered a prestigious opportunity to serve on a U.S. Air Force advisory board. “I thought it was a great honor, but after a few hours I turned it down,” Ju says. “If I do that with today’s environment, it may bring me trouble.”

A new note of caution has entered the professional calculations of Chinese-born scientists working in the United States—even those who, like Ju, hold American citizenship. Since last year, a crackdown on what federal science agencies describe as violations of ethical research-funding

practices has been followed by severe repercussions—firings, a resignation, and in one case a criminal indictment—for at least seven Asian American scientists around the country, most or all of them Chinese-born.

Although government officials insist that misbehavior, not race or national origin, is at issue, not everyone is so sure, especially given the Trump administration’s immigration policies and trade war with China.

At Princeton and elsewhere, ethnic Chinese scientists draw parallels to some of history’s darker moments, such as McCarthyism and the wartime

internment of Japanese Americans.

“Researchers of Chinese descent are feeling profiled,” says Michael A. Fisher\*10, a senior fellow at the Federation of American Scientists.

Politicians of both parties have argued for years that China exploits the open academic culture of the United States to steal intellectual property, and the issue surfaced again in February 2018, when FBI Director Christopher Wray complained to the Senate Intelligence Committee about “the level of naïveté on the part of the academic sector” regarding what he described as information collection by Chinese scholars and students.

Six months later, the National Institutes of Health, a major source of taxpayer-funded research grants, began contacting more than 60 American universities, alleging rule-breaking by some of their researchers, including violations of the confidentiality of grant proposals and failures to disclose foreign funding sources, international employment, and potential conflicts of interest. Princeton did not receive an NIH letter, University spokesman Ben Chang says.

“We found one person with a \$5 million startup package from a Chinese university that wasn’t disclosed to anybody, not to his American university and not to us,” Michael Lauer, NIH’s deputy director for extramural research, told the journal *Science* in June. “This is not subtle. It’s not an ‘Oops, I forgot to list it on a form.’ We’re talking about really, really egregious stuff.”

Two Chinese-born researchers at Emory University and three Asian Americans whose national origins were not disclosed at the M.D. Anderson Cancer Center in Houston lost their jobs, apparently after NIH inquiries. A Chinese-born eye specialist at the University of California, San Diego, resigned, and a chemistry professor at

the University of Kansas, Feng Tao '06, was charged with fraud for allegedly failing to disclose his connection with a Chinese university while he was receiving U.S. grant funds, according to the Department of Justice. It's not clear whether the California and Kansas cases grew out of the NIH probe.

Meanwhile, Chinese students and professors — including several at Princeton — have faced long, unexplained delays in getting visas to work or study in the United States. And the National Science Foundation and the Department of Energy, both sources of government research grants, have tightened rules regarding employment of non-citizens and employees' involvement with foreign research initiatives.

Princeton scientists of Chinese descent say the heightened concern over intellectual-property theft is confusing, because most federally funded research is eventually published.

"Steal what? Steal published results?" asks Kai Li, a professor of computer science. "The impression people have now in the Chinese faculty community is that basic research now becomes classified research — but then you publish in the public domain. There's no logic to this."

Given that lack of clarity, Li recently decided against collaborating with an American-born colleague on an NSF grant application. Better to avoid taking government money, he concluded.

In response to the fears of their

Chinese students and faculty, the leaders of universities from Yale to the University of California, Davis, have begun speaking out. Columbia President Lee C. Bollinger published a *Washington Post* op-ed criticizing stepped-up FBI scrutiny of foreign-born scholars. MIT released an email in which President L. Rafael Reif called it "heartbreaking" that ethnically Chinese scholars "feel unfairly scrutinized, stigmatized, and on edge."

### Chinese students and professors — including several at Princeton — have faced long, unexplained delays in getting visas to work or study in the United States.

In May, 17 Princeton professors of Chinese descent emailed President Eisgruber '83 asking that he voice support for international scholars. "Our concern is that Chinese American scholars have become collateral damage in the crossfire of the trade war between the Trump administration and the Chinese government," they wrote. "The contributions and loyalties of Chinese Americans to the American society as a whole are questioned solely due to our ethnic background."

In his reply, Eisgruber said he shared their concerns and noted his participation in several pro-immigration

initiatives. "I believe that immigration issues require active advocacy directed at Washington, rather than mere statements," he wrote.

That position doesn't entirely satisfy every faculty member who signed the original email. "Why not speak loudly and for one more time? You are a leader of diversity and academic freedom," says Ju — the mechanical engineering professor — in an email. "That kind of value has to be propagated further and deeper so that we could enjoy and feel the support. Right now, many of us are waiting for a strong and clear statement from our president."

The stepped-up government pressure forces universities to strike a difficult balance, says Tobin Smith, vice president for policy at the Association of American Universities, which represents 62 leading research universities, including Princeton. Although administrators worry about the potential harm to fruitful international collaborations, Smith says, they can't afford to seem cavalier about bipartisan fears of Chinese encroachment.

Earlier this year, the AAU co-authored a memo offering universities advice on how best to protect intellectual property against foreign threats. "There are really good practices out there," Smith says. "We just need to show that we're taking these things seriously." It's not clear if the memo reached Princeton: "We've not been able to find a copy," Chang says.

China is the United States' largest source of foreign-born graduate students, by far. In 2017, nearly 16 percent of the science and engineering doctorates awarded by American institutions went to Chinese students, according to NSF data.

Historically, many foreigners who earn degrees in the United States choose to stay, but Princeton's Chinese American faculty worry the government crackdown could end up backfiring by pushing out talented foreign-born scientists.

"What's happening is doing a great service for the Chinese government," says Yibin Kang, a professor of molecular biology at Princeton. "If you turn this into a toxic environment, you're actually helping the Chinese government to then recruit back to China." ♦ *By Deborah Yaffe*

#### NEW RELEASES



In *Race After Technology: Abolitionist Tools for the New Jim Code* (Polity), African American studies professor **Ruha Benjamin** introduces her concept of the "New Jim Code," how new technology has a built-in range of discriminatory designs that explicitly perpetuate racial hierarchies through their designers' inherent biases. Benjamin advocates for a deep scrutiny of new technologies, which have the power to obscure their own flawed designs even while claiming to be a tool for equality.



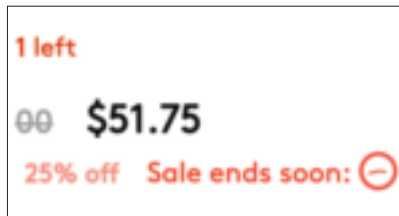
Professor of politics **Nolan McCarty** examines the 2016 election cycle through the lens of the United States' complex and partisan election process in *Polarization: What Everyone Needs to Know* (Oxford University Press). McCarty considers problematic circumstances — from gerrymandering to the primary nomination process — and argues that, given those conditions, the 2016 election results were natural, not the distinct break from tradition that many perceived them to be. ♦



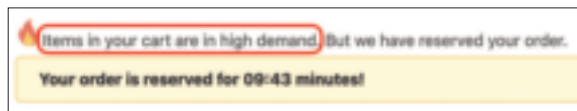
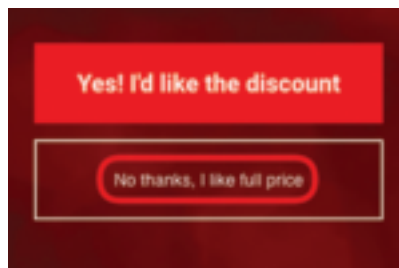
## COMPUTER SCIENCE

## Troubling Online Shopping Habits? Vendors' Practices Might Be to Blame

"Dark patterns" may sound like something from *The Matrix*, but if you shop online you've probably seen countless: timers counting down to the end of a sale, messages that supplies are limited, fees that sneak into your shopping cart.



Examples of dark patterns, left: "The sense of urgency makes our brains think something is scarcer ... than it actually is," says postdoctoral researcher Gunes Acar.



Dark patterns — a term coined by British web designer Harry Brignull — that nudge, trick, or force consumers into purchases date back to the advent of online shopping. In June, a team of researchers from Princeton and the University of Chicago were the first to catalog how hundreds of e-commerce sites use these methods. The researchers hope their catalog of nearly 2,000 different dark patterns on more than 1,300 different sites will pressure

companies to reconsider their practices, and spur regulation.

Members of Princeton's Web Transparency & Accountability Project (WebTAP) used automated web-crawling programs to assemble a list of the dark patterns the programs could see in a page's text. Then they classified the dark patterns' methods systematically.

Some patterns deceive users, say, about how many items are left in stock, and some restrict their choices — for example, not allowing customers to create an account without giving access to their Facebook account (and its valuable data). Others rely on exploiting foibles of our psychology: "Urgency" patterns, for instance, exploit our "scarcity" bias, making offers look more valuable by making them seem rare, whether through the use of a digital countdown timer or the age-old strategy of a limited-time offer. "Sneaking" patterns add products, fees, or subscriptions into customers' carts without alerting them until just before the sale, while "confirmshaming" menus present decisions to be made between the website's favored choice and an option like "No thanks, I hate saving money."

The project "was a good fit for WebTAP," says postdoc Gunes Acar, who co-authored the study. Since the team had previously created automated web-browsing programs to survey websites' privacy and tracking practices, they needed only to tweak these "crawlers" to look for dark patterns.

According to Arunesh Mathur, a third-year computer science Ph.D. student who was first author on the study, more research would be helpful, especially on platforms such as mobile apps or smart TVs.

Some dark patterns are probably illegal, says Jonathan Mayer '09, assistant professor of computer science and public affairs. "The Federal Trade Commission Act prohibits deceptive business practices," he says, as do many state laws. Still, many sites display deceptive messages about limited stock or high demand.

A bipartisan bill called the DETOUR Act, aimed at regulating dark patterns, would ban "sneaking" practices, among others, says Mayer. But the question of where the line should be between legal marketing and unacceptable manipulation remains open, he says: "Drawing that line is one of the top consumer-protection challenges today — it will involve law, policy, social science, and computer science."

◆ By Bennett McIntosh '16

Photo: Mustafa Mustafa; dark patterns images: Mathur et al.

# PRINCETON DANCE FESTIVAL

## DECEMBER 2019

**5 THURSDAY**  
8:30 p.m.

**7 SATURDAY**  
2:00 and 7:00 p.m.

**8 SUNDAY**  
2:00 p.m.

**BERLIND THEATRE**  
at McCarter  
Theatre Center

featuring new and  
repertory works by  
choreographers Zvi  
Gotheiner, Rebecca  
Lazier, Cameron  
McKinney, Christopher  
Ralph, Hofesh Shechter  
(staged by Alexandra  
Damiani), and  
Netta Yerushalmy.

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Join us in a celebration of  
**50 YEARS OF DANCE**  
AT PRINCETON  
ALUMNI RECEPTION

DECEMBER 7 • 4-6:30 P.M.  
(Between Princeton Dance  
Festival performances)  
Lewis Arts complex

For more information  
and to RSVP  
[arts.princeton.edu/  
princeton-dance-50](http://arts.princeton.edu/princeton-dance-50)


arts

# Of Minds and Machines

At 12, Tom Griffiths was slaying dragons, a task not so different, as it happens, from his current role as a professor of psychology and computer science at Princeton. That's not to say his colleagues or — heaven forbid — his students behave like dragons. Rather, the role-playing games that engaged him in his youth examined human decision-making in ways that he does in his research now.

The games from his childhood consisted of descriptions of settings and events. "You are in a dark cave," a player would be told, and so on. A player might attempt an action, like climbing a rope to escape; the roll of a die would determine if it was successful. Early in his game-playing career, Griffiths started calculating the probabilities of sequences of events to decide on the right plan.

"One of the things that I find fascinating about those kinds of games is that what they're trying to do is describe human lives in terms of a computational problem," Griffiths says. "They're trying to put a probability on every kind of human action or interaction. It's exactly the thing that I do now, which is thinking about how to specify complex models for the kinds of events that happen in human lives." Even if we don't fight dragons or search for treasures, we fight illness and search for jobs. And we run rough simulations in our heads of how things might work out, one or many steps ahead. Griffiths aims to create, with computers, approximations of those mental processes, to better understand how and why people make decisions — and enable people to make better ones.

**I**F YOU WANT TO BUILD A COMPUTER that can think like a person, psychological theories might be missing some important details. "In the past, theories have been much more qualitative, verbal," says Jonathan Cohen, co-director of the Princeton Neuroscience Institute. "From one perspective, that's appealing. It's the kind of thing that's much easier to explain to broad audiences. But they lack the precision that one expects of a rigorous scientific theory."

Computer science provides the tools to study people's psychology rigorously and in new ways — and Griffiths has been pushing the envelope, dramatically advancing the field of psychology, according to Cohen. Theories about cognition — learning, perceiving, deciding — are specified in computer code and produce quantitative predictions about how people will actually behave. "Increasingly, we have the opportunity to be much more precise about what we think are the mechanisms that underlie human cognition," Cohen says.

Griffiths has long wanted to understand how people think. After all, he says, "if you want to make intelligent machines, human beings are still the standard that we have for defining intelligence." Artificial intelligence (AI) — computers' ability to mimic human intelligence and learn to play chess or drive a car, for example — still makes a lot of dumb mistakes. But it's not just the quest for better AI that drives Griffiths — it's his need to explore "one of the greatest scientific mysteries that we have, which is how human minds work."

## TOM GRIFFITHS COMBINES PSYCHOLOGY AND ARTIFICIAL INTELLIGENCE

*By Matthew Hutson*

For years, economists treated human decision-making as highly logical. Then so-called behavioral economists found that we consistently make certain errors in our reasoning, suggesting that we might not be so rational after all. Griffiths has taken up a third flag, using mathematical models to quantify effort, efficiency, and accuracy in people's thinking. In terms of deploying our cerebral effort efficiently, he argues, we're actually highly rational.

Let's say someone asks you to predict how much money a movie would make, without telling you anything about the film. You might consult your memory of various box-office numbers and estimate: a few million dollars. Now you're told that the movie has already made \$100 million. Ah, we're in blockbuster territory. You update your estimate accordingly. With each estimate, you've performed a sophisticated statistical calculation.

Griffiths' earliest work as a graduate student, at Stanford, drew on the work of the 18th-century statistician Thomas Bayes, which involves updating prior estimates about the probability of an event or explanation based on incoming information: If a movie has made \$100 million, what are the chances that it will make \$200 million, or that it stars Will Smith? Griffiths and his Ph.D. adviser, Joshua Tenenbaum, helped pioneer the use of Bayesian methods to model cognition. It turns out that we're natural-born statisticians, at least for some problems: Bayesian probabilities often predict the kinds of inferences people actually make about the world. Asked about the movie grosses, for example, people provided off-the-cuff guesses that closely matched what a stats geek would have calculated based on historical distributions of movie earnings. Our experience bakes in those distributions, and we reason with them on the fly. Whenever you decide whether to keep waiting for a bus, you might not be scribbling Bayes' equation on a notepad, but the result wouldn't be much different.

What accounts for people doing such a good job? Griffiths attributes it to what he calls "resource rationality." To understand what he means, I find myself sitting in front of a computer in the office of Fred Callaway, one of his Ph.D. students. I'm controlling a spider navigating a web on the





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computer screen. The web branches out from the center, and I must select the best path to the edge. Each step earns or costs me money (real money if I'm a real participant). I can spend a bit to click on any or all of the steps to reveal their costs or payoffs before I make my trek. The trick is not just to choose the highest-paying path, but to sample information efficiently, considering the real costs and potential benefits of each bit of information.

Callaway likens the problem to chess — and to planning more generally. If you think long enough, theoretically you could make the absolute best chess move, the most rational decision. But that could take a very long time. While we can't always make perfectly rational decisions, we can at least be rational about how we make decisions: how we deploy our

Participants must sort a series of cards in order in a short amount of time. Most people fail, but the next group of people gets to watch the best performer from the previous group, and so on. Eventually people discover better and better strategies; in the end, people do very well. Through this and similar experiments, the lab wants to see when populations as a whole can do things that are smart even when individuals can't.

“Our goal is to be able to simulate the processes of interaction between people that support group decision-making and cultural evolution,” Griffiths says. Cultural evolution describes the way ideas are shared and refined over time in a manner similar to the evolution of species. “One way of thinking about this is from the perspective of people having limited computational resources”— finite brainpower.

## Living up to computers often

resources — our time and brainpower — when thinking. That's resource rationality. Callaway defines it this way: “Given that I just have this little hunk of meat up here” — he gestures at his head — “what are the best moves for me to think about?” He and his collaborators are finding that participants are very good at deciding when to stop surveying the spider web and just set out, coming close to the decisions of a computer with many hours of processing time. Even if we do the wrong thing, we do it for the right reasons, given the resources we have.

“Resource rationality helps to explain human successes and failures,” Griffiths says. “We're good at predicting movie grosses because it's a problem that can be solved using an efficient strategy — basically, remembering things we have heard about movies. But we make plenty of mistakes in other settings, where efficiency and accuracy may be at odds with one another.”

Griffiths studies not only how people make decisions as individuals, but also how they do when embedded in a social network, and how groups as a whole behave. In the office of postdoc Bill Thompson, I play a computerized game that requires me to improve on an arrowhead design provided by another participant, then pass it to yet another participant. It's an early test of new software designed by Griffiths and collaborators with funding from the federal Defense Advanced Research Projects Agency (DARPA).

The new platform allows researchers to recruit thousands of participants online and organize them into social networks so that the information passed between them — like the arrowhead design — can be controlled and observed. “It's never been possible before to actually simulate complex cultural processes in the lab using real people,” Thompson says. The researchers are creating microcosms of the wider information ecosystem — the passage of news, gossip, advice, and insight between people in person or through social and mass media. They hope to study processes as complex as election interference or social-media silos and political polarization. If you can closely observe how people share small bits of information in a controlled environment, you might later be able to predict the spread of fake news on Facebook.

Another experiment explores collective intelligence.

“If we want to achieve certain goals, such as developing new technologies or making scientific discoveries, we have to pool those computational resources and work together. The ability to run large-scale crowdsourced experiments where people interact with one another allows us to analyze the processes by which groups of people are able to act intelligently.”

**GRIFFITHS GREW UP IN WESTERN AUSTRALIA** and began programming at age 8, when his father brought home an early Epson portable computer. He commandeered it and wrote games in BASIC. At 13, he developed a chronic illness and spent two years doing his schoolwork from home. He also spent more time playing his role-playing games online, a couple hours a day. Eventually he'd earned enough points to become what's called a “wizard,” which allowed him to manipulate the world others inhabited, further honing his programming skills — and foreshadowing a career in experimental psychology.

Just as Griffiths wielded imaginary swords in role-playing games, he also practiced with real ones; he has fenced since he was 12. “There are interesting computational problems involved in fencing,” he says. One must decide, for example, when it's possible to parry to block another blade. Fencing has a strategic element, Griffiths says, “but in the moment, you are completely liberated from deliberation — a very extreme version of resource rationality.” As a student in the history of fencing, he has thought about the deconstruction of complex moves into easily teachable component parts, so that individual moves and the way they're chained together are quick and easy to learn and execute. “I'm totally fascinated by this but stopped putting theory into practice after I messed up the math and a longsword broke my right wrist,” he says.

As an undergraduate at the University of Western Australia, Griffiths sought “genuine mysteries” and majored in psychology, with additional classes in philosophy, anthropology, and ancient history. The summer after his sophomore year, he encountered a book chapter on artificial neural networks, algorithms that roughly mimic the architecture of the brain in order to learn from data. “I was like, ‘Wait a minute. You can use math to make models of how human minds work?’” he recalls. “I got incredibly excited



about that.” He brushed up on his calculus and linear algebra and joined a lab doing computational modeling research.

Applying to grad schools, he found, on Stanford’s web page, two scholars he hoped to work with. It turned out they had already retired, but Tenenbaum, about to start as a professor there, pulled Griffiths’ application from the pile. “We clicked when we first met,” Tenenbaum recalls. “The first word that I was going to use was just that it was a lot of *fun*, talking to him, really really fun. I was more senior, but it felt like talking to a peer or a colleague.” Griffiths gave Tenenbaum a handmade set of magnetic poetry with terminology from probability theory that they’d been scrawling on chalkboards, a set Tenenbaum still has. “It was both really sweet and really creative and something only he would have come up with or done.”

that would have a practical positive impact on society, besides doing cool research.” Together they’ve explored the best way to sequence lessons and tests, and how to infer the thinking that leads to a student’s mistakes. Rafferty and Griffiths have launched a free website, Emmy’s Workshop, offering a personalized software tutor for learning algebra.

Some of Griffiths’ insights about computer science and thinking are included in his 2016 book, *Algorithms to Live By*, written with the journalist Brian Christian. The book describes classical computer science methods — specifically how programmers get machines with limited speed and capacity to find good-enough solutions to ginormous problems — and what they might teach the rest of us, who also have limited speed and capacity.

# involves thinking less, not more.

At Stanford, Griffiths shared several math classes with a fellow cognitive-science student named Tania Lombrozo. Here he makes a linear algebra joke: “We discovered one another’s singular values.” They married, and in 2006 both started teaching psychology at Berkeley, before coming in 2018 to Princeton, where Lombrozo is also a psychology professor.

Griffiths says that studying both psychology and computer science allows him to “go to a talk in psychology and come away from it wondering, ‘Why is it that people do that thing?’” and then hear about a technical idea at a computer science talk that can answer the question. “So what I do,” he says, “is spend a lot of time just collecting mysteries on the one hand and solutions on the other hand, then hopefully connecting those things up.”

**I THINK THE THING THAT’S MOST STRIKING** about Tom is he’s got these very strong mathematical chops, but he’s also sort of a humanist,” says collaborator Alison Gopnik, at Berkeley. “He’s interested in theories of human thinking, but also in how they can help us think in our everyday lives.”

I played one version of the spider game in Callaway’s office that provided feedback on whether I was making the right move or collecting the right information. Such tools could give people insight into whether they waste too much time exploring options, or whether they act too impulsively and fail to consider long-term benefits. “Just telling me that about myself,” Callaway says, “that’s giving me a tool that I can use for self-reflecting.” Another project explores “cognitive prosthetics,” software “assistant” tools (remember Clippy, Microsoft’s animated paper assistant?) that nudge people toward the best decisions. A system designed by Griffiths’ lab turns to-do lists into a kind of game by awarding certain numbers of points for tasks, helping people reduce procrastination and prioritize the most important undertakings. In some ways it knows us — and what will make us happy down the road — better than we do in the moment.

In her second year as a Ph.D. student under Griffiths, Anna Rafferty, now a computer scientist at Carleton College, proposed shifting her focus from language to education. Griffiths “was really encouraging,” she recalls. “He got that one of the things driving me was that I wanted to do something

Readers might be relieved to find that living up to computers often involves thinking less, not more. For instance, we sometimes overestimate how much we should explore our options before acting. The book also discourages readers from attempting to multitask. When computers tackle too much at once, they load one task’s data, but before they have a chance to do anything with it they have to replace it with another task’s data, leading to a wheel-spinning phenomenon called thrashing. It’s basically what we do when we return attention to a project and have to remind ourselves where we were. “That really helps me understand why multitasking is problematic in a way that I never fully understood before,” Callaway says.

And the book addresses creativity. Instead of knocking your head against the wall trying to improve on an idea, add some randomness. Just as algorithms sometimes get stuck in dead ends and need resets, a writing project might benefit from your taking a break and clicking the “random article” link on Wikipedia. In the social realm, the authors discuss game theory, or strategies for competition, cooperation, and coordination. Just as algorithms that trade stocks or bid in online auctions can go haywire, so can human markets in which prices are based on what everyone thinks everyone else thinks something is worth. The authors advise, “Seek out games where honesty is the dominant strategy. Then just be yourself.” (Griffiths says “games” refers to any interaction — a friendship, say.)

The advice to solve some problems by relaxing certain constraints has social implications, as well: If you’re planning wedding tables, for example, you might find some surprisingly good arrangements by not assuming certain parties need to sit together. One engineer Griffiths spoke with had a breakthrough when she removed her parents from the head table.

Griffiths says readers have shown appreciation for the advice in his book: “I have received grateful emails from people who now have a better handle on their schedules, feel more relaxed about leaving things a little messy, and are thinking about using algorithms for wedding planning.” Studying humans to build AI to help humans: It can do more than teach us algebra. It might avoid wedding drama, too. ♦

*Matthew Hutson is a freelance writer who specializes in science.*



# MIND OF A MATHEMATICIAN

TERENCE TAO \*96 WAS AN EXTRAORDINARY PRODIGY — AND HE'S STILL AT IT

BY MARK F. BERNSTEIN '83

**T**erence Tao \*96's book, *Solving Mathematical Problems: A Personal Perspective*, is an engagingly slender volume, full of insights on how to approach problems in number theory, algebra, Euclidean geometry, and analytic geometry.

He was commissioned to write it by Deakin University, in Victoria, Australia, near his hometown of Adelaide, in the hope that it could be used to train secondary-school math teachers. Tao began by setting out some sensible strategies for problem-solving, including these: Understand the problem, understand the data, understand the objective, select good notation, and write down everything you know. He also hoped for something less rote. "A solution," Tao proposed, "should be relatively short, understandable, and hopefully have a touch of elegance. It should be fun to discover."

It's worth noting that Tao wrote *Solving Mathematical Problems* in 1990, when he was 15 years old.

Now considered one of the world's greatest mathematicians, Tao, a professor at UCLA, has been precocious his entire life. He scored 760 on the math portion of the SAT at the age of 9, earned his Ph.D. at 20, and was granted tenure at 24. He has been called "the Mozart of math."

In 2006, when he was 31, Tao won the Fields Medal, which has been described as the mathematics equivalent of the Nobel Prize and is given out only every four years to mathematicians

under 40 years of age. The International Mathematical Union, which awards the medal, praised Tao for his breakthroughs in partial differential equations, combinatorics, harmonic analysis, and additive number theory.

The awards and honors have only multiplied: the MacArthur fellowship (often informally called the "genius" grant), the National Science Foundation's Alan T. Waterman Award, the Royal Society's Royal Medal, the Royal Swedish Academy of Science's Crafoord Prize, and the \$3 million Breakthrough Prize in Mathematics. Now just 44, Tao has published 17 books and more than 300 research papers.

"Terry wrote 56 papers in two years and they're all high-quality," his UCLA colleague John Garnett marveled when Tao won the Fields Medal. "In a good year, I write three papers."

Sitting in his office on a hot summer afternoon, clad in khakis and a royal blue Polo shirt, Tao is friendly and unassuming as he discusses his work. Many of the problems he has tackled involve the tension between order and randomness. It is a tension that appears all around him. Tao's mind is orderly, but his cluttered office appears random. His career path has been orderly, but the appearance of mathematical genius in society seems random.

If reconciling this tension has been the work of a lifetime, Tao's book may provide a useful framework for making the attempt. Understand the problem, understand the data, and write down everything you know.

**IMAGINE THAT YOU ARE TRAPPED** in a room with a hungry lion. Both you and the lion are represented as points in space.





Suppose the lion can run faster than you. Suppose you can run faster than the lion. Suppose you and the lion can run at exactly the same speed. How do you avoid being eaten?

Professor Charles Fefferman \*69, himself a Fields Medal recipient, remembers asking 9-year-old Terry Tao these hypotheticals, which are part of a field in mathematics and computer science known as pursuit games, in 1984. Tao's father, Billy, had taken Terry around the world to meet some of the great mathematicians, to determine if his son had talent. In Princeton, Fefferman and Enrico Bombieri at the Institute for Advanced Study were the people Billy Tao wanted to meet.

The room fell silent with pondering for a while, Fefferman recalls, when Bombieri suddenly stood up, threw his arms in the air, roared like a lion, and playfully chased Tao around the room to break the tension. "For me," Fefferman says, "that was the highlight of the interview." Unfortunately for posterity, he can't recall the details but says Tao answered his questions intelligently.

"I was impressed that a 9-year-old kid could come up with ideas to a math problem that wasn't a conventional thing he had learned in any class," Fefferman says.

Tao's parents — his father was a pediatrician and his mother a high school math teacher — had not pushed him, but they had ample reason to suspect that their son, the oldest of three boys, might be special. He had taught himself how to read and do basic arithmetic when he was only 2. At 3, he remembers watching his grandmother wash the windows and wishing he could smear the detergent in the shape of numbers.

No preschool could handle a child so advanced, so Tao remained at home until he was 5, his parents giving him a specially designed curriculum. By 6, he had taught himself the BASIC computer language and soon was taking high-school-level math classes. By 9, he was sitting in on lectures at Flinders University in Adelaide and working with private tutors. His parents held him out of full enrollment at Flinders until he was 14 because he was so much younger than anyone else on campus. Tao earned his bachelor's degree there in two



Ten-year-old Terence Tao works with mathematician Paul Erdős in 1985.

## The room fell silent with pondering for a while, Fefferman recalls, when Bombieri suddenly stood up, threw his arms in the air, roared like a lion, and playfully chased Tao around the room ...

years and a master's degree in one.

Fefferman and Bombieri were not the only world-renowned mathematicians Tao met at a young age. When he was 10, he met Paul Erdős, one of the most influential mathematicians of the 20th century, when Erdős was visiting Adelaide. Famously aloof with adults, Erdős loved talking to children, whom he called "epsilons" (in mathematical formulae, the Greek letter epsilon is used to represent a small quantity).

"To me he was just another nice old man. I didn't know how famous he was," Tao says. "One thing I do remember, he spoke to me like an adult, like an equal. He didn't speak down to me." Years later, Erdős wrote one of Tao's letters of recommendation to Princeton, predicting, "I am sure he will develop into a first-rate mathematician and perhaps into a really great one."

On his first day as a Princeton graduate student, in the fall of 1992, Tao stood in the lobby of Fine Hall and stared at the math department's faculty directory. "I recognized half the names," he recalls. "It was kind of intimidating." He had chosen to work with Elias Stein, a giant in the field of harmonic analysis, the study of the properties and characteristics of sine waves. Tao still keeps Stein's famous textbook, *Harmonic Analysis: Real-Variable Methods, Orthogonality, and Oscillatory Integrals*, on his desk at UCLA.

Graduate school was Tao's first time away from home, and the transition proved difficult. His father stayed with him for the first week of classes to teach his son how to perform such basic tasks as doing laundry and opening a bank account. In his free time, Tao joined the Film Club and played foosball, online bridge, and computer games.

Tao admits that he coasted academically. Because everything had always come so easily, he had not developed good study skills. When it came time to prepare for his general exams, Tao spent only a few weeks thumbing through his sketchy notes, while others prepped for months. During the oral exam, with Stein and two other professors, Tao barely squeaked by. "I was very lucky. I was really close," he says. Afterward, Stein diplomatically noted how disappointing Tao's performance had been.

Though Tao resolved to work harder, the rarified levels of higher math proved challenging, even for him. While working on his dissertation, he would go to see Stein during office hours, queuing up with his other advisees. He gleefully imitates Stein sticking his head out the door and calling, "Neeext" in his nasal accent. Once inside, Tao would present his problem and perhaps outline the steps he had taken. Stein would nod, get up, rifle through his file cabinet, and pull an article from one of the mathematical journals.



“It was just striking,” Tao marvels, looking back. “I would spend hours and hours working on something, not very directed, and he would listen for five minutes and just from experience he would know a much more productive thing to do.”

**ALTHOUGH ERDŐS DIED IN 1996**, his work had a great influence on Tao’s career, particularly by sparking his interest in prime numbers, those numbers such as 2, 3, 5, 7, and 11 that are divisible only by themselves and 1. Although Euclid proved in 300 B.C. that there is an infinite number of prime numbers, they seem to occur haphazardly. Mathematicians have tried to divine whether there is some underlying structure.

One detectable pattern is the presence of twin primes — pairs of prime numbers, such as 5 and 7 or 11 and 13 or 29 and 31, that occur just two numbers apart from each other. Euclid believed there were an infinite number of these as well, but he could not prove it. In the 2,300 or so years since, neither has anyone else. Tao has spent much of his career trying.

In 2004, Tao and Ben Green at Oxford University decided to approach this by determining if there are an infinite number of primes equally separated by any number, not just 2. They analyzed a group of four proofs by Rutgers professor Endre Szemerédi. But those proofs don’t concern prime numbers, so they took Szemerédi’s theorem and “goosed it” (Tao’s words) until it did. “Every time Ben and I got stuck, there was always an idea from one of the four proofs that we could somehow shoehorn into our argument,” Tao remarked at the time.

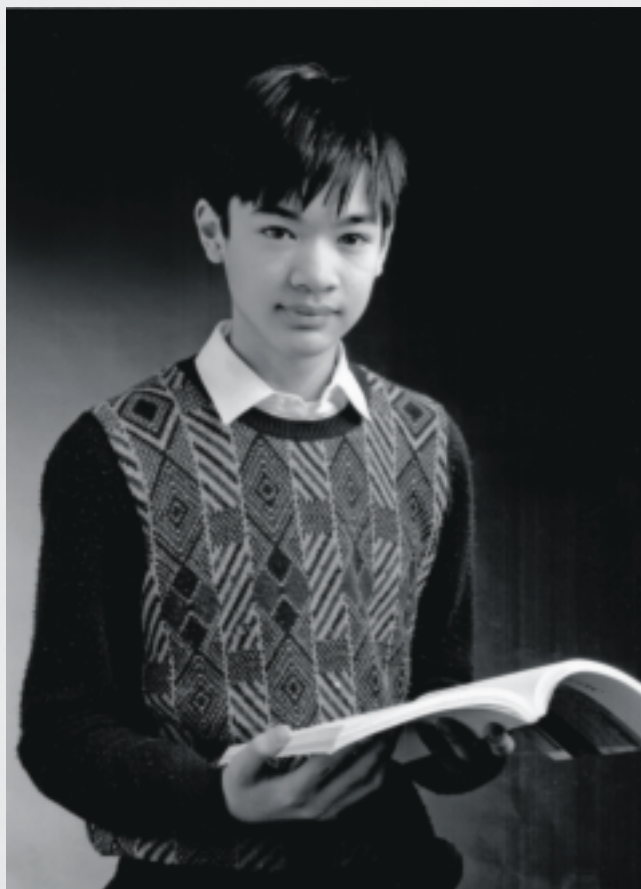
Another feature of prime numbers is that, as numbers grow bigger, primes usually occur less frequently — but not always. For example, 360,287 and 360,289 are twin primes, but the primes on either side of them are much farther apart.

In 2013, Yitang Zhang, a mathematician at the University of New Hampshire, proved that there are an infinite number of primes that are separated by, at most, 70 million. This set off a worldwide effort to prove that there are also an infinite number of primes separated by smaller numbers. Pooling their efforts and intelligence, Tao and a dozen others threw themselves at the problem, at times narrowing the gap of primes every half hour. To date, they have managed to prove that there are an infinite number of primes separated by, at most, 246, but Tao still hopes someday to get it down to 2.

“I’ve proved a lot of other things related to prime numbers, but not that one,” he says. “That’s the one I would most love to have.”

In 2015, Tao proved a different number-theory conjecture known as the Erdős discrepancy, which began as a mathematical puzzle. Imagine that someone captures you and sticks you on a precipice. You can take only one step forward or one step backward without falling to your death. Can you construct an infinite set of steps that keeps you safe? Yes, if you alternate steps forward and backward, but suppose your captor gets to choose every third — or sixth — or some other numbered step for you. Now is there a sequence of steps that will keep you safe no matter what sequence your captor chooses?

Erdős thought that the answer was no, that eventually you would be forced to take either two steps forward or backward and fall. (He simplified this to imagine the steps as a string of numbers consisting only of 1’s and -1’s.) But he could never prove it. From 2010 to 2012, Tao and several other



**This photo was used on the cover of the first edition of Tao’s book *Solving Mathematical Problems*, which he wrote when he was 15.**

mathematicians batted around ideas to solve the problem, without success. Three years later, a German mathematician, Uwe Stroinski, suggested on Tao’s blog that the Erdős discrepancy might have similarities with something called the Elliott conjecture, in an unrelated field of math.

“At first, I thought the connection was only superficial,” Tao told *Nature* magazine, but within two weeks, thanks to Stroinski’s tip, he had solved the proof and confirmed what Erdős had believed: that no matter how many steps you are allowed to take, eventually you will fall off the precipice. Tao’s colleagues around the globe reacted with amazement. “Terry Tao just dropped a bomb,” Derrick Stolee, a mathematician at Iowa State University, tweeted on the day of the announcement.

**A NON-MATHEMATICIAN MIGHT ASK** if any of these problems have real-world applications, but is that fair? No one asks a poet what a new poem “does.” The poem’s simplicity, elegance, and beauty are sufficient reasons for its existence. Aren’t the same things true for a mathematical proof?

Tao ponders this question for a moment. “I do think we have a bit more of an obligation than poets because we receive more federal funding,” he says finally, with a slight smile. “So we can’t say we pursue something solely for its artistic value. What we do is basic research.” In fact, though, some of Tao’s work has had important real-world applications, none more so than compressed sensing, a process in which digital cameras can use

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## He gets his ideas from reading, from other mathematicians, from taking long walks. ... Most paths lead nowhere, but he learns something even in the cul de sacs.

complicated algorithms to create precise images using only a tiny amount of data.

In 2004, Emmanuel Candes, a mathematician at the California Institute of Technology, was trying to find a way to reconstruct images taken by an MRI machine with the smallest amount of data. By serendipity, Candes' and Tao's children attended the same preschool, and the two mathematicians would often talk at drop-off. Candes explained his problem to Tao, whose reaction, as *Smithsonian* magazine later put it, "was vintage Tao. First he told Candes the problem was unsolvable. Then a couple of minutes later, he allowed that Candes might be on to something. By the next day, Tao had solved the problem himself."

Compressed sensing has since been adapted for a number of uses, from making quicker MRI scans that expose patients to less radiation to cellphone cameras that can produce vivid photographs from relatively few pixels, using the algorithms Tao and Candes devised to reconstruct the rest of the image. (Stanford mathematician David Donoho '78, who had also been working on the problem, came up with a similar solution independently.)

**PERHAPS TAO'S MOST FANCIFUL** work addresses something called Navier-Stokes equations, which govern the flow of fluids, including air currents. In this case, let us hope that it does not have a real-world application.

Scientists don't know whether solutions to the Navier-Stokes equations must behave smoothly throughout the fluid (for example, an ocean) and exist for all time, a condition known as global regularity. The equations were written in the 19th century, but they are not well understood and some believe that they hold the key to understanding phenomena from ocean currents to the spread of air pollution. In 2000, the Clay Mathematics Institute, a nonprofit foundation based in Peterborough, N.H., offered a \$1 million prize to anyone who could prove or disprove global regularity, calling it one of the seven most important open questions in mathematics.

Tao has approached the problem from an unusual angle. He imagines a universe governed by rules slightly different from ours in which water could, under extreme conditions, behave in impossible ways. He has speculated that water could even turn itself into what might be called a minicomputer, transferring energy into smaller and smaller spaces until it acquires such a large velocity that it blows up. So far, Tao has not solved the Navier-Stokes equations. His conjecture about an exploding water computer exists only in an alternative universe but, he says, there is no mathematical reason why it couldn't work in the real world.

"If it works," Fefferman says, "it will be mind-blowing."

**THESE EXAMPLES ONLY SCRATCH THE SURFACE** of the range of work Tao has undertaken. From day to day or month to month, he moves among projects as his time, teaching schedule, and interests dictate.

For someone who is, in many respects, so unusual, it comes as a bit of a surprise that Tao lives a remarkably normal life. He and his wife, Laura, an engineer at NASA's Jet Propulsion Lab, live near the UCLA campus with their two children. Tao rides his bicycle to work and likes to watch *Doctor Who*. He is the furthest thing from a prima donna. After he won the Breakthrough Prize in 2015, Tao told *Scientific American*, "I don't feel like I've done enough yet." He used the \$3 million prize to endow fellowships for graduate students in developing countries and gifted American high school students.

Whatever his own gifts may be, Tao rejects the notion that mathematics is reserved for geniuses. Yes, he has heard people call him the Mozart of math. It's a moniker he dislikes; he has seen the 1984 movie *Amadeus*. "Mozart is portrayed as a complete buffoon and really annoying, and I don't want to be like that," Tao explains. "Also, he dies very young."

Sly humor aside, Tao's reasons go deeper. Remarkably, the character who moves him is not Mozart but his rival, Antonio Salieri. "Someone described [*Amadeus*] as one of the best depictions of mediocrity, of what it's like to have enough talent to recognize genius but not enough to be one," Tao says. "All academics feel for the Salieri character."

If music came to Mozart from some divine inspiration, Tao says that his insights arrive, when they do, after much hard work. He gets ideas from reading, from other mathematicians, from taking long walks. Sometimes, one idea reminds him of a similar problem he saw somewhere else that might prove useful now. Most paths lead nowhere, but he learns something even in the cul de sacs.

"Once you solve a problem," he continues, "you tend to remember only the short path that got you from A to B. You forgot all the dead ends. It's a bit of a shame. It gives the wrong impression that people who are good at mathematics only choose the right steps. But there is a lot of trial and error and really terribly embarrassing ideas. Sometimes there is a 'eureka' moment, but it's more of a hitting-your-head moment: 'Of course, why was I so dense?'"

The process of problem-solving, he emphasizes, is "non-linear." In the end, though, is mathematics — is the universe — orderly or random? Tao warms to the question.

"It depends on where you look," he says. "At the extremely microscopic level, the laws of nature are ordered. Particles and quantum waves obey very rigid waves of mechanics. But as you go to more complicated objects, molecules and living creatures, then it becomes more chaotic and unpredictable."

"There's this weird mathematical phenomenon called universality. You get very complicated systems, of atoms or people, but if you look at it at a large-enough scale, order starts emerging. Einstein once said that the most incomprehensible thing about the universe is that it is comprehensible. It is very complicated, but at certain levels, patterns appear again."

"So there is order — sometimes — but there is also chaos." ♦

Mark F. Bernstein '83 is PAW's senior writer.



# PRINCETONIANS



**HAPPY TRAILS:** In 2017, at long last, Caroline Reese '14 moved to Montana. She was 10 when her mother, a horse-farm owner, took her on a riding trip at the cattle ranch where she would return each summer to work during her teen and college years. She still works there occasionally, but she's mostly occupied with her flock of Icelandic sheep — which she keeps on her fiancé's family farm — and her company, Little Creek Lamb, which sells meat, fleece, and pelts from her flock. "The hardest part of ranching is waking up at 2 a.m. in the dead of winter and hearing a chorus of 'baaaas' that tell you the sheep have escaped," Reese says. ♦

Christina Maida '14





Dwayne Green '91, left, and Thandi Onami '92 make their way through campus between events at the Thrive conference.

THRIVE CONFERENCE

# 'THIS IS OUR REUNIONS'

*During the three-day conference, Princeton's black community reflected on highs and lows*

Moments of laughter, joy, reflection, and pain punctuated Thrive: Empowering and Celebrating Princeton's Black Alumni, a conference on campus Oct. 3-5. The gathering featured educational sessions, thought-provoking dialogue, and opportunities for black alumni to connect across generations.

More than 1,200 participants attended the event, the University's fourth conference for black alumni. Although they hail from different classes, many bonded over their shared experiences — some difficult — of being black at Princeton. Still, most alumni proudly donned orange hats, pants, nail polish, and sneakers.

As Franne McNeal '82 put it, "This is our Reunions."

"I'm thrilled to be here with all of you," said Karen Richardson '93, who

started a career in admissions as a work-study undergrad and became dean of Princeton admission in July. "Welcome back, my friends." She encouraged the alumni not only to reflect on their time

at Princeton, but to pay it forward by connecting with current students.

President Eisgruber '83 updated attendees on some of the projects and initiatives taking place at the University. Michael S. Fletcher II '03, president of the Association of Black Princeton Alumni, said he was heartened by "how many people are coming back for the first time and how many are returning to continue your journey through Princeton."

Even former first lady Michelle Obama



**FOPO DJs (aka Four Poor DJs), from left: John Weaver '92, Mark Hines '94, Selwyn Seyfu Hinds '93, and Dale Williams '93 mounted a reunion to provide music for Thrive partygoers.**

Photos: Fotobuddy Photography



'85 surprised conference-goers with a pre-taped welcome message that was introduced by her brother, Craig Robinson '83. "If there's one thing that I've learned since I've left Princeton, it's this: No matter what direction you're headed, nobody gets there alone," she said. "We all need to help each other to sharpen our skills and soften our landings or jump-start a change for the better. That's how we can not only make progress for ourselves, but continue along the journey of discovering who we are. And that, to me, is what it means to thrive."

The packed schedule included more than 200 participants in more than 60 events on topics that ranged from entrepreneurship and sports to media representation and history. Alumni also scheduled time to party — including a reunion of Selwyn Seyfu Hinds '93, Mark Hines '94, John Weaver '92, and Dale Williams '93, aka the FOPO DJs (short for Four Poor DJs), who mixed music for various campus organizations in the '90s and had their own student radio show.

At one talk, Eddie S. Glaude Jr. '97, chair of African American studies, thanked the alumni for their impact in establishing the department. "Five years ago, we didn't have a Department of African American Studies ... and in a short period of time, we have become the No. 1 Department of African American Studies in the country," Glaude said as the crowd applauded heartily. He added, "What you've done, what you continue to do, what you went through — let's be very clear — what you *went through*, paved the way for us to be what we are today."

But Glaude, who read from his forthcoming book about James Baldwin, made clear that much work remains to be done — both at the national level and at Princeton itself. "As you see this place transformed — don't believe it. We have a long way to go," he said. "Princeton stands on the precipice of profound change," he continued. "We must push it to tell a different story of itself — one that expresses your presence. Princeton desperately needs you to help it become what it aspires to be."

The complex history of African Americans on Princeton's campus was a recurring theme throughout the conference. During a panel on the



Michelle Obama '85 said in a pre-recorded welcome message, "If there's one thing that I've learned since I've left Princeton, it's this: No matter what direction you're headed, nobody gets there alone."

**"We must push [Princeton] to tell a different story of itself — one that expresses your presence."**

— Eddie Glaude Jr. '97, chair of African American studies

Princeton & Slavery Project, history professor Martha Sandweiss detailed some of her research project's findings, including that the first nine presidents of the college were slave owners and some slaves lived in the President's House.

"I imagine that for generations of students, the first person they met on campus was the enslaved person who answered [their] knock," Sandweiss said of a student's first time arriving at the President's House. "So if Nassau Hall and its stories of American freedom formed the backdrop of this campus, slavery was sometimes its very face."

During the question-and-answer period, an audience member asked whether the University has considered reparations. In response, Michele Minter, vice provost for institutional equity and diversity, said: "This is a topic we are in deep national conversation about — what reparations mean to us. What we know right now at Princeton ... [is] we have obligations to be of service and to the public good, and those obligations are informed by what we know and telling a more honest version of our

history." At the next day's dedication of the *Double Sights* sculpture, which addresses the legacy of Woodrow Wilson 1879, the University's efforts to reckon with its history were likewise called into question. (See *On The Campus*, page 13.)

Many conference-goers did not sugarcoat their experiences on Princeton's campus. Still, alumni in attendance often voiced their pride to be part of Princeton's approximately 5,800 black alumni.

"To me, Thrive represents progression in a series of conversations between the University and black students, and so I've appreciated that," said Hilary Beard '84. "It's been important to me that the University has acknowledged and apologized for the harm that too many black students and students of color have experienced."

For Kezia Otinkorang '20, it was empowering to see so many successful black alumni. "Their joyful expressions, genuine interest in current students, and great faith in all of us meant the world to me and my peers. It gives us a glimpse into what black excellence and solidarity look like," she said.

While the experience comes with peaks and valleys, Princeton gives students an opportunity to change their lives, said U.S. Rep. Terri Sewell '86 of Alabama during her remarks at Thrive's closing event. "While we all have individual successes, and all of us do, we collectively thrive because of our strength in numbers and our strength in support." ♦ By C.S.

READING ROOM: DAVID J. SILVERMAN \*00

# RECKONING WITH THE ORIGINS OF THANKSGIVING



David J. Silverman \*00, professor of history at George Washington University, has investigated indigenous perspectives since his Princeton dissertation

on the Wampanoags of Martha's Vineyard. His book, *This Land Is Their Land* (Bloomsbury), offers the Wampanoag view of Plymouth Colony, the Thanksgiving myth, and the violence that shattered a fragile alliance with the settlers. On the eve of Plymouth's 400th anniversary, Silverman explores the ways in which Native people alternately contested and adapted to colonial power. "If we're going to insist on associating Thanksgiving with Pilgrims and Indians," Silverman says, "we need to get the history right."

## What are our misconceptions about the Indians and the Pilgrims?

The most fundamental one is that friendly Indians — they're not named by tribe — welcomed the Pilgrims, so that the Pilgrims could launch the United States as a democratic, Christian model for the whole world. Yet at every single level that narrative is false. The Native people did have a name — they were the Wampanoags, and they reached out because they had just experienced



**"Part of respecting Native people of the past means rendering them in three-dimensional form."**

— David J. Silverman \*00

a massive epidemic introduced by Europeans, which had decimated their population. And they were under attack by the Narragansetts and needed allies. They certainly never envisioned these newcomers creating a settler society that would displace them from the world.

## What else have we gotten wrong?

There's this notion that the Native people were frozen in a Stone Age existence before the [1620] arrival of the *Mayflower*. Native people had

civilizations that had evolved over millennia, and they had a century or more of contact with Europeans before the *Mayflower*, which deeply informed their interactions.

This was not a lasting friendship. It was uneasy from the beginning. It almost degenerated into violence multiple times. By the second generation, the region descended into a bloodbath.

## What about the first Thanksgiving?

It's actually not all that important to the alliance. There was this shared meal [in the fall of 1621], but the English barely wrote about it at all. It's a symbol designed to represent colonization as bloodless and to represent Native people consenting to their own colonization.

## How were you able to discern the Native point of view?

It's not easy. It's important to note that there are entire categories of Wampanoag people whose voices aren't represented whatsoever: women, the elderly, the very young. The Wampanoags with whom the Europeans were in contact tended to be politicians and military men and sometimes traders, who had principled disagreements and critiques that worked their way into colonial documents.

The Natives were so important to colonization. The Europeans' safety, their economies, everything about their ventures hinges on their relations with indigenous people. So they're paying very close attention, within the limits of their ethnographic blinders.

## How would they like to see Thanksgiving commemorated?

Native people recognize that the Thanksgiving myth is nonsense, but it's the one time of year when the public pays attention to them. I think it will take a massive reckoning for white Americans to confront what American history looks like with Native people at the center of it. It challenges almost every uplifting conception that Americans have of themselves and their country.

◆ Interview conducted and condensed by Julia M. Klein

◆ READ a longer version of Silverman's Q&A at [paw.princeton.edu](http://paw.princeton.edu)

## NEW PAWCAST AT PAW ONLINE



When President Dwight Eisenhower signed the National Aeronautics and Space Act in 1958, CHARLES "PETE" CONRAD '53, left, was training as a U.S. Navy test pilot. Eleven years later, he'd become the third person to walk on the moon. Nov. 19 marks the 50th anniversary of Conrad's moonwalk, part of the Apollo 12 mission, and to mark the occasion, PAWcast spoke with JORDAN BIMM,

a historian of science and postdoc in Princeton's sociology department.

Conrad was an underachieving engineering student, Bimm says, but "he quickly earned a reputation for excellence behind the controls in the cockpit. ... That goes back to his time at Princeton where, by his own admission, he spent more time flying light planes than he did studying for exams." ◆

◆ LISTEN to the full interview at [paw.princeton.edu](http://paw.princeton.edu)





Judd Greenstein \*14, a native Manhattanite, has composed an opera based on Robert Moses and Jane Jacobs.

JUDD GREENSTEIN \*14

## THE MAGICIAN OF MUSIC

*An 'unfettered' composer blends styles and sounds, to create genre-defying music*

There aren't many operas about urban planning, but Judd Greenstein \*14 has composed one. Drawing on Robert Caro '57's biography of Robert Moses and other sources, *A Marvelous Order* brings to the stage the battle between Moses and grassroots activist Jane Jacobs over his plan to demolish her Greenwich Village neighborhood. Moses and Jacobs "are operatic characters already, larger than life, and we wanted to tell the story of how New York City has changed and evolved," says Greenstein, who grew up in Manhattan. The story will be told with custom-built LED screens that use animation and singers trained in non-operatic singing who bring fresh dimensions to the genre. Seven years in the making, the opera — with a libretto by Princeton professor Tracy K. Smith — will have its premiere in 2021.

Greenstein had never created an opera before, but he's known for his exploration of musical genres and how they intersect. As a composer, performer, and artistic director of a record label, he creates and supports music that blends styles, sounds, and instruments.

"So much of what I'm trying to do is create opportunities for musicians

**"So much of what I'm trying to do is create opportunities for musicians to pursue music in the way they want."**

— Judd Greenstein \*14

to pursue music in the way they want, as opposed to being constrained by the existing infrastructure for music," he says. "It's more interesting when you allow all those things to get messier and speak to each other in new ways." Among his other recent projects are an orchestral song cycle for an indie-rock vocalist, a ballet score, and an ensemble that creates and performs pieces about Biblical characters.

Greenstein started composing on the piano at age 9. During his teenage years, a friend enlisted him to apply his musical skills to rap. Soon, he was "writing hip-hop beats at the same time as classical music," he recalls.

A college internship with Bang on a Can, a collective making innovative new music that was co-founded by Julia Wolfe \*12, helped set him on his

path. As a graduate student at Yale, where he received a master's degree in composition, Greenstein co-founded NOW Ensemble, which *Time Out New York* has described as having "the formal elegance of chamber music with a pop-honed concision and rhythmic vitality." At Princeton, where he earned a second master's degree — he is still working on his dissertation — Greenstein co-founded his own record label, New Amsterdam Records, to make the ensemble's first album because "not many labels were recording music of the kind we were making in the way we wanted," he says. "Classical music was still thought of as something for a specialized listener, and the way it was recorded reflected that — a pristine setup with limited microphones to emulate hearing it in a concert hall." He remains co-artistic director of the nonprofit label, whose mission is to support music that transcends genres. It has released more than 100 albums, and its artists have won a Grammy and a Pulitzer Prize.

Princeton Professor of Music Steven Mackey, Greenstein's thesis adviser, describes him as "prodigiously skillful and unfettered by taboo and dogma." His work with New Amsterdam Records and as a music-festival curator has "contributed to the formation of musical scenes or subcultures that will have historical importance," Mackey says.

The project that is perhaps most resonant for Greenstein is the Yehudim, an ensemble of percussion, keyboard, guitar, and song that he is relaunching in 2020. He studied with a rabbi before composing works for the group that explore the wisdom of King Solomon and draw on texts from the Jewish mystical tradition of kabbalah. *The New York Times* called *Sh'lomo*, a four-movement symphony with vocal accompaniment blending indie rock, folk music, and pop, an "epiphany ... [that] fuses his disparate musical inspirations with his abiding interest in Jewish history and literature to explosive effect."

Greenstein, who composes, plays keyboards, and sings with the Yehudim, is at work on new compositions for the group. "It's this crazy band I put together," he says, "and it's my most personal and open space." ♦ *By Jennifer Altmann*

# 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/class-notes](http://paw.princeton.edu/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 Reader Services on PAW's home page and click on the link "Recent Alumni Deaths." The list is updated with each new issue.**

## THE CLASS OF 1949



### Wally Forbes '49

Wally died June 14, 2019, less than a month after celebrating his 91st birthday. He was the youngest of five sons of B.C.

Forbes, the founder of *Forbes* magazine, and was the last of the five to survive.

Wally prepared for Princeton at the Lawrenceville School, majored in civil engineering, was the business manager for the *Nassau Sovereign*, and belonged to ASCE and Elm Club. After graduation he spent five years as a Navy Seabee, then attended Harvard Business School.

Upon the death of his oldest brother, Bruce Forbes, in 1964, Wally joined *Forbes* magazine with his brother Malcolm S. Forbes '41, but left in 1969 for several business ventures. He returned to the Forbes organization in 1996, several years after the death of Malcolm, and headed the Forbes Investors Advisory Institute until 1988.

Wally married Betty Alden Goldsmith in 1955, and they had three children, Alden (whose wife is Cindy), Alexandra, and Bruce, all of whom survive him. He is also survived by his former wife, Betty, and by Thomas G. Lemens, his partner for 36 years and husband since 2016. We offer our deep sympathy and condolences to the entire family.



### Alvin Curtis Spindler '49

Curt died Dec. 5, 2015, in Ann Arbor, Mich., his home for many years. Although our contact with him had been infrequent, we know that

he had a practice there as a psychiatrist for a long time.

Curt came to Princeton from Scarsdale High School. He majored in economics, took his meals at Court Club, and played on the club's tennis and baseball teams. After graduation he worked briefly for Bankers Trust and the Federal Reserve Bank of New York, and then entered the State University of New York Medical College in Brooklyn, where he earned a medical degree. Our knowledge of his

subsequent medical training is skimpy, but we do know that at the time of our 25th reunion he was a psychiatrist in Ann Arbor, with his own practice, and was married to Evangeline. So far as we can tell, she is his only survivor.

We wish we knew more about Curt's life, hobbies, interests, and medical career. As it is, we can only express our pride and our pleasure in knowing about another '49er who lived a happy and successful life.

## THE CLASS OF 1952



### Roger Gustavsson '52

We learned of Roger's death only now, although it occurred three years ago on Aug. 31, 2016. His daughter, Marka, told us, "He so valued his undergraduate years there. The experience transformed him. The son of Swedish immigrants, he was the first in his family to go to college, and he went on to pursue a Ph.D. in philosophy at Yale (1963)."

Roger graduated from Schurz High School in Chicago. At Princeton he majored in philosophy and ate at Prospect.

His entry in *The Book of Our History* is unusually detailed in its report of teachers and courses he had as well as on noted persons who spoke on campus during his time with us. Roger spent his own years of teaching philosophy to undergraduates, especially at DePauw University.

Roger is survived by Marka and his wife, Louise. To them we send the class's condolences, together with our pleasure in our classmate's well-spent life.



### Samuel Adams Hartwell Jr. '52

Sam died July 11, 2019. He came to us from Deerfield. At Princeton he majored in English and joined Ivy. He roomed with Bill

Brokaw, Dudley Sharp, and Jim Laughlin.

After Army service, in 1956 he earned an MBA from Harvard, and he had a career in finance at Smith Barney and Merrill Lynch. He was co-chairman of G.S. Blodgett Corp.

In 1984 Sam co-founded the East Harlem

Employment Service, known as STRIVE, an early model for workforce development that has helped many thousands of persons to find and keep jobs. It's now active in a number of cities across the country.

Sam is survived by his four children, Ellen, Charlotte, Annie, and Sam. To them the class sends its sympathies, with thanks for Sam's service to our country and to the Harlem community, as well as for many others seeking work.

## THE CLASS OF 1954



### John Edward Michael Wilson '54

Mike, as he was known by most, died Nov. 12, 2018, in Norfolk, Va.

He graduated from the Haverford School and attended Princeton for two years, joining Elm Club. He earned a bachelor's degree as a history major at the University of Pennsylvania. He earned an MBA in marketing from the University of Pennsylvania's Wharton School and worked for a time at an advertising firm in Philadelphia.

Mike married Constance M. Hall in 1953, and they had three daughters, Nicole, Lisa, and Andrea. After they divorced, he married Sandra Wengi and adopted her son.

Mike joined Alcoholics Anonymous in his 50s as a recovering alcoholic. He rebuilt his health through long-distance biking and vegetarianism. In retirement he lived in a house on stilts in Kitty Hawk, N.C. At the end of his life he was a very private man. He spent his days at the gym and reading. Very tech-savvy, his computer was his gateway to the intellectual world that he so valued.

He was predeceased by his wife of many years, Sandra, who had become incapacitated with Alzheimer's disease. He was also tragically predeceased by his adopted son, Eric. He is survived by his three daughters and five grandchildren.

## THE CLASS OF 1955



### Joseph H. Bacheller III '55

Joe died Dec. 15, 2018. He was born in Newark, N.J., in 1933 to Joseph H. Bacheller Jr. and Marjorie M. Bacheller.

In 1936 the family moved to Hingham, Mass., where they resided for many years. In 1951 Joe graduated from Milton Academy and followed up with a Princeton degree in English. At Princeton he was part of the NROTC program and was commissioned an ensign in the Navy, serving from 1955 to 1958. While on a Norfolk, Va., bus, Joe, a lieutenant junior-grade in the Navy, met the love of his life, Bruce Bishop, who would become his wonderful wife of 55 years. They married in 1959 in Belmont, Mass., where Bruce taught fourth and fifth grade.

Joe graduated from Harvard Business School in 1960 and the family relocated to Phoenix, Ariz., where Joe worked for Del Webb. In 1963 they moved to Tiburon, Calif., where Joe worked for the Draper Co., developing shopping centers.

In 1977 he formed Bacheller Properties, which built and managed apartments and other properties in Sonoma, Calif. While living in Tiburon, Joe served on the Tiburon Parks and Recreation Commission and the Planning Commission. He also participated in the Princeton Alumni Club placing “fellows” in Marin County nonprofits and was a founding member of the Tiburon Men’s Chorus, now known as the Marin Men’s Chorus. He sang with them for 30 years. Joe was a member of Westminster Presbyterian Church, where he served as an elder. He joined the Tiburon Peninsula Club and enjoyed playing tennis and going to the gym.

Joe took pride in his family and enjoyed a large group of friends. In 2014 his beloved Bruce died of cancer. Joe is survived by daughters Kimball and Susan, six grandchildren, and two great-grandchildren. He was predeceased by his son, Maj. Jack Bacheller, USMC.



#### **Rodney J. Ferris '55**

Rodney died May 1, 2019, in Lincoln, Mass., at home. He was 86.

He was born Feb. 18, 1933, in Darien to Margery Jarvis and William Henry Ferris. He attended Hotchkiss School and Princeton, where he led the varsity swim team’s butterfly squad and majored in engineering.

After graduation in 1955 he enlisted in the Air Force and married the love of his life, Natalie K. Neville, in 1956. He attended Harvard Business School and took his first position at Morgan Construction in Worcester, where he and Natalie lived the remainder of their lives. They raised four sons together, initially in the Tatnuck neighborhood and later in Holden.

Rodney’s work history included a series of senior executive positions in manufacturing and service companies in Massachusetts, including Nypro and Kronos. During his career he increasingly focused on individual development, eventually transitioning to counseling as his full-time occupation.

Worcester’s mayor gave him a key to the city for his volunteer work with Friendly House neighborhood center.

Rodney loved sailing, tennis, and reading. He was an avid piano player, regularly filling his household with show tunes, folk songs, and Christmas carols. He was a spiritual man and was an active member of the First Baptist Church, where he served as a deacon.

Rodney was predeceased by his wife, Natalie. He is survived by his four sons, Rodney, Dakin, Timothy, and Bradley; eight grandchildren; and siblings Cynthia, George, Margery, and Wendy.

#### **THE CLASS OF 1956**



#### **George W. Kunkel '56**

George died July 31, 2018, at home in Harrisburg, Pa., on the farm where his father, Lewis Kunkel 1924, taught George and his brother Lew '58 to hunt and fly-fish. He was 82.

At Princeton George majored in biology, wrestled, and lettered in crew. He joined Elm Club and roomed with Dave Phillips, Dean Holbrook, and Tom Yarrington. After earning a medical degree from the University of Pennsylvania, George served a residency in internal medicine at the University of Michigan and then spent two years in the U.S. Public Health Service, working as a surgeon on Native American reservations in Montana.

George returned to his hometown to found his rheumatology practice. He was renowned for his work ethic, his erudition, and his profound dislike of paperwork. In 2012, after more than 40 years as a sole practitioner, George took on a partner and entered semi-retirement — working “only” six days a week.

George loved practicing medicine, and he pursued his hobbies with equal passion. His immense garden featured 100 yards of spring onions, for personal use. His rosebushes — grown in outdoor beds, greenhouse pots, and hydroponic systems — were his pride and joy. He spent many Sunday afternoons fishing for bass in his pond. To ensure success, George liked to cast near the automatic fish feeder.

George is survived by his wife, Dr. Barbara Kunkel; daughter Shelly; and son-in-law Eric Bucher.



#### **Allen R. Smart '56**

Allen died May 24, 2019, in Chicago, having been born there July 3, 1934.

He was a “man for others” in his professional and personal life. Allen studied at Deerfield Academy before coming to Princeton, where he majored in history, was a member of Charter Club, and, among other things, was national advertising manager for *The Daily Princetonian*. He roomed with Bill Bennethum and Bennet Harvey his senior year. After graduation Allen spent two years on active duty as an officer in the Navy, then went to Harvard Law School, graduating in 1961.

His long and successful legal career, all with the Bell, Boyd law firm, was more than supplemented by a remarkable career in the not-for-profit world. He was always involved with at least two or three charitable organizations simultaneously, and almost always president of at least one. Areas of concentration included art, architecture, infant welfare, music, and theater. Examples were the Asian Arts Council, the Infant Welfare Society,

the Renaissance Society, and the politically powerful Friends of the Parks, with its strong influence on lakefront development. He apparently did not know how to say no.

Allen is survived by several nieces, nephews, grand-nieces, and grand-nephews, and his long-time partner, Brian Hollander, to all of whom the class expresses its sympathy.

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



#### **Carter F. Bales '60**

Carter died July 5, 2019, after a long struggle with cancer.

He came to Princeton from Oyster Bay High School, on Long Island, in a town to which he remained devoted all his life. At Princeton he rowed on the 150-pound crew, majored in economics, dined at Quadrangle, and served in the Army ROTC. After his Army service he earned an MBA at Harvard in 1965 and joined McKinsey & Co. There, he rose rapidly to senior partnership. After his nominal retirement he remained active in client relationships and as a mentor to many McKinsey executives and alumni.

In 1990 Carter added entrepreneurship to his consulting skills by successfully founding the private-equity firm Wicks Group and later New World Capital Group. With his wife, Suzy, a noted garden writer, he founded the North Shore Land Alliance, which has preserved more than 1,200 acres on northern Long Island. Carter served in senior management roles with the Nature Conservancy, the Natural Resources Defense Council, the Grand Canyon Trust, and other conservation entities. He lectured at the United Nations and became a world-recognized authority on these issues.

Carter was predeceased by Suzy in 2016. We extend our sympathies to their four children and spouses and their grandchildren.

#### **Thomas R.B. Campbell '60**

Born in Albany, N.Y., Tom came to us from Phillips Exeter Academy, where he excelled at hockey and lacrosse. He brought those skills to Princeton, ultimately becoming co-captain of the varsity hockey team and captain of the lacrosse team. He dined at Ivy, majored in art history, and roomed for three years with Madden, Ulman, Fentress, Lawrence, and Rob Wood. Tom left for a year due to illness, returned to graduate in 1961, but retained his 1960 status on graduation.

Forswearing art and architecture, Tom went into banking. Over the course of his career he learned and practiced the trade at Brown Brothers Harriman in New York for many years, then migrated north to bucolic Ghent, N.Y., where he joined the Bank of Millbrook, serving ultimately as senior adviser to the trust department.

Tom was a lifelong devotee of field sports — fly- and salmon-fishing, upland bird hunting,



and hiking with a succession of beloved Labradors. He was a keen cabinetmaker as well.

Tom died March 25, 2019, from complications of a fall. He is survived by his wife of 57 years, Ba; their three married children; and five grandchildren. The class expresses our sympathy to them all.

**THE CLASS OF 1961**

**Richard Holliday Kersten '61**

Dick died April 26, 2019, at his home in Pleasantville, N.Y., after years of living with cancer.

Born in Summit, N.J., he came to us from Chatham High School. At Princeton he was in the Freshman Glee Club and the Student Banner Agency and joined Key and Seal. Dick left Princeton during junior year and ultimately earned a bachelor's degree in mechanical engineering at Newark College of Engineering (now NJIT) while also serving as an officer in the New Jersey National Guard. He then embarked on a 29-year career with IBM as a field systems engineer. After retiring from IBM he joined a real-estate appraisal firm.

Dick married his high school sweetheart, Doris, in 1964. A longtime resident of Pleasantville, he served on the village board for 19 years, was an elder in the Presbyterian Church, and was an active member of the Rotary. He attended our 40th and 50th reunions as well as other occasional class events.

Dick is survived by Doris, children Karen and Ted, grandchildren Vera and Roy, and sister Katherine Wallman.



**Charles Hamilton Morgan '61**

Charlie died May 2, 2019, peacefully at home in his native Spartanburg, S.C.

He came to us from Spartanburg High School. At Princeton he majored in English, ate at Quad, and was a Keyceptor and a member of the Orange Key Undergraduate Schools Committee. His roommates were John Clark, Jim Wickenden, Jerry and Jack Sullivan, and Bob Reed.

After Princeton Charlie earned a master's degree in English at Tulane and then embarked on a teaching career at Converse College in his hometown. His dedication to his beloved Converse was unique, an association that spanned his entire lifetime. A sterling administrator, mentoring colleague, and legendary professor, Charlie was deeply respected and revered. He changed many lives.

Charlie also treasured his years at Princeton and the lifelong friendships he shared with his roommates and Wilson Morris. A highlight of his life was the establishment of the Charles Morgan Endowed Travel Fund at Converse. John and Jim surprised him in such a way that, we are told, almost rendered him speechless.

Charlie's passion for travel was surpassed

only by his love of his family. He is survived by his wife of 44 years, Paula; daughters Molly Fisher and her husband, Gavin, and Mamie Morgan and her husband, Alan Hester; two grandchildren, Morgan and Luke Fisher; brother Elford; and many nieces, nephews, and cousins.



**John McIvor Willcox Jr. '61**

John, known to us as "Mac," died May 15, 2019, at his home in Marshall, Va., after a two-year struggle with emphysema and pulmonary fibrosis.

Born in Darlington, S.C., John came to us from St. John's High School in Darlington, where he was editor for the newspaper, ran track, and was class valedictorian. At Princeton he majored in history and wrote his thesis on "The Feudality of Early Tudor England." He was a member of Whig-Clio and took his meals at Campus Club. John roomed with Jack Daniels, Eric Doten, and Skip Kestler, and it was Jack who notified us of his death. Over the years he stayed in touch with Jack and Bill Kincade.

After Princeton John earned a master's degree in history from Harvard, followed by a law degree at Yale. He passed the Washington, D.C., bar exam on the first try but never practiced. His 26-year career with the U.S. government included postings in Southeast Asia, Europe, and Africa. John retired in 1993, and a few years later he and his wife settled in Fauquier County, Va.

He is survived by his wife, Anne M. Clagett; and several cousins from South Carolina.

**THE CLASS OF 1962**

**Charles J. Hatfield '62**

Members of the Class of '62 and the Class of '59 will be saddened to learn Charlie died July 8, 2019, peacefully at home in East Blue Hill, Maine.

Charlie entered with the Class of '59 from Saint Paul's in New Hampshire. Charlie left Princeton sophomore year and two weeks later he entered the Marines. After two years he returned to Princeton to join the Class of '62.

Charlie roomed with a bunch of good guys, was president of Ivy Club, graduated with honors, and married Nancy Nicholas in 1960, the two becoming one of only seven married undergraduate couples. In 1961 they spent three months in Japan through the Princeton in Asia program. In 1962 son Charlie was born. Their second son, Peter, was born in 1964. Tragically, Peter died in 1981, at the age of 17.

Charlie's career was in banking, primarily 30 years with JP Morgan, mostly in London. In 1998 a stroke led to retirement and volunteer service in Maine.

In addition to Peter, Charlie was predeceased by sister Nanny Hatfield Cook. He is survived by his wife of 60 years, Nancy, and son Charlie and his wife, Sarah.

Charlie's classmates in both '62 and '59 extend their condolences to Charlie's family.



**Elson T. Harmon '62**

The class was saddened to learn of the death of Elson, who died July 18, 2019, at his residence in Shirley, Mass.

Elson came to us from

Wilson Area High School in Easton, Pa., where he was editor-in-chief of the yearbook, student director of the school band, and a member of student government. At Princeton he was a member of the Glee Club and editor of the Woodrow Wilson Society newsletter. Following graduation he earned a Ph.D. from Duke University and then taught in St. Louis and Syracuse. He joined the faculty at Groton School in 1986, beginning a 31-year career there.

At Groton he was a beloved teacher of English and directed the school's theater program for many years. Students in his classes and theatrical productions attested to the enormous impact of his dedication to his work. After relinquishing his role as director of the theater program, he continued to stay involved, supporting students both on stage and behind the scenes. After retirement he continued to teach part time at Groton.

Although he is not survived by family members, the class extends its condolences to any friends, colleagues, or former students who knew him.

**THE CLASS OF 1963**

**Stephen Crane '63**

Steve died in his sleep June 27, 2019, in Seattle. An exemplar of determination and courage, he worked passionately on global health issues affecting underserved populations.

He graduated from Walnut Hills (Ohio) High School. At Princeton he belonged to the undergraduate council, Glee Club, and Colonial Club, and began lifelong friendships with the 231 Club roommates: Hughes, Lucas, Patterson, Rediker, Revelle, and Hilton Smith. After two years he transferred to Stanford, then went to graduate school at Johns Hopkins.

At 13 Steve contracted polio, which permanently limited his left leg but not his vitality. He waterskied, biked, rode horses, hiked, traveled, and loved nothing more than sailing, even when a wheelchair became necessary.

He worked for large corporations and Washington governor John Spellman before founding an international-relations consultancy dedicated to social causes. In Seattle he was a hard-working member of Rotary International's mission to eradicate polio. Up to his death he was working with Rotary and the Gates Foundation to end malaria worldwide.

Steve, he of the booming laugh, was the biggest fan of everyone else. Surviving are daughters Elizabeth and Sarah, son Paul, two granddaughters, and brothers Bradford '58 and Robert.

**John P. Williams Jr. '63**

John died peacefully June 22, 2019, after a brief illness. He was acclaimed in the Cincinnati region for a long and spectacular tenure as president and CEO

of the Chamber of Commerce. In 2017 he was named a Great Living Cincinnatian.

An adventurous and congenial leader who was highly respected within our class, he rowed on the heavyweight crew all four years, majored in religion, and was vice president of Cap & Gown, chairman of the Campus Fund Drive, a Chapel deacon, and a horseman in the Great Train Robbery at Princeton in 1963. After college John studied law at the University of Cincinnati and joined Taft, Stettinius & Hollister before commanding a rifle company in Vietnam, receiving a Bronze Star with Combat V and two Purple Hearts, and finishing as aide-de-camp to the commanding general of Camp Pendleton.

He rejoined Taft before running the Chamber from 1984 to 2001. John's talent for listening carefully and forging collaboration helped create two new stadiums and a revamped riverfront, helped bring in Toyota's North American manufacturing headquarters, and saved two of Cincinnati's signature events, Oktoberfest and Taste of Cincinnati, by taking them under the Chamber's umbrella.

Surviving are his wife, Francie; five siblings; and 41 nieces and nephews.

**THE CLASS OF 1964****Nathaniel M. Floyd '64**

Nat Floyd died suddenly Feb. 15, 2019, in Lakeville, Conn., less than two years after beginning his very happy marriage to Germaine

Rousseau DiPaolo. He was 77 years old.

He was born in New York City and grew up in San Francisco and Menlo Park before moving to Greenwich when he was 12. Nat was a graduate of the Brunswick School, Hotchkiss, and Princeton. He earned a master's degree from the New School in 1974 and a Ph.D. from Yeshiva University in 1985, with both degrees in psychology.

Nat was an athlete, scholar, and American folk-art aficionado. At Princeton he majored in English literature and developed a love for literary criticism. He played basketball at both Hotchkiss and Princeton and was a member of Cap & Gown Club.

A nationally recognized expert on bullying, he had a distinguished career lecturing and training administrators, teachers, and staff in bullying-prevention strategies, and retired in 2016 as a psychologist with Southern Westchester County Board of Cooperative Educational Services. A true renaissance man with wide areas of expertise, he was also a Melville scholar and possessed an extensive

collection of antique weather vanes and decoys.

Nat is survived by his wife, Germaine; eight stepchildren; and his brother, Bill. He will be missed by all who knew him. The class sends its sincere condolences to his family and friends.

**THE CLASS OF 1968****Morton Harrison Fry II**

'68 Tim died July 5, 2019, in New York City of pulmonary fibrosis. He was 73.

Tim was the grandson of Morton Fry 1909 and the son of G.T.C. Fry '34. He came to Princeton from Andover, ate at Campus, rowed stroke for the lightweight crew, and was treasurer of Orange Key. He was a manager at P.J.'s Pancake House and was a co-winner of the David Bowers Prize in American Civilization.

After graduation from Yale Law School, he first served as chief prosecutor of the 1st Marine Division in California during the Vietnam War years. During a long career as an entertainment/corporate attorney at Cravath, Columbia Pictures, and Warner (with time out to run a video company), Tim was a passionate advocate for his clients, including hip-hop stars and a top ballet company, and every day of his life he shouldered a pro bono project.

Equally passionate in his political beliefs, he served on the national finance committees of Bill Clinton, Al Gore, and HRC for Senate. On the family front Tim's boundless enthusiasm extended to coaching several of his children's travel soccer teams. A charismatic force, he was a mentor to many and will be missed.

Tim is beloved and survived by his wife of 48 years, Pat Coffin, whom he met at law school; daughter Gillian; son Adam '11; and sister Holly McGowan. The class extends its profound sympathies to them all.

**THE CLASS OF 1971****Dan Cunningham '71**

Dan died March 31, 2019, at his New York brownstone after battling cancer for eight years.

During his two-and-a-half months at home on hospice care, his many visitors included Coleman, Donahue, Stewart, Miner, Mazo, Jones, Chesbrough, and Goldberg.

Dan grew up in Cincinnati and came to Princeton from Andover. While at Princeton he majored in history, participated in Big Brothers and freshman soccer, and belonged to Colonial. Classmates remember his brilliance, warmth, humor, and kindness. He graduated *magna cum laude* from Harvard Law School. He divided his legal career, spending 23 years in New York City and London as a cross-border and financial specialist at Cravath, Swaine & Moore; eight years as a "deal maker" at Allen & Overy; and nine years as a litigator with financial expertise

at Quinn Emanuel.

He married law school classmate Alice Welt in 1975. Together, following the death in infancy of their first son, Samuel, they raised two sons, Stephen and Philip.

Dan was a loyal Princetonian, participating in special-gifts campaigns for our class. He also spent 20 years as board chair of Job Path, a New York charity that supports people with disabilities, and close to that many years as an Andover trustee.

The class offers condolences to Alice, Stephen, and Philip, and other family and friends.

**THE CLASS OF 1972****John Richard Hawkins III**

'72 John died Jan. 11, 2019, in Mequon, Wis., where he lived. He was 68.

John's hometown was Hudson, N.Y. He came to Princeton from Phillips Andover Academy. He played freshman baseball and squash. Sophomore year he roomed in Holder Hall with Joe Potts and Bob Melick. He was an English major and member of Tiger Inn.

Following graduation John attended Smith College and earned a master of arts in teaching in English.

In 1977 John married Valerie Jacques and began a long career with Badger Valve & Fitting Corp., in Wauwatosa, Wis., eventually serving as president for nearly 20 years. In retirement he was a substitute teacher in the Mequon-Thiensville School District.

John was elected to the Mequon Common Council in 2006 and served for a total of 12 years. He also served on the Mequon Police and Fire Commission.

He is survived by his wife, Valerie; daughter Jamieson and her husband, John Kramph; sons John IV and his wife, Jillian; Michael and his wife, Jennifer; and Christopher; mother Loretta; brothers Gary and his wife, Susan, and Peter and his wife, Phyllis; and several grandchildren. The class extends condolences to the family.

**Wayne R. Smith '72**

Wayne died April 29, 2019, at his home in Seattle of severe complications from pneumonia at the age of 68. He was a smart and insightful classmate with

an easy manner who was quick to laugh and had a great sense of humor.

A native of Fort Washington, Pa., Wayne graduated from Germantown Academy, where he played lacrosse, a sport he continued during his freshman year. At Princeton he majored in psychology and was a member of Charter Club. Wayne was an accomplished pianist and became the keyboard player in a campus band, "One Grunch But the Eggplant." Senior year he and his roommates became independents, cooking in



their dorm room.

Following Princeton, he earned a Ph.D. in psychology from Washington University in St. Louis, followed by a master's degree in public health from the University of Washington, Seattle. Wayne joined the faculty at the University of Washington Medical School in Seattle in the Department of Psychiatry and Behavioral Sciences.

Wayne liked being outside, hiking, biking, and rambling the hills outside Wenatchee, Wash., with his dog, Greta.

He is survived by his wife, Patricia Canright Smith; stepchildren Koya Rice, Chloe Rice Haberlock, and Enon Rice and their partners; and six grandchildren. The class sends condolences to Patricia and his family.

**THE CLASS OF 1978**



**Stanley H. Reeves '78**

Stan died July 7, 2019, peacefully in his sleep after a valiant fight with cancer.

Stan graduated from Clover Park High School, Princeton, and Harvard Law School. After several years at one of Manhattan's elite firms, he returned to the Puget Sound area to be closer to his parents and to join a downtown Seattle firm.

Stan became a public defender in Tacoma, where he spent years gleefully tormenting prosecutors with his own brand of brilliance and the self-deprecating humor that made it impossible to dislike him.

In the halls of courthouses all over the state, reassuringly right with the world was the sight of Stan shuffling, head-down with purpose, looking harried in a rumpled shirt and the ever-present smear of jelly on the lapel of his Brooks Brothers suit, rushing to his next hearing for which he was already late. His humility and the heartfelt compliments were sincere, as was his staunch resistance to ceding any intellectual or philosophical point. Personal and engaging at work, he retreated home at night, content with a glass of wine and C-Span.

A confirmed bachelor, Stan left no heirs.



**Ronald Shepperson '78**

Shep died July 24, 2019, of colon cancer.

The youngest of five children, Shep became an anesthesiologist, moved to Southern California, and had the pleasure of teaching residents and medical students the merits of patient care and anesthesiology.

As he wrote for our 35th-reunion book, because of Princeton and his early exposure to diverse kinds of populations, Ron dealt with all kinds of people and situations without losing sight of who he was. He treated colleagues as family and patients as friends. He never became stuffy or staid, enjoyed life to the fullest, and loved to have

fun and to laugh, sing, dance, and play music.

From his first day at Princeton Ron felt blessed with the lifelong friends and experiences he knew were responsible for the person he became. In his own words, he lived a full life and hoped that all Princetonians past and future share his love for Old Nassau.

Shep is survived by his husband, Luis Hernandez. They loved traveling, hosting dinner parties, and spending time with family and friends. Shep is also survived by his mother, three sisters, goddaughter Jennifer, godson Joseph, and a host of nieces, nephews, cousins, aunts, and uncles.

**THE CLASS OF 1983**



**Lucy Swift '83**

Lucy Swift lived a life of graceful intention and generous service.

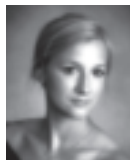
On July 24, 2019, cancer claimed Lucy, but her real story is about the life she embraced with infectious joy, passionate curiosity, spiritual wisdom, and gracious humility.

Born in Paris in 1961, Lucy was a true citizen of the globe, having lived in Paris, London, Greenwich, New York, Tokyo, Chicago, and San Francisco. At Princeton Lucy majored in East Asian studies, was a member of Tower, manager of the men's varsity soccer team, and editor of the *Nassau Herald* and *Bric-a-Brac*. She received her MBA from Stanford in 1991 and then moved to Minneapolis, working for General Mills and later Twin Cities Public Television.

Lucy was "all in" when it came to community, connection, and life. She could always be counted on for warm friendship and boundless kindness. She faced her illness with optimistic strength and thoughtful perspective. In the year between being declared cancer-free and learning the cancer had returned, Lucy focused on celebrating the joys in life, including the birth of her and Tony's first grandson, Ethan. Her power of the positive was a wonder to watch. Her investment in sharing her experience to help others tackle the challenges of cancer through a focus on one's spirit was uplifting.

Lucy is survived by her parents Barbara and Charles Swift '54; her husband, Tony Pulver; daughters Lindsay and Hannah; son-in-law Anthony Locatelli; grandson Ethan; brother Charlie Swift '88 and his wife, Nancy '89; and their daughters, Cameron and Courtney.

**THE CLASS OF 2013**



**Sophie Charlotte Krause '13**

Charlotte died July 6, 2019, at the age of 29 after courageously fighting cancer for several months. She was a designer, artist, passionate advocate for women, gifted athlete, and daughter, sister, partner, and friend.

Charlotte was born Dec. 3, 1989, in

Braunschweig, Germany. She was self-assured, determined, curious, and playful. She balanced an international lifestyle, rigorous academic studies, and demanding athletic pursuits with grace. Charlotte remained modest and never failed to make time for the people she loved — always a fierce and loyal friend.

Charlotte graduated from the Wilhelm Gymnasium in Braunschweig in 2009. She spent a year of high school abroad with the Pidgeon family in Norfolk, Va. She returned to the United States to attend Princeton.

Charlotte majored in architecture with a certificate in visual arts. She was prolific in the classroom. Charlotte was on the field hockey team and led it to four Ivy League championships and the program's first-ever National Championship title her senior year. She was excited about discovering the world, yet never missed a holiday at home with her family.

Charlotte moved to Austria after Princeton to continue her architecture studies at the University of Applied Arts in Vienna. There, with the love of her life, Lukas Schmidt, she built a close community of friends.

Charlotte is survived by her parents, Heidi and Andreas; siblings Johannes, Anna, and Philipp; and her partner, Lukas. She is also survived by her American family, Brenda and Bill Pidgeon and their children, Nicole, Anna, and Jonathan.

**THE CLASS OF 2018**



**Annie Li Yang '18**

Annie died June 25, 2019. She was born in Raleigh, N.C., and moved with her family to Troy, Mich., in 2011.

Annie's passion and engagement with the Princeton community were evident in all of the activities she led and participated in. She wrote more than 50 news articles and served as a news editor for *The Daily Princetonian*. She was involved in the Petey Greene Program, Project Solidarity, the Student Health Advisory Board, the Princeton University Biological Sciences Society, and the Princeton Student Events Committee. Looking to apply her education globally, Annie conducted her thesis research in Andasibe, Madagascar. She graduated with honors, majoring in ecology and evolutionary biology with certificates in global health and health policy, and planets and life.

Annie completed her first year of medical school at Michigan State University College of Human Medicine. She planned to become an ophthalmologist and would have earned a medical degree in 2022.

She is fondly remembered by classmates and colleagues as a brilliant, dedicated, caring, and exuberant ray of sunshine. She was always ready with a quick joke to lift everyone's spirits and never hesitated to lend a sympathetic ear or a helping hand to those in need. She will be

dearly missed.

Annie is survived by her mother, Liping Li; sisters Liyuan Lifanov and Jennie Yang '20; and brother Richard Yang '22. Her obituary can be found here: <https://www.montlawn.com/obituary/annie-yang>.

#### GRADUATE ALUMNI

##### Robert Christian Anderson \*48

Robert Christian Anderson, retired assistant director of the Brookhaven National Laboratory, died peacefully Jan. 9, 2019, after celebrating his 100th birthday in September. Anderson graduated from Middlebury College and earned a Ph.D. in chemistry from Princeton in 1948. He was one of the first employees at Brookhaven, working there from 1948 to 1983. From 1956 to 1983 he served as assistant director responsible for scientific personnel, university relations, and public affairs.

In this capacity he led efforts to expand opportunities for women and minorities in science. In 1974 he was appointed to the governing council of Stony Brook University and served as chair for nine years, starting in 1976.

During World War II Anderson worked at Merck & Co. on key medicinal compounds. In the 1950s he conducted early experiments in viticulture and wine-making on Long Island for the New York State Agricultural Extension Service. He was an avid outdoors enthusiast, a skilled silk-screen printmaker, and lifelong advocate for science in service of society.

Anderson is survived by his wife of 26 years, Lynn; four children (including Jon '74); five grandchildren; and two great-grandchildren. His first wife, Luise, died in 1990.

##### Theodore D. Lockwood \*52

Theodore Lockwood, president of Trinity College in Hartford, Conn., from 1968 to 1982, who admitted the college's first female students, died Jan. 21, 2019, at age 94.

Lockwood graduated from Trinity in 1948 as class valedictorian. In 1952 he earned a Ph.D. in history from Princeton. He taught at Dartmouth, MIT, and Juniata College in Pennsylvania before becoming dean of faculty at Concord College in West Virginia, and provost and dean of faculty at Union College in New York.

During his time at Trinity, in 1969, the college admitted its first female students. It also increased the number of women and people of color in the college's faculty and administration. Today, women are 50 percent of the student body.

Eleanor Reid, a former associate director of admissions at Trinity, said, "I admired him very much. He was clearly an intellectual. He was committed to Trinity, and had the respect of everyone I knew that worked with him."

After leaving Trinity in 1982, Lockwood went to New Mexico and became the founding president of United World College. He retired

in 1998 and moved to Stowe, Vt.

Lockwood is survived by his wife, Lu; three daughters from his first marriage; and two stepsons. A son died in 2005.

##### Michel L. Balinski \*59

Michel Balinski, a major figure in bringing operations-research methodology to bear on the electoral process, died Feb. 4, 2019, in France. He was 85.

Born in 1933, Balinski and his family fled France and the emerging Nazi threat and reached the United States in 1940. He graduated from Williams College in 1954 and in 1956 earned a master's degree from MIT. In 1959 he earned a Ph.D. in mathematics from Princeton. He spent the next five years at Princeton, with the consulting firm Mathematica, and at the University of Pennsylvania.

In 1965 Balinski was appointed a professor of mathematics at the CUNY Graduate Center. Then he relocated to Yale for several years before taking a professorship at the École Polytechnique in Paris. From 1983 to 1990 he was concurrently a professor of applied mathematics at Stony Brook University, SUNY.

For all his contributions to operations research, he is best known for his research and publications in electoral systems. Among his honors, Balinski twice won awards from the Mathematical Association of America for articles on voting. In 2013 he received INFORM'S John von Neumann Theory Prize, one of the highest honors in operations research.

Balinski is survived by two daughters (including Maria '82) and a granddaughter.

##### Myron Glazer \*65

Myron Glazer, retired professor of sociology at Smith College, died Feb. 3, 2019, of complications of Parkinson's disease. He was 84.

In 1956 he graduated from the City College of New York. His high school and college experiences made him a great advocate for public education. Prior to earning a Ph.D. in sociology from Princeton in 1965, Glazer earned a master's in sociology from Rutgers in 1961.

After Princeton Glazer had a four-decade career at Smith, serving as chair of the sociology department for more than a decade, co-chair of the Project on Women and Social Change, and president of the Massachusetts Sociological Association. He was dedicated to teaching and research, writing 10 books. He gave voice to men and women who unselfishly "exposed unethical behavior in government and industry."

His interviews with Chilean students advocating for democracy, truck drivers, nuclear activists, European environmentalists, and many others were the basis for such books as *The Whistleblowers: Exposing Corruption in Government and Industry* and *The Environmental Crusaders*.

During his last 14 years, he battled Parkinson's with great determination and had an active life for much of that time.

Glazer is survived by his wife and colleague, Penina; two children; and five grandchildren.

##### Douglas H. Keare \*66

Douglas Keare, a retired international-development official with the World Bank, died Jan. 8, 2019, at the age of 84.

Keare graduated from Dartmouth College with a bachelor's degree and also completed a Tuck/Thayer program in business and engineering. He earned a Ph.D. in economics from Princeton in 1966.

Keare began his career in international development with the Ford Foundation and worked in Malaysia. He joined the World Bank in 1970 in Bangladesh. When he and his family were evacuated from Bangladesh in 1971 he moved to Washington, D.C., where he "enjoyed an exciting and rewarding career at the Bank," and he and his wife, Ginger, raised their children.

When he retired from the World Bank, Keare moved to Boston, where he worked with the Harvard Institute for International Development and the Lincoln Institute for Land Policy until he fully retired. Thereafter, he and his wife enjoyed many summers at Cape Cod. Throughout his life, he said, "travel was in my DNA."

Keare is survived by his wife, Ginger, whom he married in 1959; three children; and nine grandchildren.

##### Amin Jafarian \*16

Amin Jafarian, who earned a master's degree in finance in 2016 from the Bendheim Center for Finance at Princeton and had been a lecturer there, died Jan. 27, 2019, in an auto accident. He was 35.

He graduated in 2005 from the Sharif University of Technology in Iran with a bachelor's degree in electrical engineering. He later became a naturalized U.S. citizen. In 2011 he earned a Ph.D. in electrical engineering from the University of Texas, Austin. Then, he worked at Qualcomm and Neurocom.

After graduating from Princeton's MFIN program, Jafarian was a visiting lecturer in data science and finance at the Bendheim Center. He also worked in quantitative finance at Cubist, IMC, and Alpha Simplex.

Jafarian and his fiancée, Maryam Farboodie (a former Bendheim faculty member), were on a classmate's wedding trip in Namibia, in southwest Africa, when the accident occurred. His fiancée was seriously injured, and recovered.

Markus Brunnermeier, director of the Bendheim Center for Finance, wrote that Jafarian "will be remembered fondly by all for his dry wit, creative and wide-ranging intellect, and his love for Princeton."

*Graduate memorials are prepared by the APGA.*



# Classifieds

## For Rent

### Europe

**Paris, Left Bank:** Elegant apartment off Seine in 6th. Short walk to Louvre, Notre Dame. 609-924-7520. gam1@comcast.net

**Paris, Marais:** Elegant, 2 bedroom, 2 bath apartment, vibrant Pompidou museum/sidewalk café quarter on 13c pedestrian street, full kitchen, w/d, AC, cable. desaix@verizon.net, 212-473-9472.

**France, Paris-Marais:** Exquisite, sunny, quiet one-bedroom apartment behind Place des Vosges. King-size bed, living/dining room, six chairs, full kitchen, washer, dryer, weekly maid service, WiFi, \$1350 weekly. max@gwu.edu

**Ile St-Louis:** Elegant, spacious, top floor, skylighted apartment, gorgeous views overlooking the Seine, 2 bedrooms sleep 4, 2 baths, elevator, well-appointed, full kitchen, WiFi. 678-232-8444. triff@mindspring.com

**Italy/Todi:** Luxurious 8BR, 7.5BA villa, amazing views, infinity pool, olives, lavender, grapes, vegetable garden, housekeeper, A/C, Wi-Fi. Discount — Princetonians. Photos/prices/availability: MarilynGasparini@aol.com, p'11.

**Paris, Tuileries Gardens:** Beautifully-appointed, spacious, 1BR queen, 6th floor, elevator, concierge. karin.demorest@gmail.com, w\*49.

**Paris 7th:** Fifth floor, quiet, studio sleeps 3. Balcony. View Eiffel Tower. www.parisgrenelle.com, 207-752-0285.

**Provence:** Delightful stone farmhouse facing Roman theater, 5 bedrooms, pool, market town. Frenchfarmhouse.com

**Umbria/Todi.** Elegant restored 14thC convent. Walk to town. 4 ensuite BRs, A/C, gardens, olive orchards, pool, WIFI. 847-234-9171. jcrawford@TRIADCAPLLC.COM, '68.

**Rome, Italy:** Breathtakingly beautiful art-filled apartment on via Gregoriana near Spanish steps. 2 bedrooms in a 17th century palazzo. Unsuitable for small children. Mariaceliswirth@gmail.com, 212-360-6321, k'38.

**Stunning Paris apartments:** original period details, high-end amenities, the best locations! Bac/St. Germain, Rivoli, Luxembourg Gardens, Rive Gauche, Odeon, Upper Marais. 1-3BR, 1-2.5BA. 917-746-8056, www.56paris.com/for-rent

**Unique 1880s heritage Irish farmhouse** on fourteen acres in Ox Mountains, County Sligo; Wild Atlantic Way; Fáilte Ireland Welcome Standard; a Hidden Ireland Property. Adventure, Culture, Food! info@oldirishfarmhouse.com, '77.

**Paris near Louvre, Opéra, Ritz Hôtel.** Family managed. Sleeps two, terms depend on season, 6 night minimum. apower7@icloud.com, 831-521-7155, w'49.

**Umbria, Italy:** Stunning, spacious countryside villa, olive groves, fabulous views. Sleeps 4-12, pool. Next to castle, golf course, cashmere shops. +44 7894420299; barbarasteino@gmail.com, www.umbriaholidayvilla.com \*60 '98.

### Africa

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**Stone Harbor, NJ:** Beachfront, 4BR, upscale. 570-430-3639, Stoneharborbeachhouses.com, radams150@aol.com

**Stone Harbor, NJ:** Houses ½ block from beach, sleep 10 each. Great for families, reunions, weddings. VRBO.com/7627382, 7632290. Bayberry10501@optimum.net, 201-803-1669, p'18.

**Wellfleet:** 4BR beachfront cottage, spectacular views overlooking Cape Cod National Seashore, walk to town. 610-745-5873, warrenst@aol.com, '84, s'86.

**Litchfield County 1790s** home across from bison farm & close to vineyards. Weekend, weekly and monthly rentals. Contact Shea at 347-432-3817 or owens\_shea@yahoo.com, '94.

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### United States West

**Big Sky Montana:** Charming 4 BR log home on 20 acres beautifully furnished, spectacular views, Big Sky sunsets, skiing, hiking, fishing and golfing within 5 minutes. Close to Yellowstone National Park and Bozeman. Enjoyment all 4 seasons. 610-225-3286. janegriffith655@gmail.com, s'67.

**Park City/Deer Valley, Utah:** 3 BR ski-out condominium in Upper Deer Valley. Newly remodeled, hot tub, beautiful views, available all seasons. Reasonable rates. 937-825-4137 or pjkolodzik@aol.com, p'12 p'20.

**Madison Valley Montana:** Jaw-dropping views, Near Yellowstone, Wildlife, Quiet. Photos/details: MovingWater.org 801-419-7289.

**Big Sky, Montana:** 4BR, 4BA luxurious ski-in ski-out home and separate 1BR, 1BA apartment. Spectacular view of Lone Peak. Hiking: Beehive Basin in Gallatin National Forest. Book at Staymontana.com, property code: Big Sky — Little Plume Lodge or Little Plume Flat, '76 p'21.

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## He Wrote Science Fiction Before the Genre Existed

By Elyse Graham '07

In 1893, Charles Howard Hinton became an instructor in mathematics at Princeton. His preferred format as a mathematician was not the paper or the blackboard talk, but science fiction, which did not yet exist as a genre. He wrote science fiction anyway, publishing whimsical inquiries into the strange geometries of higher mathematics under the heading “scientific romances.”

The fourth dimension — its unfamiliar properties and the uncanny beings that might inhabit it — was his signature topic. Should higher dimensions exist,

he suggested, then either we exist in the fourth dimension unawares, perhaps in the form of undiscovered particles; or we exist in three dimensions, and so live in peril that a higher thinker will unthink us: “If we are in three dimensions only, while there are really four dimensions, then we must be relatively to those beings who exist in four dimensions, as lines and planes are in relation to us. That is, we must be mere abstractions.”

Hinton’s best student was not at Princeton. In the 1870s, while living in London, he had accompanied his father on visits with the mathematician Mary Boole, whose husband, George Boole, had created the Boolean algebra that pervades computing today. Hinton entertained himself on these visits by bringing wooden cubes, arranging them into shapes, and teaching the Boole children

about geometrical models. Alicia Boole, the middle child, showed an unusual gift for visualizing higher dimensions; she became famous for drawing and building models of three-dimensional cross-sections of four-dimensional objects. Hinton coined the word *tesseract* for four-dimensional hypercubes such as those Boole modeled.

At Princeton, where he taught until 1897, Hinton invented a baseball-pitching machine powered by gunpowder. The machine soon ceased to be used, a contemporary told *The New York Sun* in 1907, “on account of the fear it inspired in the batters.” (The machine had injured several people.)

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**He left to posterity a cast of characters including an Unlearner who helps students to forget knowledge that has proven irksome or irrelevant.**

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No matter; the surly physics of our world never held his interest nearly as much as the speculative dimensions that mathematicians call higher space, which he populated with impossible creatures. He left to posterity a cast of characters as strange as the higher-dimensional shapes in Boole’s drawings: an invisible woman, the personification of an idea, who is wooed and hunted by men who believe in her though they cannot see her; a kingdom of people whose life force grows and decays according to the laws of thermodynamics; an Unlearner who helps students to forget knowledge that has proven irksome or irrelevant; hidden kings; sentient equations; living ethers that cradle worlds. His work inspired Aleister Crowley, H.P. Lovecraft, Jorge Luis Borges, Alan Moore, Madeleine L’Engle, and Christopher Nolan, among many others. Upon his death, the *Alumni Weekly* wrote: “Many of his exquisite fancies he embodied in story or parable, but his whimsical, fantastic humor was best brought out in talk, and his friends can never forget the rare charm of his conversation.” ♦



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