

# Pomona

COLLEGE  
MAGAZINE  
SPRING 2015

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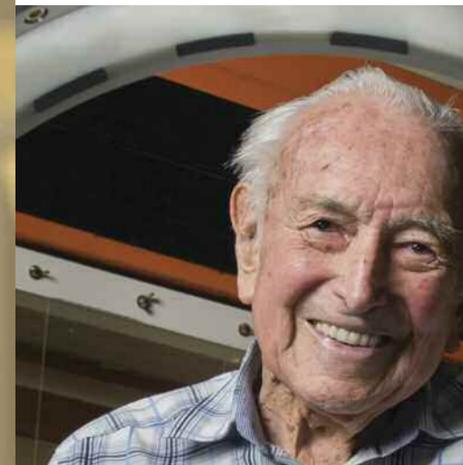
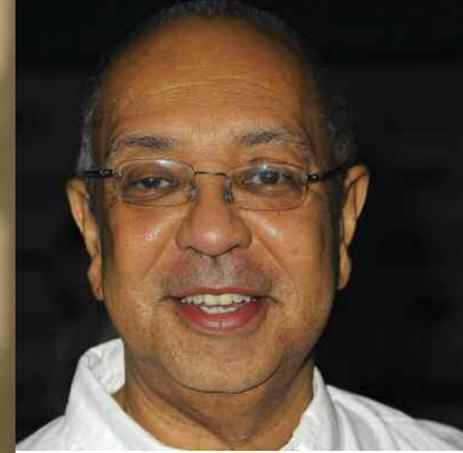
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# Pomona

/DARING MINDS II/

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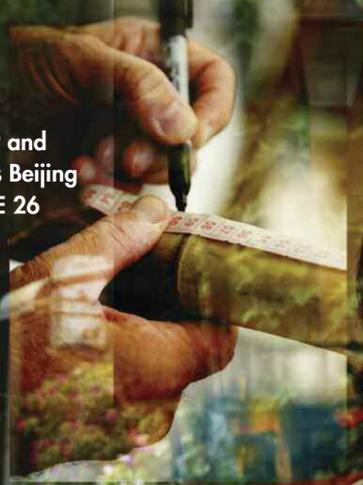
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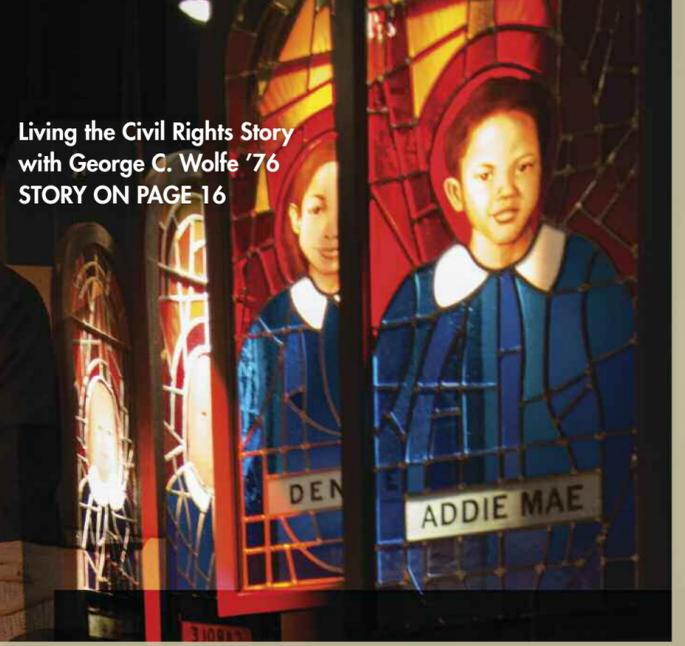
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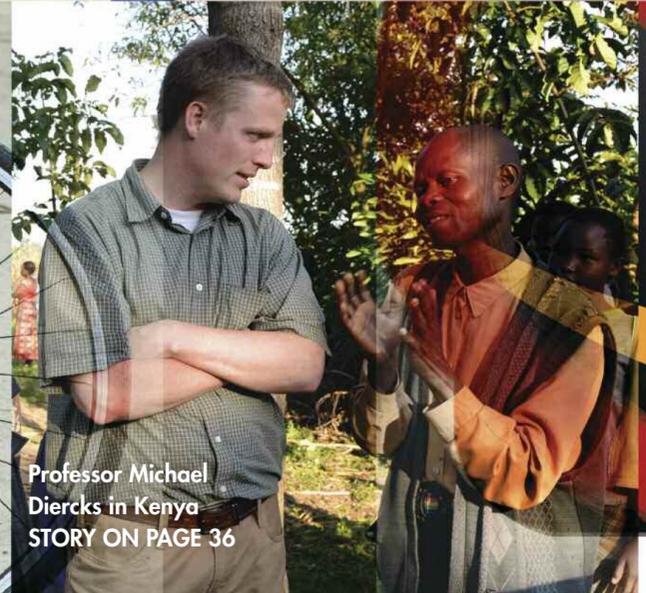
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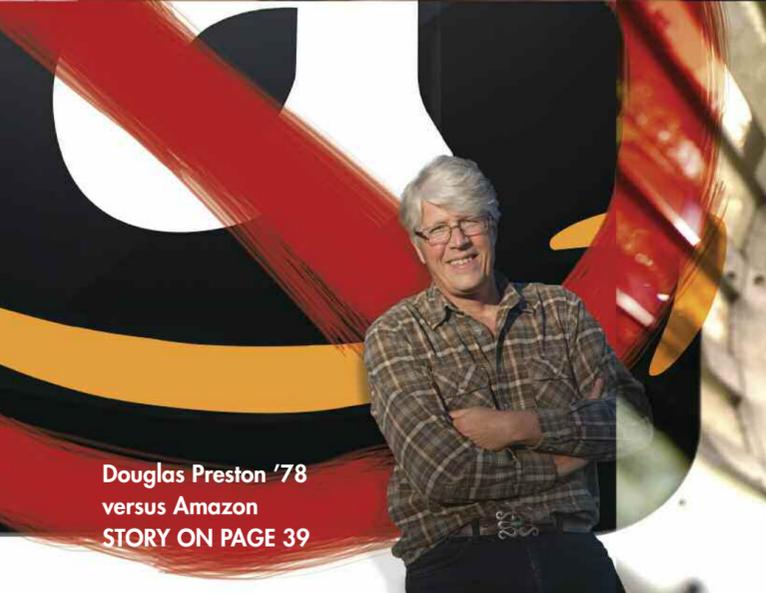
# "THE WORLD NEEDS DARING MINDS."

—President David W. Oxtoby

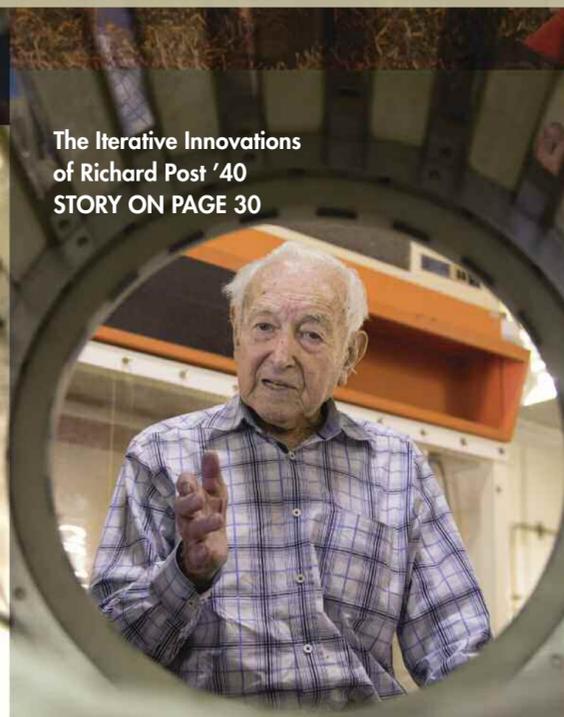
These are the words I used four years ago to explain why we were then launching a five-year campaign to raise \$250 million in support of some very ambitious goals. My point is the same now as it was then: This isn't just about Pomona. It's about the future. And it's about all of us. ▶



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The Iterative Innovations  
of Richard Post '40  
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Professor Ami Radunskey and Women in Math  
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Over the past four years, Daring Minds has become more than the name of a fundraising campaign. The words have been adopted by Pomona students, alumni and faculty in various ways as they strive to express what happens here and why it matters. It has caught on among members of the Pomona family, I think, because it captures something essential to the Pomona experience—something that simply feels true to those who have lived this place, directly or vicariously, and taken a piece of it away with them. Pomona is truly made up of men and women who are both highly talented and venturesome by choice, and a Pomona education provides the foundation necessary for such people to grow in confidence and ability and, ultimately, to make a difference in the world. The results, on display in every issue of *PCM*, speak for themselves.

Of course, when we talk about daring minds, we tend to emphasize the exceptional cases—daring minds, writ large, so to speak. The main features in this issue are no exception. In the field of science, the work of genetic researcher Jennifer Doudna '85 is now acclaimed the world over, and its ripple effects are likely to touch all of our lives in profoundly positive ways in the years to come. On the artistic side, the creativity of Tony Award-winning playwright, director and producer George C. Wolfe '76 at the new Center for Civil and Human Rights in Atlanta is

to start a conversation about Beijing's congested transportation systems by teaching small groups of people to build their own bamboo bicycles, and like Celia Neustadt '12, who is mobilizing teenagers in Baltimore to work with local government to resolve difficult problems in urban development. And as evidence that this isn't just about recent generations, there's the story of physicist Richard Post '40, who at the age of 96 is still using his innovative genius to build something that will improve people's lives.

My point is that this is about all of us who have been touched through the years by the ethos and the opportunities that are Pomona College. This is about every member of the Pomona family who heeds the famous charge on our gates—to bear their added riches in trust for humankind—and tries to live it day by day. It's about people who care about our common future and are moved to do something about it, whatever their walk of life and whatever the reach of their actions. It's about teachers preparing the next generation. It's about doctors caring for those in distress. It's about businesspeople seeking to build something beneficial and lasting. It's about those who strengthen their local communities in any of a thousand ways.

The world needs the daring minds who walk through Pomona's gates each year, and that makes this college worthy of all of our support.

**"WITH ONE YEAR TO GO TO THE END OF CAMPAIGN POMONA: DARING MINDS, THERE IS STILL MUCH TO BE DONE FOR THE DARING MINDS OF THE FUTURE."**

bringing the inspiring story of the American civil rights movement to new generations in extraordinarily powerful ways.

But in this issue, you'll also find people you probably haven't seen in the media. For instance, you'll read about David Wang '09, who is trying

With one year to go to the end of *Campaign Pomona: Daring Minds*, there is still much to be done for the daring minds of the future. I hope you'll join us as we work to make Pomona an even better place for them to thrive and grow.

—David W. Oxtoby, President of Pomona College

# The Power of Quiet

If **someday you** happen to be in downtown Atlanta with a few hours to spare, I highly recommend taking a turn through the new Center for Civil and Human Rights. In fact, if you don't happen to be in Atlanta, I recommend it anyway. It's worth the trip, especially if you have kids.

Last fall, while researching one of the feature stories in this issue ("Rolls Down Like Water"), I toured the Center's exhibits three times, once with director Doug Shipman and twice, more slowly and introspectively, on my own. The Center is a museum in the modern sense—not so much a collection of artifacts as an orchestrated intellectual and sensory experience, rigorously rooted in history. In this case, the experience (much of it conceived by our own George C. Wolfe '76) is, by turns, enlightening, gut-wrenching, uplifting and heartbreaking.

The last part of my visit took me downstairs to the only part of the museum that really is a collection of artifacts—the small room that houses a rotating exhibit of papers and personal items of the Rev. Dr. Martin Luther King Jr. There, alongside King's aftershave, aspirin tin and razor, were a couple of thoughtful, handwritten meditations on the philosophy of nonviolence, including one worn thin at the edges from being folded and carried in his wallet.

When we think of the civil rights movement today, the first thing that comes to mind, for many of us, is King's voice—that powerful, mellifluous baritone. And yet, as the Center's thoughtfully framed exhibits reminded me, the movement he gave such eloquent voice to was largely a quiet one—based more on restraint than action, more on painstaking planning than quick response, more on passive resistance than confrontation, and more on soft voices than loud ones. Beneath it all was a breathtaking degree of quiet bravery and intellectual daring. Led by perhaps the greatest orator of our time, it was, on the whole, an introvert's revolution.

That thought came to me as I read Susan Cain's wonderful book, *Quiet: The Power of Introverts in a World That Can't Stop Talking*. In her introduction, Cain compares King's voluble leadership with the quiet strength of another of the movement's icons, Rosa Parks, a woman described by those who knew her as "timid and shy," but with "the courage of a lion." As Cain points out, if it had been King who refused to give up his seat on that Montgomery bus, he would have been quickly dismissed as a grandstander. Paradoxically, it was the quiet, ordinary outrage of Parks' "No" that rang around the world.

Today, Cain argues, we live in a "Culture of Personality" that idealizes extroverts and sees signs of introversion as character flaws in need of adjustment. Parents fret about children who want to sit alone and read instead of playing sports. Colleges and universities penalize applicants who aren't sufficiently gregarious and involved. Organizations assume that being a "team player" is an essential part of being a good employee. People who need time by themselves feel guilty for their lack of enthusiasm for all things social.

And yet, as the Rosa Parks of the world show, you can't measure leadership by volume or the quality of a solution by the confidence with which it's expounded. Without introverts, Cain makes clear, there would be no theories of gravitation or relativity, no Harry Potter, no Google, no Apple computers—and, for that matter, King wouldn't have had Gandhi's philosophy of nonviolent resistance to carry in his wallet and apply to an America in need of transformation. Daring minds come in all intellectual shapes and all temperamental sizes. As a lifelong introvert myself, I find that thought a reassuring one.

—MW

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**Pomona College** is an independent liberal arts college established in 1887. Located in Claremont, Calif., it is the founding member of The Claremont Colleges.

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Pomona College complies with all applicable state and federal civil rights laws prohibiting discrimination in education and the workplace. This policy of non-discrimination covers admission, access and service in Pomona College programs and activities, as well as hiring, promotion, compensation, benefits and all other terms and conditions of employment at Pomona College.



## PCM: Thumbs Up

After a near 50-year hiatus from contact with the College, I am now re-engaged. Two obvious factors have been the 50th Year Reunion and the College's email listserv. A third factor is your excellent publication. Very professional in layout and content. I suspect this may play a role in the increasing recognition of the College in national publications.

—Jerry Parker '64  
Olympia, Wash.

**Thanks for the years of editing PCM**—I have copies from the '50s that look like the monthly tool store "what's-on-sale" mailings. What a change! For me, I would like to see more on the current faculty and profiles of what graduates have accomplished to be a "tribute to Christian society." (This used to be on each tea bag in the '50s.) Harvard asks for voluntary contributions, which I have maintained over the years, and you can plan on a steady, small, but constant stream from me. All best wishes for the next 16 years.

—H.G. Wilkes  
Hingham, Mass.

**Thank you for your letter regarding the Pomona College Magazine.** I thought the recent issue was excellent—particularly the article "Ash Heap of Success." Thank you, Professor Seligman.

—Ellen Walden Hardison '44  
Corona, Calif.

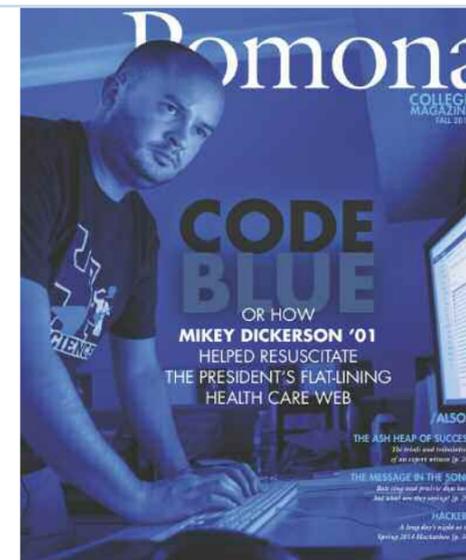
**I was in Claremont** visiting my sister at the San Antonio Gardens, and one evening we decided to visit the Skyspace installation by James Turrell. I keep most of my old PCMs, and so I found the Winter 2008 publication and was able to read some of the background about the Skyspace. What a wonderful experience. We enjoyed viewing the colors as they progressed after sunset. The night sky changed colors too!

Keep up the good work and thanks.  
—Barbara McBurney Rainer '53  
Carmel, Calif.

**Commentary on PCM, Fall 2014:** For some of us, coding is a means to an end, not an end in itself. It has to be continually upgraded. A while ago, I wrote a large number of papers on wavelets, but only as long as I had access to MATLAB's Wavelet Toolbox.

"The Ash Heap of Success" is a patent dispute (for lawyers). However, the DNA diagrams were marvelous. (I postdoced in DNA.)

DIY Physics: lab projects for electronics; they are confined to mechanics, which makes good sense.



A photonics lab might be useful also, using lasers for the same applications.

Keep up the good work.  
—Katharine J. Jones, '61  
Alpine, Calif.

## PCM: Thumbs Down

**I have wanted** to write this letter for some years, but your August 29 letter, along with the current issue of *Pomona College Magazine*, prompted me to write you immediately.

If the magazine is in such a financial situation that it has to nickel and dime the alumni to keep going, I have a strong suggestion for you—the same suggestion I have been holding for some years: Cut back!

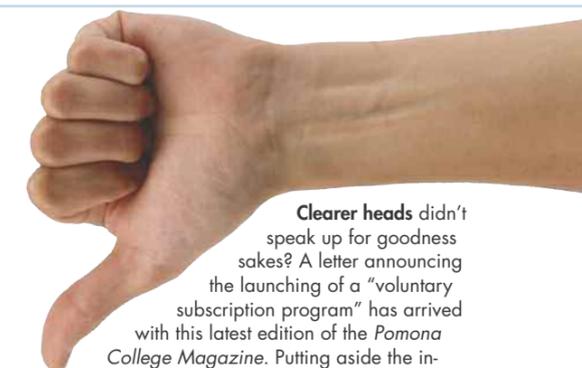
Let me also put your request in the context of last week's *New York Times* article which states that Pomona College's endowment sits at more than \$1 million per student.

The production of the magazine, which has to be extremely costly, is way overblown. If you cut back on paper quality, make it a smaller size—both in measurement and number of articles (nine-plus in this issue; you could do with half that)—but most of all, scale back the DESIGN, the savings would be substantial.

The magazine is so over-designed that it becomes difficult to read. Where is your eye to focus? Where does the article start? Are the sidebars relevant? For those of us slightly older folks whose eyesight is beginning to fail, the type size of many of the articles is too small, and the color tone is slightly lighter than other comparable magazines. The heavy, slick paper makes it harder to read, causing reflections. It is also more difficult to recycle. Perhaps it is time to give alumni the option of receiving all issues online.

I would much rather have my donation to the College spent on tuition relief for a needy student than on a fancy, overdone magazine.

—Susan Hutchinson Self '62  
Santa Rosa, Calif.



**Clearer heads** didn't speak up for goodness sakes? A letter announcing the launching of a "voluntary subscription program" has arrived with this latest edition of the *Pomona College Magazine*. Putting aside the increasingly slick and unnecessarily thick stock chosen for recent publications, let me address my deep aversion to the ploy of "voluntary subscription." I quote: "everyone will continue to receive PCM whether or not they give." How very kind of you.

Didn't anyone realize that such a ploy disenfranchises? Has anyone heard about the unemployed, about fixed incomes further dwindling, about the broader economic chasm experienced by, yes, even Pomona College graduates? You propose the 1% "subscribe." Even if I were a member of that group I would still be writing this letter because I question whether your need to win accolades has become more important than the mission of maintaining a link with ALL Pomona College graduates. May I respectfully suggest someone needs to put on the brakes.

—Silvia Pauloo-Taylor '57  
Tinton Falls, N.J.

## PCM: Thumbs Green

**The most recent** issue of the *Pomona College Magazine* is very nice looking, as always, but I was distressed that it was mailed in a plastic bag in order to include the letter asking for funding and the mailing envelope. This could have been easily avoided! It is more difficult in many communities—if not impossible—to recycle plastic than it is paper. Stapling in the envelope, including the letter in the text of the magazine, would have worked very well.

I also noticed that while you do use paper from "responsible sources," you could go much further to limit the publication's impact on the environment. I know recycled paper can be more costly and doesn't always look as nice, but I suspect your audience would forgive you for that. Please include environmental concerns in your aesthetic decisions. In our house, we do almost all of our reading online anyway.

—Ellen Wilson P'15  
Pittsburgh, Pa.

**Editor's Note:** Sustainable printing is not as simple as it may appear. Some aspects of the matter are counterintuitive. For example, coated paper kills fewer trees than uncoated paper, because it uses less wood pulp and more clay. And recycled sheets may come from Europe or Asia, with a huge carbon footprint. Add to that the fact that there is no reliable certification process for recycled papers to ensure that their production is truly environmentally friendly, and you have a difficult puzzle to solve. The best solution ►

we've found so far is to use printers overseen and audited by the Forest Stewardship Council (FSC). This means the paper they use in printing the magazine comes from a mix of recycled waste and sustainably harvested (and monitored) forests. It also means the printer uses environmentally friendly chemicals and inks. —MW

## Sagehen Senate

I graduated from Pomona 58 years ago. The world has changed since then. Astronauts have landed on the moon, and I have experienced the Vietnam War; the Civil Rights movement, Women's and Gay Movements; and the development of the computer age. But I never thought that I would see the day that sagehens, and their male counterparts, the sage grouse, might determine which political party will control the Senate after the forthcoming elections.



How the sage grouse may swing the Senate—Candidates running for seats in Montana and Colorado are sponsoring legislation. B5

My wife and I live in Bend, Oregon, during the summers. Yesterday the following lead-in appeared on the front page of the local paper. (See below.) Upon seeing the lead-in, I wondered if the sage grouse might be related to the sagehen, so I read the entire article. I learned that the sagehen is the female of the sage grouse species. Seemingly, the candidates for Senate in Montana and Colorado have differing views on whether the sage grouse species should or should not be on the federal endangered species list, and that this issue might indeed determine the composition of the Senate after the fall elections.

I had a convertible during my senior year at Pomona, and the rally committee asked me if I could transport Cecil the Sagehen to the night Pomona-Caltech football game which was being held in the Rose Bowl. We managed to squeeze Cecil into the back seat of my car, and I set out for Pasadena. I couldn't go more than 20 mph because the wind might damage the Bird, so I wandered through the back roads of Monrovia, Arcadia and Altadena. At one point a motorcycle officer pulled up alongside me at a stop sign. I thought he wanted to give me a ticket for some type of violation, but after looking at me and the Bird with a puzzled expression on his face, he roared away.

—George E. Sayre '56  
Bend, Ore.

## Sad News

I was saddened to read of Professor Emerita Margery Smith Briggs' death just 12 days shy of her 99th birthday.

When I was a freshman, 50 years ago, my first class at Pomona College was elementary music theory, taught by Mrs. Briggs. It was the most difficult

class that I ever had either at Pomona or later at Yale. As a teacher, Mrs. Briggs was enthusiastic, demanding, hard-working, organized and inspiring. She expected excellence from herself and from her students.

When I eventually began my own career as a college professor, the first class that I taught was elementary music theory. Then and ever after, I kept the energetic, inventive, dedicated example of Mrs. Briggs before me as a positive paradigm of teaching and personhood.

Over the years, I kept in touch with Margery. We often spoke on the phone, and I saw her in Claremont a year before her death. She was, at the age of 97, bright, engaging, filled with philosophical, musical and historical insights. Always independent by nature, she was still driving and insisted on taking us out to lunch at one of her favorite restaurants.

—David Noon, '68  
New York, NY

## Art on Campus

May I congratulate you and your staff on conceiving and designing the attractive new Pomona College Calendar. It is one of the best I have seen, and aptly demonstrates not only the College's dedication to art, but also how much its chosen artworks add distinction to the College.

But not everyone appreciates art in the same way, and disagreements about what constitutes good art have not always come down on art's side in Pomona's history.

In the spring of 1953, Walker Hall had been open about a year. Its lounge was a happy gathering point for those who appreciated a view across a green expanse that perfectly framed Mt. Baldy. It must have been one of those persons who had an idea: Why not place a sculpture in front of the huge new window? In any case, I was at a meeting of the Associated Men Students' Council when that idea was proposed. Specifically, why not use a \$5,000 surplus in the AMS budget to commission a sculpture for the area outside Walker Hall? Even more specifically, the individual floating this proposal seemed to have a commitment from the sculptor Isamu Noguchi to install one of his pieces there for \$10,000. AMS approved the idea, and through the Dean of Students, asked that the trustees come up with an additional \$5,000 for the project.

Later I talked to the Dean Shelton Beatty (or possibly his assistant, Bill Wheaton) after word had come down that the Board had not granted the requested matching money. Why, I asked, had that happened? One prominent trustee, the Dean said, had opposed the idea, even going so far as to offer, by contrast, a donation of \$5,000 to "paint over Prometheus." That last bit is hearsay, to be sure, and may have been spoken in jest. But clearly Pomona missed out on a Noguchi to go along with its other distinguished artworks. Over the years I have seen a number of Noguchi sculptures. One has stuck with me: it looked a bit like a rocket ship ready to take off. I wondered if that was the piece Pomona missed out on and thought, even then, how stunning it would have looked next to Walker Hall.

One other event was not a miss: Prometheus is gloriously with us. But a collection of incidents adds humor to the creation of Orozco's masterpiece. My parents were missionaries in Mexico (where I was born) and they knew Orozco personally. They may have heard this story from him and told it to me, or I may have heard it as a student at Pomona. The trustees and Pomona's president viewed Prometheus as it neared completion and objected to scenes of writhing naked bodies. Orozco angrily effaced the bodies with a strident blue color, a clashing, almost insulting contrast to the colors in the rest of the fresco. The blue is very much still there. Orozco also asked for more money and was turned down. His next commission was at Dartmouth College where, among other scenes, he depicted a group of robed academics at the gates of Hell. Apparently the faces of the first two figures are identifiable as those of the president of Pomona and of the chairman of Pomona's Board of Trustees.

Art's price is paid in differing currencies!

—Charles B. Neff, 1954  
Mercer Island, Wash.

Hail Pomona! Thank you for the calendar. I took the time, at last, to really look at it. I'm curious about Peter Shelton '73—the artwork "GhandiG" for July 2015. Is he related to Hal, John, or Marty, who were old Pomona artists, professors, etc.? I have three or four Hal Sheltons hanging here and one Joe Donat, also Pomona. They were 1930s to 1940s—before the '70s, but certainly could be related.

The map was useful but could have been larger, easier to read and locate—especially better names for buildings on sites for an old dame of 98 years.

Art is delightful. I miss the staged "artistic" performances that melted away with traditions such as the classic Plug Ugly, done annually by faculty and the other traditions that produced "Hail, Pomona, Hail—May thy sons and daughters sing praises of thy name, praises of thy fame 'til the heavens above shall ring—" etc.

"Hail, Pomona" became our standard greeting for a long time—still is with me. An operation that I had about a year ago began with that. The MD performing the operation also was a Pomona graduate.

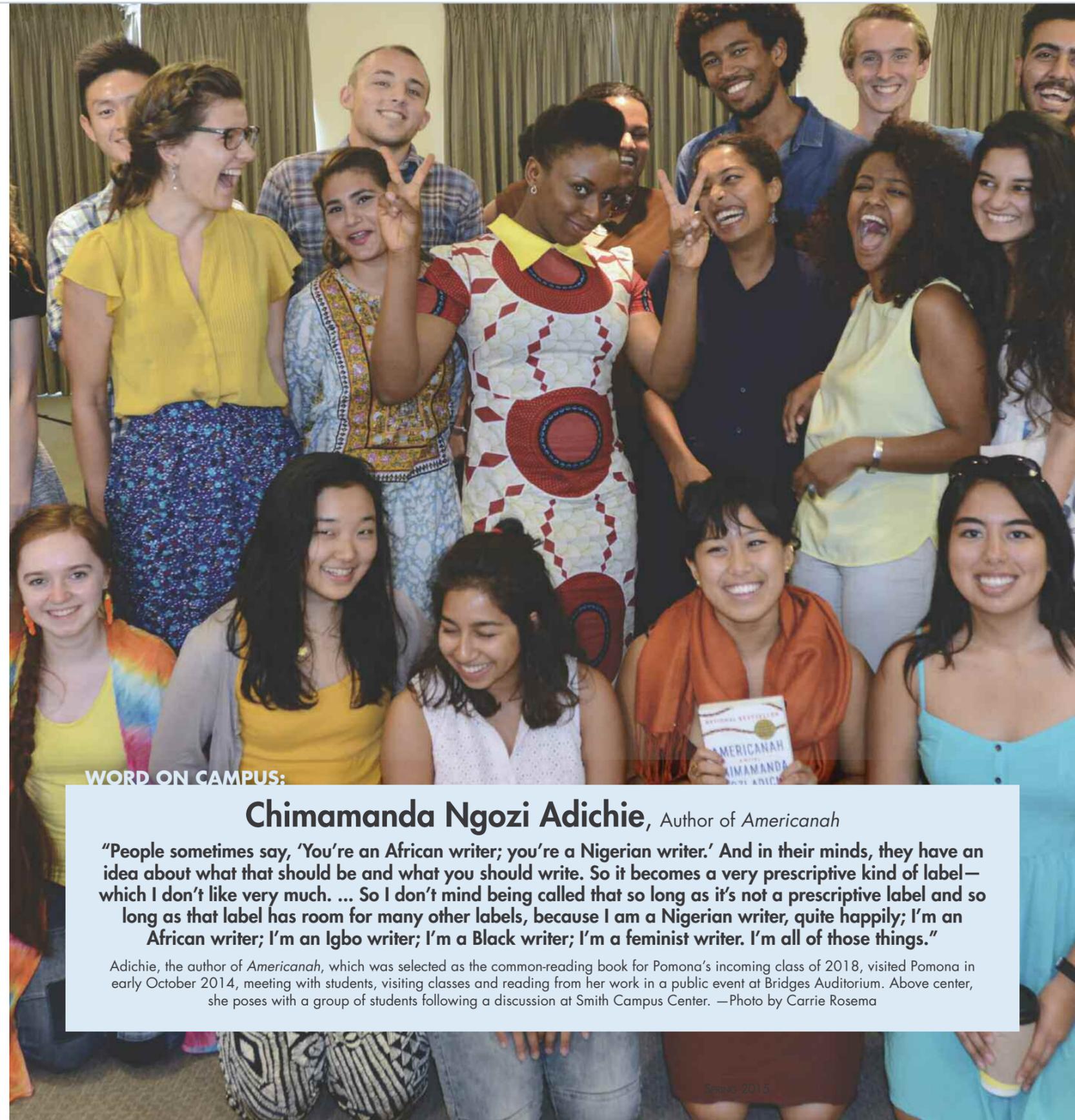
So—Hail, Pomona!

—Mollie Miles '37  
Portland, Ore.

## [Calendar Erratum]

In the 2014–15 Pomona College Engagement Calendar, which was sent to all Pomona College donors last summer, the date for Ash Wednesday was mistakenly listed as March 18, 2015. The correct date is February 18.

[Alumni and friends are invited to email letters to [pcm@pomona.edu](mailto:pcm@pomona.edu) or "snail-mail" them to Pomona College Magazine, 550 North College Ave., Claremont, CA 91711. Letters are selected for publication based on relevance and interest to our readers and may be edited for length, style and clarity.]



## WORD ON CAMPUS:

### Chimamanda Ngozi Adichie, Author of *Americanah*

"People sometimes say, 'You're an African writer; you're a Nigerian writer.' And in their minds, they have an idea about what that should be and what you should write. So it becomes a very prescriptive kind of label—which I don't like very much. ... So I don't mind being called that so long as it's not a prescriptive label and so long as that label has room for many other labels, because I am a Nigerian writer, quite happily; I'm an African writer; I'm an Igbo writer; I'm a Black writer; I'm a feminist writer. I'm all of those things."

Adichie, the author of *Americanah*, which was selected as the common-reading book for Pomona's incoming class of 2018, visited Pomona in early October 2014, meeting with students, visiting classes and reading from her work in a public event at Bridges Auditorium. Above center, she poses with a group of students following a discussion at Smith Campus Center. —Photo by Carrie Rosema

1

# Mountainous Monument: The majestic San Gabriel Mountains, Pomona College's ever-present backdrop, are now a national monument encompassing 350,000 acres of scenic, rugged terrain.

President Barack Obama visited nearby Bonelli Regional Park in October to sign the proclamation, saying, "We are blessed to have the most beautiful landscapes in the world." For Pomona students, the nearby mountains have always been a favorite spot for recreation, but they also serve as a key site for field trips and student research in geology and other fields. The College's shared one-meter telescope at Table Mountain Observatory is located high in the mountains near the resort town of Wrightwood.

2

## Do You Speak Sagehen?

Pomona has its own ever-evolving set of unique words that only have meaning on the Pomona campus. Here are a few special words and phrases that are vital to understanding life at Pomona today.

### Spo-gro

Short for "sponsor group," this is a word students are likely to hear frequently during their first year at Pomona, and possibly for the rest of their lives. Designed to help students make a smooth transition to college, the Sponsor Program clusters first-year students into sponsor groups of about 15 students who live together in a residence hall, along with older students who help them settle into the Pomona community.

### OA

OA stands for Orientation Adventure, the three-day trip that all first-years go on before they start class. There are various derivations of this word, such as "OA-by," which is what you may be introduced as if you encounter your OA leader at a party.

### Table Manners, Pub, Bloc, Tap

At Pomona, the term "Table Manners" doesn't refer to a set of polite social behaviors every student should learn. For today's Sagehens, it's the name of a party thrown in Doms Lounge of the Smith Campus Center every Tuesday night. Other parties that take place on campus weekly have equally cryptic names, such as Pub, Bloc and Tap.



3

## Sustainable Numbers

**2,500,000**  
The number of gallons of water the College expects to save each year due to new pH controllers installed on its 10 water-cooling towers. Purchased last March, the new controllers reduce the number of water replacement cycles in building air conditioning systems.

**46,000**  
The number of pounds of used appliances, furnishings, books and other items (including 100+ couches) saved from the landfill last May in the College's Clean Sweep, which picks up items left behind in residence halls for resale the next fall. This year's sale raised more than \$9,500 for sustainability programs.

**750**  
The number of new low-flow faucets and showerheads installed as part of the College's Drought Action Plan. The College also reduced irrigation to landscaped areas by at least 20%, timed watering schedules for night-time and prohibited washing of outside walkways.

**161**  
The number of bicycles available to students last year through the College's Green Bikes program, in which students check out bikes for the entire semester and learn how to repair and maintain them.

**58**  
The percentage of produce served in Pomona's dining halls last year that came from local sources.

4

## How Classes Are Born

Pomona offers more than 600 classes in 47 majors, and each year new courses are born. Here's a look at the origins of seven of the newest:

**1) Behavioral Economics** (Professor of Economics John Clithero '05) was added by popular student demand. It explores a growing subfield that attempts to incorporate more psychologically plausible assumptions into the traditional economic model of "unbounded rationality."



**2) Laughing Matters** (Professor of Romance Languages and Literatures Jose Cartagena-Calderón) grew out of the professor's research into the meaning and value of humor in Hispanic literature and art.

**3) Anthropology of Food** (Professor of Anthropology Drew Gladney) explores food and culture with special attention to food taboos and security issues. The course was born out of a discussion of California's ban on foie gras in an Introduction to Anthropology class.

**4) Genes and Behavior** (Professor of Neuroscience Elizabeth Glater) originated in a conference the professor attended that focused on the gap between what the public believes and what studies have shown about the dominant influence of genes on behavior. The class examines the science behind the fundamental question of "nature vs. nurture."

**5) The Science of Empire** (Professor Pey-Yi Chu) explores the history of science in connection with the expansion of European empires. The class grew out of a book Chu is writing on the history of frozen earth and permafrost research in Russia and the Soviet Union.

**6) Surveillance and the Media** (Professor of Media Studies Mark Andrejevic) was created in the wake of recent revelations about the NSA and increasingly intrusive technologies of surveillance. Originating in the professor's writings, it examines "how the media in which we are immersed double as tools for monitoring and surveillance."

**7) Disability Studies** (Hentyle Yapp, Mellon Chau Post-Doctoral Fellow in Gender and Women's Studies) was formed to examine the changing definitions and approaches to the concept of disability and related areas of activism as part of Pomona's emphasis on Dynamics of Difference and Power.



5

## Rocking Studio Art



A selection of interesting rocks placed in the courtyard of the new Studio Art Hall will serve as instructional tools, artistic inspiration—and occasional outdoor seating.

The idea came from Art Professor Michael O'Malley and Geology Professors Bob Gaines and Jade Star Lackey. Original plans calling for the placement of some generic granite stones were replaced by a more eclectic arrangement of rocks as a way to enliven the building's stark open spaces, inspire young artists and bring in other disciplines. The Geology Department plans to use the rocks as teaching tools in introductory courses.

"Artists draw inspiration and knowledge from all sources," says O'Malley. "As a sculptor, I love learning about stones and the fascinating stories behind them. The art faculty hopes that the building draws students from across the campus, and we saw the stones as a device to create a more complex community."

Standouts among the stones include a brilliant sheet of green quartzite from Utah and a dazzling marble boulder in its raw, unpolished form. One rock, a checkered block of granite, even has a strong connection to the L.A. art world, having been discovered in the same Riverside quarry as Michael Heizer's Levitated Mass installation at LACMA.

# HOW TO BECOME A ROLE MODEL FOR WOMEN IN MATH

## As a long-time leader of EDGE

(Enhancing Diversity in Graduate Education), Pomona College Professor of Mathematics Ami Radunskaya says she tries to instill some of her own innate stubbornness in young women seeking higher degrees in math. EDGE, founded in 1998, is a national mentoring program and summer workshop designed to encourage female mathematicians — particularly those from underrepresented groups—to persist in graduate study of math. Radunskaya was a member of the original EDGE faculty and has served as an instructor, mentor and organizer ever since its inception. Currently, Radunskaya is featured in the documentary film, *The Empowerment Project*, about “ordinary women doing extraordinary things.”



1

**DISCOVER MATH AS A TODDLER.** At age 4, do math problems for fun and amuse guests at cocktail parties by showing your prowess in adding and subtracting. When challenged by your father, a professor of economics at UC Berkeley, with a tricky subtraction problem, invent negative numbers to solve it.

2

**START PLAYING CELLO AT AGE 9.** Form a trio with your siblings (who play violin and piano) and play your first paying gig at the Martinez Music Forum, earning \$5 each. Graduate from high school at 16, skip college and immediately join the Oakland Symphony. Quit the symphony at age 23 to compose and perform more experimental music.

3

**START COLLEGE AT UC BERKELEY** after taking your son on two European tours before the age of 6 months and realizing that was no life for an infant. Try chemistry and computer science, but gravitate back to your first love—math. Find two mentors on the faculty, one a talented but untenured woman, the other a man who won a MacArthur Fellowship for a program that helps students from underrepresented groups overcome sociological barriers.

4

**SEE YOUR WOMAN MENTOR DENIED TENURE.** Watch as she challenges the decision in court and wins. Be infuriated by the sexist attitude of some of the faculty. Decide to go to Stanford for graduate school. Create a program there based on the one your second mentor pioneered and win the Gores Award for Excellence in Teaching.

5

**FIND OUT YOU'RE THE ONLY WOMAN** in the Math Department when you begin your post-doc at Rice University. Start a group called Woman Math Warriors to make women in math more visible by sponsoring talks by top woman mathematicians. Meet lots of amazing women in the field. Leave after three years to join the Pomona faculty in 1994.

6

**JOIN THE ORIGINAL FACULTY** of EDGE to encourage female mathematicians to persist in graduate school. Take over co-leadership when the founders retire. Take pride in the program's success in retaining women in math (current total of 56 PhDs and 90 master's degrees, with many of the 200 participants still in the grad school pipeline).

## Bank Shots

**At one point** during the 2013-14 season, an opposing men's basketball coach visiting Voelkel Gymnasium was a little frustrated with the way his day was going and needed a sympathetic ear. The closest people to his bench were working the scorer's table, so during a dead ball, he turned and started an impromptu conversation.

"Holy (bleep), McAndrews is good," he said. "Has anyone stopped him? Because we sure can't."

While his question was rhetorical, the answer has mostly been no. A first-team All-SCIAC selection, Kyle McAndrews '15 already had over 1,000 points in his Pomona-Pitzer career (1,023) heading into his senior year, averaging 17.8 as a junior. He is also an Academic All-District winner and strong All-America candidate this year with a lofty GPA as a dual major in mathematics and economics.

As a result of his success in the classroom at Pomona, he earned an internship opportunity at J.P. Morgan in San Francisco last summer, and will begin full-time work there as an investment banking analyst after graduation. He's the rare college basketball player who already signed his pro contract before his senior season, and with no need for the NCAA to start asking questions.

In fact, there were several investment banking firms interested in McAndrews, who missed a couple of practices last winter to fly to San Francisco for interviews. It was almost like going through the recruiting process all over again. However, McAndrews is quick to point out the flaw in the parallel. "For these interviews, you have to try to convince them to hire you," he laughs. "During the recruiting process, the coaches already want you and just try to win you over. It's safe to say that my interview with Coach Kat [Head Coach Charles Katsiaficas] was a little less intense."

As a standout basketball player at Lakeside School in Seattle, McAndrews was intrigued by Pomona almost from the start of the college application process. Several other Lakeside students had recently attended Pomona and had successful experiences in sports and in the

classroom, including Academic All-American football players James Lambert '12 and Duncan Hussey '13, and women's soccer captain Charlotte Fisker '14, among others.

"I knew Pomona was a great school and it seemed like an ideal fit," he says.



"The biggest thing that convinced me to come here was just the visit and spending time with the guys on the team. I also visited during one of the games against CMS so I got to see what the rivalry was like."

If the recruiting visit didn't give him a full sense of the intensity of the Pomona-Pitzer vs. Claremont-Mudd-Scripps rivalry, his freshman year drove the point home. In the first meeting in front of an overflow crowd in Voelkel Gymnasium, the Sagehens tied the score with six seconds left, only to see CMS drive coast-to-coast for a winning buzzer-beater in a crazy swing of momentum.

In the rematch, the Sagehens were down by two after a CMS three-pointer with 10 seconds left, when McAndrews was fouled shooting a three-pointer with just 0.4 seconds showing on the clock. With Ducey Gymnasium going bonkers trying to distract him, McAndrews stepped to the line for three pressure-packed shots, and buried all three to give Pomona-Pitzer the one-point win.

"It was pretty loud in there," McAndrews laughs. "When the whistle blew, I was just glad to get the chance to step to the line in that situation since the game was over otherwise. Then the noise started building and it got really intense. I was just happy to help us get the win."

The clutch performance was a harbinger of things to come. In the SCIAC semifinals against Whittier as a freshman, McAndrews scored 18 of his 22 points to carry the Sagehens to a 60-53 win after trailing by five at the half. As a sophomore, he hit a tying three-pointer with 20 seconds left in an 81-79 win over Westmont, while last year, he hit several big shots in a double-overtime win over Chapman, including a jumper and a three-pointer in the last 30 seconds of regulation and a three-point play with 12 seconds left in the first overtime, all with the Sagehens trailing.

He also had 15 of his 18 points in the second half of a home win over CMS after breaking a scoreless drought with a first-half buzzer-beater from three-point territory. He broke out his full arsenal of scoring weapons late in the second half to help put it away—step backs, pull-ups, crossovers, drives to the rim through traffic, etc.

According to Katsiaficas, McAndrews arrived at Pomona-Pitzer with many of those scoring gifts, but has worked exceptionally hard at becoming a complete player. "Kyle has an aggressive scoring mentality that is difficult to find anywhere at this level," says Katsiaficas, who puts McAndrews on the short list of the top four or five guards he has coached in 27 years. "Where he has really added to his game is expanding his range out to the three-point line and improving as a passer. He's so much tougher to guard now because you can't afford to play off him, and it's hard to run a double team at him."

McAndrews says the process of developing that added range was a difficult one. "After my freshman year, I made a structural change to my jump shot," he says. "It required taking a couple of steps backwards to move forward. It was frustrating for a while, but fortunately I had good coaching to help me through it, and most of the frustration was during the off-season."

That same work ethic has helped him succeed in the classroom. He also credits the culture in the athletic program for making it doable. "We have a great atmosphere here, where our coaches and teammates all buy in to the philosophy that academics come first," he says. "If you have a lab, you go to the lab; if you have class, you leave practice early. When I had my interviews last year and had to miss practice time, it wasn't ideal, but everyone was 100 percent supportive."

McAndrews had another big effort in the SCIAC semifinals last year, scoring 26 points against Chapman, but the team came up short and did not get an at-large bid to the NCAA Tournament. The only things missing from his resumé are a SCIAC title and an NCAA bid.

"That's the big goal," he says. "That's everything to me. We have a really good chance to make this a special season with the guys we have coming back and the young guys we have who are ready to step in and play right away. We're just going in with the attitude that we need to work hard at getting better every day and hopefully have it be our year. We'd love to put 2015 on a banner."

—Jeremy Kniffin

## A Sampling of Fall Events



### THEATRE:

#### The World Premiere of "Kitimat"

8 p.m. April 9-11 and 2 p.m., April 11-12  
Seaver Theatre (300 E. Bonita Ave.)

Commissioned by the Theatre Dept. and the Mellon Elemental Arts Initiative, "Kitimat" is a new play by Elaine Avila based on true events in Kitimat, British Columbia, an industry town in the Canadian wilderness that found itself at the center of an international controversy when asked to vote "yes" or "no" on an upcoming pipeline project.

### LECTURE SERIES

#### 53rd Robbins Lecture Series:

#### Nobel Prize-winning geneticist Jack Szostak

March 2-4

Seaver North Auditorium (645 N. College Ave.)

Professor Jack Szostak of Harvard Medical School, winner of the 2009 Nobel Prize in Medicine or Physiology, will give four lectures on the biochemical origins of life on Earth:

- "The Origins of Cellular Life"—8 p.m., March 2
- "Synthesis of the Building Blocks of Life on the Early Earth"—11 a.m., March 3
- "RNA Replication Before Enzymes"—4:30 p.m., March 3
- "Primitive Cell Membranes and the Assembly of the First Cells"—4:30 p.m., March 4

### MUSIC:

#### Pomona College Choir & Orchestra in Concert

8 p.m. April 17 & 3 p.m. April 19

Bridges Hall of Music (150 E. 4th Street)

This concert by the Pomona College Choir (Donna M. Di Grazia, conductor) and the Pomona College Orchestra (Eric Lindholm, conductor) will feature Fauré's "Pavane" and "Les Djinns" and Mozart's "Mass in C Minor, K 427."

### EXHIBITION:

#### PAGES: Mirella Bentivoglio,

#### Selected Works 1966-2012

Through May 17

Pomona College Museum of Art (330 N. College Ave.)

This exhibition of more than 60 works—prints, photographs, sculpture, video—traces the Italian artist's engagement over almost 50 years with the concept of the "page."

STUDIO ART HALL

## It Takes a Village...

Under a striking canopy roof, Pomona's innovative new Studio Art Hall creates a village of interconnected studios to bring together disciplines ranging from sculpture and painting to digital arts and multimedia. With more than half the building's exterior made of glass, the open, free-flowing design encourages interaction and collaboration in shared spaces, including a central courtyard. At 35,000 square feet, the new hall provides much-needed space for student and faculty artists with a design that reflects an integrated vision of the arts and an interdisciplinary approach to teaching. —Photo by Henry Cabala. **For more photos of the new Studio Art Hall, see Last Look, page 62.**



# ROLLS DOWN LIKE WATER

STORY AND PHOTOS  
BY MARK WOOD

AT THE NATIONAL CENTER FOR CIVIL AND HUMAN RIGHTS IN ATLANTA, TONY-AWARD WINNING DIRECTOR AND PLAYWRIGHT **GEORGE C. WOLFE '76** CREATES A LASTING IMPRESSION.

## G grab a stool

at the old-fashioned lunch counter. Slip on a pair of earphones and press your palms to the hand outlines on the countertop. Close your eyes if you dare. A soothing Southern voice murmurs in your ear, "This your first time, right? So far, so good. You'll be all right." But then you hear the mob coming, surrounding you, jeering at you. "Git up!" A vicious jolt as if a ghost has kicked your stool. "If you don't git up, boy, I'm gonna kill you."

The voice moves around you, so close you can almost feel the breath on your ear. Dishes shatter. Silverware jangles off walls. Sirens rise in the distance. Your stool is jostled again and again as the shouting engulfs you. "Kill him!" "Stomp his face!"

After 90 seconds, the chaos subsides, replaced by a woman's voice: "What you've just experienced was created to honor the brave men and women who participated in the American civil rights sit-in movement."

Heart racing, you lift your sweaty palms from the countertop and take away an indelible memory.

Which is exactly the way Tony Award-winning director, playwright and producer George C. Wolfe '76 planned it.

**IN 2006, THE CENTER** for Civil and Human Rights consisted of three things: a collection of the Rev. Dr. Martin Luther King Jr.'s papers, on loan from Morehouse College; a parcel of land in

downtown Atlanta, donated by Coca-Cola; and a dream—the dream of telling the story of the American civil rights movement to audiences too young to remember. The person responsible for making that dream a reality—the Center's president, Doug Shipman—was looking for ideas, so he met with a lot of people, including Tom Bernstein, now chair of the U.S. Holocaust Memorial Museum in Washington, D.C.

"Tom said, 'You need a storyteller to be a central part of this. I think you need a non-traditional storyteller,'" Shipman recalls. "I said, 'Who do you have in mind, Tom?' He said, 'George Wolfe.'"

At the time, Wolfe's only apparent connection with museum design was a play he'd written two decades earlier, called *The Colored Museum*, in which 11 museum exhibits come to life on stage in scathing vignettes of the Black experience in America. But Shipman didn't find Bernstein's suggestion strange in the ►

least. Today, museums like the Holocaust Museum aren't just about collecting historical artifacts—they're also about telling stories, recreating experiences, touching emotions—in other words, they're a cross between a history class and interactive theatre.

For his part, Wolfe—who says if he hadn't fallen in love with the theatre he probably would have been a history teacher—found the idea of playing a lead role in the conceptualization and design of the Center intriguing. He delayed saying yes, but within a few months, he was already starting to do what he always does when he takes on a new project—bury himself in research. After comparing notes, Shipman sent him a selection of books about Atlanta's civil rights history. A couple of months later, when they met again, in addition to the books on Atlanta, Wolfe had gone through an additional 22. Shipman was startled both by the depth of detail that Wolfe had absorbed and by the completeness of his ideas.

"He drew this sketch," Shipman recalls. "It was in a gallery format, how he wanted to tell the civil rights story. It had things like a shape that was a crescent moon—that was the March on Washington space. It had what he called then a game of 'I'm sitting at a lunch counter.' Almost all of the elements that you see here were in this drawing, and what was interesting to me was that he didn't do it like an outline or a script. He did it in a space—he did it in rooms. That became the basis of what you see here. We pulled it out at the opening and we looked at it and we said, 'I can't believe it—look at that. That's there. And look at that.' It was incredible. His original vision was very, very clear."

**HAVING GROWN UP** in the '50s and '60s in the partially segregated city of Frankfort, Kentucky, Wolfe describes his own memories of the civil rights movement as "visceral."

"In 1964, Martin Luther King came to town for a march on Frankfort and my grandmother took me out of school so that I could march with her," he recalls. "I also remember, very specifically the chair I was sitting in, watching TV as Robert Kennedy, standing atop a car, announced to a crowd in Indianapolis that King had been killed. These images and many others are vividly alive inside of me to this very day."

For today's young people, who don't share that deep emotional connection to what was at stake, what was lost and what was won during the civil rights movement, Wolfe wanted to create a kind of immersion experience.

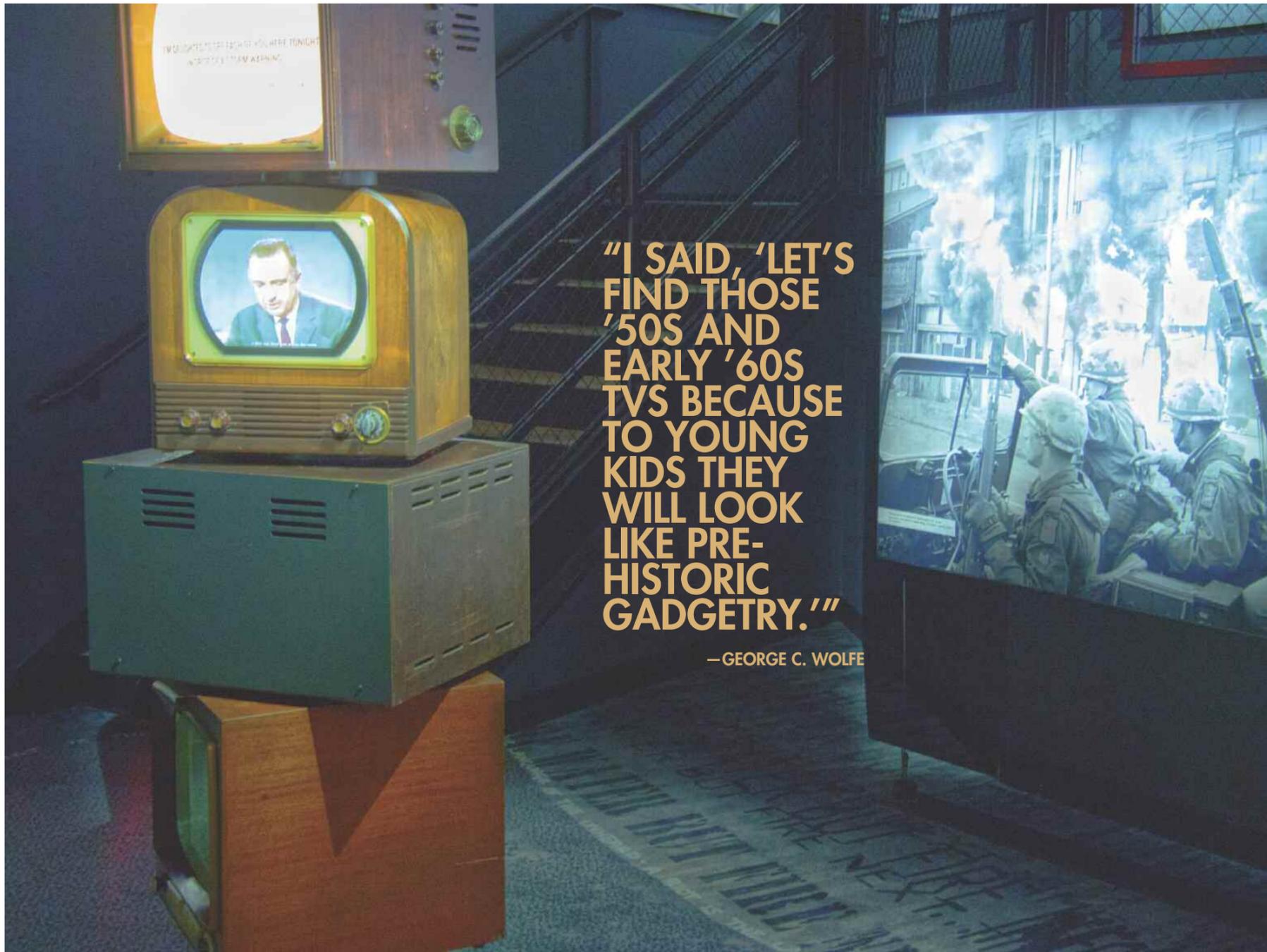
"I wanted to make sure that every single story we explored was not only grounded in a very specific intellectual rigor," he says, "but I also wanted to find the entry point into each story, so that people with no overt connection to the American civil rights story, who are not walking around with a visceral minefield based on memories, and who didn't march with their grandmother, could still make an emotional connection, could feel a similar kind of charge. That was the ambition that I set up for myself."

The scale, he decided, shouldn't feel grand and sweeping, but close and intimate—not like a film, but like a play.

"When you're watching a film," he explains, "you tend to lean back in your seat because the scale of what we are witnessing is so much larger than us. But when you're watching a play and it's ►

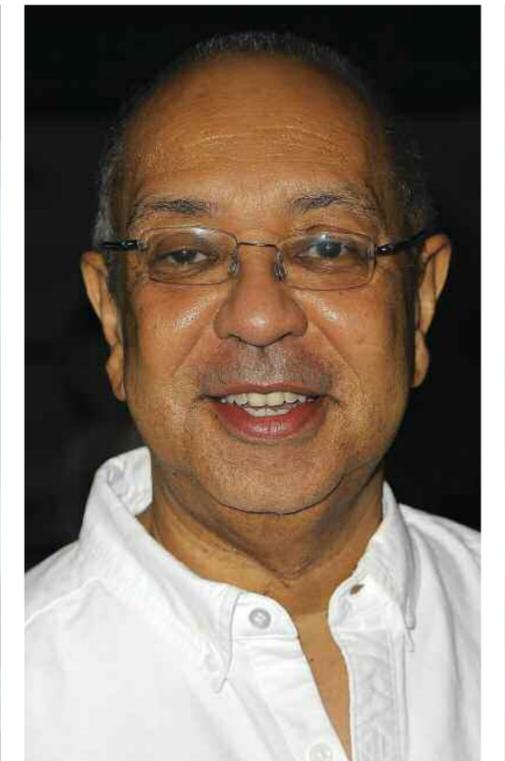


**Clockwise from top left:** Four visitors to the Center absorbed in the lunch counter sit-in experience; the front façade of the Center; George C. Wolfe '76, who designed the exhibits as chief creative officer; and a mix of old TV sets and modern video screens that tell the story of Martin Luther King's assassination and the ensuing riots that swept the nation. **(Back cover:** visitors reverently watching video in the room devoted to the March on Washington)



**"I SAID, 'LET'S FIND THOSE '50S AND EARLY '60S TVS BECAUSE TO YOUNG KIDS THEY WILL LOOK LIKE PRE-HISTORIC GADGETRY.'"**

—GEORGE C. WOLFE



really working, you lean forward in the seat, because you're recognizing that the bodies in peril on stage are the same as yours. That level of identification causes you to surrender."

To keep the story on that level, he first had to decide how to weave in the colossal figure who towered over that civil rights landscape—Martin Luther King Jr. himself. Clearly, King was central to the story, and his unmistakably eloquent voice was its driving force, but Wolfe didn't want him to dominate the narrative.

"There are people who come along and history makes them better than us," he explains. "They start out like us, but history takes over and makes them better than us; our memories make them better than us; the circumstances of how they lived and died make them better than us. I didn't want to create an homage to that. I wanted to create this—for lack of better words—celebratory journey of ordinary people, and how their sense of commitment and sacrifice and bravery changed the world."

In his research, the stories that captivated him were some of the least known—like the story of Claudette Colvin, the teenager in Montgomery, Alabama, who refused to give up her seat nine months before Rosa Parks. But because of her youth and the fact that she was pregnant, it was decided by local civil rights leaders that she was not the right face for the moment, so the boycott didn't begin until nine months later, when Parks became an icon of the movement. Or like the story of Ruby Bridges, the little girl who integrated New Orleans public schools and whose courage was immortalized by the Norman Rockwell painting that appeared on the cover of *Look Magazine*.

"Everybody can't necessarily turn into Martin Luther King, but you can be a Claudette Colvin, or you can be a Ruby Bridges, or you can be a Viola Liuzzo. So the driving theme of the civil rights story became everybody can take a stand, should become invested in making their world a better place."

**TODAY, THE CENTER** is a shining, glass-fronted spaceship of a building occupying the northeast corner of Pemberton Place, a park that is also home to The World of Coca-Cola and the Atlanta Aquarium. In the lobby, your eyes are drawn to the giant mural that Wolfe commissioned from artist Paula Scher, depicting a range of human rights movements radiating out from an upraised, open hand.

To the left of the mural is a square portal with the words "Rolls Down Like Water: The American Civil Rights Movement" above the doorway. This is where most of Wolfe's efforts were focused. The title comes from a King quote, printed to the right of the portal: "No, we are not satisfied and we will not be satisfied until justice rolls down like water and righteousness like a mighty stream."

Inside, Wolfe's admittedly obsessive attention to storytelling detail is everywhere.

It's in the burnt-out half-shell of a bus, papered over on the outside with mugshots of hundreds of Freedom Riders. Inside, you can sit on real bus seats and watch a documentary about their story.

It's in a free-standing office door in the middle of a room, with a frosted glass window bearing the name "Eugene 'Bull' Connor, Commissioner of Public Safety," beyond which a trip-

tych of videos shows police using fire hoses and dogs against young protesters while Connor calmly defends the practice. ("I mean his title's the commissioner of public safety," Wolfe muses. "Can you get more ironic than that? 'Hi, I'm the commissioner of public safety. Break out the hose and the dogs?'"")

It's in four light-saturated, stained-glass windows hanging over a pile of rubble, honoring the four little girls killed in the Birmingham church bombing of '63.

It's in a stack of vintage television sets showing the breaking news of King's assassination or the racist vitriol from Southern segregationists. ("I said, 'Let's find those '50s and early '60s TVs because to young kids they will look like pre-historic gadgetry, and they'll initially enjoy the difference of it, and in turn be shocked by the horror of what they are seeing and hearing, so that hopefully they can begin to understand the journey we've gone on in this country.'")

But there's more to Wolfe's creation than just a series of self-contained exhibits. For Wolfe, it's something more classical and more unified—a drama in three acts.

"The first act takes us up to just before the March on Washington," he explains. "Then from the March on Washington and the four little girls and Goodman, Schwerner and Chaney, to LBJ and the political transformation—that's the second act. And then, the last act begins with the assassination of King."

The emotional power of it all is visible in a well-used box of tissues tucked into the corner of a couch in the upstairs room where footage of King's funeral plays nonstop. "There were no tissue holders here," Shipman says. "But literally we just put them there because we saw that people needed them."

In addition to the emotional impact of the journey, however, Wolfe hopes visitors will come away with an appreciation for a couple of little-understood facts about the civil rights story.

One is that it was largely a youth movement.

"Delving into the research, and because I was a child when most of this was happening, it was startling to see how truly young everybody was," he says. "To me this is part of why people are responding so emotionally; you're constantly witnessing young faces risking their lives, sacrificing their youth if you will, to make a better world."

The other is that these weren't simply people caught up in the flow of history—each one of them chose individually to stand up and say no to injustice. He offers as an example the young people who took part in the lunch counter sit-ins, whose bravery was matched by their intentionality and thoughtfulness.

"I wanted people to begin to understand the deep level of mental, emotional and spiritual training these young people had to go through before participating in a sit-in," he says. "The astonishing level of commitment that was required. I was also struck by how incredibly media-savvy the architects of the civil rights movement were. They knew that if you had these young black and white students, flawlessly dressed with their pressed shirts and ties, the women in gloves to match their outfits, sitting at a lunch counter, surrounded by these packs of uncouth hooligans, the cameras rolling, who's going to come across as the normal human being whose cause is worthy, and who's coming across as crazy?"



**"I MEAN HIS TITLE'S THE COMMISSIONER OF PUBLIC SAFETY. CAN YOU GET MORE IRONIC THAN THAT? 'HI, I'M THE COMMISSIONER OF PUBLIC SAFETY. BREAK OUT THE HOSE AND THE DOGS?'"**

—GEORGE C. WOLFE

**"PEOPLE SAY, 'WELL,** George C. Wolfe was involved, but was he *really* involved?" Shipman says after leading an early-morning tour of the exhibits. "I probably talked to George for seven years, two to three times a week, unless it was like, 'Okay, for the next month I'm off the grid.' But if we were working, we were talking about photo choices, script choices, positioning, everything. George had said early on, 'I'm going to build this thing from the details up. Everything has to matter, and you've got to do it from the ground up.'"

As opening day approached, Wolfe's focus became more and more intense. He reworked the sound for the lunch counter to maximize its emotional punch—right down to the volume of a breaking plate or the direction of sound for a thrown fork. He went through the exhibit with technicians, fine-tuning the sound at every station, obsessing over every detail.

"In theatre, I'm used to a preview period where daily you get to fix things based on the audiences' response the night before, but we didn't have that," he says. "And so the lack of previews was making me crazy because I know from doing 9,000 shows that it's easy to make a show go from okay to really good, but to make a play go from really good to brilliant, it's a series of incremental improvements which ultimately elevate the material. So like I said, my obsession with detail got elevated to a crazed level, changing and fixing as much as I could for as long as I could.

Since the Center opened its doors in June, Shipman says the response has been overwhelming. "We get 15-year-olds who obviously weren't there who say this is incredible. We get 80-year-olds. Yesterday the minister of culture for Ireland was here. She said, 'This is just remarkable, the way you're telling the story. It's so relevant.' I think that's all a testament to George's vision."

For his part, Wolfe says he feels honored to play a role in the telling of such an important story. "I wanted to honor the people who stood up and said, 'This is wrong!' Who took a stance, changed the country, and in turn the world, and invented a vocabulary, a language of dissent that people the world over are still using to this very day. The Muslim women in Saudi Arabia, protesting the ban on woman drivers, dubbed themselves, 'Freedom Riders.'"

But for a man who has devoted his life to the ephemeral art of the theatre, the most amazing part may be that the fruits of his labor haven't already vanished. This is one set that will, for the foreseeable future, never be torn down. "I've been very fortunate to have worked on some really remarkable theatre projects, and I'm very proud of the work that I've done. But then the production ends and the work evaporates, because that's theatre. People frequently stop me on the street and say, 'Oh my God, when I saw *Angels In America*, or *Bring In Da Noise, Bring In Da Funk*—?' But that's all that remains of those productions—memories. But when I go through 'Rolls Down Like Water,' and I watch people experiencing the exhibits, inside I'm screaming, 'My God, I can't believe it's still here!' The permanence of it all is very startling, and I've got to say there's something about that I find wonderfully, naïvely reassuring."

JENNIFER DOUDNA '85 DIDN'T SET OUT TO REVOLUTIONIZE GENETIC ENGINEERING, BUT THAT MAY BE EXACTLY WHAT SHE DID.

# A CRISPR CUT

Story by Adam Rogers '92 / Photo by Robert Durell

## The action at scientific conferences

mostly happens in conference rooms and hotel bars, but sometimes the players break out to see the sights. That's what Jennifer Doudna was doing at a conference put on by the American Society of Microbiology in spring 2011. She attended a session on a type of bacterial genetic sequence called a clustered, regularly interspaced, short palindromic repeat—CRISPR, for short. They seemed to have something to do with an immune system for bacteria, though to be honest, Doudna, a biochemist at UC Berkeley who specializes in the three-dimensional structure of genetic material, thought they were “a boutique area of science” at best.

That night, Doudna ran into someone else who was working on the same problem. In Germany, Emmanuelle Charpentier's lab was studying what most people call “flesh-eating bacteria,” a species of *Streptococcus*, and Charpentier's team had found something important in one of their pet bug's CRISPRs—it made a protein called Cas9. But she needed help to understand all of the moving parts. So Charpentier asked Doudna if she wanted to team up. Doudna said yes. Typical conference stuff.

Over the next few months, Doudna's postdocs in California worked with Charpentier's teams in France and Germany. But what they started to figure out began, slowly, to look a lot bigger than just an immune system for flesh-eating bacteria. CRISPR/Cas9 made a complex structure of protein and genetic material that looked like it could cut DNA—which is to say, genes—but it was precisely targeted, almost as simple as putting a cursor between two letters on a computer screen and clicking *delete*. “There were other techniques in the literature, but they were difficult,” Doudna says. “This is the kind of technique that, in principle, anybody who knows anything about molecular biology will be able to do.”

Doudna and Charpentier wrote a paper for *Science*, one of the world's premiere scientific journals. When it came out, in summer 2012, the scientific community went nuts. By the end of 2013, hundreds of papers from labs all over the world had confirmed that, yes, not only was ►



CRISPR a quick-and-easy way to edit a genome as easily as Word edits a magazine article, but it worked in just about every living thing—yeast, zebrafish, mice, stem cells, in-vitro tissue cultures, and even cells from human beings. Most gene-editing techniques work in theory, but in practice require wrestling to the ground complicated, ornery techniques that often fail. But with CRISPR: You want that gene over there? You got it. Companies formed seemingly overnight to turn CRISPR into medicines, research tools, and maybe even profits. Doudna's lab was at the center of a shift that could be every bit as significant as being able to sequence the genome.

**The kind of cells** that you and I have encode information in the form of deoxyribonucleic acid—DNA, a long backbone of two spiraling strands bridged by “base pairs,” the famous A, T, C, and G that comprise the genetic sequence. But DNA isn't the only genetic material. When it's time to make proteins, cells unspool lengths of DNA from their tightly-packed chromosomes and make a cheap copy called ribonucleic acid, or RNA. It's this RNA that other machinery in the cell reads—the sequence of A,

C, G, and U (replacing the T) represent amino acids, and amino acids put together are the proteins of which we are mostly made. It's a cool system.

RNA, though, is kind of weird. Because in addition to containing information, it can also form structures that do jobs. In fact, the biological machine that reads RNA and outputs proteins, called a ribosome, is itself made of RNA. In this particular corner of molecular biology, the map is also the terrain. This dual personality is behind the “RNA world” theory, the idea that RNA's ability to both carry and initiate the code of life means it gave rise to all life on earth.

It's also what compelled Jennifer Doudna, freshly graduated from Pomona, to get her PhD. Growing up in Oahu she knew she wanted to be a biochemist; a set of seminars she attended in high school had sealed that deal. She studied biology as an undergraduate, worked in real labs, and pointed herself at grad school in Boston as soon as it was time to apply. She ended up getting in the laboratory of Jack Szostak, who came up with the RNA world idea.

Doudna decided that she wanted to understand those RNA structures—figuring out the structure of ribosomes and other so-called catalytic RNA. Basically that meant trying to get them to crystalize and then x-ray them. It was, Doudna says, a methodological challenge that was “every bit as cool as I could have imagined.” Eventually she ended up a professor at Yale, and she solved a few of those structures. Doudna was earning a reputation as an ace in a field without many practitioners. “She's careful and diligent in pursuing all the leads without cutting corners,” says George Church, a Harvard Medical School geneticist who remembers Doudna's student days there. “And she has a good knack for picking the right topics.”

The West Coast lured her back; in 2010, Doudna took a job

at UC Berkeley. “I had always considered myself a basic scientist,” she says. “But you want to feel like your work is going to help solve human problems at some level.” She started working on diseases caused by RNA mutations, and on a technique called RNA interference, or RNAi. Basically it uses small molecules to interrupt the translation of RNA into proteins, to try to fix problems before they start. And to make it work, you have to understand the structural characteristics of RNA.

At about the same time, some food researchers in Copenhagen were learning something new about yogurt. Turning milk into yogurt requires specialized bacteria, but every so often those bacteria get sick—just like people, they get attacked by viruses trying to hijack their cellular machinery. The Danish team found that bacteria exposed in advance to the viruses, called bacteriophages, became immune. It was like vaccination, but for microbes.

**How'd it work?** In the late 1980s scientists found long, repeating sequences in bacterial DNA that were the same back-to-front—palindromes, in other words. And between the

palindromes: nonsense. At least, that's what they thought at the time. But the genetic gibberish turned out to be quoted from bacteriophage DNA. Put all that together and you got RNA structures that could target specific DNA sequences in a virus, and a protein that would chop that DNA up, destroying it. It was, in other words, an immune system. The Danish yogurt makers had hit upon a rudimentary way of programming it to hit specific viral targets.

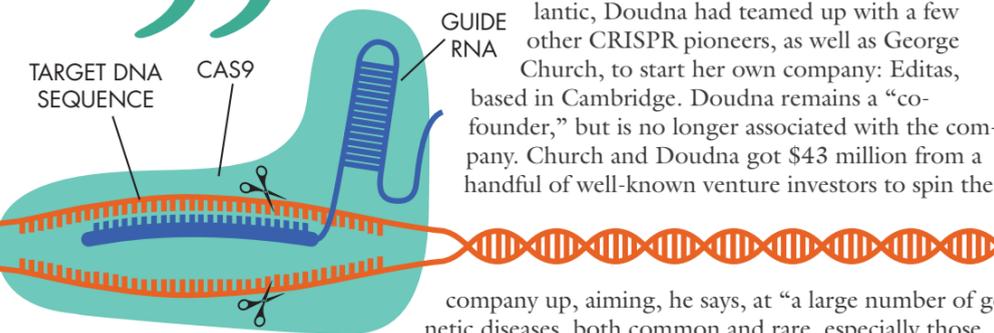
That's why Charpentier started studying it. “I'm interested in how bacteria cause diseases, and how they can become resistant to antibiotics,” she says. “Initially the goal was to look for this class of small RNAs to find one with a nice regulatory function. Coming to CRISPR was in a way a bit by chance.” It wasn't crazy to imagine that she'd find a useful enzyme in her work—most of the DNA- and RNA-cutting enzymes used in labs were isolated from organisms found in nature.

The thing was, though, that even the most advanced techniques for cutting-and-pasting DNA and RNA were really tough to use. The two best approaches, “zinc-finger nucleases” and “TALEN,” required the creation of a new, bespoke protein every time, coded to the specific sequence a researcher wanted to cut. “Zinc finger nucleases were originally priced at about \$25,000 each. You could do it yourself for a little less, but it extracted a corresponding amount of flesh,” says Church. “TALENs looked easier, but they were particularly hard to engineer biologically. It lasted for about a year, a year and a half, as a fad.”

The RNAi Doudna was working with turned out to have similar problems. Usually you try to engineer a bacterial or insect cell to make protein or RNA. However, you then have to purify the protein or RNA that you want out of all the gunk you don't. Those methods took a whole skill set, and not everyone had it.

In the late 2000s, though, postdocs in Doudna's lab were

“I was working away in my lab on a bacterial immune system. Genome engineering wasn't on my radar. If you had asked me in 2007 if the CRISPR system was going to be useful, I don't know what I would have answered.”  
—Jennifer Doudna '85



starting to get really good results in experimenting with CRISPR. It was easier to do and didn't need custom-made proteins. Doudna's and Charpentier's two labs together realized that in the case of CRISPR/Cas9, the same protein was doing the cutting every time. The only thing that changed were two adjacent structures made of RNA—and you could engineer their function into one, a short, synthetic stretch called a guide RNA that was really easy to make. “We figured out how to program Cas9 to cut any sequence in DNA just by changing the guide RNA,” says Doudna. When she and one of her students realized what they had, sitting in her office at Cal, “we looked at each other and said, this could be an incredible tool for genome engineering.”

On the other side of the world, Charpentier was just as stunned. “All the other tools, each time you want to target DNA at a specific site you have to engineer a new protein. This requires time, and it's not easy for someone who isn't used to it,” Charpentier says. “With Cas9, anyone can use the tool. It's cheap, it's fast, it's efficient, and it works in any size organism. It's revolutionizing biology.”

So what's CRISPR actually going to be for? That's still being determined, at labs all around the world—and a handful of companies that spun up in the dizzy aftermath of the Doudna-Charpentier paper. “There's a distinction between CRISPR-Cas9 as a therapeutic tool, using it to correct mutations in cells that would then be reimplanted in a patient—or delivering Cas9 directly,” says Charpentier. “But the other possibility is more indirect. That's using it as a tool in labs for development, to help screen drugs or to understand a disease by using it to create models of the disease in animals.” In other words, you could use the technique as a medicine, to correct a mutation directly, or use it to

induce a mutation you wanted to study in an animal to test other possible drugs.

Charpentier herself is one of the founders of a company, Crispr Therapeutics, based in Basel, that's planning to focus on making treatments for people. The company's CEO, Rodger Novak, is a longtime drug development exec, and the company is well-funded, but even Novak acknowledges what they're doing won't be easy. “What biotech pharma always struggles with is the biology of the target. In many instances we don't know until late-stage development, pivotal human trials, if the target we're using is the target we need.” Novak says. “The other challenge is delivery. If you go after the liver or the lungs or the brain, very different requirements apply.” He says he's cautiously confident.

Meanwhile on the other side of the Atlantic, Doudna had teamed up with a few other CRISPR pioneers, as well as George Church, to start her own company: Editas, based in Cambridge. Doudna remains a “co-founder,” but is no longer associated with the company. Church and Doudna got \$43 million from a handful of well-known venture investors to spin the

company up, aiming, he says, at “a large number of genetic diseases, both common and rare, especially those that might require the removal or editing of DNA, rather than just the addition.” Other therapies in trials are better than CRISPR-Cas9 at adding DNA, inserting a gene, says Church. CRISPR-Cas9 is much better at cutting—harkening back to its original function in the flesh-eating *Streptococcus* Charpentier studied.

Back in Doudna's lab at Berkeley, though, her team is still trying to answer some fundamental questions. No one doubts that CRISPR works, but some researchers still worry about whether they can target it narrowly enough to work as a therapeutic. But Doudna would like to know how its targeting system works at all—with just 20 bases of RNA it can somehow home in on any sequence of DNA. No one knows how. “We'd love to figure that out,” Doudna says. And no one knows how it acquires the “spacer” sequences, the genetic information between the palindromes. That would be the secret to how CRISPR works as an immune system in bacteria, and for now it's a mystery.

As the excitement around CRISPR has continued to grow, no one seems more surprised than Doudna herself. “I was working away in my lab on a bacterial immune system. Genome engineering wasn't on my radar,” she says. “If you had asked me in 2007 if the CRISPR system was going to be useful, I don't know what I would have answered.” Today, though, Doudna is a little more sure: If it continues to work as we expect, it's going to change everything.

**EDITOR'S NOTE:** In November, Doudna and Charpentier were awarded the 2015 Breakthrough Prize for Life Sciences, each receiving a stipend of \$3 million. Their discovery was also featured as one of 10 “World Changing Ideas” on the cover of *Scientific American*.

IN A CITY BESEIGED BY SIX MILLION MOTOR VEHICLES, HOW DO YOU BRING ABOUT CHANGE? DAVID WANG '09 BELIEVES IT MIGHT BE ONE BAMBOO BICYCLE AT A TIME.

Story by Zoe Alsop / Photos by Go Takayama

# BAMBOO BICYCLES BEIJING

In a narrow alley between the twelve-lane roar of Beijing's second ring road and the touristy mayhem of the Drum and Bell towers is a whitewashed shoebox of a space that is more an extension of the little concrete stoop out front than an actual room. There, on a late-summer Saturday this year, four early risers stand peering at a matter-of-fact list of instructions jotted on a white board. Sweet odors of epoxy and sawdust mask the gritty, metallic smell of the smog blanketing the city. ▶

Knobby sticks of bamboo are lined up on four workbenches. A diagram of a bicycle frame is posted on the wall above each bench. In a day's time these sticks will be frames and, in a few days more, they will be rolling off down the street with their builders on board.

At the moment, though, the diagrams look like a dare.

Here at Bamboo Bicycles Beijing's ninth and last bicycle-building workshop of the year, David Chin-Fei Wang '09, compact and boyish at 28, moves calmly among the participants, taking up a saw and guiding its teeth into a bamboo tube, adjusting a vise or murmuring encouragement to someone who has improvised a solution to a tricky cut. The industrious humility of the scene belies the seriousness of the issue Wang hopes to address: the smog-belching, land-devouring, atomizing urban gridlock that besets cities across Asia as newly wealthy societies embrace the private automobile.

In Beijing, a city once famous for its bicycles, car worship is powerful. Tree-lined bike paths have been leveled to accommodate the city's six million vehicles. An ever-expanding network of ring roads radiates deeper and deeper into the countryside, and car exhaust accounts for a quarter of the city's infamous smog. All of this brings little joy to drivers. Though China has become the number one consumer of some of the world's fastest cars—Lamborghinis, Porsches and Ferraris abound—traffic creeps along at an average speed of under 10 miles per hour.

Wang hopes that, by helping people make fine bikes by hand he can get them to think differently about the way they move around the city.

"It's not about getting rid of cars," says Wang. "It's about starting a conversation about a more diverse mobility culture."

**After graduating from Pomona** with a degree in Asian Studies, Wang won a Fulbright to study physical fitness programs and nationalism in China, where Mao Zedong once prescribed a regimen of exercises, saying, "The body is the capital of the revolution." After spending time at Xi'an Jiatong University, though, he found what the students did in their free time more interesting than the program of study.

Moving to Beijing, he took a job with China Youthology, a market research company set up to help brands like Mercedes, Pepsi Co. and Nokia understand how Chinese kids in their teens and twenties make decisions.

As Wang settled in Beijing, he started noticing the old bicycles abandoned around the city, sometimes in heaps and sometimes tethered alone to a fence or tree. It seemed like a waste. Scouring the sidewalks for something he could refurbish, he decided on a Yongjiu brand cruiser from the 1980s.

In his living room he cleaned and stripped the old frame, tinkering with components until everything was back in working order. He painted the bike Fanta orange, added some tiger stripes and set it atop white tires.

Wherever the tiger bike went, it drew curious onlookers. Though China produces more goods than any other country, making stuff by hand is not a pastime for the urban elite. A new middle class has so thoroughly rejected handicraft that even the building of IKEA furniture is mostly outsourced. So Beijingers

were uncertain what to make of something so humble made with such obvious care.

Wang, however, wasn't satisfied. In a country where mining and refinement of metals has tainted rivers, soil and air, he wanted to work with something friendlier to the environment. So naturally, he thought of a resource that China has in great abundance—something beautiful and rapidly renewable, a species of grass that can grow as much as 35 inches in a day, producing a material pliant enough to act as a natural shock absorber, yet durable and stiff enough to handle well.

He thought of bamboo.

The idea of building bicycle frames out of bamboo isn't new. The first bamboo bicycles were a sensation at the London Stanley Show of 1894, and there are several companies manufacturing and selling them today. In China, a small start-up called Shanghai Bamboo Bicycles has been marketing bamboo bikes and trikes since 2009. But Wang wasn't interested in selling bamboo bikes—he just wanted to build one.

So he ordered a few lengths of bamboo on Taobao, China's vaster version of eBay, and set to work figuring out how to make them into a frame. Cobbling together information from the web, Wang worked in the living room of the apartment he shared with friends until he had his first completed bamboo bike.

If his tiger bike attracted attention, the bamboo bike was a showstopper. "People were always stopping me to ask about the bike," he says. Wang enjoyed the resulting conversations with people from all walks of life, from stolid middle-class citizens to fashion-conscious kids, and in their curiosity, he sensed an opportunity to make a difference.

During his research on the web, he had stumbled onto a number of bike-building workshops in places ranging from Africa to Australia. Maybe, he thought, a workshop to teach people in Beijing to build their own bamboo bikes would deepen the impromptu conversations he was having in the street and create a cascade of conversations about the sustainability of China's growing car culture.

But first, he had to scale up.

He streamlined his building process and equipment so that four participants could be fairly certain to produce a bamboo frame in just two days. Then, to get a better understanding of his new medium, he traveled to Taiwan, where some of the best bamboo craftsmen taught him which bamboo was best suited for bicycles and how to work with it. Through a Kickstarter campaign, he raised \$17,869. A campaign on China's Dreamore crowdsourcing platform brought in another \$3,000, and Bamboo Bicycles Beijing was born.

**"I am your typical** victim of a Chinese education," laughs Danna Zhu as she works on her bicycle frame. "There are so many of us. They don't let us make anything in school." Posing with a bandsaw poised above a tube of bamboo, she asks the gangly bespectacled college dropout at the next station to take her picture. She's never used a saw before.

At 23, Danna is part of a post-1990 generation of Chinese women widely chastised for their materialism. Back in 2010, when a contestant on a reality TV show told a young bachelor



Nine-year-old Fei Fei with his bamboo bike

she would "rather cry in the back of a BMW" than take a ride on the back of his bicycle, government regulators ordered reality shows to rein in the broadcast of "incorrect social and love values such as money worship."

But a car, like a house, remains a prerequisite for many brides and their families.

"They'll still want cars," Zhu says of her friends.

Ragtag kids from the hutong—the narrow lane outside—skitter about her as she works, steadying a bamboo tube while she saws or pilfering bamboo scraps to paint on the steps, where an old woman driving a tricycle cart loaded with soda stops to banter. Another grandma pauses on her way from the wet market to give a thumbs up.

The kids seem to appreciate the workshop more than anyone.

Against one wall is propped a small bike. The kids built it themselves. For days before the September workshop, they have been coming by, clamoring to know whether Wang has finished adding components like wheels and a seat. On the first day of the workshop, Fei Fei, 9, finds the bike ready at last. Quietly he lifts it out onto the street, pedaling a tentative few yards before disappearing around the corner.

Twice in the course of a few hours, people stop to compliment the bikes and ask how much they cost. When a grizzled man towing recycling on his tricycle cart repeats the query a third time, Wang, visibly piqued, says again that the bicycles are not for sale.

"They think it's just about selling a bike and it's not." What it is about, as he often repeats, is starting a conversation.

**It's fall 2014**, and Wang is planning an October trip to Massachusetts, with several frames for supporters of his Kickstarter campaign stashed in his luggage. The project is at a turning point—the goal he had set for himself and online funders had been to build 25 bikes. He has doubled that and is on target to make 75 by the end of the year. All of this is good but he wonders how he might further the conversation, perhaps tapping into the kind of enthusiasm he'd seen in the kids on the lane.

He's looking into partnering with local schools. At the same time, he's searching for ways to make more and better bikes in as sustainable a way as possible, tracking down villages with abundant bamboo, looking for alternatives to epoxy, and working on kits for people to make bikes at home.

The frames themselves are slowly morphing—he made his first women's and kid's prototypes in late summer. Participants have egged him on with requests for things like cup-holders, children's seats and multi-gear models.

"Right now I'm just concentrating on making the next bike," Wang says. "I'll follow my curiosity and hope it just grows."

Recently, Mercedes, an old client of his, got in touch.

"Benz is doing a lot to create more efficient and sustainable urban mobility," he says. "It's to their credit. They see the way things are isn't sustainable."

Back on the lane, an old, flat-faced Liberation truck filled with sand for construction has blocked the T-junction. While a bleating line of cars and jerry-rigged motorized tricycle trucks forms along the cross road, an antlike stream of pedestrians and scooters improvise a path through a pile of sand. It's along this path that two bamboo bicycles slip quietly northward, leaving a Lexus SUV in the dust.

A photograph of an elderly man, Dick Post '40, smiling and standing in the center of a large, circular, metallic tunnel. The tunnel is composed of many vertical metal rods and has a complex, industrial appearance. The lighting is dramatic, with the man's face and shirt clearly visible against the darker background of the tunnel.

Dick Post '40 has had an amazingly productive life in science, and at age 96, he's still going strong.

# MAKING **IDEAS** HAPPEN

Story by Justin Gerdes / Photos by Robert Durell

**R**

emember the U.S. Army commercials from the 1980s? A voice intones: “We do more before 9 a.m. than most people do all day.” If *Mad Men’s* Don Draper were to coin a catchphrase for Dick Post, it would read: “He’s made more discoveries after age 90 than most scientists do in their careers.”

For more than six decades, Richard F. Post ’40 has dedicated his life to solving energy challenges. “My whole career has been shaped by energy,” he says. An applied physicist at Lawrence Livermore National Laboratory (LLNL), Post has 34 patents to his name—nine issued since he turned 90—in nuclear fusion, magnetics and flywheel energy storage.

Post, who turned 96 in November, maintains a work schedule that would exhaust a man a quarter of his age. Retired since 1994 and officially known as a “rehired retired scientist,” Post clocks 30 hours at the lab each week. Until a fall last year injured his shoulder, he was driving himself the 60-mile round trip from his home four days each week to LLNL. “You know why he takes the fifth day off?” asks Steve Wampler, a public information officer at LLNL. “Because he’s retired.”

Post may take a day off at the lab, but that doesn’t mean he stops working. “Friday through Sunday are not always days off for Dick,” says Post’s colleague Robert Yamamoto, principal Investigator for LLNL’s electromechanical battery program. “When Dick comes to work at LLNL on Monday morning, I can generally expect to get a call from him. Dick will want to chat about his latest ideas and thoughts he has developed over the past 72 hours,” adds Yamamoto. The two often meet for lunch on Mondays in Dick’s office. “Dick wants to know if his ideas are practical and have some ‘real meat on the bones.’”

“I learn so much, and am equally amazed at the quality of the new ideas Dick has and his extreme enthusiasm for his ideas—as if he was a person just starting off in his science career,” he says.

### Pomona Roots

Post’s family connections with Pomona College go back more than 100 years. His grandfather, Daniel H. Colcord, was professor of classics, and his mother, Miriam Colcord, graduated in 1910. Post credits Pomona College with helping him discover both his life’s work and the love of his life.

In Professor of Physics Roland R. Tileston he found both an academic mentor and a life mentor. “He not only looked after my academic side; he looked after my social side,” Post says. “He would call me in on Monday morning and say, ‘There was a dance on Saturday. Did you go to it? Did you take a different girl?’”

Tileston took special care to ensure that promising students had the financial means to undertake graduate studies. “In my case, for financial reasons, he kept me on for a year as a graduate assistant—700 bucks, saved half of it. And then, in 1941, he started me as an instructor in physics because he had arranged for a fellowship for me at MIT.”

Then came Pearl Harbor. Tileston immediately recommended Post for a position at the Naval Research Laboratory near Washington, D.C., where a former student of Tileston’s, Dr. John Ide, was director of the sonar program. “When I left, I flew from Los Angeles airport and he brought the whole physics class to see me off,” recalls Post. “He was a marvelous professor, and I owe him a tremendous debt.”

It was while he was living in Virginia that a friend and fellow alumnus, Vince Peterson ’43, heard that some Pomona College girls were in town and decided to throw a party. “Marylee [Marylee Armstrong ’47] and her friends came,” Post recalls, “and it was 15 minutes before I knew that this is the one I wanted to spend my life with.”

### From Fusion to Flywheels

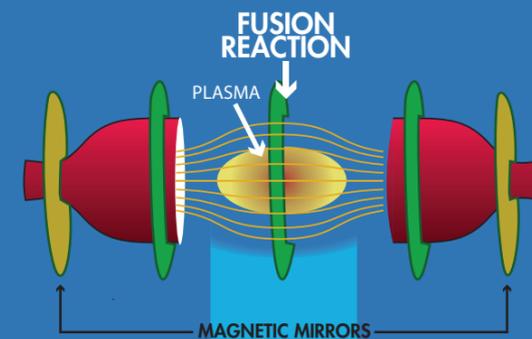
It was nuclear fusion that brought Dick Post to Lawrence Livermore National Laboratory in 1952. Following his completion of a doctorate in physics at Stanford and a brief stint at nearby Lawrence Berkeley National Laboratory, Post had heard Herb York, the first director of LLNL, deliver some lectures on the topic. Post later followed York to LLNL, interviewing for the job with the lab’s co-founder and future director, Edward Teller, known as the father of the hydrogen bomb. Magnetic nuclear fusion would be the focus of Post’s research until the mid-1980s.

Convinced of the promise of the technology, Post regards the premature termination of his line of fusion research, in an act of Cold War politics, a regrettable mistake. “The fuel reserve for fusion is infinite. There’s no long-term radioactive problems, no

## The Iterative Innovations of Richard Post

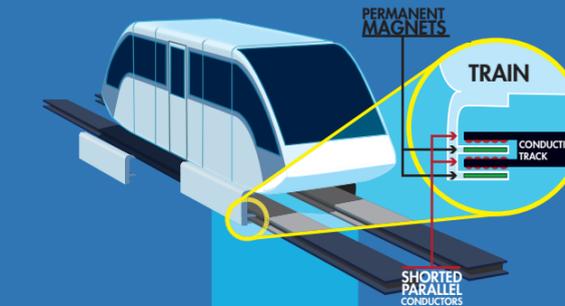
1950s

### MAGNETIC MIRROR FUSION



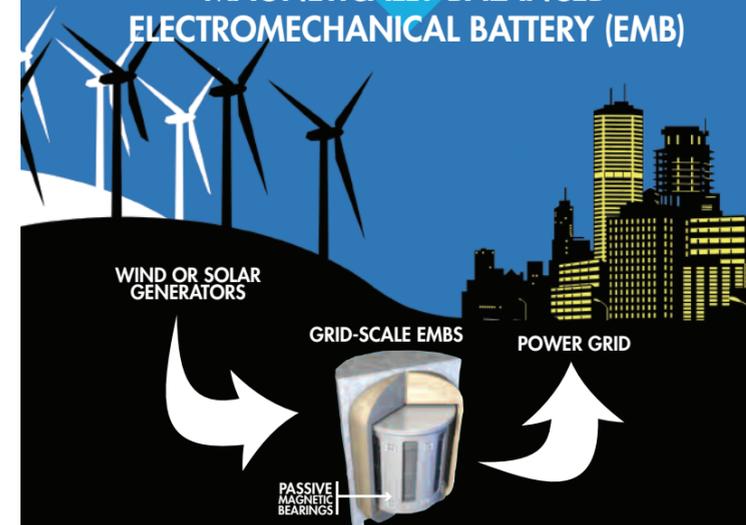
1980s

### MAGNETIC LEVITATION (MAGLEV) TRAINS



2010s

### MAGNETICALLY BALANCED ELECTROMECHANICAL BATTERY (EMB)



carbon. That’s why I devoted most of my career to fusion research—until the budget was cut in a deal between Reagan and Gorbachev,” he says. LLNL was forced to phase out its magnetic fusion program, and Post had to shift his attention to other fields. But, in what would become a hallmark of his career, Post was able to apply lessons learned from his research in nuclear fusion to a seemingly unrelated area: magnetically levitated trains.

With seed money dispensed under a competitive grant program run by the LLNL director, Post was awarded a couple of million dollars to develop a concept for maglev train technology. The concept, Inductrack, was later licensed by the San Diego-based defense contractor General Atomics and, in 2004, a 120-meter test track was built.

“It involves a special array of permanent magnets mounted underneath the train and a track, which consists of shorted parallel conductors. The levitation only requires motion. The test model levitates at walking speeds. The Japanese superconducting train has to be over 100 miles per hour before it levitates,” says Post.

“Why is this important?” he asks. “Because if all power fails, this train doesn’t give a darn. It slows down to walking speeds and settles down onto its wheels. It’s a totally fail-safe system. That’s going to be a very important characteristic of future maglevs—they’d better be fail-safe.”

Plans to build a 4.6-mile, full-scale demonstration system on the campus of California University of Pennsylvania were put on hold when the Great Recession hit in 2008. Post says Inductrack technology has been licensed to two other companies—he couldn’t give their names.

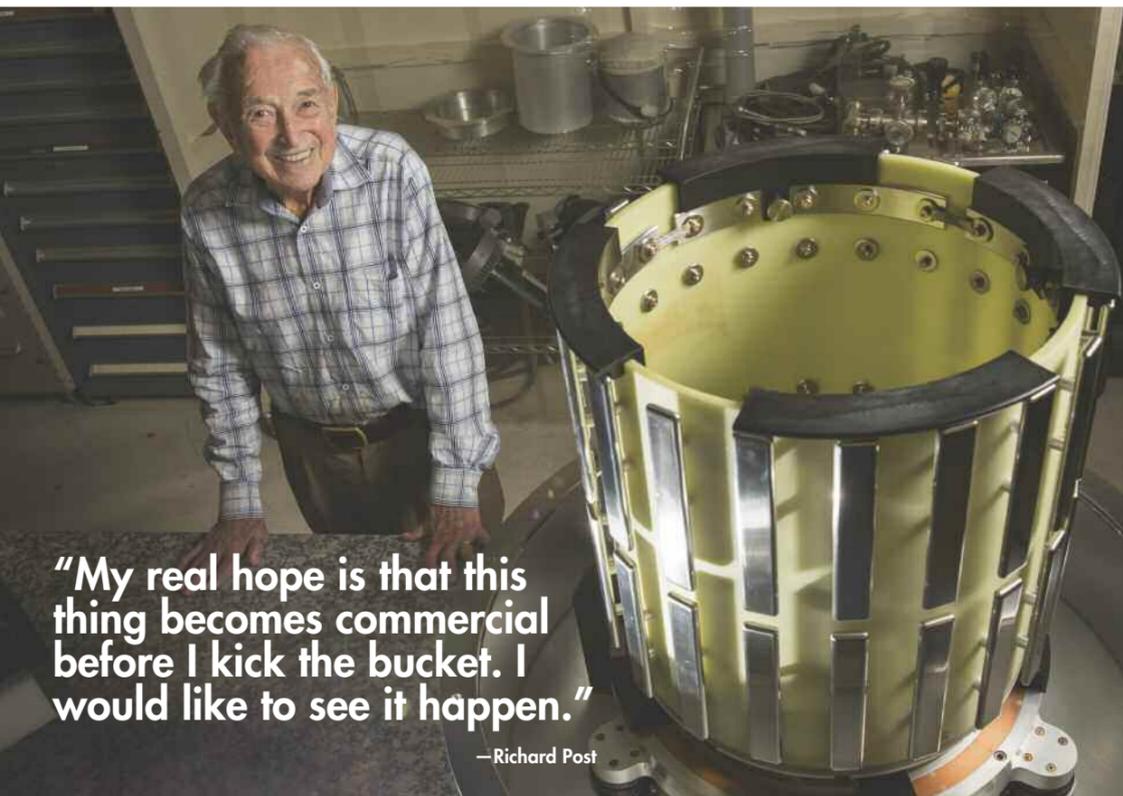
In another case of iterative innovation, Post is leveraging knowledge gained from the development of Inductrack to his latest—and likely last—research focus: flywheel energy storage. Post’s thinking on the topic has had a long gestation. In December 1973, Post and his son Stephen published an article in *Scientific American* making the case that advances in materials and mechanical design made it possible to use flywheels to store energy in the power sector and in the propulsion systems of vehicles.

Forty years later, Post believes he might actually see his concept hit the market within a few years.

The principle of the flywheel is quite simple. A spinning wheel stores mechanical energy; energy can be either put in or taken out of the device. Post’s flywheel research builds upon work done in the 1950s by MIT researcher John G. Trump on electrostatic generators. “He didn’t appreciate the importance of the charging circuit that charges this thing and puts the voltage on it. He used a resistor,” Post says. When Post started work on electrostatic generators for flywheels, he asked himself a question: “‘Why the heck did Trump use a resistor? Why didn’t he use an inductor, to reduce losses?’” Post experimented on his computer, inserting an inductor value for the resistor. “All of a sudden, the power took off by almost a factor of 100,” he says. ▶

Many flywheel manufacturers use what are called active magnetic bearings to suspend and stabilize the flywheel—not Post. “What we have developed over many years now,” he says, “is what is called *passive* magnetic bearings, which are self-stabilizing and don’t require any feedback circuits. They are extremely simple compared to the active bearings, much less expensive, and don’t require any maintenance.”

“If we design it right,” he adds, “it has an almost indefinite lifetime because there are no wearing parts.” This is in contrast to, say, the lithium-ion batteries used in smart phones, laptops, and electric vehicles, which have a limited life cycle of charges and discharges before they must be replaced. Because Post’s flywheel operates essentially friction free, energy dissipation is very low. The flywheel operates at 95% to 98% efficiency—that is, up to 98% of the energy stored in the flywheel can be extracted and put to use.



**“My real hope is that this thing becomes commercial before I kick the bucket. I would like to see it happen.”**

—Richard Post

Post envisions the technology used in large- and small-scale applications. Grid-scale units would be deployed by utilities or grid operators to help balance the variable output from large solar and wind power plants. A 5-kilowatt residential unit would be about the size of a suitcase, says Post, with the flywheel sealed in a vacuum chamber, perhaps under the floor of the garage.

Post says a company is interested in adapting his flywheel technology for use in cars. The idea is not new. Flywheels are already used by Formula 1 racing cars to supply quick bursts of power. For the consumer market, manufacturers would install a series of small flywheels that would, in all-electric vehicles like the

Nissan Leaf or Tesla Model S, replace a battery pack entirely; for hybrids like the Toyota Prius, flywheels would replace the small battery pack that boosts efficiency.

“We could substantially extend the range and eliminate the fire hazard posed by lithium-ion battery technology, and avoid the battery life cycle problem,” says Post.

### Making it Happen

“If I have seen further, it is by standing on the shoulders of giants,” said Sir Isaac Newton. If so, the spry Dick Post must be a contortionist, because one set of shoulders he is standing on is his own.

He says one reason he has been so productive for so long, especially after age 90, is that his recent patents build upon earlier discoveries. He is using magnetic bearings work from Inductrack, for instance, in his current flywheel research. “Even though it’s a totally different field, it’s the same concept,” he says. “One of the reasons that I can still file patents is I can draw on past experience and convert it to a present problem.” He has filed 28 of his 85 records of invention, a precursor to a patent, since he turned 90.

Asked where his ideas come from, Post mentions that he recently read a book about the inventor Nikola Tesla. “He was able to visualize, without hardware, his inventions. That’s part of the process for me. When I go to sleep, I think: The magnets could go this way.” Post also credits software invented decades after his career began. “The tremendous help to me in this whole process is I learned how to use Mathematica, which is a very sophisticated computer mathematics program. I couldn’t live without it.”

For Post, the labors of his theorizing mean nothing if the result cannot be used to solve a problem in the real world. “Dick certainly is an ‘idea’ man,” says colleague Robert Yamamoto, “but he truly understands the need to do the real engineering to make an idea come to fruition. He

knows that theory alone can only take you so far, and that an idea, unless demonstrated completely, is not worth much. He sincerely understands the real-world, make-it-happen aspect that engineering brings to the table. This is not a common trait of many of the scientists I have worked with.”

Asked what drives him to come to the office four days a week, Post answers without hesitation: “The flywheel. I want to see this happen! I’ve devoted my career to energy. For Pete’s sake, we were torpedoed on fusion, which I think was a terrible mistake.

“My real hope is that this thing becomes commercial before I kick the bucket. I would like to see it happen.”



### The Human Side of Research

Bukusu villagers near Bungoma, Kenya, sing and dance around a circumcision candidate during an all-night coming-of-age celebration. Professor Michael Diercks, who has been conducting research on four little-known languages in the area, was invited to share in this tradition, which has been practiced for hundreds of years. —STORY ON PAGE 36

# Rite of Passage

Story and Photos by Kris Dreessen



Such intimate sharing and insight into Luhya language-speaking communities is the result of a multi-year collaborative international research project, of which Diercks is a principal investigator. A team of seven American linguists are studying four small Kenyan languages—Bukusu, Wanga, Llogoori and Tiriki.

The team is supported by several grants, including a prestigious \$477,000 National Science Foundation grant. Much of Diercks' work so far was made possible by the Hirsch Research Initiation Grant from Pomona College. The team includes Pomona Linguistics and Cognitive Science Chair and Professor Mary Paster and Pomona linguistics students, as well as researchers at Ohio State University, Southern Illinois University, the University of Maryland and the University of Missouri.

While there are more than 1.6 million speakers of the four Luhya languages, they are at risk, says Diercks, as everyday life changes to a less forested area and young people move toward English and Swahili for economic advantage. One example is the circumcision itself. More families are choosing hospital circumcision over the traditional way.

"As the community changes, so does the language, and what isn't preserved may be lost," says Diercks.

**"Hamba mutalia. Haaaaa woyeee.**

Hamba mutalia."

Young Humphrey walks into the center of the crowd before his traditional mud-covered home. The metal jingles on the leather strips on his wrist, making a bright snap in the air.

Surrounded by their voices, chanting softly and clapping, he leads the procession, draped in the skin and testicles of a bull sacrificed to mark this momentous change. They make a clearing for him. He stops silent before an elder, who carefully lifts off the skin. More than 100 of the boy's family, friends and fellow villagers envelope him with whoops of joy and dance.

The next phase of his coming-of-age ceremony has begun.

The ground vibrates as they lift their hands to the sky and dance. "Hamba mutalia ... Haaaaa woyeee..."

Michael Diercks, assistant professor of linguistics and cognitive science at Pomona, smiles, watching the circle of bodies sway and jump. In an instant, many people reach out and pull him into the fray.

They will celebrate throughout the night, encouraging 12-year-old Humphrey to have courage for morning, when he will go with them to the river to be covered in mud, and run home for the circumcision ritual to become a man.

It is one of the most important events in Bukusu life—a rite of passage that few outsiders ever see. Humphrey's parents trusted Diercks to share the event, and want to preserve it for future generations.

"I feel like I know more about the world than I did 24 hours ago," says Diercks in the morning. "We were experiencing something ancient, right in the present, through their rituals and dancing and singing, that are the same things they have been practicing for ages, perhaps even hundreds of years. It was as if we were transported back in time. When you looked up in the sky in the middle of the night, it could have been 100 years ago."



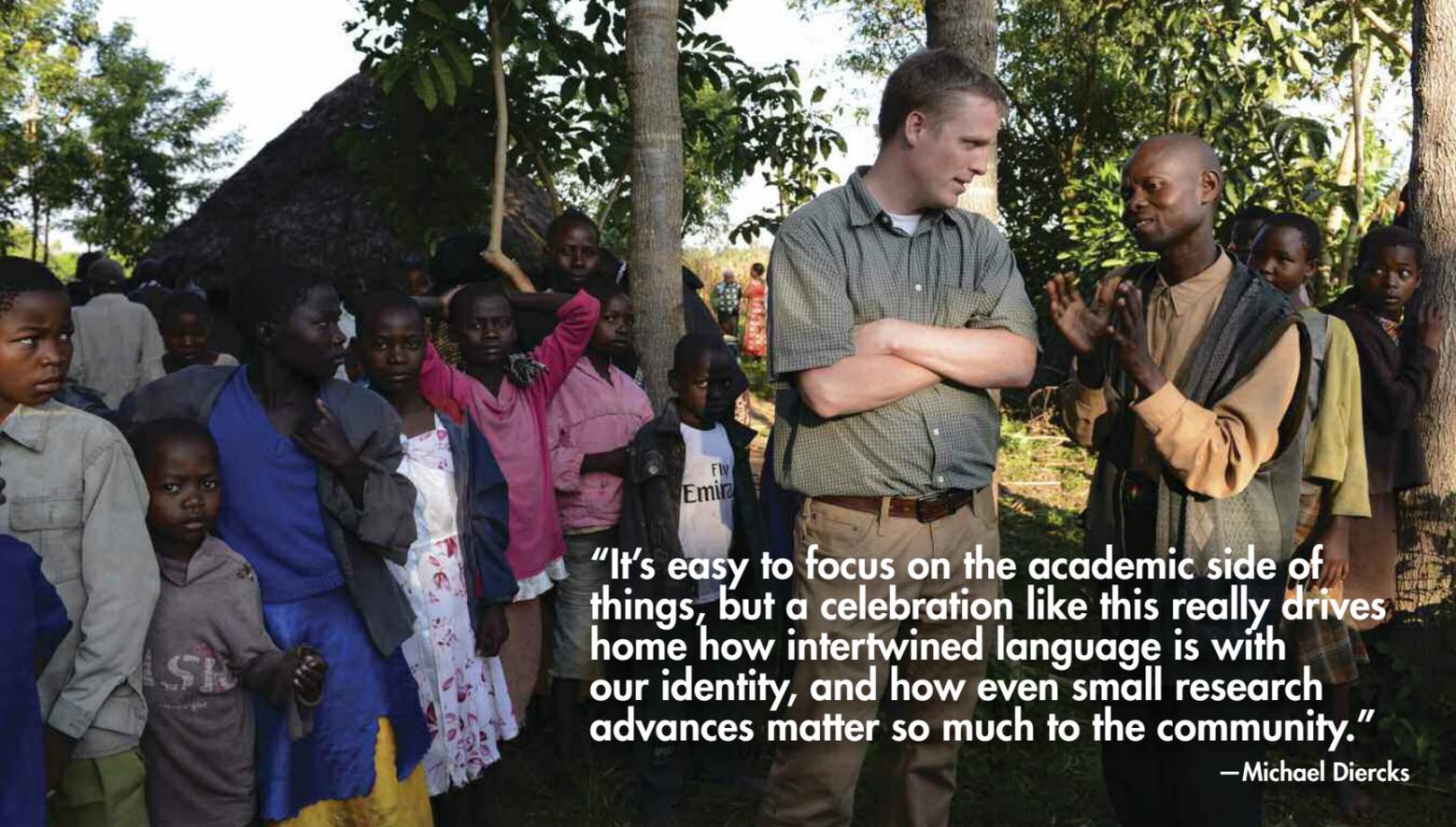
**IN THE MOST** comprehensive study of each of these languages to date, the team is collecting audio recordings from Luhya speakers and analyzing tone, sentence structure and other characteristics to describe how the language works. They are also collecting folk tales, narratives, songs and many other kinds of oral literature that document language use and aspects of each culture, as well as creating dictionaries for each language. Their research will be available in open-access venues for other scholars, and for Kenyans to learn about their languages.

"In the end, we are producing description and analysis of these languages that will be theoretically relevant and useful to furthering our knowledge of how human languages work," says Diercks, "but also producing work that will be valuable to communities, whether for its role in preserving aspects of their language and culture, or in providing resources that will be useful in educational contexts, like adult and child literacy."

So far, the team has collected and begun to analyze more than 100 hours of audio samples by Luhya speakers. Diercks, and phonologist and co-primary investigator Michael Marlo, from the University of Missouri English Department, have spent a lot of time in Kenya fostering the close-knit relationships needed to gain trust and access to different communities.

Diercks has been to Kenya many times. Earlier this year, he spent several months with a Tiriki family, gathering interviews and training Kenyan research assistants Kelvin Alulu and linguist Maurice Sifuna to collect interviews year-round. ▶

**Bottom:** Professor Michael Diercks participates in a Bukusu circumcision ceremony with friends, relatives and neighbors of young Humphrey Barasa. The family invited Diercks to witness the event to help preserve their traditions. **Top right:** Smeared with the stomach contents of a bull to help give him courage as he goes from boy to man, Humphrey prepares for the final stages of his rite of passage. **Top left:** The Luhya-speaking region of Kenya, marked in red.



**"It's easy to focus on the academic side of things, but a celebration like this really drives home how intertwined language is with our identity, and how even small research advances matter so much to the community."**

—Michael Diercks

Back in California, the students in Paster and Diercks' Field Methods of Linguistics course are at the center of Luhya work.

"The field methods class is a great opportunity for students to apply their knowledge of linguistic theory to real languages, which are much messier and more interesting than the data sets they see in theory courses," says Paster. "We try to find speakers of lesser-known languages so that students have an opportunity to break new ground and publish their findings. Our students this year are doing professional-quality research and writing that will be the basis for all of our future work on Llogoori."

"I've been able to have so many experiences that I would not have had at another university," says aspiring linguist Alex Samuels '15. "Professors need research assistants. At other places, it would be graduate students doing the work I'm doing. Here, it gets to be me, which is awesome."

As a Summer Undergraduate Research Program scholar, Samuels also spent the summer researching aspects of Llogoori with Paster. Since there is no published grammar of Llogoori, Samuels' final paper from the previous semester is this fall's required reading in the advanced fields methods class. "I was really proud," he says.

**WHAT LUHYA SPEAKERS** choose to share is a mixed bag. Linet Kebeya Mmbone spoke about hardships after losing her husband, and raising her children as a single mother without skills. Mungambwe talked about Llogoori history. Retired police officer Benjamin Egadwe spoke about how men used to have several wives, and changes in community since Christianity arrived.

Ultimately, the stories will be shared with community members, along with images and stories generated by a volunteer

photojournalist who spent several weeks in Kenya last summer. Together, they help to create an intimate portrait of the communities in which the linguistic team works; a snapshot of who they are and what's important to them. Back at Pomona, the photographs and portraits are connections to the stories and texts students study, 9,500 miles away.

This summer, Diercks was able to see the pride Benjamin and other Llogoori speakers have in their culture and in the language project, when Alulu organized a celebration of progress so far.

They took motorbike taxis over windy dirt paths through the forest to their village. When they arrived, Mugangwe, Egadwe, and a dozen others ran out to meet them, dressed in their finest suits and traditional kanga cloths, and singing traditional greeting songs. They had walked hours into town for a goat, which they slaughtered for the feast.

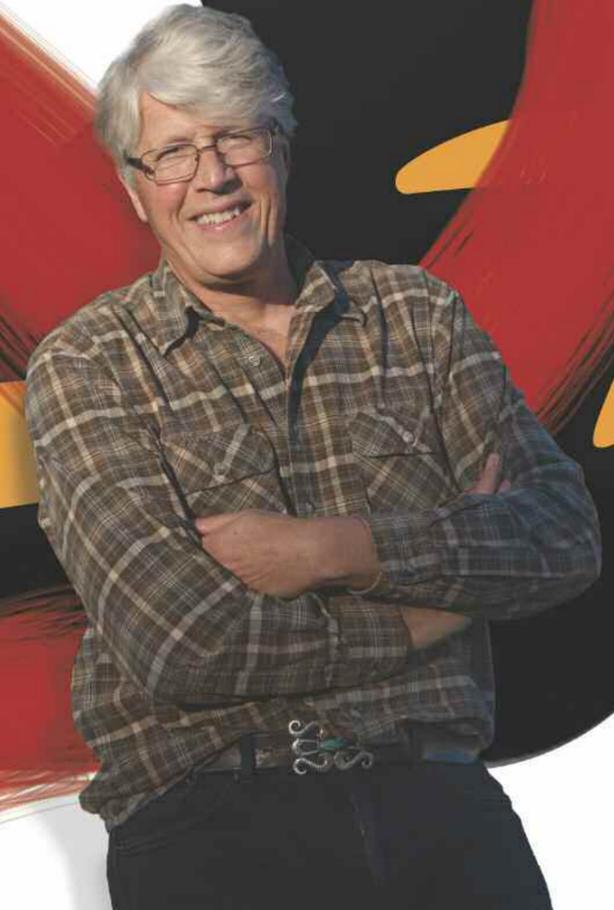
"This was a big moment for me," says Diercks. "We spend so much of our time with individual people and then holed up analyzing the language, we don't always get to see the whole community come together and celebrate research progress. It's easy to focus on the academic side of things, but a celebration like this really drives home how intertwined language is with our identity, and how even small research advances matter so much to the community."

At the celebration, Diercks also got a taste of what the project means to the Luhya speakers who have the opportunity to share. "This is how we teach our current children about how the Llogoori used to live," says Egadwe. "Children have new customs. We feel it is good to teach them this way. Most of the old people do not remain. We are now the old people, telling our ways. This is a way to preserve our culture. We are taking good care of it."

/book.shelf/ Douglas Preston '78 takes on the Goliath of books.

## Preston Versus Amazon

By Adam Conner-Simons '08



**T**he words that galvanized a thousand authors to speak out against a powerful corporate retailer were written along a dirt road, in an 8-by-10 shack, by a wispy-haired, self-described "wimp."

This past year Amazon spent many months in testy negotiations with Hachette, the fourth-largest book publisher in the U.S. When no agreement had been reached by May, Amazon began delaying shipment of Hachette books, shutting down pre-orders, and even removing the publisher's titles from its all-important recommendation algorithms.

Such gestures aren't trivial—when the entity responsible for selling 40 percent of America's printed books makes yours difficult to buy, sales drop.

Sitting here on the deck of his spacious summer house over-

looking Maine's pristine Muscongus Bay, thriller writer Douglas Preston '78 clearly isn't worried for his own livelihood. He's published more than a dozen best-sellers and cultivated a devout following that will find him with or without Amazon.

But what keeps him up at night—and what spurred him to write 500 words that put his name in the headlines and a sizable thorn in Amazon's side—is thinking about all the young authors that he says have been "held hostage in the middle of a back-room deal between two big corporations."

In June, Preston penned an informal letter about Amazon's actions, with the idea that a few writers might co-sign. After famous friends like Stephen King and Nora Roberts started spreading the word, the letter went viral, and within a matter of days more than 900 of his peers had gotten on-board and joined ▶

the group that Preston had dubbed “Authors United.”

It wasn’t a completely united front—a vocal contingent of self-published authors posted lengthy screeds online calling him a “one-percenter,” a “pinhead” and worse, while Amazon reps dismissed him in the press as “entitled” and “an opportunist.” When Amazon found out that he planned to publish his letter as a full-page ad in *The New York Times*, the company’s head of e-books tracked down his phone number and called to issue veiled threats and try to stop him.

Preston shrugs when he reflects on how the situation escalated and how he, improbably, became the face behind a movement that he never set out to lead.

“I’ve never been much of an activist about these things,” he says. “But [Amazon’s tactics] felt like an act of betrayal. We writers helped a struggling start-up become one of the world’s largest companies, and this is how they repay us?”

**Amazon’s path to global dominance** hasn’t come without making some enemies. CEO Jeff Bezos has internally referred to his team’s business strategy as “the Gazelle Project,” in that Amazon approaches publishers “the way a cheetah would pursue a sickly gazelle.”

The Hachette dispute is far from Amazon’s first: in 2010 it deleted the “buy” option for all MacMillan books, which quickly forced the publisher to cave in during negotiations. The company often paints publishing houses as middlemen and gatekeepers—relics from another era whose skills at distribution and publicity have been rendered moot by instant downloads and viral word-of-mouth.

Many self-published authors agree. Sci-fi writer Hugh Howey has collected more than 8,000 signatures for a Change.org petition arguing that companies like Hachette are “resisting technology” rather than adapting to the changing times.

Preston, naturally, begs to differ. He sees publishers as vital curators, editors and investors, and believes that the biggest challenge for Authors United is, ironically enough, telling the right stories.

Here’s his: it’s 1978, and he’s a fresh-faced college grad creating communications content for the American Museum of Natural History. The job pays peanuts but lets him explore all of the museum’s hidden treasures, from majestic butterfly exhibits to a hair-raising “dinosaur graveyard” in the basement.

A few years into the gig, he gives a tour to an editor named Lincoln Child, who suggests that he pull his anecdotes into a book.

While novels can often be cobbled together on nights and weekends, Preston’s journalistic writing would require some heavy daytime reporting. As a first-time author, Preston isn’t in a position to drop everything to write, but his publisher St. Martin’s Press gives him an advance of \$7,200 that lets him take six months off from his job.

“Without that cash, there’d be no first book and I might not even be doing this for a living right now,” he says.

The experience made Preston recognize the importance of publishers as venture capitalists for ideas—a tradition that, in a sense, extends back to the Renaissance, when royal families like the Medicis funded artwork by Michelangelo and Sandro Botticelli.

“These publishers supported me when I was unknown and believed in me enough to keep releasing my books even when the first few didn’t sell,” says Preston, who’s been with Hachette for 20 years. “What’s lost in the narrative is that, if authors couldn’t get advances, an awful lot of extremely important books wouldn’t get written.”

**As with most business disputes**, Amazon and Hachette’s boils down to dollar signs. Their main disagreement has revolved around e-books, which now make up almost a third of the market. Currently 30 percent of each e-book’s revenues go to Amazon, and 70 percent go to Hachette, which then carves out a cut for the author (usually 10 to 15 percent). While nobody knows exactly what was happening behind closed doors during negotiations, Amazon was reportedly pressing for 50 percent of revenues.

What’s also at stake are e-book prices themselves. Amazon has famously been selling many e-books at a loss, and says that prices above \$9.99 hurt overall sales. Hachette, meanwhile, has been reluctant to set a precedent for lower prices that might cannibalize hardcover sales.

Preston says he has no particular problems with \$10 e-books, but at the same time is flummoxed by the animosity leveled at authors whose books are being sold for a few dollars more.

“Some people have said e-books should be cheaper because they’re ‘just words,’ but then why isn’t anybody out picketing the makers of ‘Grand Theft Auto’ for charging \$65 for a video game that’s ‘just electrons?’” he asks. “It devalues all the work that goes into the creative process. Is every book really worth just \$9.99 to you?”

Amazon has likened e-books to paperbacks, another technological advance that lowered literature’s costs but also allowed for its increased availability. Many authors would counter that the Amazon-driven trend toward lower and lower e-book prices threatens the long-term viability of the entire profession.

“Amazon is doing the same thing Spotify is doing—treating creative content as though it were a commodity, like a TV set or a vacuum,” Preston says. “They’ve spurred a massive price devaluation of books that’s caused consumers to expect artificially low prices—and the net result is that it’s now exceedingly difficult for young authors to make a living.”

**It’s not just first-time authors** who’ve felt the pinch, which is why many authors were wary about signing a letter like Preston’s that would pit them against such a massive retail juggernaut. Novelist Lucy Ferriss ’75 was gung-ho about Authors United last summer, but as the publication date of her next book approached, she started reflecting on the wide reach of Amazon, which ▶

1986



**Dinosaurs in the Attic**, Preston’s first nonfiction book resulted from a chance meeting with editor Lincoln Child, with whom he would eventually co-author more than 20 thrillers.

1987

1988

1989

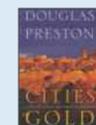
1990

1991

# A Douglas Preston Bibliography/Timeline

◆ Co-authored with Lincoln Child

1992

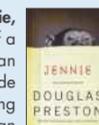


**Cities of Gold**, Preston’s second nonfiction book, tells the story of his thousand-mile trek on horseback to retrace the explorer Coronado’s search for the legendary Seven Cities of Gold.

1993

In his first novel, **Jennie**, Preston tells the story of a researcher who raises an orphaned chimp alongside his two children, blurring the line between human and ape in a bittersweet story at the intersection of science and love.

1994

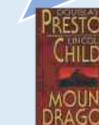


**Relic**, the debut collaboration between Preston and Lincoln Child about a monster in the halls of the New York Museum of Natural History, has been translated into more than a dozen languages and made into a feature film.

1995



1996



Set in a research facility in the New Mexico desert, **Mount Dragon**, Preston and Child’s second techno-thriller, combines bioengineering, virtual reality and serious questions of scientific ethics.

1997

1998



1998 saw two new novels from Preston and Child: **Reliquary**, a sequel to **Relic**, and **Riptide**, a thriller about a team of high-tech treasure-hunters trying to solve a deadly labyrinth in search of pirate gold.

1999



**Thunderhead** interweaves topics from Preston’s non-fiction work, including the Southwestern desert, archeology, and the “cities of gold,” in a cross between a treasure-hunt and a scientific thriller.

2000

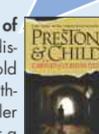


In **The Ice Limit**, meteorite hunters make their way to a desolate island on the rim of Antarctica to steal the largest meteorite ever found, only to find themselves enmeshed in the sinister mystery of its origin.

2001

In **The Cabinet of Curiosities**, the discovery of century-old victims of a 19th-century serial killer sets the stage for a fresh murder spree.

2002



**Still Life With Crows** sends series hero Aloysius Pendergast on a busman’s holiday in a deadly Kansas town. The year 2003 also saw **The Codex**, the first thriller Preston wrote without his co-author.

2003



2004



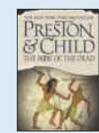
**Brimstone** tells the tale of Pendergast’s investigation of a fiendishly bizarre murder by fire.

2005



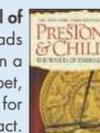
Framed for murder in **Dance of Death**, Pendergast goes on the run in search of his diabolical brother, Diogenes. **Tyrannosaur Canyon** focuses on a fossil holding a clue to the dinosaur extinction, plus a deadly secret.

2006



**The Wheel of Darkness** leads Pendergast on a pilgrimage to Tibet, then on a search for a rare artifact.

2007



In 2008 Preston published two books of his own, the techno-thriller **Blaspemy** and a nonfiction book titled **The Monster of Florence**, now being made into a movie.

2008



The FBI’s enigmatic special agent returns to New York in **Cemetery Dance** to investigate a murderous cult.

2009

2010



**Fever Dream** sends Pendergast on a quest to solve the riddle of his wife’s murder. **Impact** ties together seemingly disparate stories about gemstones, meteor impacts and gamma ray activity on Mars.

2011



**Gideon’s Sword** introduces a new series with a character on an impossible mission. **Cold Vengeance** follows Pendergast’s search for his wife’s murderer from the moors of Scotland to the bayous of Louisiana.

2012



**Gideon’s Corpse** sends Gideon Crew to track down a mysterious terrorist cell. **Two Graves** reminds Pendergast of the meaning of Confucius’s warning: “Before you embark on a journey of revenge, first dig two graves.”

2013



**White Fire** is set in a resort town with a secret past. To prevent the town’s destruction, Pendergast must solve a riddle from the 1800s.

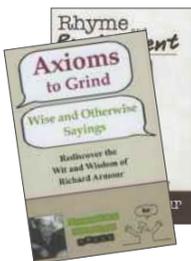
2014



While leading Writers United, Preston also found time to pen three new books, two with his co-author, Lincoln Child (**Lost Island** with Gideon Crew and **Blue Labyrinth** with Agent Pendergast), and one by himself, newly released as **The Kraken Project**.

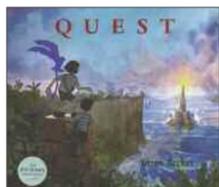
## Bookmarks

### Axioms to Grind & Rhyme and Punishment



These posthumously published tomes by Richard Armour '27 were edited by his son, Geoff Armour '63. *Axioms to Grind* includes 900 of Armour's famed aphorisms. *Rhyme and Punishment* is his autobiography. Phoenix Publishing Group 2012 / 225 pages / \$14.95  
Phoenix Publishing Group 2013 / 122 pages / \$14.95

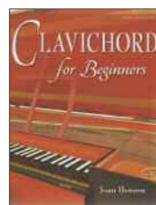
### Quest



In a visually stunning sequel to his Caldecott Honor-winning picture book *Journey*,

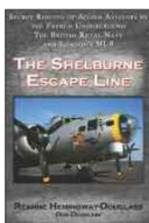
Aaron Becker '96 offers the second installment in an intended trilogy of brightly colored fantasy adventures without words. Candlewick 2014 / 40 pages / \$15.99

### Clavichord for Beginners



Joan Benson '46, a champion of the clavichord in the modern world, offers a method book for practitioners and enthusiasts alike, including a master class DVD and a CD of Benson performing. Indiana University Press 2014 / 144 pages / \$50.00

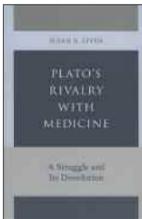
### The Shelburne Escape Line



Reanne Hemingway-Douglass '63 tells the little-known World War II story of an escape route that the French Resistance used to rescue Allied airmen shot down over France. Cave Art Press 2014 / 104 pages / \$18.95

### Plato's Rivalry with Medicine

*A Struggle and Its Dissolution*



Susan Levin '84, professor of philosophy at Smith College, examines the famous philosopher's evolving engagement with the subject of medicine and argues that his works have much

to offer in the world of bioethics. Oxford University Press 2014 / 320 pages / \$65.00

### Fractured Legacy



In his sixth novel, Charles Neff '54 revisits the Pacific Northwest, where a clash between an old family legacy, tribal land rights, and a marriage in trouble results in a suspicious death,

threatening the lives of those who try to solve it. Bennett & Hastings Publishing 2014 / 276 pages / \$14.95

### Sky Blue Stone

*The Turquoise Trade in World History*

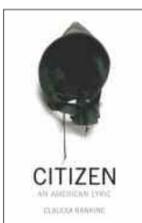


Assistant Professor of History Arash Khazeni examines the origins, trade, and circulation of turquoise in the history of Islamic Eurasia and global encounters between empire and nature.

University of California Press 2014 / 216 pages / \$29.95

### Citizen

*An American Lyric*



A National Book Award finalist, Professor of English Claudia Rankine's meditation on race recounts the racial aggressions of daily life in America in a progression of revealing vignettes.

Graywolf Press 2014 / 160 pages / \$20.00

owns both the review site Goodreads and Audible (the seller of the majority of the world's audiobooks).

"It becomes much more real when your own sales are tied into it," Ferriss says. "It's startling to realize how much of my personal investment as an author is caught up in getting good results with Amazon."

Despite her reservations, she's stayed on-board—in no small part because of Preston's dedication. She recalls that when he and his brother Richard '76 (a fellow writer) joined Pomona's literary magazine *Passwords*, it only took a matter of weeks for her team of editors to voluntarily hand over control.

"They were impeccably organized, they had goals, and we were hopelessly incompetent," she says with a laugh. "With Authors United, it doesn't surprise me that Doug's been able to essentially herd an army of feral cats. Once he decides to get something done, he does it."

Since the initial letter, Authors United tried to reach out directly to members of the Amazon Board, with no luck. Preston was also approached by a team of prestigious pro bono lawyers who will be submitting a formal brief for the Department of Justice that outlines Amazon's antitrust violations. He hopes it will encourage, if not an actual lawsuit, then at least more transparency on the part of retailers and publishers' business dealings.

"Amazon makes most publishers sign non-disclosure agreements, such that we don't even know what's going on with these contracts," he says. "What's the nature of these relationships, and what is Amazon asking for? The DOJ has to bring this all out in the open so the American people can look at the facts for themselves."

**When I met** with Preston on a crisp autumn morning in October, he sounded frustrated and a tad overwhelmed. He was promoting the publication of his third novel of 2014, gearing up for a book fair in United Arab Emirates, working on the next installment in his popular "Pendergast" series, and fielding phone calls from journalists about the ongoing publishing feud.

"Truth be told, I'm sick and tired of the situation, and would love to get rid of Authors United and go back to writing books," he told me then.

Less than a month later, Hachette and Amazon reached a deal that made Hachette responsible for setting e-book prices, but also gave Amazon the opportunity to offer "specific financial incentives for Hachette to deliver lower prices."

Preston views the resolution as just the end of one battle in a larger war for writers, publishers and retailers. Despite the tedious and thankless nature of his role, he says he takes comfort in the fact that his efforts have put a spotlight on the changing landscape of his industry—and the tricky economics that come with being an author in the digital age.

"If nothing else, it's reassuring to look at the list of folks who've signed the letter and see everyone from cookbook authors and sci-fi writers to poets and Nobel laureates," he says. "I've been in this industry long enough to know that it's rare to get writers to agree on anything."

## Tribute ('trib·yut) noun

1. A gift, payment, declaration or other acknowledgment of gratitude, respect or admiration
2. Evidence attesting to some praiseworthy quality or characteristic
3. **A Pomona College student whose parent, grandparent or sibling is a Pomona alumna, alumnus or employee**



**The tributes from the Class of 2018** pictured here are (left to right): Lydia Saylor, Justin Cappuccilli, Eli Tanenbaum, Kelly Ragsdale, Jessica James, Kelly Scharlach, Evan Fenner, and Adam Starr. Not pictured are: Aaron Sege, Hannah Hecht, Quincy Clarke, William Gottsegen, Robin Pollak, Molly Mosher, Woorim Chung, Darien Boyd, Thomas Byrne, Caroline Cochran, Natalya Ponomareva, Kyle Allison, Alexander Pusch, German Rojas, Matthew Gee, Samuel To, Jacob Gomez, Benjamin Higgs, Peter Mellinger, Paul Westcott, Calvin Aylward, Mark Penrod, Angela Twum, Dominic Frempong, and Tascha Shahriari-Parsa.

# Youth-Led Change

By Daniel Gould

**D**uring visits to her hometown of Baltimore while she was a student at Pomona, Celia Neustadt '12 started to notice some interesting shifts in the makeup of the city's public spaces. The Inner Harbor waterfront, long seen by locals as a tourist-only enclave, had started attracting black teens from around the city looking for a place to shop and meet friends, a big change from when Neustadt herself was a Baltimore City high school student.

The influx of a new crowd, however, had also sparked new tensions. Complaints and concerns from business owners over loitering, theft and "rowdy" behavior were leading to curfews that prevented groups of teens from enjoying the downtown district at night and after school, and bans that kept them out of popular clothing stores. Negative interactions with police and security staff added to the resentment felt by Baltimore youth. The friction was palpable, Neustadt recalls, as she walked around the Harbor one night after an Orioles baseball game.

"Not only were there more teenagers than I remembered, but it felt kind of tense. There was a feeling in the air, like if someone lit a match, it would spread like wildfire."

Intrigued and concerned, Neustadt came back to Pomona for her senior year and began making connections between her own observations and concepts she was studying as a sociology major.

"I had become really interested in these ideas about the power of public spaces," she says. "I wanted to see if teens were intentionally staking a claim to this space, and figure out how they were using it."

Neustadt channeled her curiosity into a proposal for a youth-led research team that would help amplify the voices of young people of color who felt excluded from the area. After winning a Napier Grant designed to promote leadership in social change, she went back to Baltimore the summer after her graduation and kicked off a new community organization, the Inner Harbor Project (IHP).

Since its launch in 2012, the IHP has brought together a cohort of high school students from neighborhoods around Baltimore to try to uncover the sources of conflict in the city's downtown. Building on a tradition in social justice work known as participatory action research, the IHP's student staffers have combed the city to hold focus groups with other teens, while also interviewing stakeholders such as land developers, security companies and business owners.

The conversations have shed some much-needed light on the issue. Community leaders now have a better understanding of

why the Harbor is so valuable to young people looking for a vibrant and inclusive space to call their own.

"Teenagers don't have that many places to go to in Baltimore, and so they really flock to the Inner Harbor," Neustadt explains. "They feel like they've lucked into this larger world."

Still, the project has also put a focus on problems like encounters between teens and police, which often cause mistrust and lead to more serious confrontations down the road. To create a takeaway for policymakers and officials, the group used its findings to draw up a list of proposals to reduce tensions and improve safety, catching the attention of local media and politicians. Some of their recommendations were even incorporated into the city's most recent master plan for the waterfront district.



Below: Celia Neustadt '12 (far left) poses with a group of high school students from neighborhoods around Baltimore taking part in the Inner Harbor Project.

**"THIS ORGANIZATION IS ABOUT RECOGNIZING THE EXTREME POTENTIAL THAT THESE YOUNG PEOPLE HAVE TO EFFECT CHANGE IN THEIR CITY. THEY AND ONLY THEY HAVE THE ANSWERS TO THIS ISSUE THAT HAS PEOPLE AT THE CITY LEVEL SCRATCHING THEIR HEADS."**

—Celia Neustadt

Neustadt, who says the response from City Hall and local businesses has been "overwhelmingly positive," credits the Inner Harbor Project's success to the teens themselves and their ability to draw upon their own lived experiences.

"This organization is about recognizing the extreme potential that these young people have to effect change in their city," she insists. "They and only they have the answers to this issue that has people at the city level scratching their heads."

While Neustadt is modest about her own contributions, others stress how her clear values and vision laid the foundation for the program and the positive results that have followed.

"I think Celia's commitment to community and change has been instrumental in this work," says Professor of Sociology and Chicana/o-Latina/o Studies Gilda Ochoa, a trusted mentor from Pomona who encouraged Neustadt to involve youth in the project and work from their perspective.

Looking ahead, Neustadt is hopeful that the organization might serve as a model for other cities that struggle with conflict between police and youth of color at their tourist attractions, mentioning locations like the French Quarter in New Orleans and Millennium Park in Chicago.

"This is my attempt to create a little ounce of change, to create a structure for having a discussion about inequality and the way spaces are used. I don't see myself doing anything else for a long time."

## Bulletin Board

Worldwide  
Happy Hour  
on March 11

**Mark your calendar.** The next Claremont Colleges Worldwide Happy Hour is scheduled for March 11, 2015. Held every year in September and March, the Happy Hour brings together hundreds of alumni from all seven Claremont Colleges at dozens of bars and restaurants around the world. Want to make sure there's a Happy Hour near you? Consider hosting and adding your own city to the list! For more information, contact Lauren Bergeron '05 at [lauren.bergeron@pomona.edu](mailto:lauren.bergeron@pomona.edu).

## Connecting Sagehens

**Looking for a** useful tool to locate and connect with Pomona alums in your area or during travels? Sagehen Connect has been helping Pomona alums get in touch since fall 2013. This free app is available through the iTunes App Store and Google Play and offers easy mobile access to fun and helpful features such as:

- searchable alumni directory
- mapped results of nearby alumni
- alumni information via LinkedIn
- the Alumni Events Calendar
- Pomona-Pitzer sports
- news, schedules, broadcasts

To get connected, just grab your iPhone or Android and visit [pomona.edu/sagehenconnect](http://pomona.edu/sagehenconnect). Chirp!

Chirp Along With Sagehens  
on Pomona's Social Media

**Meet up with** fellow alumni online for discussions of all varieties, new and "throwback" Pomona pictures, alumni news and events, Sagehen sports and more. Join [facebook.com/groups/sagehens](https://www.facebook.com/groups/sagehens) and follow @SagehenAlumni on Twitter to get in on the fun and to share your own Pomoniana (include #47sightings and #pomonacollege in your posts and tweets!).



## Sagehens Flock to Fall Networking Events

**Last fall, as** students convened on campus for another year of discovery, collaboration and fun, hundreds of alumni and friends also came together to learn and laugh in a series of networking events hosted by Pomona.

In November, more than 120 Sagehens braved the rain in Washington, D.C., to attend the College's third annual "Pomona in the City." Held at the stunning Carnegie Institution for Science, the event was hosted by Susanne Garvey '74. Alumni, parents and friends mingled and enjoyed lectures from Pomona faculty Pierre Englebert, David Menefee-Libey, Cameron Munter, Mary Paster, John Seery and Lenny Seligman, and from President David Oxtoby.

Sagehens on the right coast also flocked to the College's first East Coast Career Networking Series, with events in New York City, Boston and Washington, D.C. The NYC event, hosted by John Popp '78, was headlined by *The New York Times* education reporter Richard Pérez-Peña '84. In Boston, award-winning architect Chris Chu '76 shared highlights of her career journey (including a feature on HGTV's "This Old House

Boston"), and the series concluded in the Beltway with remarks by Mikey Dickerson '01, Chief Administrator of the U.S. Digital Service (and subject of fall's *PCM* cover story).

Meanwhile, on the West Coast, Sagehen volunteers spearheaded a San Francisco Tech Happy Hour, and dozens of alumni and current Pomona students gathered at the City Club for the perennial Los Angeles Finance Networking Event, overseen this year by Meg Lodise '85.

In December, the Los Angeles Entrepreneurship and Investing Alumni Panel, hosted by Marcia Goodstein '86 at her Idealab offices in Pasadena, closed out an exciting events season for Pomona alumni and friends.

Thank you to the many Sagehen hosts, speakers and attendees who participated in the success of these spirited events. To be sure you hear about upcoming networking events in your area, bookmark the College events calendar at [pomona.edu/alumni/events](http://pomona.edu/alumni/events), join the Pomona Alumni Facebook group at [facebook.com/groups/sagehens](https://www.facebook.com/groups/sagehens) and make sure your contact information is up to date by emailing [alumni@pomona.edu](mailto:alumni@pomona.edu).

## H. Russell Smith '36

(1914–2014)

H. Russell Smith was born in Clark County, Ohio, on August 15, 1914. His family moved to California in 1919, and Russ grew up in Whittier and on a citrus ranch in the El Cajon Valley. After graduating from Grossmont Union High School in 1932, Russ enrolled at Pomona College. The Depression forced him to work for a local construction company to pay his college expenses. At Pomona, Russ distinguished himself as a track star and student body president before graduating in 1936. Also during this time, Russ first met R. Stanton Avery. Stan and Russ would become business partners a decade later, when in 1946 they incorporated what is today Avery Dennison Corporation.

In 1937, Smith sailed for Europe and landed a job with the International Labor Office of the League of Nations in Geneva, Switzerland, where he spent the next three years. During this period, Russ wrote numerous letters to his friends and family state-side, and these prescient and insightful letters have since been reproduced for many readers.

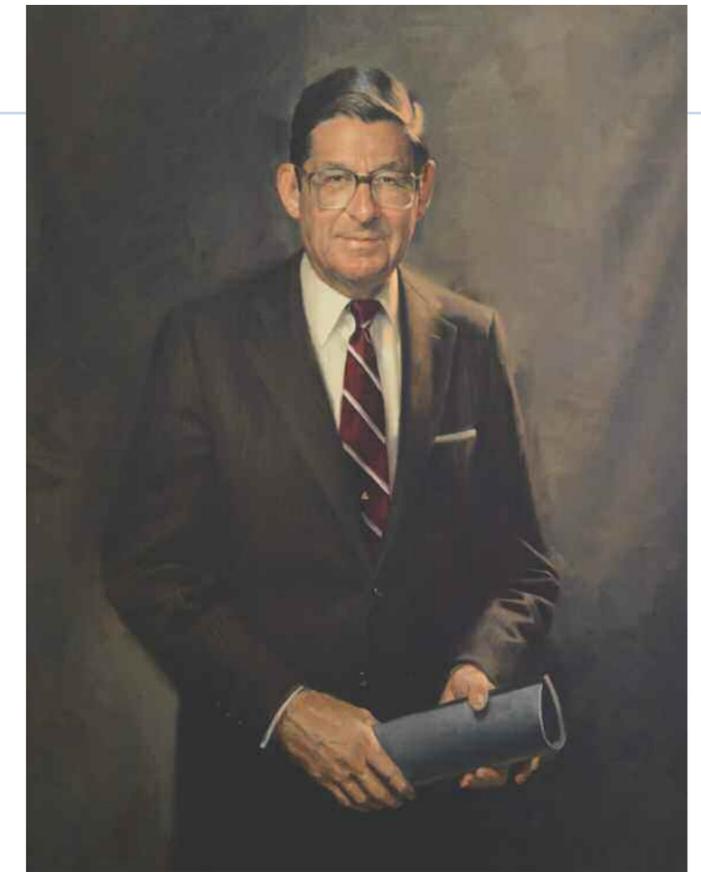
Upon his return to the U.S., Russ became assistant to the president of the Blue Diamond Corporation, and it was here that he met Jeanne Rogers. They married in 1942, only three weeks after their first date, and they were happily married for 67 years, until her death in 2009. Early in their marriage, in 1943, Russ was commissioned as an officer in the U.S. Navy, and Russ and Jeanne spent three years in Washington, D.C.

In addition to his executive roles over four decades at Avery Dennison Corporation, Russ served as a director of numerous other companies, including Security Pacific National Bank, Southern California Edison Company, Beckman Instruments, Inc., Title Insurance and Trust Company, Kinsmith Financial Corporation, and Unitek Corporation.

One of Russ's defining traits was his deeply held belief in the transformative power of philanthropy, a conviction that he backed up not only with his personal resources but also with his time and extraordinary leadership skills. He served as chairman of the boards of Pomona College, the Los Angeles Philharmonic Association, Community Television of Southern California (KCET), Children's Hospital Los Angeles and The H. Russell Smith Foundation. Several Los Angeles philanthropies honored Russ by naming buildings and endowed chairs in his honor.

Russ joined the Children's Hospital board in 1980, initially drawn in by the excellent care being provided to his first grandson for a congenital brain tumor. But it was also a time of severe financial crisis for CHLA, and he served not only as board chair but also as the acting CEO and CFO until those positions could be filled. Russ is widely credited with leading Children's Hospital from near failure back to financial strength, and he always regarded this as one of his great life achievements.

He also served as a member of the boards of the Los Angeles



Music Center Operating Company, the Music Center Foundation, Polytechnic School in Pasadena, the Orthopaedic Hospital, the Independent Colleges of Southern California, the Public Broadcasting Service, the Los Angeles Chamber of Commerce, the United Way of Los Angeles, and the Claremont University Center. In addition, he was a board member of the Los Angeles Country Club and the Lincoln Club in Los Angeles.

Russ Smith pursued a long, productive, energetic, creative and caring life, one based on the values of integrity, industriousness and generosity. His role as the patriarch and loving mentor for all in his family and his successful leadership positions in business and philanthropy were defined by a thoughtful wisdom and creativity, great energy and a genuine and deep caring for the welfare of others.

Above all, Russ was an unfailing optimist with an unquenchable curiosity and zest for life, an elegant and highly successful man who was nevertheless accessible and humble. He pursued his personal interests, such as swimming, sailing, hiking and reading, with characteristic passion. It was, in fact, this infectious *joie de vivre* that sustained Russ for more than a century of life, and that leaves all who knew him deeply grateful to have been a part of his life's endeavors. Fortunately, his legacy is preserved in his autobiography, *My Life in the 20th Century*, which he wrote and self-published in 1999.

Russ is survived by his son Stewart '68 and his wife, Robin Ferracone; by his son Douglas '71 and his wife, Deirdre; by his daughter Ellen Scott and her husband, Barry; and by nine grandchildren and two great-grandchildren.

## Vintage Made Simple

**Bored of your** wardrobe? Jonathan Starzyk '14 might be able to help. For the past year, he's been busy filling a gap in the world of men's wear with his own online store that sells unique vintage clothes. First created while he was a student at Pomona, Jonathan's brand, STARZYK, is now based out of his hometown of Chicago. There, he's working to make the business take root in the city and continue its growth, using creative efforts to connect with local buyers while still reaching style-minded guys across the country.

### A CHANCE WORTH TAKING

Jonathan got his first exposure to the fashion world through summer internships with retailers and brands in Chicago, including a stint at international label French Connection. He loved the field's link between artistic projects and business know-how, but sought more independence than he saw in some of the positions in the industry.

"I wanted to do something that I knew I'd be really invested in," he says. "I felt like I understood what worked for a lot of these brands and what didn't, and I wanted my voice to be heard."

Interestingly, he was also realizing how difficult it was to find cool, distinctive outfits on his own. Thrift store shopping often meant hunting through racks of cluttered items for hours on end, only to go home empty-handed. Meanwhile, looks from better-known shops were quickly snatched up by others with similar tastes, making it hard to stand out from the crowd.

It wasn't long before Jonathan sensed a way to tap an unmet need while having free rein to pursue his passion. Why not "gamble on myself," he thought, and start his own venture?

### FROM INCONVENIENCE TO OPPORTUNITY

With the help of a fellowship from student entrepreneurship group Pomona Ventures, Jonathan launched his website Shop-Starzyk.com in the fall of his senior year. Selling everything from retro jackets and polos to swim shorts and tees, the site simplifies the tedious task of 'thrifting' by collecting quality apparel in one convenient source.



Jonathan finds his inventory by carefully combing through estate sales, thrift stores and other vintage hotspots in search of standout items. The selection process is based on a simple but effective rule: only offer clothes that Jonathan and his colleagues would seek out for themselves.

"We take the time to find pieces that we know we'd enjoy, and we think our customer would enjoy," he says. "The brand is very much an extension of me and the things I like."

Knowing he someday wanted to run a startup, Jonathan used the flexibility of his media studies major to pick up valuable skills for the fashion field. At Pomona he took courses in digital photography and graphic design, supplemented by a semester in Australia where he studied marketing. The preparation has paid off, allowing him to handle projects like shooting photos for look-books and designing his own logo.

"It's nice to see how much I've grown from my learning experiences and how I've been able to apply them to a legitimate business," he reflects.

### LET THE CLOTHES DO THE TALKING

Since relocating to Chicago after graduation, Jonathan has been figuring out new ways to meet the challenges of running an online shop, the biggest of which is getting people to check out the product. The company lends itself well to social media platforms like Tumblr and Instagram, which Jonathan uses to target likely shoppers and define the brand's look. Still, he says these tactics are just one piece of the puzzle.

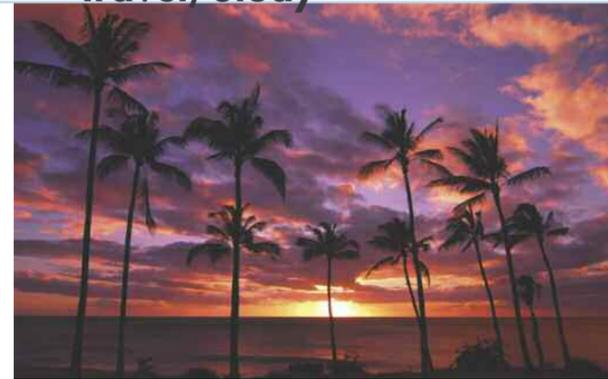
"I've learned that people want to be able to interact with businesses in any way they can, and that's hard to do with our online and social presence alone."

One way to reach out to buyers is through pop-up shops, temporary stands where Jonathan sells his wares in strategic locations like fashion festivals and street fairs. "The idea is to be present, allow for interaction, and let the clothes do the talking," he explains.

Wherever Jonathan's current project leads him, friends and collaborators say they've come to expect his unique, self-confident style of career building. "Jonathan always has a vision of what he wants, and will go through a very interesting path to get there," says Hannah Doruelo '16, a friend from Chicago who interned at STARZYK for a semester to help get the company off the ground. "I really see him as a trailblazer."

—Daniel Gould

## Travel/Study



### Hawaiian Seascapes (Big Island to Molokai)

With Geology Professor Rick Hazlett

Dec. 5–12, 2015

**Board the Safari Explorer** for a seven-day cruise from the Big Island of Hawaii to Molokai, with stops on West Maui and the "private island" of Lanai. Enjoy dramatic volcanic backdrops, marine life sightings, and opportunities for snorkeling, kayaking and paddleboarding. Join Geology Professor Rick Hazlett for this seagoing tour, with a look into the islands' volcanic origins, history and diversity of sea life. Highlights include a night snorkel with giant Pacific manta rays, a marine life search in the Humpback National Marine Sanctuary and an evening *pa'ina* (feast) and Hawaiian jam session on Molokai.

FUTURE TRIP:

### From Angles to Angels: The Christianization of Barbarian England

With History Professor Ken Wolf

TBA (2015 or 2016)

**The eighth in** a series of alumni walking trips with a medieval theme, this is the first involving the United Kingdom. Its purpose is to appreciate the fascinating history (captured by the Venerable Bede) of the conversion of the barbarian conquerors of England, starring the Irish and Roman missionaries. In Scotland, you will visit Kilmartin, Dumbarton and Loch Lomond; in England, Lindisfarne, Hadrian's Wall and Durham Cathedral.

For more information about these or any of our other trips, please contact the Pomona College Alumni Office at (909) 621-8110 or [alumni@pomona.edu](mailto:alumni@pomona.edu).

# CREATIVE SPACES

**Last October**, Pomona opened a stunning new 35,000-square-foot Studio Art Hall that brings together, under a gently flowing roof, a veritable village of indoor and outdoor spaces dedicated to art making, art appreciation and art interaction.



Designed by wHY architect Kulapat Yantrasast, the building's exterior is marked by extensive use of glass, which floods the separate studios with natural light. The building's open and porous design emphasizes connections, with glass walls exposing the various disciplines during the artmaking process and creating a transparent, collaborative atmosphere in which to explore new ideas, materials and artistic production. ▶



PHOTO BY HENRY CABALA

Maximizing the benefits of its sunny Southern California location, floor-to-ceiling windows in many studios frame the expansive San Gabriel Mountains or adjacent oak grove. The arching wood and steel roof echoes the rise and fall of the nearby mountain range and draws parallels to the historic bow-string trussed warehouses that are home to Los Angeles' thriving art scene.

"The seeds for new ways of thinking are planted through the serendipitous encounter, the unplanned studio visit and the informal visibility of the workspaces and studios," says Mark Allen, chair of the Pomona Art Department. "The building's non-hierarchical gathering of mediums fuels an openness and unrestricted approach to art."

"Cross-pollination of ideas cannot occur in walled-off art studios," says Yantrasast. "The Studio Art Hall's concept and design reflects Pomona College's ethos of nurturing innovation and culturally-minded graduates who either stay in the arts or venture into science, humanities or business. This building really could not exist anywhere else."

Built to the LEED Gold standards of the U.S. Green Building Council, the \$29 million Studio Art Hall forges new connections to disciplines beyond the arts. Major program elements are arranged around a central courtyard that accentuates a prominent north-south path through campus. The studios have the capacity to expand the working environment into the natural elements and pedestrian spaces.





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♪ Oh deep in my heart ♪

# Rolls Down Like Water:

George C. Wolfe '76 and the  
Center for Civil and Human Rights

STORY ON PAGE

# 16

