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2020

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If you put young blood into old mice, they—and their cells—will appear biologically younger. Harnessing this to remedy the ills of human aging while avoiding premature commercialization is the puzzle of a lifetime.

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As they fan out across the globe, students, faculty and staff capture images great and small. Through Stanford Earth's annual photo contest, they share the wonders of the world with all of us.

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FOOD STYLING BY KATIE CHRIST, MA '97  
ILLUSTRATIONS AND HAND-LETTERING BY LUKE LUCAS

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Professors, students and alumni on perseverance during the pandemic.

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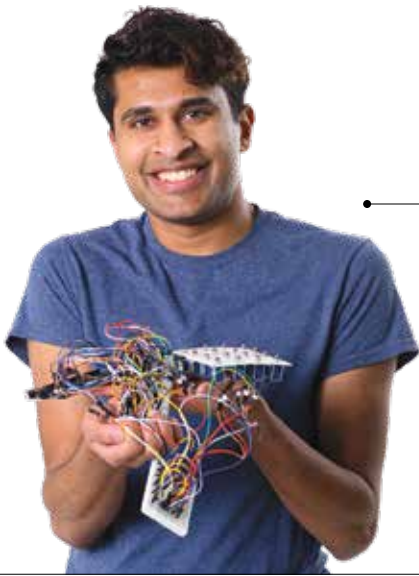
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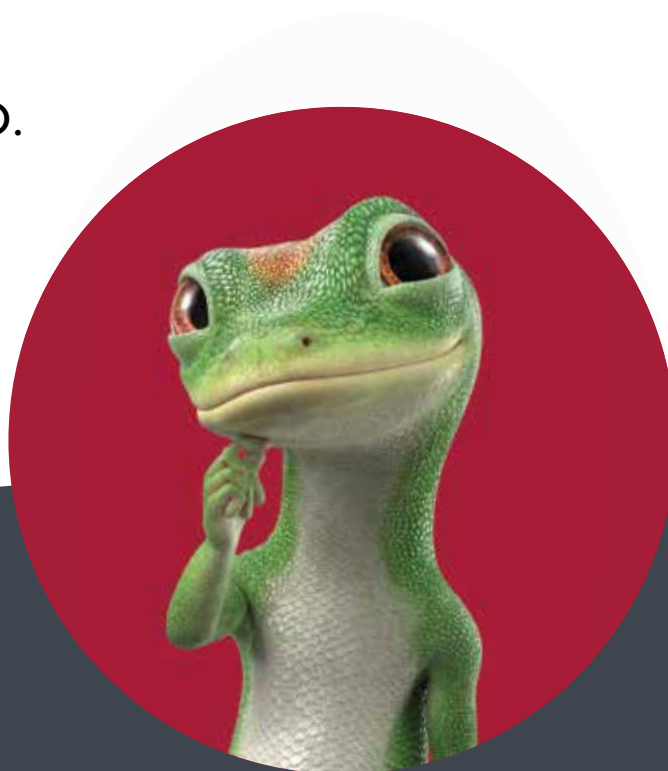




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# Dialogue

## Baby Talk

The March cover story reported on research resulting from the global open-source database of children's first words developed by Stanford psychologist Mike Frank, '03.



@STANFORDMAG

Look who's on the cover of @stanfordmag!  
A nice write-up of @mcxfrank's work on  
babies' language acquisition!

**Luke Stein, PhD '13**  
**@lukestein**

The article on language acquisition by children overlooked one of my most memorable Stanford professors, Ruth Hirsch Weir, whose 1962 book, *Language in the Crib*, was a notable contribution in this field. We arrived at Stanford simultaneously, I as a freshman, she as an assistant professor—in fact, my very first class there was probably hers as well. A brilliant, humane person, gone far too soon.  
**Michael Doudoroff, '61, MA '65, PhD '69**  
**Lawrence, Kansas**

### Bugs in Your Ears

*We received an unusually large number of comments about the March issue's back-page essay by Elizabeth Wallace, '18, on whether Aesop's fable about the ant and the grasshopper is a commentary on the virtues of hard work or of interdependence.*

I was quite taken by Elizabeth Wallace's essay.

I had a very similar experience teaching middle school math to kids from East Palo Alto and East Menlo Park who attended St. Elizabeth Seton School. At that time, all my students were students of color.

It was impossible to use the word problems about fractions from the math textbook. Solving the problems always relied on equal divisions of pies, cakes, pencils, school

supplies or pizzas (lots of pizza!). None of my students could understand the problems. They wanted to know who had or had not eaten that day, who might be coming home late from work, who already had a backpack, who had pencils saved from last year and so on. So we rewrote the problems together. They solved the problems, and I had a cross-cultural lesson in compassion and true fairness. It is critical to examine our cultural biases in teaching lest we leave students behind.

**Diane Guinta**  
**Los Altos, California**

I suspect you published "Grace for the Grasshopper" as insight into cross-culturalism. But as a former conservative who has morphed into a progressive liberal, I find it a powerful political message for our chaotic times. I wish it could be read by everyone who believes a progressive candidate would be a disaster in the coming election. I wish we could apply Blackstone's Ratio ("better to let 10 guilty men go free to preserve the innocence of one") to social issues: better to support 10 lazy rapscallions to help the one who truly needs it. I believe strongly that there still is an American dream, that we still can be a commonwealth where we help others who are not as fortunate. I don't understand how we became so selfish as to be surpassed in compassion by



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### It Sparked Joy

Why is my husband on the ground, hunched over, laughing uncontrollably with tears rolling down his face, one might wonder? Oh, because we are cleaning out the garage and he found THIS gem of a cover shot. Sexy look post-stealing second was all the rage in 2008.

**Jessica Mendoza, '02, MA '03**





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## Tree Huggers

So cool! I always wanted to be the Tree too, but lacked the building skills to do it!

**Lauri Godbold Halderman, '88**

Ummm, what about the beer and donuts?

**Daniel Druker, '88**

Daniel Druker, shhhhh. Top secret. And those were back in our day. Not allowed anymore.

**Carole Sams Hoemeke, '89, MA '90**

I think @dastanfordtree could definitely start a fitness-regimen business! Especially if it's rounded out with donuts . . .

**Hilary Smith, '90**

I'm loving this new kind of reporting!

**DeRonnie Pitts, '00, MBA '07**

This was amazing! Please do more pieces like this.

**Purvi Mody-Jain, MA '99, MBA '04**

**ICYMI:**  
Go to [alu.ms/DocuTree](http://alu.ms/DocuTree).

smaller countries like Indonesia.

**Howard Baldwin, '77**

**Lake Oswego, Oregon**

The essay provides an interesting perspective on cultural differences. But it seems to miss the point. There's a practical reason why many (most?) societies tend to value work over slacking: If everyone were like the grasshopper, all would starve together.

Wallace tells of diligent students who cheerfully share test answers with those who haven't bothered to study. She concludes that this can be interpreted as an act of "lifting up the entire class." Nothing could be further from the truth. Those who were given answers have learned nothing and their competence has not been increased. One hopes that this sort of thing doesn't happen at, say, medical schools.

True community implies mutual effort, not a situation in which some people ride on the backs of others or follow their impulses. Perhaps the prevalence of casual, irresponsible attitudes toward work, study and obligations to other people described by Wallace is one of the reasons why so many Indonesians have to leave their homeland to find work (about 7 percent of the entire Indonesian labor force is employed overseas), and why Wallace was there teaching English, instead of being in an American classroom full of Americans learning Indonesian.

**David Rearwin, PhD '73**

**San Diego, California**

Many, many thanks for your lovely story about the ant and the grasshopper. You undoubtedly wrote this before the coronavirus arrived, but it could not have been published at a more timely moment. As we think about how to respond to this global crisis, the importance of taking care of family, friends and neighbors looms large and we definitely need those grasshoppers along with the ants.

**Amy Davenport, '69**

**Montpelier, Vermont**

## Making Friends the Nerd Nation Way

*In March, Mei-Lan Steimle, '21, recounted the trials and tribulations of her scientific approach to befriending everyone she meets.*

Loved the article "Buddy System."

If she'd like an explanation, I know exactly what happened.

**Nick Frost, '88**

**Henderson, Nevada**

Steimle's essay shows her to be wise beyond her years. I especially admire her poetic wisdom concerning the potential value of reaching out to strangers:

"We are asteroids in a void, glancing off each other and spinning out into oblivion. . . . But a new friend is a new mind, a universe of perspectives. So why wouldn't I make strides to get to know a stranger who's been cast into my orbit? The risk is embarrassment, but the reward is an entire world."

In these trying times, wouldn't it be great if we could all gleefully reach out like that?

**Eugene Tatum, '78**

**Bowling Green, Kentucky**

## Mind the Calendar

*"How to Quit Your Job" (March) provided advice from Stanford product design instructors Bill Burnett, '79, MS '82, and Dave Evans, '75, MS '76, co-authors of Designing Your Life and Designing Your Work Life.*

Although I'm in that stage of life in which advice on how to quit my job is, thankfully, no longer needed, I thought the tips provided by Evans and Burnett were spot-on. With regard to their final point, "Exit Well," I feel compelled to add a specific recommendation gleaned from personal experience: Don't submit a letter of resignation on April 1!

**Scott McCarty, '76**

**Ventura, California**

## Dialogue Box

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Letters may be edited for length, clarity and civility, and may appear in print, online or both.

## Editor's Note

KATHY ZONANA, '93, JD '96

# Resilience, Ingenuity and Generosity

We're looking for the helpers.  
And they aren't hard to find.

► **WE STARTED PLANNING** this cover story eight months ago. It seemed perfect for the start of barbecue season. Intrepid vegetarian and animal lover Melinda Sacks, '74, would go inside Impossible Foods and taste a plant-based burger that is designed for and marketed to confirmed carnivores. In the ensuing article, she'd examine our cultural attachment to the hamburger through environmental, health and economic lenses. I'd write a column about the magazine story that changed my life—a 2002 *New York Times Magazine* piece that converted me to grass-fed beef—and hint that maybe our story would change your life.

Needless to say, this is not that column. Our lives have changed in ways most of us did not anticipate eight months ago. Almost none of us are old enough to remember the last time a deadly pandemic swept the world, in 1918. More than 40 percent of us live in communities—New York, Seattle, Los Angeles, the Bay Area—that are deeply affected as of this writing. We're learning to live with uncertainty, fear, grief and the knowledge that none of us will remain untouched by this.

And yet I see the Stanford community rallying in so many ways to meet the

challenges of the present. Across campus (that is, before I start working from my dining room), I watch scientists rapidly develop and deploy a test for COVID-19. Over the phone, I hear from Kate Knepper, '93, about the rotation schedule her group of hospitalists has devised so they don't all get sick at the same time. In my Facebook feed appears a song from children's musician Dr. Noize, aka Cory Cullinan, '92; his wife, Janette (Sampson, '92, MA '00); and their daughters about how families can be creative while sheltering in place. On Slack, a colleague shares an article on how Kitsbow, a cycling accessory company founded by Zander Nosler, '94, has pivoted to manufacturing face shields and masks.

A few such stories of resilience, ingenuity and generosity appear on page 20, and we'll be bringing you more in the coming weeks on [Stanfordmag.org](http://Stanfordmag.org), in the Loop newsletter and on social media. We can't tell these stories without your help, so when you come across fellow alumni who are making you proud, I hope you will let us know.

And when it's safe, let's get together for that barbecue. ■

Email Kathy at [kathyz@stanford.edu](mailto:kathyz@stanford.edu).

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# An Unprecedented Challenge

Stanford responds to the coronavirus pandemic.

► **THIS SPRING**, Stanford, like the rest of the world, has been grappling with an unprecedented challenge: the COVID-19 pandemic. Our first priority has been to protect our community members and to care for those who are sick. We have had to make tough decisions, from moving spring quarter online, to requiring those employees who can to telework, to sending most undergraduates home.

As I write this in late March, we are in the midst of this rapidly developing crisis. It is hard to predict how the situation will have evolved by the time this magazine is published in a few weeks' time, so in this column

I thought I would step back and reflect on some of the broader lessons we are already learning.

First, the crisis has driven home the importance of universities in generating knowledge to address global challenges. Stanford scientists are working around the clock to research potential treatments and vaccines for the coronavirus.

The COVID-19 diagnostic test developed at Stanford has rapidly expanded capacity to test and serve patients in the Bay Area. Meanwhile, experts across the university have been weighing in on issues from the economic implications of this pandemic to strategies for staying connected while social distancing. Their insights will help us better understand the impact of this disease on society.

Second, the pandemic has specifically highlighted the critical need for cross-border scholarship. Researchers and scientists from around the world are working together to

understand the virus and discover treatments that might prove effective against it. Knowledge from overseas has also been crucial in understanding the most effective strategies for containment and mitigation.

The coronavirus has drawn attention to how interconnected our world is: It has spread through modern transportation networks and densely populated communities. One role of universities is to respond to globalization with an openness to understanding one another and to sharing ideas across borders. Sharing knowledge is key to tackling the world's pressing challenges, from this pandemic to longer-term issues like climate change.

Lastly, this crisis has highlighted how important it is for Stanford to be nimble. As the outbreak has intensified, it has been critical both to have reliable emergency response structures in place and to have the flexibility to shift course in a rapidly evolving situation. I am deeply grateful to all who have been involved in our planning and response, and tremendously proud of how our entire community has worked to advance our collective well-being during this difficult time.

We will continue to face unknowns in the weeks and months ahead. Our focus, in the near and medium term, will remain on preserving operations to the best of our ability, saving lives through research and clinical care, and supporting our community.

At the same time, we need to begin planning for the longer term. Our Recovery Team is thinking through the aftermath of this crisis, including how to return students to campus and what a "new normal" will look like—both at Stanford and beyond. The coronavirus will have far-reaching consequences and leave a lasting impact on our society. We are beginning to contemplate how Stanford can contribute and lead in the world that emerges after the pandemic subsides.

We will look back on this as a difficult moment in Stanford's history. But this is a university that has survived two major earthquakes, numerous economic downturns—even other epidemics. Our spirit of optimism and innovation has always impelled us to rise to the occasion. I am confident that, by standing together as a community, we will emerge from this moment even stronger and more resilient. ■







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# Stanford, Still

In March, the rapid spread of the novel coronavirus caused staff to move their work to all corners of the Bay and students to join faculty for class from computer screens around the world. Meanwhile, beloved spaces waited—quietly, patiently—to welcome us home.

PHOTOGRAPH BY BEN PATTON, '03







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was a job.*

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WHO WE ARE

# Meet Aparna Verma

Aspiring podcaster makes a childhood fantasy come true. ➤

“Ever since I read *Black Beauty*, I knew I wanted to ride horses. I wanted to be your typical horse girl who had horse stickers on her binder and wore her hair in braids.”





➤ **APARNA VERMA WAS A 6-YEAR-OLD** from Baltimore County, Md., when she first encountered *Black Beauty*, the classic children's novel about an ebony horse cherished for his size and strength. She imagined touching his shiny coat and the white star on his forehead. And for years to come, she would dream of riding a horse.

As a freshman, Verma contemplated joining the Stanford Polo Club, but it wasn't until she attended the Queen's Cup during her study abroad at Oxford the following year that she "caught the polo bug." Back on the Farm during her junior year, she mustered the courage to take the reins of a horse for the first time during tryouts for the club. And she made it.

She calls the experience of learning the sport a "baptism by fire," not unlike her first time recording audio for the Stanford Storytelling Project. Midway through her senior year, Verma was relishing her last few polo games and had set her sights on applying her English major in the real world. Upon graduation, she hopes to create her own podcast inspired by *This American Life*, with the goal of telling "vulnerable stories that will make people stop and think."

*"I've always been into horses, but my parents couldn't afford riding lessons let alone lease a horse, so coming to Stanford made [the dream I had as a 6-year-old] a reality."*

*"I still can't believe that because I go to Stanford I'm afforded these different opportunities and this degree of respect that I did not have growing up. It feels strange to suddenly have that."*

*"The Stanford Polo Club is only 10 minutes away from campus, but it feels like a world away."*



*"I was afraid [of riding a horse] for the first time, but I'm also a person whose mantra is 'fake it till you make it,' so I was faking it for a very long time, but now I think I've made it."*

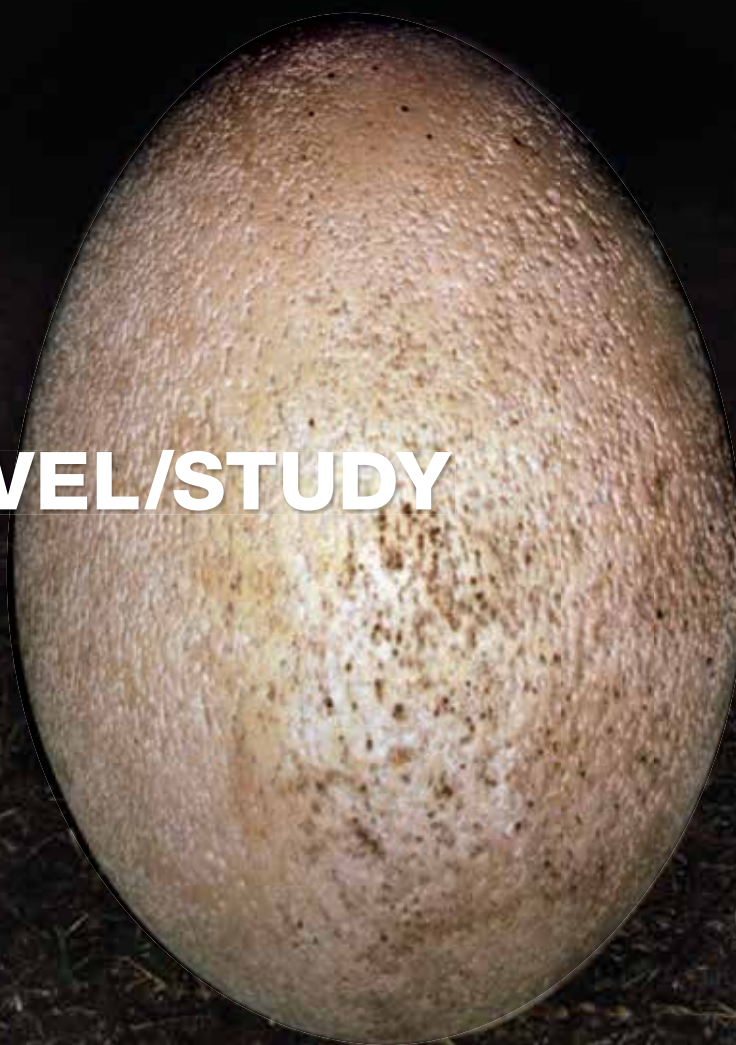
*"The horses really helped me balance the stress of junior year, where you're [taking] the classes you need to take in order to graduate on time. This was the year that I stopped [working with] the Stanford Daily, and that was a very difficult decision for me."*

*"Riding a horse is probably the most freeing act in the entire world. You really are in tune with that amazing, gentle creature. You become one, and you just feel their power, their grace, their beauty."*

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# The Birdman of Alcatraz

Seriously.

**BEFORE THE TOURISTS, BEFORE THE PRISON,** and before humans had ever set foot on its land, Alcatraz Island was a rich bird habitat. The 18th-century Spanish explorers who sailed into San Francisco Bay dubbed the 22-acre island *La Isla de los Alcatraces*, which, depending upon the interpretation, means the island of pelicans, or gannets, or simply “strange birds.”

Human settlement proved disastrous for the island’s feathered inhabitants. Cannon blasts at the U.S. military fort built there in the 1850s scared off nesting pelicans. In the 1870s, the Army cleared away the remainder of the natural vegetation to

make room for a military prison. The Bureau of Prisons went on to keep the grounds immaculately maintained during its 30 years operating the notorious Alcatraz Federal Penitentiary—great for spotting runaway inmates, not so much for sustaining nesting wildlife.

When the prison closed in 1963, the shrubs were restored. The birds, save for those original pelicans, came home to roost. And this time, Bill Merkle wants to make sure that they stay.

Merkle, ’91, is a National Park Service ranger and a wildlife ecologist at Golden Gate National Recreation Area, a sprawling

national park that stretches from Point Reyes in the north to Woodside in the south. As head of the park’s wildlife program, he oversees a robust monitoring and breeding program for species like cormorants, pigeon guillemots, snowy egrets and black-crowned night herons.

When monitoring began in the 1990s, Alcatraz was lucky to see 1,500 birds in a year. But now, “at the peak of the breeding season, with adult birds and their young, there are probably in excess of 9,000 water-birds on the island,” says Merkle—along with the human visitors, who top 4,000 per day.

—Corinne Purtill, ’02

JOHN TODD



# Why Omega-3s Are Good for You

For the first time, a link between cell biology and dietary science.

**LONG AGO**, when life first made the journey onto land, our primordial ancestors endowed us with the primary cilium, a small cellular appendage analogous to an antenna. And exactly what it does has been more or less a mystery ever since.

One thing scientists did know was that people with a rare defect in the cilium can't stop eating and eventually become insulin resistant. Recently, a team of Stanford researchers conducted a comprehensive

the cilia of fat stem cells, they signal the cells to divide, supplying the body with more storage units for fat. This divide-and-conquer method is a healthier alternative to stockpiling fat in a few large fat cells, a process correlated with insulin resistance, diabetes and inflammation.

The study provides answers to assorted nutritional questions, such as "Why do we pop fish oil pills?" and "Why are potato chips bad for you?" While fish like salmon contain

a significant amount of omega-3s, many processed snack foods are full of saturated fats, which obstruct the binding of omega-3s to the cilia receptor, leading to bloated fat cells.

"It's the same number of pigeon-holes, but a lot more pigeons get stuffed in there," says the study's senior author, Peter Jackson, a professor of microbiology and immunology and of pathology. "What you want is more, small fat cells rather than fewer, large fat cells." By this mechanism, eating

fewer products high in saturated fats is a veritable practice of nutrition by subtraction.

As for those omega-3s, a diet rich in them is associated with lower risks of heart disease, stroke, arthritis and depression. In a literal sense, they do the human body a fat lot of good.

—Andrew Tan, '22

## The Uber 'Rich'

Some rideshare drivers have an advantage.

If you're an Uber driver, it pays to be young. And male. According to new research from the Graduate School of Business, the average 30-year-old driver makes 10 percent more than the average 60-year-old driver, while men make 7 percent more than women.

But don't blame implicit bias (after all, the app doesn't assign rides based on age or gender). Pay disparities, two studies show, are better explained by driver behavior. Young men drive faster and in heavier traffic, and they're more willing to pick up drunk passengers from busy party areas on weekends. Meanwhile, women often work fewer hours and play it safer. Older drivers stick to the suburbs, which spaces out trips.

"You're basically being paid for how quickly you can get to places and take good routes," Rebecca Diamond, associate professor of economics and co-author of the studies, told Insights by Stanford Business. Anyone inclined to do that could be on the road to a raise.

— Melina Walling, '20



molecular screening in search of the chemical substance sensed by fat stem cells. The answer: omega-3 fatty acids. The sensor: The primary cilium. And the revelation: At last, a link between cell biology and dietary science.

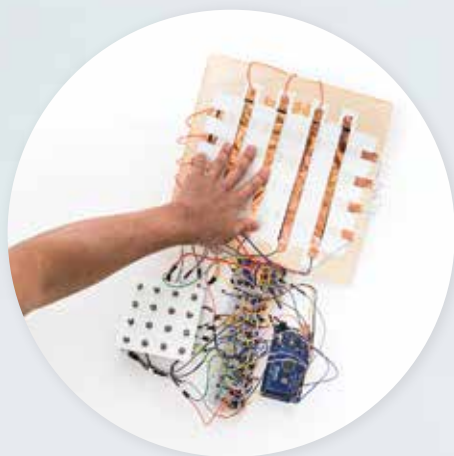
When omega-3s bind to a receptor on



# Do-Gooder, by Design

What happens when a multitalented tinkerer graduates.

**DOES AKSHAY DINAKAR, '19, HAVE SOME IDEAS?** You could say that. He left Stanford last year with an engineering degree in product design—and more than a dozen designs and prototypes for inventions in fields ranging from music to bioengineering to entertainment. Some of his designs are open-source, making those technologies replicable around the world. His philosophy: “In today’s tech world, there’s so much ambiguity about what’s good or bad. Whatever it is that I create or contribute, I want people to agree that it’s a good thing.” In addition to expanding his own design portfolio, Dinakar has been taking advantage of Cardinal Ventures, an on-campus accelerator program for student start-ups, to help launch his consumer product company, Tangible. As for how he manages to do it all? Well, that’s a proprietary combination of ambition, positivity and a whole lot of sticky notes. —Melina Walling, '20



## Terrain

Remember the bed-of-nails sensory toy? You depress one side to see a pattern raised on the other. This is its tricked-out electrical equivalent—a touch pad connected to a physical 3D matrix. It’s an early direction for Tangible, but *shh*—that’s under wraps.



## Moonwalk

“I have direct family experience with someone who experiences neuropathy, which is nerve damage that leads to numbness in the hands and feet,” says Dinakar. So, using household materials, he created a prosthetic sensor that uses haptic feedback to improve mobility and balance.



## Stikato

“The world’s most portable music stand” sticks to any surface and improves posture for traveling musicians. Dinakar was a violinist in the National Youth Orchestra and has performed around the world.



## Diya

Designed to reduce waste during manufacturing, these sustainable bamboo lamps inspired by Indian mythology require no hardware to assemble.



## Robot Suit

A USB-rechargeable suit featuring LEDs, lasers and a built-in speaker system that connects to your phone. After wearing the suit to the roving campus party Nomad a few times, “I was kind of this anonymous celebrity,” Dinakar says. Rumor has it “that people used to call me ‘Halo Man.’”



## AKSHAY IN ACTION

Dinakar demonstrates his inventions at [alu.ms/akshay](http://alu.ms/akshay).





# Ocean Voyager

Alex Kostich is one of the world's top open water swimmers.



**LAST NOVEMBER**, at an annual 5-mile open water race in St. Croix, U.S. Virgin Islands, that he's won 18 times, **Alex Kostich** placed second, by less than a second, to a 16-year-old. A spectator on the beach asked him whether he consciously let the other guy win.

It's an understandable question. When detailing Kostich's racing accolades, the first question is how far back do you want to go? As a member of the U.S. national team, he won a total of three gold medals at the Pan American Games in 1987 and 1991. An All-American and an NCAA runner-up in the 1,650-yard freestyle while competing for Stanford, Kostich, '92, has won or placed in the top 10 of dozens of ocean races over the years, including the 2.4-mile Waikiki Roughwater and the La Jolla Gatorman, a grueling 3-mile swim in the San Diego area, from La Jolla Cove to Scripps Pier and back. In 2019, he earned a spot in Guinness World Records for completing the **fastest-ever solo circumnavigation swim (10 km) of Pitcairn, a remote volcanic island in the southern Pacific.**

Kostich balances his swimming with a career in the entertainment industry; he's

senior vice president of creative marketing at Participant, a production company in Los Angeles devoted to socially conscious projects (and founded by Jeff Skoll, MBA '95). Recent films Kostich helped market include *Dark Waters* and *Stillwater* (neither is swimming-related, despite the aquatic titles); he appreciates the connection between his work and his love of the natural environment. "I love that I'm able to work on projects that raise awareness about global issues facing all of us," notably climate change, pollution, rising ocean levels and overfishing, he says. "It's nice to know that what I'm working on in my professional life might actually affect and influence, in positive ways, what I treasure in my personal life."

Apart from future island circumnavigations and ocean races, Kostich is plotting his next challenge, this time on terra firma. Along with his husband, Steve Childers, and a few close friends, he plans to climb Mount Kilimanjaro. "I thought it would be cool to do something outside of my comfort zone," he says.

—David Preizler

## Another Reason to Rethink

Scientists link alcohol-related facial flushing with cell damage and Alzheimer's.

If you're among the 8 percent of those whose face turns cabernet-red and puffy when you drink, you may want to choose your next tipple with caution. Having the gene mutation that impairs alcohol metabolism could increase a person's risk of developing Alzheimer's disease.

Stanford scientists recently found that cells from Alzheimer's patients and from mice with the mutation contained more free radicals and toxic by-products than cells from control groups did, leading to a vicious circle of cell damage with neurodegenerative consequences. Adding alcohol increased the level of free radicals in all cells, but more so in those with the alcohol-related mutation.

"Our data suggest that alcohol and Alzheimer's disease-prone genes may put humans at greater risk of Alzheimer's onset and progression," says lead researcher Daria Mochly-Rosen, a professor of chemical and systems biology. "An epidemiological study in humans should be carried out in the future." ■





VOICES

# A Community Copes

Change, challenge and the coronavirus.

AS TOLD TO SUMMER MOORE BATTE

*In* March, the campus community—along with the rest of California and many other states—began taking social-distancing measures to reduce the spread of COVID-19. All instruction became virtual. Undergraduates left campus housing unless they had no choice but to stay. Graduate students whose research labs were shuttered worried about making progress toward their degrees. Traditional commencement exercises were called off. Around the world, alumni saw their lives and work similarly upended. Even as the ground felt like it was shifting beneath them, a few made time to share their concerns, their coping strategies and the ways they had found to be helpful.

## THE SENIOR

Paul Phan, '20, is set to graduate in June. He plans to return to campus in the fall to work as a course assistant.

"I kind of wanted to go home because it was stressful staying on campus. People were anxious. But now that I'm back home in Baltimore, it's pretty isolating. Things are starting to hit a lot more now.

My friends are all processing in different ways. But we understand that it's best for public health concerns. My concentration in human biology is global health and infectious disease, so what's going on right now is what I want to study. So I understand the reasons why it needs to happen, but it's hard to process. It's kind of a sad way to end Stanford."



BEN PATTON, '03



### **To Be Continued**

If you know of an alum who is helping others during this pandemic, please tell us at [stanford.magazine@stanford.edu](mailto:stanford.magazine@stanford.edu). We'll publish selected stories at [Stanfordmag.org](http://Stanfordmag.org).



### THE INSTRUCTOR

Teaching professor of mechanical engineering David Beach, '68, MA '72, uses Stanford's Product Realization Lab to integrate making and learning.

"To teach courses where students are doing hands-on making without any access to the laboratory has been challenging and scary. We think we're pioneers in this area, in the idea that you learn better if you're making things. And if you don't have a tool set, how are you going to do that?"

We have the challenge of radically rewriting the courses in such a way that they offer good educational value to students in the absence of laboratory facilities. One of the ideas is that it will look more like the practice of engineering in the real world. The students will ship their design digitally somewhere else, and it will get made there and returned to them for testing and evaluation. It very unfortunately does not include their getting tacit knowledge by having intimate contact with core materials and tools. But it is a valuable thing to do.

The students have been amazingly resilient. Their online presentations have been filled with wonderful insights and good organization and communication skills. I couldn't be more impressed."

### THE OVERSEAS HOPEFUL

Cynthia Jia, '21, was to spend spring quarter in Florence, followed by an internship in Zurich. Instead, she headed home to Michigan, where she isolated herself from her parents for two weeks out of caution.

"It was a pretty huge decision for me to go overseas. I've never been to Europe before. But as I thought about it more, I started getting excited.

Things just devolved pretty rapidly. I guess a tiny part of me is relieved because I'm still scared of traveling and change. But I was so excited to be able to push myself.

I'm diabetic. I would need to take six months of supplies to Europe. It was something that was stressing me out. Now, well, I guess I'm worried about my health in other ways. I'm most concerned right now about the well-being of my family and friends. Right now there's just a lot on my mind. It's a general sense of confusion and disappointment and concern. I feel like no one can really say that things are going be fine, because we don't know."

### THE FAMILY IN MILAN

Josh Fried, '01, was at the beginning of a seven-month sabbatical in Milan with his wife, Amanda (Kahn, '03), and their two daughters when northern Italy was put on lockdown. The family returned to California shortly after this interview.

"The thing that's been really weird is the gradual loss of freedoms. I think if it had been sudden lockdown—you can't leave your apartment building—that actually might have been easier to swallow in some ways. Because you'd know that they're taking the most direct action possible. You'd know that it's going to be over as quickly as possible.

If a politician had come out and said, 'Italy. We're a very social people. Kiss, kiss; hug, hug; everybody hangs out with Grandma and Grandpa; family dinner Sunday night. This is going to be really painful, but we're going to put the country on lockdown for two weeks or four weeks, and at the end of that everything's going to be better,' I think a lot of people could have swallowed it. But it was the hemming and hawing, and a lot of politicians just not wanting to disturb the cultural norms and Italy's way of life."

### THE MAPMAKER

Zaya Battogtokh, '21, built trackcorona.live with her high school friends from Arlington, Va. Their site, which launched in February and updates every 20 minutes, was among the first to aggregate COVID-19 data from numerous countries.

"It's crazy to work on it one day, then come back the next to see that five new countries have people that are affected. We have about 70,000 unique visitors a day.

It was a side project, for sure. But, you know, some Stanford professors have reached out to me, saying, 'This is really cool what you're doing with this; I hope you pursue a career in medicine or data science.' And that's something I'm definitely thinking about more because I think this type of visualization is important. It's important for people to see data in an easy-to-digest format."

### THE ADVISER

Assistant professor of bioengineering and of genetics Polly Fordyce, PhD '07, had to close her lab, suspending the experiments of more than a dozen grad students and postdocs.

"We're thinking creatively about existing data sets we can analyze, reading more papers and deciding exactly how to set up experiments when they get back in lab, doing a paper on data that they weren't going to write up. But it's really destructive. Some people were about to do the last experiment they needed for a paper, or an experiment that would have given them months of data to analyze. And now they're stalled.

Everyone in my lab wanted to help coronavirus efforts. It is a really delicate balance between thinking, 'We all want to do something' and 'What can we do in a way that doesn't endanger any students or postdocs or go against the spirit of the shelter-in-place order?' There are some COVID-related experiments that we could do, and we ultimately decided not to pursue them now because I'm not convinced the results would come fast enough to change the course of the pandemic. We have funding to work on a lot of things that will remain a challenge six months from now, like cancer and other biomedical and engineering research."

**THE CONNECTOR**

**Joy Zhang, '10, MBA '18**, is a co-founder of Bay Area-based Mon Ami, which matches active companions with isolated senior citizens (another co-founder is Madeline Dangerfield-Cha, MBA '18). With the outbreak of COVID-19, Mon Ami pivoted from in-person visits to a virtual program.

"It was really hard to hear, 'My mom is alone and she really looked forward to these visits.' And we have the technology to be able to do it anywhere, so we quickly made it a free volunteer phone bank. Anybody can sign up a senior loved one to receive calls. We have volunteers now from nine countries.

There are so many people who want to reach out and support someone. And, honestly, young people are isolated too. We've been hearing from the volunteers that it's a nice way to break up the day. And it's evolving—some seniors are using it because they want tech help! They're trying to figure out the technology to stay connected. Having a college student or a young person to help them do that is a way to extend their capabilities."

**THE MED STUDENT**

**Lydia Tam, '17**, is a second-year medical student at Stanford. Typically, she and her classmates would begin hospital rotations in late spring.

"The school has pulled third- and fourth-year students out of their rotations. Some people need these rotations to be able to graduate this year. But also some research has been showing that people in our 20s can be completely asymptomatic but are carriers. And so in order to not put our patients at risk, they've pulled out the students.

I hope that when I am a physician, I'll be able to be on the front lines and actually be helpful. Meanwhile, I am personally involved in doing telephone wellness checks for primary care patients.

The least that we can do as medical students is just to encourage our peers to do what they can to social distance and give people the correct information in an effective way."

**THE DISTANCE-LEARNING EXEC**

**Sean Gorman, '91**, is COO of Seattle's Panopto, a video platform that has become part of a trio of tools (the others are Zoom and Canvas) that universities around the world are using to enable online instruction. "Typically it would take months for a university to implement a remote-learning solution. It's happening in days now. And students are dramatically ramping up the amount of video they are consuming because it's now the primary mechanism for getting instruction.

We feel a sense of urgency as employees to—as fast as we can—set up universities and get them up and running. We're definitely working around the clock to get that done, but it's because this is what we were born to do and we can really help."

**THE INFECTIOUS-DISEASE DOC**

**Sara Bhargava Vora, '96**, is an assistant professor of pediatric infectious diseases at Seattle Children's Hospital, where she has been preparing for pediatric COVID-19 cases and developing protocols.

"As neighboring adult hospitals are seeing an influx of patients, we are taking all pediatric patients in the region and have raised our age limits to allow other hospitals to have more capacity. There is certainly a lot of stress among my colleagues. People are working hard for their patients. At the same time, they are worried about themselves and their families, juggling childcare and education of their children, and learning new skills—like working outside of their specialty and providing telemedicine.

I hope that we will be better prepared for the next pandemic on many dimensions: surveillance, response and capacity. I also have been really impressed by the creativity and resourcefulness of my colleagues. From our local hospital protocols up to the CDC and FDA, I hope we maintain this spirit of moving quickly in a time of need for research, new drugs, new vaccines and more flexible regulations." ■

SUMMER MOORE BATTE, '99, is the editor of *Stanfordmag.org*. Email her at [summerm@stanford.edu](mailto:summerm@stanford.edu).

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PURSUIITS

# Make It Work

When in doubt, don't throw it out.

BY JUNE D. BELL



**B**LATANTLY DISREGARDING the “Do not disassemble” warning on a Panasonic iron, Pascal Bruyere and J.D. Pruett, ’23, removed the screws holding the soleplate to the shell, pulled the pieces apart and tugged on the iron’s cord. Instead of retracting smartly into the base, the cord made only halfhearted efforts at rewinding.

“It’s not like I’ve worn it out by using it,” owner Jeanne Schaefer quipped. The 15-year-old iron still worked, yet the lazy cord bothered her. A replacement would cost as little as \$25—but discarding hers seemed wrong. “Think of all the resources that went into making it,” the Palo Alto resident said. “The fact that we’d just put it in the landfill is why we’re in trouble. We just keep using up the earth’s resources.”

Unable to fix it herself, Schaefer headed to the Repair Café, a quarterly pop-up fix-it workshop in Palo Alto where eco-minded engineering students and other volunteers perform free repairs on almost anything that visitors can haul in.

Since the café’s debut in 2012, Palo Alto

fixers have matched wits with more than 4,600 broken items, including coffee makers that won’t brew, beaded jewelry that has come unstrung, musical instruments that won’t play, zippers that won’t zip, bicycles that won’t brake and lamps that won’t light. The Repair Café is modeled on a concept that began in Amsterdam in 2009 and has spread globally to more than 2,000 locations.

When Peter Skinner, ’78, read a 2012 *New York Times* feature about the fix-it frenzy sweeping the Netherlands, he was intrigued and inspired. He told his wife, Marie Earl, ’78, MLA ’98, that he planned to launch the United States’ first Repair Café. She was justifiably dubious. “I can’t fix anything,” Skinner admits with a laugh. “I’m a total hack.”

But Skinner was confident he could corral a group of friends the couple had known since they were undergrads and tap their collective expertise. Libby Dame, ’79, was a longtime City of Palo Alto employee who had helped launch programs around energy conservation and solar power. Her husband, John Eaton, ’78, MS ’84, was a

longtime tinkerer who had worked at Stanford’s original recycling center and handled energy conservation for on-campus housing. Today, he designs and develops medical devices. Bob Wenzlau, ’78, MS ’81, had started the university’s recycling center and, later, Palo Alto’s curbside recycling and composting programs. Now he’s the CEO of Terradex Inc., a local firm that advises on how to treat and handle hazardous and contaminated sites.

The group worked their contacts to find a location and support. The Museum of American Heritage in downtown Palo Alto offered its space, and Ace Hardware donated supplies. (GreenWaste, which collects the city’s trash and recycling, later provided a trailer to hold supplies.) The first event, in October 2012, attracted media coverage and about 100 people. The next Repair Café drew twice as many, and about 140 people attended each of the four 2019 Repair Cafés.

Palo Alto’s Repair Cafés are staffed by several dozen tool-toting volunteer fixers, often including Stanford faculty and engineering students eager to put their



**THE KEEPERS:** At a recent Repair Café, volunteer fixers were able to salvage about 75 percent of the 202 items brought in. Co-founder Skinner (opposite) credits the café with changing his life's course.





repair skills to good use. They make no judgments about whether an item is worth the time and effort to repair, no matter how old, obsolete or worn it is. If an owner deems it worth keeping, it's fair game. "Most of the people who come have the same mentality," Eaton says. "They could easily buy a new hair dryer, but they don't want to throw a perfectly good item away."

Dame and Earl greet visitors and log repair requests. Visitors nibble donated bagels and sip coffee in a sunny courtyard until a fixer is available. Owners explain the issue and watch—or sometimes even lend a hand—as the fixer tackles the problem.

Successful repairs are celebrated with the ringing of a handbell, which periodically punctuates the chatter of fixers and visitors. Repair Café fixers are able to completely or partially repair about two-thirds of the items they handle, making a symbolic and personal dent in a vast amount of trash. Between 1960 and 2017, the amount of waste sent to U.S. landfills roughly tripled, jumping to 39 million tons, according to the Environmental Protection Agency, even though the U.S. population hadn't even doubled. Despite recycling mandates, environmental awareness and zero-waste initiatives, 52 percent of the waste generated in the United States in 2017 was buried in landfills. (Stanford sends 36 percent of its trash to the landfill and is working to cut that amount to 10 percent by 2030.)

Modern appliances would have much longer lives if engineers designed them to be easily repaired. "We struggle with plastic devices that can't be separated [into components]," Wenzlau says. "The idea of disassembly isn't built into products. If we have a zero-waste goal, how can we keep this material out of the landfill? Repair fits in really well with a zero-waste strategy."

Durable, cheap to manufacture and lightweight to ship, plastic is ubiquitous in consumer goods. Plastic components are typically fused through ultrasonic welding, a process that uses vibration to heat components until they melt together. An ultrasonic weld eliminates the need for screws, glues and fasteners, which saves resources. "But the flip side is that when something does break," Eaton says, "it makes it very difficult to actually fix it."

Stanford engineering students like

Pruett learn this lesson firsthand at the Repair Café. More than 340 Stanford engineering students have apprenticed at cafés in Palo Alto, Mountain View, Santa Clara and San Jose.

"I sell it as hands-on engineering," says apprentice coordinator Lawrence Garwin, '87, who spent 26 years building houses with natural materials, working on tall ships and creating off-the-grid electrical systems



## ITEMS FIXED

ELECTRONIC KEYBOARD  
TOY PIG WITH BROKEN LEG  
GYROSCOPE  
VINTAGE RADIO  
MANY LAMPS



## ITEMS NOT FIXED

ALARM CLOCK  
MICROWAVE OVEN  
PAPER SHREDDER  
CD PLAYER  
DESK CHAIR

before completing his bachelor's degree in 2013. While working with fellow engineering students on group projects, he discovered that few had experience with tools and repairs.

Under the tutelage of skilled Repair Café volunteers, students hone practical skills and see how smart design choices can reduce waste. "A lot of them will become designers, and we want them to design for repair rather than obsolescence," Garwin says.

Students and seasoned fixers draw inspiration from vintage goods. They've had stellar success accessing and then repairing the inner workings of 1950s-era drink mixers, mid-century blenders, manual typewriters, adding machines and decades-old box fans.

Longtime volunteer Todd Smith says one

of his most memorable repairs was a vintage Singer sewing machine. Employees at several repair shops had declared it a loss, but the owner had a sentimental attachment to the machine. Smith, a Stanford physics professor emeritus, eventually located and replaced a broken wire. The machine sprang back to life, and the owner wept with joy.

Those satisfying fixes continue to motivate Skinner as Palo Alto's fix-it program approaches the eight-year mark. "The Repair Café is this really tiny thing," he says, "but it's at least something that people can participate in at a local level that makes them feel like they're contributing in some sort of way."

Skinner credits the Repair Café with changing the course of his career. In 2016, he transitioned from finance consulting to his current role as CFO of the Monterey Regional Waste Management District, which emphasizes waste reduction and transforms waste into energy or reusable materials. "I can't say that it was part of a grand plan, but it has been sort of a logical evolution for me," he says. "And I feel like I'm doing something that gets me out of bed in the morning."

Of the 202 items that fixers examined during a recent café's four hours, 75 percent were fixed partially or, like Schaefer's iron, completely. She wasn't surprised. At previous cafés, fixers had replaced the missing rivets on a pair of her pruning shears, and a mechanical engineering student had unstuck the valves on her son's trumpet, which she then donated to a music program. Schaefer watched as Bruyere and Pruett disassembled her iron and discussed possible remedies.

"The spring that rewinds the cord is lazy," concluded Bruyere, a mechanical engineer. The duo adjusted, tested and then fine-tuned the tension of a long, thin metal coil. When they were satisfied, they reassembled the iron and tested the cord. It retracted obediently. The repair had taken well over an hour and an impressive amount of patience.

The fixers handed the iron back to Schaefer, who clutched it, delighted. "I like this place," she said. The handbell rang. ■

JUNE D. BELL is a freelance writer in the Bay Area.

# CARDINAL POWER

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ADVICE

# 8 Life Lessons You Can Learn from Improv

How to apply just-go-with-it wisdom to your career, relationships and well-being.

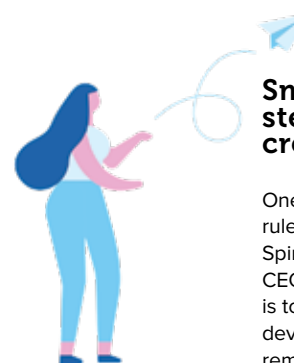
BY CHARITY FERREIRA

**YOU'RE ONSTAGE** with nothing prepared and an expectant audience to entertain. Sound like a nightmare? Alums of Stanford Improvisors, developed by drama senior lecturer emerita Patricia Ryan Madson in 1991, say this scenario is more like a magical opportunity. Moreover, improv as Madson taught it, they say, gave them a code for life. Eight of them helped us crack it.



## Pay attention.

The most important skill you have as an improviser, says **Jacob Klein**, '01, MA '01, is the ability to deeply observe and respond to your fellow improvisers. As director of learning games at Curriculum Associates, he might use it to elicit feedback from kids who respond to a game in ways he didn't anticipate. The technique helps "when you really want to pay attention to how things are unfolding," Klein says, and enables you to "empathize with someone else and notice what they're doing."



## Small obvious steps = big creative leaps.

One of the most important rules of improv, says Spire Health founder and CEO **Jonathan Palley**, '07, is to "be obvious." To develop a system for remotely monitoring

people with chronic respiratory conditions, who don't always remember to wear a device, his team began with an obvious observation: All patients wear clothes. "So the next obvious step was wondering, what if the technology was part of the patient's clothes?" And then, "Clothes always have little tags on them. Another small step." The result was Health Tags, which monitor patients and send data to their care teams. "We grow up with an image of Einstein and the light bulb. Somehow a new idea is like this: 'Ding!'" says Palley. "The reality is that it's a process of iteration. And improv gave me a structure to do that."

## Be vulnerable.

Improv informed UCSF associate professor **Ryan Laponis**'s view of risk-taking, he says, which helps him teach communication skills to medical students and faculty in an open, feedback-friendly environment. "In order to do improv, you have to create a sense of safety and connection to allow for that vulnerability, to allow for failure," says Laponis, '02, MS '03. "Going through that as a learner was incredibly powerful."



## Don't go it alone.

Improv teaches you to "really tap into that sense of 'I can learn from other people,'" says actor, improviser and trainer **Claire Slattery**, '09. Slattery, who coaches groups on collaboration techniques, says applied improv has become a sought-after skill set because there's growing recognition that solving some of society's more intractable problems will require its particular brand of humility and openness to partnership. "We're seeing it in politics. We're seeing it in social justice. There's so much more empathy and understanding that nothing can be done alone," she says.

## The journey is the thing.

What makes improvisers so good at creating something out of nothing isn't as much about *what* they do as it is about *how* they do it, says **Lisa Rowland**, '04, a performer and teacher at BATS Improv, Stanford lecturer in theater and performance studies, corporate communications trainer and co-host of the podcast *Monster Baby*. "Approaching one another generously; paying close attention; assuming brilliance on the part of our partners; showing up with a willingness and an openness and a playfulness and a boldness; being willing to be courageous; also being willing to cede the floor." While she can't guarantee what will happen in life or onstage, Rowland says, "I can commit to showing up in a particular way. And I trust that something good will be on the other side of it."



## Stay positive.

Improvisers begin a scene by establishing the setup, says mindfulness teacher **Ted DesMaisons**, '90, MBA '96, who co-hosts the podcast *Monster Baby* with Lisa Rowland and recently wrote *Playful Mindfulness: A Joyful Journey to Everyday Confidence, Calm, and Connection*. "If the setup includes something negative, that really limits your options because the urgency of the negative has to get resolved right away. If the setup is more neutral or positive, the scene has more places to go." Our minds are similarly powerful storytellers, he says. When you can avoid a negative perspective, he says, "a broader horizon is possible."

## Trust that the scene will evolve.

"Improv energetically prepared me to be a clinical psychologist in a way that I don't think anything else really could have," says **Ilyssa Silverman Bass**, '03, MA '03.

"The longer you do it, the more you enter the scene with a calm curiosity and excitement to discover what comes next. I think I was conditioned through improv to look forward to the unexpected with other people."



## Accept the offer.

Screenwriter **Adam Tobin**, '93, learned from improv that offers are everywhere, just waiting to be noticed and accepted. Tobin, a Stanford senior lecturer in art and art history, will ask his screenwriting students to write down a title for a movie or TV series using their own first initial, then start thinking about what that story might be. "The point is to get information, notice it, and then trust yourself enough that you can play around with it a little bit. And it doesn't have to be perfect." ■





SPOTLIGHT

# From Ear to Ear

Plastic surgeon Sheryl Lewin gives kids with microtia a reason to smile.

BY DENI ELLIS BÉCHARD

**d**URING HER RESIDENCY in plastic surgery, Sheryl Lewin, MD '98, was given a block of soap, a carving tool and 30 minutes to sculpt an ear. Afterward, she looked up its anatomy. "Oh," she remembers thinking, "it's a lot harder than one would think."

Almost a decade later, by then an attending pediatric plastic surgeon, Lewin was the one challenging herself. Her son was 5, and whenever he napped during a family vacation, she carved the shape of his ear into a block of soap. Though she came closer to capturing its structure, she still wasn't satisfied.

In the years since, Lewin has devoted her career to understanding the complex elegance of the ear. For her patients, she is as much an artist as a physician, focusing her career around a single procedure: creating ears for children born with microtia. The congenital

condition affects one in every 6,000 to 12,000 children and ranges in severity from a small ear (the literal meaning of *microtia*) to a hint of undeveloped ear tissue to no ear at all.

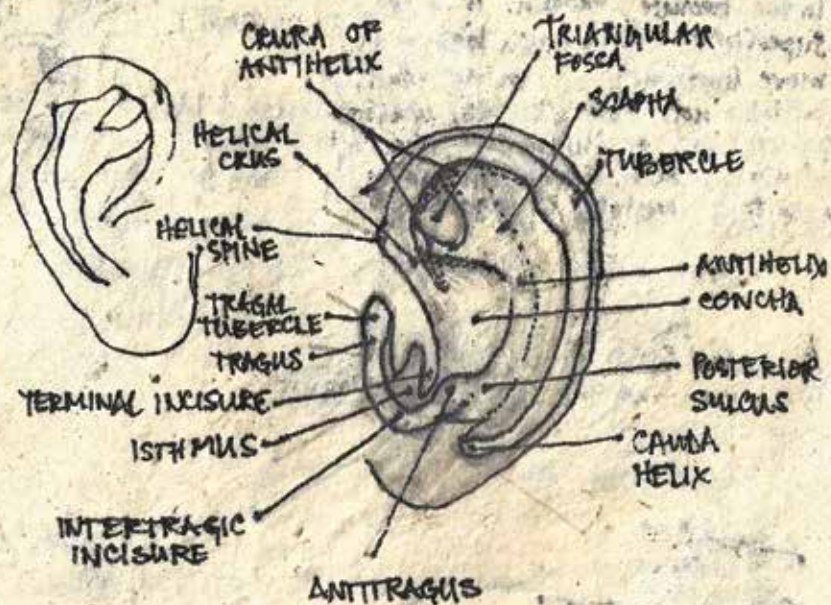
Historically, masters of realistic art have stood out for their skill in representing this complex part of the human body, such as in Renaissance painter Antonio Pisanello's *Portrait of Leonello d'Este*, of which one critic writes "the delicate, shell-like ear give[s] an impression of refinement and quivering sensitivity," or in *October*, the 19th-century naturalist tableau by Jules Bastien-Lepage in which the perfectly detailed ear of a young woman harvesting potatoes is rendered near the center of a pastoral landscape.

And yet the analogy between art and surgery falls short, since Lewin's work goes well beyond representation, and the material she uses is both synthetic and organic: a rigid

polymer sculpture that she overlays with fascia and skin. She must take into consideration function, sensation and physical integration with a vision of how the ear will fit as the body grows, since her patients—the majority of them children—will spend a lifetime with her creations.

**LEWIN NEVER PLANNED** on becoming a physician. The child of a nurse and an architect, she grew up in Studio City, Calif., passing her free time drawing, painting and sculpting. In third grade, Lewin started a business creating made-to-order sculptures. She sold the figurines to family friends, and by the time she was in high school, she was composing them inside glass spheres—with techniques similar to building a boat inside a bottle—and turning them into Christmas ornaments. When it came time for college, Lewin decided to

**AUDIOPHILE:** Lewin has been refining her ear artistry since residency. Today, she constructs ears from custom polyethylene implants.



### ARTERIES

SUP. TEMP. A. + OCCIP. A.  
POST. AURICULAR A.

### NERVES

AURICULOTEMPORAL N. (V<sub>3</sub>)  
AURICULAR N. (X)  
GREAT AURICULAR (C<sub>2-3</sub>)  
LESSER OCCIPITAL N.

supply superior cranial surface

from posterior SCM m. (superf. temp a. - post. auricular v.)  
supplies lower lat surface (deep to this n.)  
Arnold's nerve: supplies concha & post. canal

supplies suprat auricle & skin of sup. ant EAC & tympanic membrane

55







**MODEL, PATIENT:** Lewin scans Jady Sappington to create ears for her younger sister, Annika.

study architecture at UC Berkeley.

Though she loved architecture, she struggled to see it as the right career. As she was nearing graduation, her boyfriend, John—her high school sweetheart and now her husband—asked her why she'd never considered going into medicine. He had a point. "I like working with people in a more direct way," Lewin says. "Architecture was missing that human component."

At first, she thought it was too late to embark on medical training. But John found a nearby postbaccalaureate program where she could complete premed requirements. He also called med schools and was told that it wasn't too late.

"Well, let's see if I can handle science," she recalls telling herself. "To my surprise, I was much more interested in the science courses than I anticipated. And I very much remember my interview at Stanford. I came home and said that would be my dream." The ambition and social concern of its students impressed her, as did the Medical Scholars Research Program, a funded fifth year that allows students to gain hands-on experience in academic research.

The final turning point in her search for

a vocation came when, as a medical student, she saw her first cleft lip. "I called my husband and said, 'This is what I'm going to do.' It's an amazing concept to me. You take this brand-new baby from its parents. They've only ever looked at this child who's had an obvious deformity, and you bring back this baby who's had this great transformation."

As a resident in plastic surgery at USC, Lewin learned the reconstructive techniques for microtia. "She had already determined she was going to be the best at ear reconstruction and take it to another level," says David Kulber, one of her professors there.

Most surgeons treat microtia by creating an ear from rib cartilage (the microtia team

**'Our story had gone from a little girl who wasn't able to have ears and was made fun of. Now Annika gets to have ears, and she gets to say they are her sister's ears.'**

at Lucile Packard Children's Hospital Stanford has its own specialized technique for doing so). Lewin has pursued an alternative technique, developed in Germany in 1982, that she learned about in 2004, during her postdoctoral fellowship in craniofacial and pediatric plastic surgery at Children's Hospital in Los Angeles. Using porous polyethylene, it allowed for the creation of ear implants that, though thin, were strong

enough to resist the contraction of the healing skin—a process known as scar contracture. By melting the implants together and carving them, she could fashion aesthetically pleasing ears.

**LEWIN SETTLED DOWN** in Southern California, where today she lives in Palos Verdes with John and their children, Geoffrey, 17, and Kaci, 16. By 2007, the year she carved Geoffrey's ear in soap, she was director of microtia at Children's Hospital. Five years later, she began a private practice in Torrance, Calif., focusing almost exclusively on the condition. She now performs 150 ear surgeries each year.

Lewin's continued quest to make ever-more-realistic ears led to an unpaid role advising Poriferous, a company producing custom polyethylene implants. She recommended developing the ear in a single piece, which reduces the risk of breakage when children play. In 2018, she hit on another innovation: using a 3D scanner on patients' "big" ears or, in the case of children without either ear, on siblings'.

"As much as I thought I was doing OK sculpting, I was never as good as what this silly little scanner has taught me," she says. "There's so much more detail than even I knew. You think of the ear as an oval, but if you really look at it from the back and the side and other angles, it's actually moving in three different dimensions."

Before each surgery, she begins with a 2D drawing on paper of the ear, eye and eyebrow on the unaffected side to capture "the artistic gestalt of where the ear should go." In surgery, she lifts the skin where the ear is missing, as well as the tiny earlobe present in many microtia patients, keeping them attached to the body's blood supply. She does the same with a flap of fascia—thin, translucent tissue rich with arteries, veins and nerves that is capable of nourishing and giving sensation to grafted skin. Next, by carving two millimeters at a time from the base of the polymer implant, she fits it to the skull, stitches it in place and covers it with fascia. She then puts in a drain that she suctions to mold the fascia over the implant like shrink-wrap.

After evaluating symmetry and placement, she sews the skin—seven square inches are required to cover the ear—artfully to hide the scars. Some of this skin comes from the belly,

and since its coloration is slightly different, Lewin uses it for the back of the ear. For the front of the ear, she removes skin from the back of the opposite ear and grafts it to the fascia. She attaches the tiny earlobe, sculpts a tragus (the fleshy prominence in front of the ear canal) and creates the appearance of a canal for children who don't have one. In some patients, she implants a titanium screw in the skull that will later allow a hearing aid to transmit vibrations to the cochlea.

Shannon Sappington, who brought her daughter Annika to Lewin for microtia surgery, recalls her as "honest and very bighearted, very patient and so down-to-earth." In 2017, Sappington and her husband, Jay, adopted Annika from an orphanage in China, where she had lived for eight years. She had been born without ears. The couple already had three children, so Lewin scanned the ears of their eldest, Jady, who was only a year older than Annika, to create implants for her.

"I'll never forget when, in March of last year, Dr. Lewin washed Annika's hair and took off the ear mold that was protecting her new ear," Sappington recalls. "Dr. Lewin warned Annika, 'Remember, it's going to be all kinds of crazy colors at first. It's going to be purple and red.' When Dr. Lewin took that mold off, Annika was really quiet and shy. She glanced in the mirror and she was trying to hide a smile. I got emotional, and Dr. Lewin got emotional. Our story had gone from a little girl who wasn't able to have ears and was made fun of. Now Annika gets to have ears, and she gets to say they are her sister's ears."

In addition to Lewin's private practice, she also runs Earicles—Miracles for Ears, a nonprofit for children with failed microtia surgeries. She redoes the surgeries in her clinic, which is "warm and welcoming—more like a living room than an exam room," Lewin says. The operating room, where she spends up to 10 hours a day, has a wall of opaque glass that reveals the shadows of the trees outside. Lewin designed the clinic herself, putting her architectural skills to use at last. ■

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# FLIPPING BURGERS

**CAN PLANT-BASED 'MEAT' REPLACE THE REAL THING,  
OR IS THAT JUST AN IMPOSSIBLE DREAM?**

BY

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2018, Americans ate 26.8 billion pounds of beef. They ate it at home and in restaurants, at ballparks and picnics, in taco salads and pasta dishes, morning, noon and night. The average American eats three hamburgers a week. Multiply that by the 2018 U.S. population of 327.2 million and you get enough burgers to circle the earth 126 times.

A market as large as that is bound to attract disruptors. Over the past decade, several companies devoted to developing meat alternatives have emerged, and they're now beginning to prosper. A growing number of Americans are opting for "beef" that comes from a lab kitchen, wooed by plant-based products that mimic the taste, texture and appearance of the real thing. Over the past two years, sales of alt-beef have grown 38 percent.

One of those companies, Impossible Foods, founded by Stanford professor emeritus Pat Brown, cracked the fast-food

market—the Impossible Whopper was introduced by Burger King last August—and its burgers can be found in 17,000 restaurants nationwide. In May 2019, Impossible's competitor Beyond Meat had the most successful initial public offering of any major company since 2000, when its stock skyrocketed 63 percent on the first day of trading.

Burger alternatives have been around since the days of hippie counterculture and the '70s classic *Moosewood Cookbook*. The Impossible Burger marks a departure from those homely patties slapped together from ground-up mixtures of grains, mushrooms, legumes, nuts, seeds and tofu. Created in a lab, it looks and acts like beef. It sizzles when it hits a hot pan, and it "bleeds" when you press it with a fork. Moreover, unlike its predecessors, the Impossible Burger isn't aimed at vegetarians. It's a plant-based burger for carnivores. The beef industry has taken note of the threat and is pushing back.

A recent full-page ad in the *New York Times* sponsored by meat producers compared the new plant-based burgers to dog food, daring people to differentiate between their ingredients. A Super Bowl ad that aired in the Washington, D.C., area depicted a contest in which kids were asked to spell ingredients in a plant-based burger. In the "first synthetic meat spelling bee," a little boy in giant glasses has to spell *methylcellulose*, a binding agent used in the Impossible Burger. He fails, then cheerfully spells *bacon*. Says

the narrator: "If you can't spell it, you probably shouldn't be eating it."

Impossible shot back with its own spelling bee ad. Pat Brown played the moderator, asking a ponytailed contestant to spell *poop*. The gist is that fecal material at beef-processing plants sometimes makes its way into the meat. "Just because a kid can spell *poop* doesn't mean you or your kids should be eating it," says Brown in the ad.

The marketplace success of Impossible and other alt-beef producers is focusing new attention on claims they make about nutritional and environmental benefits. Is a plant-based burger better for you than a meat one? And how does the environmental impact of producing alt-beef compare with that of raising beef cattle at a large scale?

The burger battle is on.

## THE IMPOSSIBLE DREAM

Before he was in the business of disrupting the beef industry, Pat Brown was the head of a celebrated genomics lab at Stanford Medicine. A biochemist and pediatrician, he co-invented the DNA microarray, a tool that allows scientists to see how genes are expressed in individual cells and to identify mutations.

While on an 18-month sabbatical in 2009, Brown decided he wanted to do something about what he considers the biggest existential threat to the planet: the use of

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## 1885

### Hamburger Charlie

There are multiple claimants, variously disputed, about the origin of the hamburger. The earliest belongs to Charles Nagreen of Seymour, Wis., who at age 15 flattens a meatball between two pieces of bread to create a walkabout snack, and sells them to patrons at his hometown county fair. Nagreen, who lives in a neighborhood of German immigrants, names the sandwich after the German town of Hamburg.



## 1891

### Oscar: Not Just for Hot Dogs

Oscar Weber Bilby serves the first hamburger on a bun at a Fourth of July party at his farm west of Tulsa, Okla. Oscar is best known at the time for his Superior Root Beer, and his burger-on-a-bun is meant to complement the soft drink. In 1933, the Weber family opens Superior Root Beer Drive-In, which is still in business.



**‘THE USE OF ANIMALS, THE FOOD TECHNOLOGY, IS ESSENTIALLY COMPLETELY RESPONSIBLE FOR THIS CATASTROPHIC COLLAPSE IN GLOBAL BIODIVERSITY.’**

**—PAT BROWN**

animals in food production. In 2011, with \$9 million in venture funds, Brown founded Impossible Foods. Its mission: “To save meat. And earth.”

Brown says we are poised to make a shift similar to when humans went from hunter-gatherers to domesticating livestock for food. It made sense then; it makes no sense now, he asserts.

“The use of animals, the food technology, is essentially completely responsible for this catastrophic collapse in global biodiversity,” says Brown, who at 65 still runs marathons. “What people don’t realize is it’s not just that we won’t see giraffes anymore if we stay on this path. It’s that we depend on that biodiversity to keep the ecosystems

and our planet healthy.”

But most people won’t give up eating what they love, Brown acknowledges, even if it is for a good cause. “That means that we just have to find a way to satisfy the demand for beef, because it is not going to go away.”

So Brown assembled a team of mostly Stanford-trained scientists and put them to work developing a meatlike product that would be good enough to satisfy even the most devoted beef eaters. The first obstacle for Impossible was to figure out how to reproduce the flavor that makes meat, well, meaty. It turns out a molecule called heme is the answer. Heme exists in both plants and animals, behaving similarly even though it is chemically different. It is heme that makes a

medium-rare Impossible Burger appear to bleed, and gives off the aroma of cooked meat. The company’s scientists figured out that soy was a good primary source of heme, but soon learned that uprooting hundreds of acres of soybean plants was not environmentally or financially sustainable. So they developed a different method: injecting the DNA from soy plants into genetically engineered yeast.

Sergey Solomatin, a former Stanford postdoc in chemistry, is director of research at Impossible. He laughs at the early memory of trudging through ankle-deep dirt in Minnesota, where soybeans are a dominant crop, pulling out the plants and using a hair comb to separate the heme-containing

## 1900

### Louis’ Lunch

Louis Lassen, a purveyor of steak sandwiches, slaps leftover ground beef between two slices of bread in response to a customer’s plea for a quick meal. The Library of Congress recognizes Lassen, a Danish immigrant who sold lunch items from a cart in New Haven, Conn., as the creator of the hamburger. In 1917, Lassen opens Louis’ Lunch, a restaurant still operated by the Lassen family.



## 1904

### The Handheld Burger

Restaurateur Fletcher Davis of Athens, Texas, takes his hamburger sandwiches to the **1904 World’s Fair in St. Louis**, where they grow in popularity. Shortly after, the “handheld burger” begins showing up on menus.

## 1921

### A Slider Is Born

**Walter Anderson**, a cook at the first White Castle burger stand, pairs up with insurance salesman Edgar Ingram to peddle five-cent hamburgers made of a thin ground beef patty cooked on a grill. They dub their 2.5-inch mini version a slider, a name later appropriated by other burger vendors.



nodules. “We ground the nodules up and brought them back and said, ‘Now make burgers,’ to the rest of the team. We had no idea.”

Finding that meaty flavor maker was a major milestone, but Impossible R&D also had to tackle texture—in short, to make its plant-based product behave like hamburger.

## ‘IF PEOPLE WANT TO WATCH THEIR DIET, EXERCISE MORE AND MAINTAIN A BETTER LIFESTYLE, THAT WOULD BE SMART, BUT I WOULDN’T SAY YOU NECESSARILY HAVE TO EAT LESS MEAT FOR BETTER HEALTH.’

That meant creating a ground mixture that would not crumble when cooked and that didn’t require special instructions.

At Impossible’s high-ceilinged laboratory inside the company’s Redwood Shores, Calif., headquarters, Solomatin demonstrates a machine that measures how much force is required to bite into and chew a burger; an appealing meat replacement needs to offer similar resistance. Other technologies test the burgers for cooking behavior, juiciness

and aroma (there is one room designated just for smell tests). The Impossible Burger itself is manufactured in a 68,000-square-foot plant across the Bay in Oakland, as its younger cousin, Impossible Pork, will be.

The second edition of the Impossible Burger, released in January 2019, contains 21 plant-derived ingredients. Some are unfam-

iliar to consumers, like the methylcellulose from the spelling bee ad. Protein comes from soy and potatoes, fat from coconut oil and sunflower oil. Binders and starches help hold the patty together so it doesn’t fall apart on the grill or in the skillet.

Many consumers cannot differentiate the Impossible Burger from a beef burger, an obvious win for the company. However, the Impossible version is more expensive than a conventional burger—it will run you \$16.95

at the Counter in Palo Alto, whereas a beef burger costs \$12.95—which helps explain why the company’s marketing focuses not just on taste but also on associated benefits Impossible says are inherent in a plant-based burger. Nutrition, for one.

### THE HEALTH ARGUMENT

Christopher Gardner has spent more than 20 years studying diets and food patterns and their impact on humans. A professor of medicine at the Stanford Prevention Research Center, he isn’t ready to declare the Impossible Burger the winner in the nutrition sweepstakes. “On the health side, we just don’t know yet.”

Gardner is counting on his study dubbed SWAP-MEAT (Study with Appetizing Plant Food-Meat Eating Alternatives Trial) to shed new light on the health results of eating plant-based versus animal-based meat. Funded by the National Institutes of Health, it will be ready for publication this summer. It is the first randomized study of its kind.

SWAP-MEAT is designed to investigate the effect on heart health, the gut microbiome and metabolic status when replacing the consumption of animal meat with that of plant-based meat. Participants consume specified beef products for eight weeks, then switch to plant-based meat alternatives for another eight weeks. Short-term studies like this one give investigators important clues

## 1926

### Say Cheese

The cheeseburger arrives on the scene when 16-year-old fry cook Lionel Sternberger places a piece of American cheese on a beef patty at the Rite Spot Restaurant in Pasadena, Calif.

## 1931

### ‘I Will Gladly Pay You Tuesday’

E.C. Seger, creator of the popular *Popeye* comic strip, introduces a new character: **J. Wellington Wimpy**, a hamburger fanatic.



## 1948

### The Golden Arches Arrive

Maurice and Richard McDonald open the first McDonald’s restaurant in San Bernardino, Calif. In 1955, entrepreneur Ray Kroc persuades the brothers to let him franchise the business and opens a **McDonald’s** in Des Plaines, Ill. By 1960, there are more than 1,000 McDonald’s nationwide.

about risk factors that can appear as early as two weeks into an altered diet. The findings will also inform future long-term studies.

In the meantime, critics point out that plant-based burgers are highly processed, contain GMOs and have much higher sodium content than a typical beef burger. (See graphic, right.) Among the most outspoken is John Mackey, co-founder and CEO of Whole Foods Market, which was one of the first supermarket chains to carry Impossible beef last fall. A 2019 commentary by three Harvard researchers in the *Journal of the American Medical Association*, while noting the risks of diets high in red meat, said people should also be “cautious” about the health effects of plant-based alternatives that use purified plant proteins rather than whole foods.

Others are unmoved by the “overprocessed” argument against alt-meat. Gardner points out that commercial bread has 27 ingredients. Commercially raised cows are fed antibiotics, hormones and feed additives, which end up in the beef. “Do those count as ingredients?” he asks.

John Ioannidis, an epidemiologist and a co-director of the Meta-Research Innovation Center at Stanford, says it’s too soon to jump to conclusions.

“Could there be harm from eating meat? Yes,” he says. “If people want to watch their diet, exercise more and maintain a better lifestyle, that would be smart, but I wouldn’t say you necessarily have to eat less meat for

WHAT’S THE DIFFERENCE?			
LEAN GROUND BEEF		IMPOSSIBLE BURGER 2.0	
4	OUNCES	4	
197	CALORIES	240	
11 g fat (4.5 g saturated)	FAT	14 g fat (8 g saturated)	
73 mg	CHOLESTEROL	0 mg	
74 mg	SODIUM	370 mg	
0 g	CARBOHYDRATES	9 g	
0 g	FIBER	3 g	
22 g	PROTEIN	19 g	

better health. We have no good data that a carnivore diet would be harmful, but our data are too thin in this regard.”

## ABOUT THAT PLANET

So if alt-meat burgers can offer a taste similar to beef but no particular nutritional benefits,

why pay more for them? The answer may lie in the smaller environmental footprint of alt-meat products. Impossible Foods (and its closest competitors) boasts that it uses 75 percent less water and 95 percent less land while generating about 87 percent less greenhouse gas emissions to produce its burgers than do producers of conventional beef

## 1948

### Some Sizzling Competition

**In-N-Out Burger** opens its first restaurant, a drive-through stand in Baldwin Park, Calif. Founder Harry Snyder installs two-way speakers that allow customers to place their orders without leaving their cars, an innovation later adopted by nearly all fast-food chains.



## 1971

**Stroganoff, Sort Of**  
General Mills introduces **Hamburger Helper**, a boxed concoction of dried pasta and seasonings, under its Betty Crocker label.

## 1982

### The ‘Hippie Burger’

London-based natural-food restaurant owner **Gregory Sams** coins the term *VegeBurger* when he introduces a meatless patty to his customers.





## WHAT'S YOUR BEEF?

Conventional, plant based, grass fed, lab grown  
or none of the above?

Tell us at  
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burgers. Come for the taste, invites Impossible in its promotions, but stay for the impact.

Much of the difference comes down to, well, cow burps. “Cows and other ruminants emit as much methane as all the oil and gas wells in the world,” says professor of earth system science Rob Jackson. “Eating plants lower on the food chain is more energy efficient and easier on the environment.”

It's unclear exactly how harmful cows are to the planet, since comparisons of relative effects are complex and statistics can vary widely based on criteria used to evaluate them. For example, a 2019 study by the United States Department of Agriculture found that cows account for 3.3 percent of all greenhouse gas emissions in the United States, compared with 50 percent from electricity production and transportation combined. However, other studies assess not only the impact of the cows themselves but also how acreage used for livestock production claims land that would otherwise

provide natural carbon sinks. One such study, by the Food and Agricultural Organization of the United Nations, placed the percentage of worldwide greenhouse gas emissions caused by livestock at 14.5 percent, more than half of which is attributed to cattle raising.

“The impact of 93 million cows on the country is a real story not understood in terms of its depth and adversity,” says Denis Hayes, '69, JD '85, CEO of Seattle-based environmental nonprofit the Bullitt Foundation. (Hayes also organized the first Earth Day.) “We are seeing the devastation of cattle grazing and overgrazing playing out across the world, the overuse of pesticides, cow burps that add to methane pollution, beef contamination in the slaughterhouse, antibiotics and other contaminants in our meat, even the impact on climate change, which is the most dangerous factor.

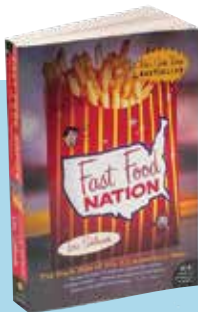
“We are not anti-cow; we are pro-cow in the right circumstances, but in the vast majority of cattle facilities, we feed cows the

equivalent of candy corn,” Hayes says, referring to the corn-based diet fed to the majority of factory-farmed beef cattle. “We are trying to make them fatter faster. It sounds wild, but our goal is to get people to start noticing what kinds of grasses beef are raised on, what kind of soil.”

Fourth-generation cattle rancher Cory Carman, '01, couldn't agree more. She says we don't have to turn to lab-produced meat to protect the environment.

It was the feedlots she'd see driving back and forth from her home in Oregon to Stanford that inspired Carman to return there and focus on ranching practices that were regenerative, humane and financially viable. “I came back [from college] determined to raise grass-fed beef,” she recalls. “I wanted to answer the question, ‘How can you raise cattle in a way that doesn't harm the environment?’ We are doing that.”

Carman says that by disturbing the soil with their hooves and fertilizing it with their manure, cattle that eat grass promote new growth, contributing to soil health and carbon sequestration. “Instead of talking about how to achieve that potential, we're often starting from a place of cattle being a source of methane and thus beef is inherently bad,” she says. “When we draw a circle around an entire system and say, ‘Oh, man, cattle emit methane, therefore we should not have any cattle,’ that is the wrong approach.”



### 2001

#### The Backlash Begins

*Fast Food Nation* by investigative journalist Eric Schlosser describes the influence of the fast-food industry on health, nutrition and the environment. The book becomes a bestseller and helps inspire a consumer movement away from industrial-scale processed foods.

### 2009

#### Beef Takes a Holiday

Beyond Meat sets up shop in Los Angeles with the motto “Planting the future of protein.”

### 2011

#### Meat, Your Match

Stanford biochemist Pat Brown leaves his faculty position to found **Impossible Foods**. Its goal: “to end the use of animals to make food.”



Raising and processing 100 percent grass-fed cattle is not easy, though, and it's more expensive than raising a large number of cattle in a massive feedlot, where economies of scale provide an advantage. Moreover, Carman Ranch keeps its animals munching on highly curated grasses for up to three years before turning them into steaks and burgers, whereas a corn-fed

says Steve Myrick, '05, vice president of operations for Memphis Meats.

"It's entirely possible to produce foods that deliver the same value and pleasure to consumers, with a tiny fraction of the environmental impact," says Impossible Foods' Brown. "It's up to us to figure out how to do that and make great products. Then we have to compete in the market-

## 'WE ARE NOT ANTI-COW; WE ARE PRO-COW IN THE RIGHT CIRCUMSTANCES, BUT IN THE VAST MAJORITY OF CATTLE FACILITIES, WE FEED COWS THE EQUIVALENT OF CANDY CORN.'

cow is fattened up quickly and slaughtered at 18 months.

Carman thinks there's a place in the future for beef as a luxury garnish, an artisanal product that people are willing to pay for.

### HAVE WE REACHED PEAK BEEF?

A Gallup poll released in January showed that more than 40 percent of Americans have tried plant-based meat products, while 30 percent still say they're "not familiar at all" with the products. Sales of plant-based meat could reach \$1 billion in 2020, the Good Food Institute projects. Ninety percent of those using plant-based products are not vegetarian or vegan, says a report from the NPD Group, a market research firm that studies consumer trends.

An article in the *Atlantic* predicted that beef eating may peak in 2020, not because people don't like beef anymore, or even because they are being environmentally aware, but because there are so many innovative options with which to replace it. And the alt-meat category will continue to grow. The newest aspirant, Berkeley-based Memphis Meats, is developing a product called cell-based meat—essentially animal flesh grown in a lab. "We want to create a scalable and sustainable way to bring meat to the plate so we can keep eating what we love,"

place. If we succeed, we would be taking that business away from the incumbent industry so that there's no economic incentive to continue."

Brown's zealous advocacy could leave the impression that he doesn't care about the people who work in the beef industry, but that's not true, he says. "When you replaced an incandescent bulb with an LED, it wasn't because you hate coal miners," he says. The shift, Brown predicts, could lead to better, safer, higher-paid jobs with crops, not cows.

That may be a while. The market share currently represented by plant-based beef is less than 1 percent. As consumers get more information and experience with alternatives to conventional factory-farmed beef, the latter industry may contract, but how soon and how far is anyone's guess. For now, the traditional hamburger reigns. Will it coexist with its plant-based rivals? Not if Brown has anything to do with it. He wants total victory.

"My goal was not to be in the food industry, not to start a food company and not to work on plant-based beef. It was to take down the animal-based food industry as quickly as possible." ■

MELINDA SACKS, '74, is a senior writer at *STANFORD*. Email her at [msacks@stanford.edu](mailto:msacks@stanford.edu).

## CHAMPIONS OF AGING WELL



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# THE Elixir OF Youth

by Deni Ellis Béchard

Young  
blood  
and the  
search for  
biological  
immortality.

Eternal youth is among humanity's oldest quests. For centuries, from the British Isles to Japan, people searched for fountains and elixirs. In ancient China, wealthy individuals consumed potions made from gemstones to metabolize the endurance of jade or cinnabar, or from gold to keep from "tarnishing." But in Europe, a touted panacea was human blood, bought fresh from executioners during Medieval and Renaissance times, or—much earlier, in ancient Greece—harvested from virgins and gladiators. As has so often been the case, the Hellenic people were on to something.

The first murmurings that young blood might

illustrations by Bruno Mallart



mitigate the effects of aging echoed through the scientific community in 2005. A team of Stanford researchers had paired old mice with young mice, linking their circulatory systems, and within five weeks, the muscle and liver tissues of the old mice began to resemble those of the young mice. The common belief that aging results from simple wear and tear suddenly seemed questionable. Rather, the body's cells appeared to receive signals from the young blood telling them to regenerate.

The gold standard of science is reproducibility, and over the next 15 years, trials repeatedly showed health improvements in old mice dosed with young blood. Few scientists questioned its restorative effects, but many asked which of its components were responsible and who would be the first to distill those and bring them to market.

"Just a couple decades ago, if you postulated that you could slow down or reverse aging, you were really out there," says Stanford professor of neurology and neurological sciences Tony Wyss-Coray, "but now, just in the past 10 years, there are so many interventions—genetic interventions, diets, environmental interventions—that show that you can slow down aging or even reverse aging, measured with many different tools."

In recent years, life-extension therapies have hit the mainstream. Unlike their enthusiasts who promise the imminence of biological immortality, Wyss-Coray stands out

for the rigor with which he has researched how young blood affects the brain. Chosen by *Time* in 2018 as one of 50 people transforming health care, the 55-year-old Swiss-born American is also a skeptic. "I am not one of these researchers who would take a drug they work on because they believe in it so much," he says. He points out that trial after clinical trial with humans—many of which were based on promising mouse experiments—has failed. Yet through his work at Stanford and Alkahest, the biotech company he co-founded, he has brought us closer to understanding how young blood can rejuvenate the brain and which of its components do so. (Hint: They're not specific to virgins or gladiators, or even mice.)

## Making Cells Young

**Parabiosis** ("living beside"), a state in which two organisms share physiological systems, as in conjoined twins, was surgically induced for the first time by French zoologist Paul Bert in 1864. As a proof of concept, he linked the circulatory systems of two rats. The technique won him some attention but largely fell out of use until the 1950s, when researchers joined rats to evaluate whether the metabolic needs of one affected the other. (They did.) During that same period, Clive McCay, a gerontologist at Cornell, devised heterochronic ("different in time") parabiosis, in which old rats were conjoined with young rats,

which resulted in minor increases in life span for the old rats. Half a century later, the technique was revived, this time at Stanford under the leadership of Thomas Rando, professor of neurology, and Irving Weissman, MD '65, professor of developmental biology. "We had been studying the decline in tissue regeneration with age," Rando recalls, "and we had been trying to understand the mechanisms by which specifically the stem cells in old animals failed to engage in tissue repair like stem cells from young animals."

The results were startling: Old mice soon exhibited significantly enhanced repair of muscle and liver tissue. Something in young blood was activating stem cells, the cells responsible for tissue repair. The aged cells themselves began rejuvenating—a word that Rando uses cautiously, since measuring a cell's biological age is difficult. "But certainly what we seem to be doing," he says, "is conferring youthful properties to old cells."

The regeneration appeared to involve epigenetics. "What makes a liver cell different from a skin cell," Rando says, "is not the DNA—the DNA is the same—it's the epigenome reading that DNA in a different way. We have evidence that with age you get the same kind of thing happening, where the DNA is essentially the same but the readout of that DNA is different, and it's possible to reprogram that so that the old cell becomes younger by the way it reads its DNA."



## The Plasma Swap

**Wyss-Coray** joined Stanford's faculty in 2002, recruited by Rando, who was spearheading a research program on aging and age-related diseases. Wyss-Coray had completed his PhD in immunology at the University of Bern and a postdoc at Scripps Research Institute and the Gladstone Institute and was developing ways to diagnose Alzheimer's—a disease to which he had a personal connection through his father-in-law. "I saw how he disappeared," Wyss-Coray recalls, "and how in the end there was just a shell."

Wyss-Coray had conducted his research with mice engineered to express Alzheimer's symptoms, but the lack of progress in diagnosing and treating the disease in humans frustrated him. At Stanford, he focused on how to detect the disease in

— — — — —  
'Just a couple decades ago, if you postulated that you could slow down or reverse aging, you were really out there.'



people. "You can't study the brain at the molecular level unless a person has died," he says. "But you can probe the blood. The idea is that if something happens in the brain, it will leave molecular signatures in the blood."

When he analyzed human blood for clear markers specific to the disease, he found them as well as biomarkers of old age—which appeared to grow stronger as a patient's Alzheimer's advanced. "The aging connection," he says, "came from following the trail to understand Alzheimer's and realizing that the strongest signature we kept seeing was an aging signature." After publishing these results in 2007, he increasingly found himself being invited to conferences on aging, a field in which he'd previously held no ambitions.

Rando and Wyss-Coray then combined their efforts to investigate how heterochronic parabiosis affects the brain. In a 2011 paper in *Nature*, they showed that young mice infused with the blood of old mice had impaired learning and memory. In 2014, in *Nature Medicine*, Wyss-Coray's lab went further, publishing a paper that stated: "Exposure of an aged animal to young blood can counteract and reverse preexisting effects of brain aging."

During this time, Wyss-Coray's lab showed that parabiosis wasn't necessary to conduct these experiments. Plasma—the liquid part of the blood—could simply be injected. It didn't even have to come from the same species. "If we take plasma from old people and put it into young mice," he says, "we make the brains of mice more inflamed, we reduce stem cell activity, and we impair cognitive function. If we take plasma from young people and put it in an old mouse, that old mouse has more stem cell activity, has less inflammation and their memory function is better."

While Rando and Wyss-Coray were conducting their research, Amy Wagers, a postdoc with the 2005 Rando-Weissman research team who is now professor of stem cell and regenerative biology at Harvard, was doing her own investigation into heterochronic parabiosis. In 2013 and 2014, her lab published research showing that parabiosis promoted muscle regeneration in older mice and made their enlarged and inefficient

hearts resemble those of young mice.

Speaking of the chronic diseases prevalent in older individuals, Wagers says, "A hypothesis that's being tested not just by my lab but by many around the world is that the common denominator is aging, that there are fundamental mechanisms of aging that are seeding these diseases. Often there's a confounding of life-span extension and strategies targeted at improving the health of older individuals. It's entirely possible those two things will be connected, but it's also possible that they are not. You could have an impact on health without changing life expectancy. And that, I think, would also be a win."

## Now, Wait a Minute

**Around** this time, the idea that young blood had rejuvenating qualities started generating excitement in Silicon Valley, where start-ups began charging tens or hundreds of thousands of dollars for plasma transfusions. Cashing in on the buzz, HBO's *Silicon Valley* featured a scene in which Gavin Belson—chief innovation officer and tech supervillain—watches a PowerPoint presentation while receiving blood from his "transfusion associate." Even Joe & the Juice, a global chain of juice bars with several locations in Palo Alto, got in on the fun, including "Young Blood" on its menu (it contains celery, lemon and apple).

The FDA, responding to companies bringing young blood to market before either the mechanism underlying its short-term effects or its overall long-term impact was understood, issued a warning in February 2019, stating that "some patients are being preyed upon by unscrupulous actors touting treatments of plasma from young donors as cures and remedies. Such treatments have no proven clinical benefits for the uses for which these clinics are advertising them and are potentially harmful."

Wyss-Coray sees premature commercialization of young blood overshadowing the research aims of Alkahest, which he co-founded in 2014 and on whose board he and Rando serve. "We are very different," he says. "We use clinical trials to demonstrate whether this really works. In a



clinical trial, you cannot charge the subject.”

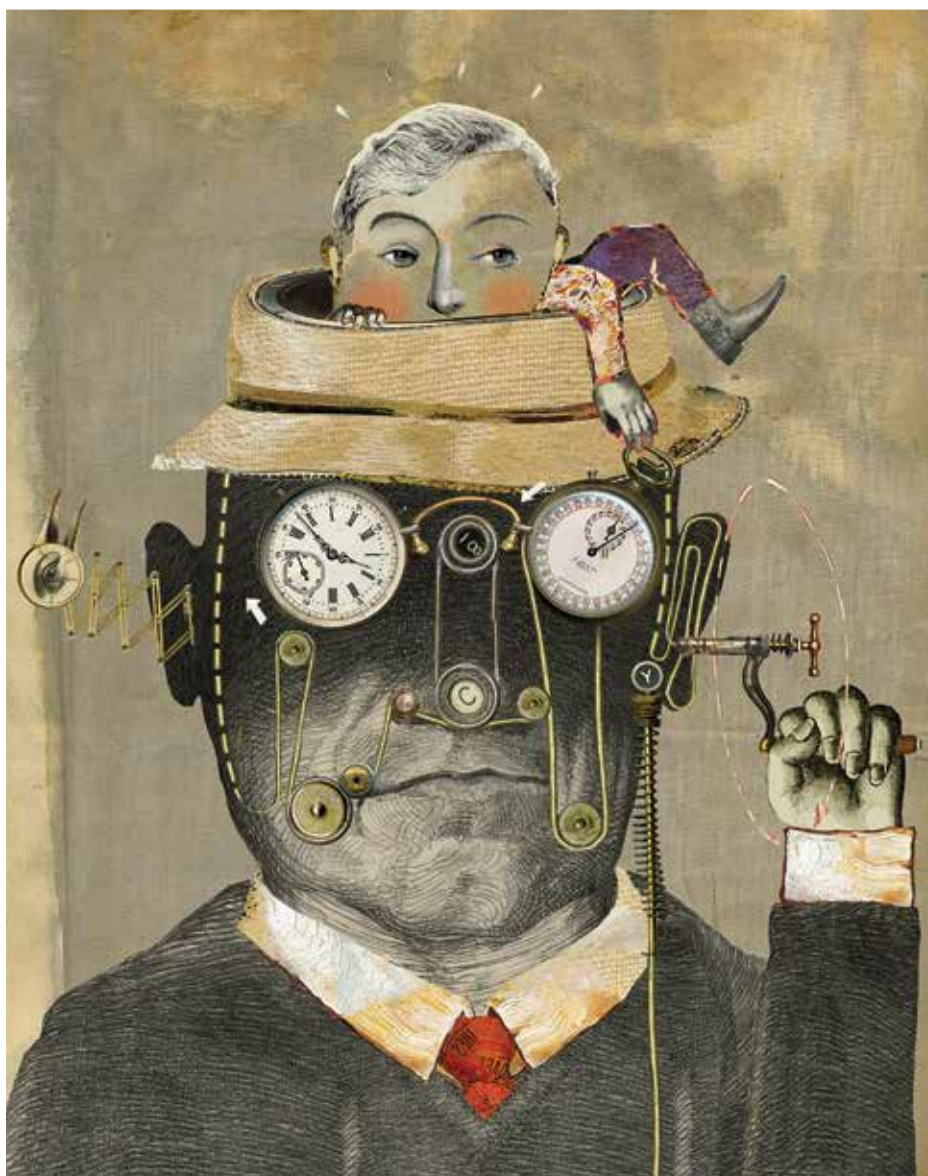
The challenge now was legitimizing what had previously looked to be one of the most promising breakthroughs in the field of aging.

## The Philosopher's Sponge?

**The story** of Alkahest begins with Chen Din Hwa, a philanthropist in Hong Kong who owned the Nan Fung Group—one of the city's largest privately held property developers. In 2009, at the age of 86, Din Hwa learned he had Alzheimer's and also began receiving blood transfusions for cancer. His grandson, Vincent Cheung, who holds a bachelor's in molecular and cell biology from UC Berkeley, noticed that after each transfusion, his grandfather's lucidity temporarily increased. When he shared this observation with Karoly Nikolich, a family friend who was an adjunct professor of psychiatry and behavioral sciences at Stanford and had a long history of involvement in biotech, Nikolich told him about Wyss-Coray's work. Not long afterward, the Nan Fung Group expressed interest in seeding a company.

Din Hwa died in 2012, but two years later, Alkahest was founded, with Nikolich as CEO and Wyss-Coray as chair of the scientific advisory board. The company's name came from Wyss-Coray's readings on Paracelsus, the 16th-century Swiss alchemist who claimed to have invented alkahest—a universal solvent that could dissolve any substance to its individual parts. It was supposed to be the philosopher's stone—a centuries-old notion of a material that could transmute base metals to gold and restore youth.

“Here we have plasma,” Wyss-Coray says, “which is this complex soup, and if we can figure out the rules and the individual components, we understand life, if you will.” But invoking Paracelsus conveyed a subtler message. “Paracelsus is credited as the founder of pharmacology because he discovered, or claimed to discover, that the dose makes the toxin. It depends on how much you take of anything whether it kills you or it has a beneficial effect.”



‘[T]he dose makes the toxin. It depends on how much you take of anything whether it kills you or it has a beneficial effect.’

To avoid incorrect dosing, Alkahest used an albumin-rich plasma fraction that contained many proteins commonly found

in young blood and that had already received FDA approval for transfusions, which facilitated the rapid start of clinical trials. (Due to the demand for millions of transfusions each year, donated blood is separated into the fractions that recipients need—only the red or the white blood cells, the plasma, or specific plasma proteins.)

While Alkahest does not disclose the reasoning behind the proteins it chooses for treatment, albumin has been of special interest due to its ability to stabilize other factors, preventing them from degrading. “Albumin is a sponge protein that's the most abundant protein in the blood,” Wyss-Coray explains. “It binds a lot of different factors and acts as an antioxidant to some

extent, and with age, it changes its function and it's not as effective."

In August 2019, Alkahest completed a six-month phase 2 trial. (Only after phase 3—a much longer trial with a larger cohort and a control group—does the FDA give approval.) Forty patients with mild to moderate Alzheimer's who had been treated with the plasma fraction over a period of six months showed no significant decline in cognitive function. "If you look at historic controls of people who have Alzheimer's disease," Wyss-Coray says, "they go down very gradually on average, so there's a noticeable effect from the normal decline to no decline at all."

Wyss-Coray also embarked on another study that would help legitimize the use of blood plasma in treating cognitive decline. The vessels nourishing our gray matter are highly impermeable compared with those elsewhere, and historically, this blood-brain barrier was thought to keep out many elements in the blood, allowing only water and essential nutrients to pass through—not the types of blood factors that might cause regeneration. "It's still an enigma what this blood-brain barrier is," Wyss-Coray says. "We're basically postulating all you need to do to make the brain function better and have less inflammation and more stem cell activity is change the composition of the blood. And the first reaction from neuroscientists is, 'Are you crazy? These factors can't get into the brain.'"

Using molecular-labeling techniques, Wyss-Coray's lab tagged thousands of protein species in plasma and then injected it into mice. When the researchers looked at the mice's brain tissue under the microscope, they saw tagged proteins inside the blood-brain barrier and in the neurons themselves. There was no longer any question that the blood was sending molecular signals to the brain.

## Just a Matter of Time

**Understanding** aging scientifically demands a system of biological measurement. Chronological age is an imprecise gauge of health, as a quick comparison of vigor among octogenarians, much less

among people in their 30s or 40s, would reveal. Precisely assessing the protein composition of plasma at different ages, however, might provide a yardstick for life span.

"When I started 15 years ago, I was looking at about 100 proteins in the blood, and now I can look at almost 3,000 different proteins," Wyss-Coray says, emphasizing how advances in technology have benefited his research. Recently, in a study of 4,263 people aged 18 to 95, his team measured how the blood's protein content changes with age, then created an aging clock. The team discovered that people's biological age is generally within three years of their chronological age, with the exception of those who are unusually healthy or unhealthy.

The largest change in blood proteins takes place around 78 years old, when the concentrations of approximately 1,000 proteins decrease or increase. Smaller waves occur around 60 and even around 34. "That's super interesting to us," Wyss-Coray says, "because it suggests that the aging process is uneven, that the proteins that change then are not the same ones that change later. So you can start to ask what the biological processes are that change at an early age in people. How do they affect aging 20, 30, 50 years down the line? And if you want to have an impact on aging, would you actually have to intervene much earlier?"

## Remember Me

**Wyss-Coray** and his wife, Christina, the clinical coordinator at Stanford's Alzheimer's Disease Research Center, have two grown daughters—an urban planner and a PhD student in biology at Stanford—and a 16-year-old son. Wyss-Coray observes the rapidity with which his youngest child learns to use a new computer or phone. "I get frustrated when I see how quickly he picks up this stuff," he says and laughs. "I start to feel aging, and it gets annoying, especially cognitive aging—that your brain is not as fast."

He acknowledges the ticking clock but remains skeptical of solving aging for his generation. "I'm too realistic," he says. "We still have a limited understanding of biology in general. For a lot of these proteins, we know very little about them."

By mapping proteins associated with aging, he has come closer to identifying which of young blood's ingredients have regenerative potential. Still, the reasons that proteins are created at certain ages and how they affect the rest of the body remain poorly understood. He points out that while the life span of worms has been dramatically extended in labs, the same techniques haven't worked in humans or even mice, and he reiterates that mouse studies of the brain rarely produce results in humans. "Many clinical trials start with good, solid preclinical data—otherwise, you wouldn't put \$100 million into a phase 3 trial. And yet they fail, one after another."

Aside from the feasibility of life extension, Wyss-Coray also weighs the ethical considerations. Given the global demand for plasma and the already limited supply for people critically in need, synthetic plasma proteins would have to be made and might be available only for the wealthy. "There are huge socioeconomic implications," he says. "If we all of a sudden find something that prolongs life span to 120 in the average population, I don't think we could deal with that. There aren't enough resources, and the population would increase so rapidly that we could probably not cope with it without starting to kill each other or having massive famines."

In light of these concerns, Wyss-Coray's focus is on treating diseases and allowing people to have healthy lives (what both Rando and Wagers refer to as increasing "health span" rather than life span). As Alkahest raises funds for a phase 3 study on mild to moderate Alzheimer's, it is running other trials investigating the impact of young plasma on Parkinson's, severe Alzheimer's and recovery after surgery. It is still years away from definitively knowing whether young blood can treat age-related cognitive diseases.

As for Wyss-Coray's own cognitive decline, would he eventually consider using plasma to prevent it if the trials are successful? He hesitates and then says, "If the phase 3 data shows a positive effect? Yeah." ■

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DENI ELLIS BÉCHARD is a senior writer at STANFORD. Email him at [dbechard@stanford.edu](mailto:dbechard@stanford.edu).





# View Finder

BY MELINA WALLING



## **SKY LIGHTS**

“The Milky Way was the brightest I’ve ever seen it,” says Nora Hennessy, who captured this shot in the Peruvian Andes at over 12,000 feet above sea level. “Being on that high plateau—you feel like you’re on top of the world, but you also feel small with all the stars and mountains around you.”

**Once a year, photographers from across the university vie for the best shots on Earth. The reward comes with the territory.**

PH.D. STUDENT NORA HENNESSY, MS '17





**S**

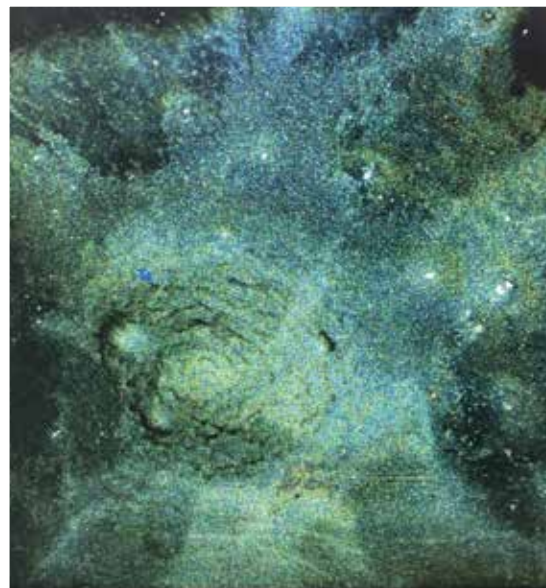
#### **EVEN CONTINENTS, MORE THAN 15 LOCATIONS, DOZENS OF CONTESTANTS.**

No, it's not *The Amazing Race*. The latest Earth Sciences Photo Contest drew more than 200 submissions from across the Stanford community. Heading into its third year in 2020, the competition put on by the School of Earth, Energy and Environmental Sciences is meant to inspire current community members and prospective students to learn and appreciate the stories behind earth science research and sustainability.

Entrants in the 2019 contest said stewardship was a common driver for their adventures. "I feel like when I travel to these amazing places and meet people who live in them, I'm a lot more motivated to work toward improving our energy systems—to do what I can about climate change," says Nora Hennessy, MS '17, a PhD student in energy resources engineering and the winner of the landscape photography competition.

Looking big-picture wasn't the only way to catch the judges' attention. Emily Lacroix, a PhD candidate in earth system science, was a finalist in the lab category with her up-close shot of carbon cycling research. "Soils account for over a quarter of global carbon dioxide emissions," Lacroix says. Microbes in the soil break down carbon-rich organic matter, a process that affects the rate at which carbon dioxide enters the air. Being able to alter that cycle even a small amount through land-use practices or other means could be helpful to humans, and the planet, she says. "Even a little wiggle room could have a huge effect. It could make things worse—or it could be a solution." ■

MELINA WALLING, '20, is an editorial intern at STANFORD and a master's student in earth systems studying environmental communication. Her photo "Grand Canyon Silhouette" received an honorable mention in the landscape photography category. Find this photo and more at [alu.ms/earthphotos2019](http://alu.ms/earthphotos2019).



#### **ISPY...**

Emily Lacroix studies soil carbon chemistry by looking closely—very closely—at organic matter she deposits on sheets of gold foil. "I snapped this view from the microscope with my phone," she says.

FROM TOP: JOAN ROUGHGARDEN; EMILY LACROIX, PHD CANDIDATE



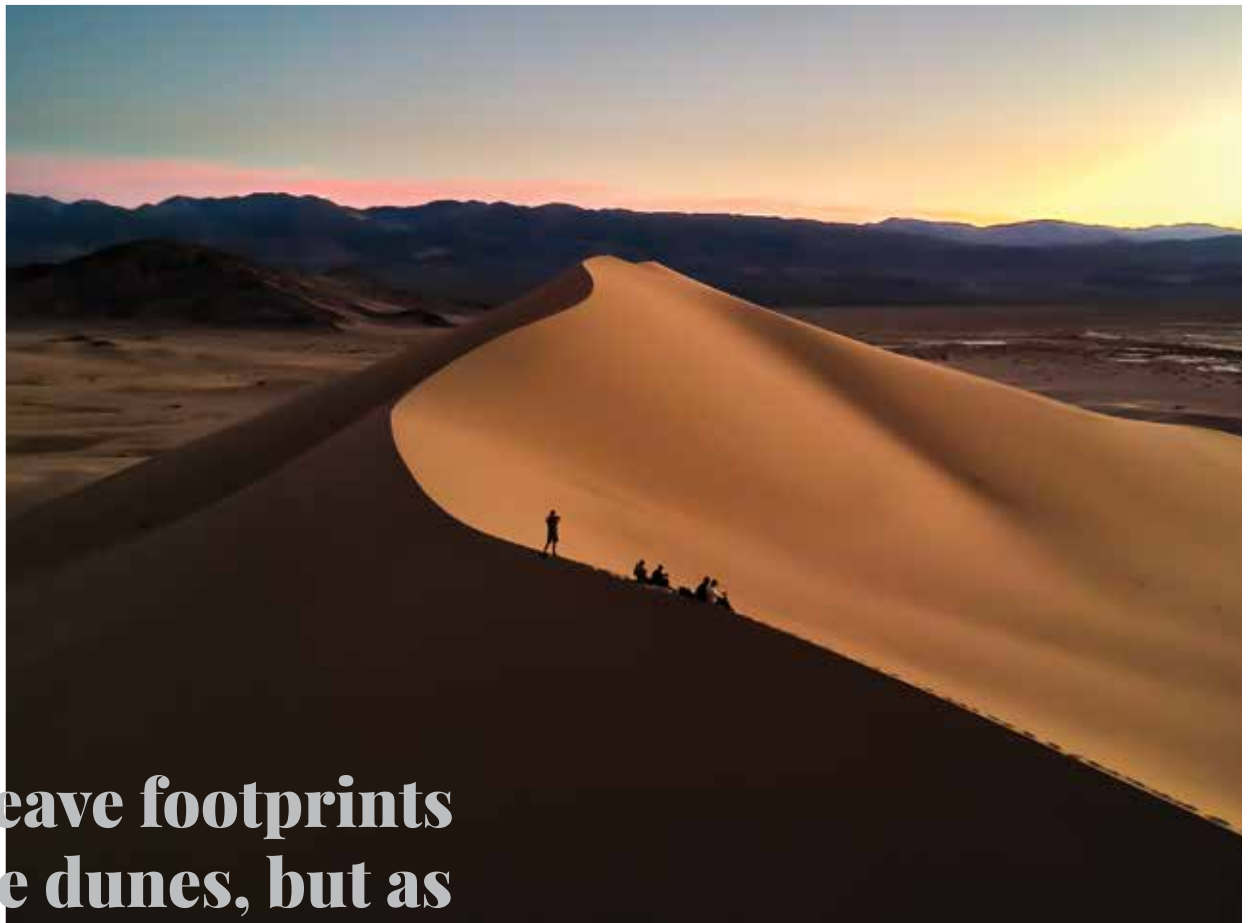


## **CRITICAL MASS**

Professor of biology and of geophysics emerita Joan Roughgarden created this panorama of king penguins while traveling to South Georgia Island in the South Atlantic Ocean, a major breeding spot for the species.

## **SLIPPERY SLOPES**

"You can see the dunes forming and reshaping right in front of you," says earth materials lab manager Katie Dunn. "As geologists, we enjoy going out and looking at these amazing features and trying to understand them." Dunn used a drone to snap the photo, including the mountains in the background for scale.



**'You leave footprints on the dunes, but as soon as the wind blows, they're gone.'**

*—Katie Dunn*



## **BACKLIT BEAUTY**

During her first field season in Palau, PhD candidate Heidi Hirsh, MS '19, snorkeled through Jellyfish Lake, where swarms of jellies (nonstinging, thankfully) congregate in the thousands. "It's a magical experience," Hirsh says. "You can look up and see through the surface of the water to the sky."



## **DEW POINT**

Hanna Payne, '19, a master's student in earth systems, spent an early morning hiking through a rain forest in Hawaii with some of her classmates in the Wrigley Field Program, a quarter-long series of courses blending the study of earth sciences, life sciences and Hawaiian culture. "The sun was just rising, and we were looking into a sea of fog," she says.



FROM TOP: HEIDI HIRSH, MS '19, PHD CANDIDATE; HANNA PAYNE, '19



## **JUST KEEP SWIMMING**

Hirsh had one goal for a dive trip to Indonesia: shooting a picture of the elusive clownfish, which she first noticed during her biogeochemistry research in Palau. “They’re curious, but they’re shy, and they can be hard to shoot because they move so fast,” says Hirsh, who studies earth system science.

‘Through my time traveling,  
I’ve come to realize that there’s  
a lot of important work to do  
in my own backyard.’

—Hanna Payne



## REVIEW

# Holocaust History That Resonates



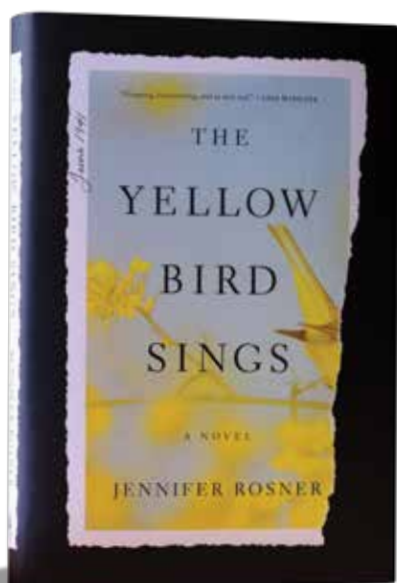
**CARA WALL, '92,**  
is a writer in New York.  
Her first novel,  
*The Dearly Beloved*,  
was published in 2019.

**THE YELLOW BIRD SINGS** is not a new story. At first, it feels too familiar; we have read, heard and seen many narratives about Jewish families hiding in barns and woods to avoid capture by Nazi soldiers. This one is about Roza, a mother hiding in a hayloft with her 5-year-old daughter, Shira. They endure the familiar traumas of World War II: hunger, illness, injury, near-capture, separation and Roza's rape. These terrible truths are presented matter-of-factly, almost too stoically; Roza and Shira resign themselves to the indignities of their situation without a fight, slipping passively into the silence that is essential for them to stay alive.

That silence, however, is not empty. It is full of music—soundless memories of Roza's father, a violin maker; and her husband, an orchestra violinist, Roza's own cello accompanying him as he played. Shira, too, is full of music she cannot reveal. She is a muted prodigy who, when given a piece of paper for the first time in years, asks her mother to teach her how to write notes instead of letters and then composes two lines of harmony on the page. The melodies are so strong that she invents an imaginary bird to sing them, one who can trill and squawk and fly away, as she cannot.

The use of music as a metaphor for the soul is older than any war. It, and the supporting cast of nuns, farmers' wives and ruthless commandants soothed by

forced concerts, could be trite and threadbare were it not for the breathtaking specificity of Jennifer Rosner's language. From a pastry piping tip in a coat pocket, to bleach poured over dark hair, to the sewing machine in a wooded camp, the details of these characters' lives emerge, intricate and distinct, full of longing and the understanding that "life itself [is] the holding together of small broken pieces." There are no surprises here, but there are many pleasures, and in the end, *The Yellow Bird Sings* is an old story beautifully told, reminding us that repeating horrible stories in human detail is the art that might keep us from repeating history. ■



**Shira begins humming, a melody to drown out tragedy. When her mother hushes her with a near-silent hiss, she in turn hushes her bird, who rears and pecks, angrily, not wanting to be silenced.**

*The Yellow Bird Sings: A Novel*, by Jennifer Rosner, PhD '98, Flatiron Books.

## *We Recommend*

# Our Common Ground

### **The Catalyst: How to Change Anyone's Mind**

Jonah Berger, '02,  
PhD '07; Simon  
& Schuster.

The trick is in  
convincing the  
“five horsemen of  
inertia” that they  
*want* to dismount.

### **Honestly Speaking: How the Way We Communicate Transforms Leader- ship, Love, and Life**

Andrew Blotky,  
'02, JD '09; Wise  
Ink Creative  
Publishing.

Authenticity  
rules: Know your  
audience, know  
yourself—and  
approach both  
with compassion.

### **How to Be a Conscious Eater: Making Food Choices That Are Good for You, Others, and the Planet**

Sophie Egan,  
'09; Workman  
Publishing.

So, you lucked  
into the super-  
market right after  
a restock? Here's  
how to bring  
home a better-for-  
everyone bounty.

### **Dare to Inspire: Sustain the Fire of Inspiration in Work and Life**

Allison Holzer,  
Sandra Spataro, '88,  
MA '88,

Jen Grace Baron;  
Da Capo Press.

Moments of insight  
need not be  
fleeting; the energy  
they spark can  
keep the motiva-  
tion going.

### **The War for Kindness: Building Empathy in a Fractured World**

Jamil Zaki,  
associate professor  
of psychology;  
Crown.

The time is now:

Learning to  
empathize with  
“the other” is an  
urgent step toward  
a stronger,  
kinder future.





# HONORING STANFORD LEADERS

## Gold Spike

*In 1969 the Stanford Cabinet designated the Gold Spike award as the highest annual honor for leadership service to Stanford. The original gold spike was driven by Leland Stanford in Utah in May 1869 to mark the final link in the nation's first transcontinental railroad.*

## Stanford Medal

*Introduced in 2006 by Stanford Associates, the Stanford Medal recognizes select alumni leaders who have provided decades of distinguished and significant service to Stanford.*

### 2020 GOLD SPIKE RECIPIENTS



**Fred W. Alvarez, '72, JD '75** is a remarkable Stanford citizen whose leadership at the Law School and advocacy for Latino alumni initiatives across the university have benefited Stanford in numerous ways. For four decades, Fred has held a

nonstop series of critical roles for the university including a term on the Board of Trustees and as Chair of the Law School Board of Visitors. Equally effective in the trenches and in the boardroom, Fred is dedicated to ensuring that Stanford strive to be the best version of itself.



**Susan P. Diekman, '65, MA '67** has been the indefatigable chair of the Cantor Arts Center's Director's Advisory Board since its inception in 2004. Under her leadership, the Director's Advisory Board has been a valued partner

to three successive Cantor Center directors as the museum's reputation as an arts destination has grown. Her service contributions to the university extend to the new Stanford Hospital, class reunions and campaign initiatives. Stanford continues to benefit from Sue's talents, energy and dedication.



**Stuart C. Burden, '84** is a wonderfully inclusive leader who has given his time and talents to scores of university efforts and initiatives. A stalwart volunteer for the class of '84, Stuart also served on the SAA's Board of Directors for nine years—including two as chair. Exceptionally dedicated and disarmingly modest, Stuart approaches his service with warmth, integrity, initiative, and a generous spirit.



**Michelle Greer Galloway, '87, JD '89** demonstrates her unparalleled commitment to Stanford in every project she champions and every partnership she fosters. A key leader for the Law School, Michelle is a trusted and sought-after advisor to staff and deans alike. An extraordinary mentor to students and young alumni, Michelle's collegiality and tireless, contagious enthusiasm for serving Stanford inspire fellow alumni to engage more profoundly with the university.



**Andrew J. Howard, '98** has distinguished himself as one of Stanford's most extraordinary volunteers with his abounding passion and enduring dedication to the university. A key volunteer leader for the Office of Undergraduate Admission for more than 20 years, Andy has recruited and inspired legions of alumni volunteers and made a notable impact for Stanford in Southern California.

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[alumni.stanford.edu/goto/associates](https://alumni.stanford.edu/goto/associates)

# Farewells

## FACULTY

**Albert Cohen**, of Stanford, December 31, at 90. He was William H. Bonsall Professor of Music, emeritus, and former chair of the music department. He started as a professional violinist, and then an interest in early Baroque music led him to pursue musicology. He published numerous books and articles on music theory and French music in the 17th and 18th centuries. Over the course of his career, he was awarded a Guggenheim Fellowship, Fulbright grant and multiple grants from the National Endowment for the Humanities. He helped establish Stanford's Lully Archive, Braun Music Center, and Center for Computer Research in Music and Acoustics. Survivors: his wife, Betty; son, Stefan, '88; two grandsons; and two siblings. His daughter, Eva, died the same day as her father.

**Hector Garcia-Molina**, MS '75 (electrical engineering), MS '77, PhD '79 (computer science), of Stanford, November 25, at 65, of cancer. He was the Leonard Bosack and Sandy K. Lerner Professor in Engineering and former chair of the computer science department. His research on distributed databases laid the foundations for online commerce and cloud computing. He was the author, co-author and editor of nine books and more than 400 articles and conference papers. His work was recognized by awards from the Association for Computing Machinery, American Academy of Arts and Sciences, and National Academy of Engineering. He helped launch the Stanford Digital Libraries Project to digitize traditional libraries; the project's early research assistants included the later founders of Google. He was also highly skilled in photography and an official Stanford sports photographer. Survivors: his loving family.

**Richard "Dick" Goode**, of Los Altos Hills, October 30, at 84. He taught an undergraduate course on paranormal psychology, trained Stanford surgical residents and treated patients for more than four decades, but his greatest influence may have been his inventions. He developed a ventilator to drain infections of the middle ear, surgical nasal splints and implantable hearing aids, and he contributed to research on cochlear implants for the severely hearing impaired. He served as president of the American Academy of Otolaryngology-Head & Neck Surgery and the American Academy of Facial Plastic and Reconstructive Surgery. He was also an accomplished magician and performed magic tricks throughout his life. Survivors: his wife, Lynn Szekely; children, Melissa Wood, Allison Corallo and Jim; former wife, Marcia Lloyd; and six grandchildren.

**Bert George Hickman Jr.**, of Palo Alto, November 23, at 95. He was an emeritus professor of economics and former chair of the economics department. With his collaborator Robert Coen, he did pioneering work in modeling techniques and computer simulation methods in economics, and he helped develop a model for predicting the long-term growth and stability of the U.S. economy. He also worked on international macroeconomics with Lawrence Lau. He helped found and for 30 years chaired Project LINK, a cooperative international research effort to understand how to integrate in a global context the macroeconomic models that had been developed in advanced economies. Survivors: his wife, Edythe; children,

Wendy, Paul, '75, and Alison; and grandchildren, including Geoffrey Morris, '04, MS '06.

**David Swenson Hogness**, of Stanford, December 24, at 94. He was a professor of biochemistry. He conducted a series of experiments in the 1970s and 1980s that bridged the gap between molecular biology and genetics, allowed researchers to identify the position of particular genes along the chromosome, and played a key role in launching the fields of molecular genetics and genomics. The techniques he developed and the insights derived from his studies served as the bedrock for the Human Genome Project and have been used to identify thousands of disease-associated genes. Outside the lab, he enjoyed camping, hiking, and kayaking with friends and family, especially in Puget Sound and Glacier National Park. He was predeceased by his wife, Judy. Survivors: his sons, Peter and Chris.

**David Mark Ritson**, of Stanford, October 25, at 94. He taught physics while pushing the boundaries of high-energy particle physics at SLAC. He contributed to the discovery of subatomic particles and their most fundamental interactions. He enjoyed opportunities to live abroad and travel widely, and he took his family on sabbaticals to Italy and England. He loved art, music, and finding scenic spots and pleasant restaurants. In retirement, he used his analytical skills to analyze data and publish articles about global warming. He was predeceased by his wife, Edda. Survivors: his children, Francesca, Peter, Matt, Vincent and Marc, '80, MS '82; seven grandchildren; and great-grandson.

**Lawrence Vincent "Larry" Ryan**, of Cupertino, Calif., November 23, at 96. He served in the Marine Corps during World War II and was injured at the Battle of Iwo Jima. He was an English professor, helped found the Structured Liberal

## Philosopher and Radio Host

To make a point about our inevitable fates, Professor Ken Taylor would lie on the floor of his Education as Self Fashioning classroom.

"Look upon your mortality and ask what is a good way to live your life," he would call up to his students. "How ought I live?"

**Kenneth Allen Taylor**, co-host of the syndicated public radio show *Philosophy Talk* and former chair of the philosophy department, died on December 3 after suffering a probable heart attack at his home in Los Altos. He was 65. Hours earlier, he had posted on Facebook that he was almost finished with his fourth book, *Referring to the World*.

"He's absolutely irreplaceable," says Ruth Starkman, Taylor's co-teacher for Education as Self-Fashioning.

Taylor was born in Sandusky, Ohio. The son of a factory worker and a nurse, he grew up "flat broke," according to an online Q&A

from 2018. He played the violin and trombone, competed as a wrestler and sang in the choir. As an undergraduate at the University of Notre Dame, he studied electrical engineering, psychology and math before settling into the Program of Liberal Studies, and in 1977 became its first African American graduate. After earning his PhD in philosophy from the University of Chicago, he taught at several universities before joining Stanford in 1995.

Quayshawn Spencer, MS '08, PhD '09, one of Taylor's former teaching assistants, says his mentor was "like a kid in the candy store" every time he taught a class. He was also exacting. When Spencer presented at a Stanford colloquium, "the toughest person in the room was Ken."

John Perry, an emeritus professor who co-founded the radio show *Philosophy Talk*, calls Taylor a "great teacher," noting that he always wore a tie to class "out of respect for his students."

Perry had trouble finding someone with whom to launch the show until Taylor came along. "He was all in from the start," he says. *Philosophy Talk* embodied Taylor's belief that everyone should have at least some exposure to big ideas.

"He didn't want to turn everybody into a philosophy major, but he wanted everybody to have a chance to become more philosophically minded," says Krista Lawlor, current chair of the philosophy department.

Claire Yoshida, who met Taylor at the University of Chicago and married him in 1982, says her husband had an "amazing mind."

"You could get him to think about anything," she says, "and he would think very well about it."

In addition to Yoshida, Taylor is survived by their son, Kiyoshi; his parents; and two siblings.

—Rebecca Beyer





Education program and received the Lloyd W. Dinkelspiel Award for outstanding service to undergraduate education. In retirement, he taught at the Fromm Institute in San Francisco and led many Stanford alumni trips to Europe. He was predeceased by his wife of 70 years, Patricia. Survivors: his children, Katrina, Lawrence, Gregory, '74, and Mary, '77; four grandchildren; and great-granddaughter.

**Pan A. Yotopoulos**, of Palo Alto, December 17, at 86. He was an emeritus professor of economics. He authored, co-authored and edited 12 books and more than 70 articles in the fields of developmental and agricultural economics, economic demography, international trade, production and consumption theory. He received numerous awards for his research, which addressed such issues as global food crises, human hunger, poverty and inequality. He advised international organizations, including the Greek government and the World Bank's International Bank for Reconstruction and Development. He also taught extensively abroad, from Sweden and the Netherlands to Japan, Italy and Singapore. After retiring from Stanford, he was appointed to a distinguished professorship at the U. of Florence. Survivors: his former wife, Mary; children, Kyvele Artinian and Jason, '91, MBA '96; and two grandchildren.

#### 1930s

**Fern Elizabeth Reid Gordon**, '39 (social science/social thought), of Los Angeles, September 20, at 102. She was a member of Pi Beta Phi. During World War II, she worked for the British army staff in San Francisco. She married, raised her daughters and became an active supporter of charitable organizations, including the Los Angeles Museum of Art. She served as president of the Los Angeles Symphony's Junior Philharmonic Committee. She traveled extensively (including many Stanford trips), enjoyed music, history and the Beach Club, and most of all loved her family and friends. She was predeceased by her husband, Lynn. Survivors: her daughter, Susan Bonesteel.

#### 1940s

**Caroline Parry Tyson Randolph**, '43 (political science), of Richmond, Va., December 26, at 98. She worked in naval intelligence as a Japanese translator during World War II. She served her community as a tour guide at the Virginia Museum of Fine Arts and as a board member of the Boys Home of Virginia. She considered music and sports universal languages and actively participated in both. She was also a gifted gardener and sang in the choir at St. Stephen's Episcopal Church. She was predeceased by her husband, Beverley. Survivors: her children, Mary Kundzins, Beverley III, Charles and Katharine; two grandchildren; and sister.

**Marion "Mimi" Nielsen Hoffman**, '44 (pre-business), of Tulare, Calif., February 10, 2019, at 96. She helped launch and then held leadership positions at many organizations, including the Tulare Woman's Club, University Women, Tulare County Symphony, Symphony League, Las Madrinas, Tulare Historical Museum and the California Farm Show. While Ronald Reagan was governor, she was appointed to the California State Nursing Board, and in 1970 she was recognized as the Tulare Chamber of Commerce Woman of the Year. She also enjoyed swimming and playing tennis, golf and bridge. She was predeceased by her husband of 60 years, Chase, '44. Survivors: her children, Chuck, '69, Karen, '71, Mark, '76, MS '77, and Gregory, '79; eight grandchildren,

including Ingrid, '95, and Kat Coombes, '07, MS '08; and seven great-grandchildren.

**William Dick Pennycook**, '44 (general engineering), of Santa Barbara, Calif., November 12, at 97, of natural causes. He was a member of Theta Delta Chi. After graduation, he served as an officer in the Army Signal Corps in Germany. He earned his MS in 1959 from UCLA and subsequently served as a forensic engineer for Truesdail Laboratories in Los Angeles. He was a state registered electrical engineer, mechanical engineer and safety engineer. He was an avid skier, folk dancer and environmentalist. He enjoyed the Sierras and led many family and Scout trips into the backcountry. In retirement, he traveled the world. He was predeceased by his wife of 49 years, Janet (Wallace, '45). Survivors: his wife, Jeanne Nicholls; children, Jean and William III; seven grandchildren; and 13 great-grandchildren.

**Betty Claire Farley Purcell**, '44 (biological sciences), of Redmond, Wash., November 7, at 97. After raising her children, she earned a master's degree in education from Seattle U. and taught elementary school in Bellevue for more than 18 years. She loved animals, travel, entertaining and maintaining a wide circle of friendships. She was predeceased by her husband of 48 years, Ernest. Survivors: her children, John, '76, Kelly and Mollie, '83; and five grandchildren.

**Roy S. Stanford**, '46 (basic medical sciences), MD '50, of Sacramento, Calif., October 17, at 93. He joined the Navy during World War II and retired as a lieutenant commander from the Navy Reserve. After completing active service as a Navy medical officer, he was in private practice as a general surgeon. He was predeceased by his first wife, Doris; second wife, Patricia; son Robert; and a grandson. Survivors: his children Catherine Keller, Lorraine Faires and Donald; stepdaughters, Patricia Fosha, Janet Peterson and Margaret Leger; 15 grandchildren; 12 great-grandchildren; and two sisters.

**Marian Jeanne Merrill Brubaker**, '49 (biological sciences), MA '51 (bacteriology), MD '54, of La Cañada, Calif., August 25, at 92, after a lengthy illness. She completed her internship and residency in dermatology at the USC Medical Center. In addition to her private practice, she mentored future doctors in pediatric dermatology as a clinical professor at USC. In retirement, she fulfilled her lifelong goal of traveling, and she visited Egypt and China, among other destinations. She was predeceased by her husband, Rowan Ward. Survivors: her children, David and Ann; and grandchildren.

**Marshall Lee Small**, '49 (undergraduate law), JD '51, of San Francisco, December 8, at 92. He was a member of Phi Gamma Delta and served in the Merchant Marine during World War II. After completing his law degree and clerking for Supreme Court Justice William O. Douglas, he served during the Korean War in the office of the Judge Advocate General. He spent the rest of his legal career with Morrison & Foerster, where he was chair, managing partner and general counsel. In 2002, the California State Bar honored him with its Business Law Section Lifetime Achievement Award. He was dedicated to pro bono work and also served for more than a decade as a volunteer elementary school teacher's assistant. He was predeceased by his wife of 63 years, Mary. Survivors: his children, Daniel and Liz; grandson; and brother.

#### 1950s

**Joseph Haratani**, '50 (civil engineering), of Sonoma, Calif., December 6, at 96. After he was sent to an internment camp for Japanese Americans, he joined the Army and served with the

442nd Regimental Combat Team during World War II. After graduation, he served as a civil and sanitary engineer with the State Department in Latin America, Southeast Asia and the Middle East. Survivors: his wife, Amy; sons, Guy, Richard and Saji; two grandchildren; and three siblings.

**Alfred E. Heller**, '50 (English), of San Rafael, Calif., December 20, at 90. He was on the crew team and served in the Army. A summer wilderness excursion as a student led to a life of environmental activism, first as publisher of a weekly newspaper in Grass Valley, Calif., and then by founding the group California Tomorrow. He was also editor and publisher of the quarterly magazine *World's Fair*. He served on the boards of The Nature Conservancy, Planning and Conservation League, Trust for Public Land, San Francisco Planning and Urban Research, and Resource Renewal Institute, as well as the Stanford Alumni Association, Bay Area Independent Publishers Association and Marin Symphony. Survivors: his wife of 64 years, Ruth (Botsford, '49); daughters, Miranda, Katherine, Anne Anderson and Janet Harckham; eight grandchildren; and one great-grandchild.

**Ann Marion Peckham Seed**, '50 (geography), of Santa Barbara, Calif., December 15, at 91. She served her community through the Junior League, Assistance League of Santa Barbara and the Cottage Hospital Auxiliary. She was an accomplished golfer who enjoyed playing courses around the world and an avid fan of Stanford football. She was predeceased by her husband, Harris, and granddaughter. Survivors: her children, Marcie Ide and Jim; stepchildren, Nan Verkaik and Hal; four grandchildren; and seven great-grandchildren.

**Andrew Hugh D'Anneo**, '51 (Romantic languages), JD '56, of Calistoga, Calif., December 1, at 90. He practiced law in San Francisco and Calistoga and also served on the state labor commission. He was a life member of the Western Philatelic Library. Survivors: his wife of 31 years, Barbara Nechis; former wife, Jean Charles Gansa, '52; children, Roberta, Drew, Allan, John and Paul; and six grandchildren.

**Mildred Lorie "Millie" Ems Ferro**, '51 (nursing), of Denver, December 1, at 93. She was a practicing nurse in San Francisco, Petaluma and Santa Rosa. She actively supported the Petaluma Concert Association, CommonHealth Club and Red Hat Society. In retirement, she was a health volunteer for the Petaluma Senior Center. Survivors: her sons, Mel and Mark; four grandchildren; and a great-grandchild.

**Donald Leo Lucas**, '51 (economics), MBA '53, of Atherton, Calif., December 27, at 89. He was a member of Zeta Psi and the rugby and football teams. After serving in the Army, he made a career in corporate finance. With Draper, Gaither & Anderson, he raised half the initial equity financing for National Semiconductor Corp. As an independent Silicon Valley venture capitalist, he served on the boards and in director roles at Oracle, HBO, Macromedia/Adobe and many other companies. He co-founded the Stanford Institute for Economic Policy and Research and the Humanities and Sciences Council. He was a devout Catholic and a member of the Sovereign Military Order of Malta. He was predeceased by his wife of 47 years, Lygia, and son John Anthony. Survivors: his children, Nancy Thibodeau, Alexandra Ertola and Donald; nine grandchildren; and brother.

**Kenneth Robert Clark**, '52 (English), MA '56 (speech and drama), of Chilliwack, British Columbia, September 20, at 89, of natural causes. He played in the Band and served in the Navy. He taught communications to university students,

which was informed by his work as a scriptwriter, producer of dramas for ABC and writer and producer for PBS. He was also a real estate agent and innkeeper. He served as president of several Rotary chapters and was president of the Santa Cruz County Symphony. He traveled widely but spent many especially happy years in Nova Scotia. He was predeceased by his wife, Elizabeth. Survivors: his children, Michael, Stephen, Libby and Katie; and six grandchildren.

**Robert Donald Hoffman**, '52 (geology), of Burlingame, Calif., November 23, at 89, of congestive heart failure. He was a member of the marching band. He spent his early career with Tidewater Oil before becoming a consulting geologist in Bakersfield, Calif. He was active in the American Association of Petroleum Geologists and served as Bakersfield's first commissioner for the American Youth Soccer Organization. He also enjoyed handball, bridge, genealogy and reading. He was predeceased by his wife, Dolores (Morelli), '54, MA '54. Survivors: his children, Laurel Winzler, '76, Susan, Diana Oertel, '81, Steve and Mark; and three grandchildren.

**Paula Joan Foster Olch**, '52 (biological sciences), of Tucson, Ariz., June 22, 2019, at 87, of Parkinson's disease. After trying various careers, she found her calling as a massage therapist. She maintained many circles of friends and loved hiking in the Sonoran Desert. She enjoyed yoga and singing in choirs, competitive ballroom dance and Scottish country and contra dancing. Her spirit of adventure led her on travels to Mexico, Guatemala, Costa Rica, Bali, Japan, Scotland, England and Canada. Survivors: her daughters, Karen and Janice; and a granddaughter.

**Albert Richard "Dick" Jaqua**, '53 (general engineering), of La Honda, Calif., September 24, at 89. He loved music and performed at many local events during his time at Stanford. Later he appeared in musicals with the Palo Alto Community Players and Paglacci Players, and opened a guitar studio in Palo Alto before starting a career in design and building. He also enjoyed piloting his airplane, reading Shakespeare, growing oak trees and playing tennis. He was predeceased by his daughter Wendy. Survivors: his wife, Ami; children Aaron, Paul, Daniel and Rebeka; 10 grandchildren; three great-grandchildren; and sister.

**Philip Max Saeta**, '53 (undergraduate law), JD '57, of Bel Air, Calif., December 27, at 88, of mesothelioma. He met his future wife at the Stanford Jolly-Up dance and served in the Army after graduation. His legal career began with Beardsley, Hufstедler & Kemble, and he later served on the municipal court and superior court in Los Angeles and as a private judge through 2018. He held board and leadership positions with the California Judges Association, American Bar Association, Volunteers of America and the American Jewish Committee. He was predeceased by his first wife, of 56 years, Joanne (Hixson), '53, MA '54, and son Stephen, '84. Survivors: his wife Judith Enright; children, David, '81, Peter, '82, and Sandra McDaniel, '86; and eight grandchildren, including Stephen, '13, Brennan, '12, MA '12, and Ethan, '13.

**John F. "Jack" Skinner**, '53 (basic medical sciences), MD '56, of Newport Beach, Calif., August 29, at 88, of breast cancer. He was a member of Alpha Delta Phi. He completed his residency in internal medicine at UCLA before serving two years in the Army Medical Corps in Denver. He returned to Newport Beach to raise his family and start his medical practice. In retirement, he provided volunteer medical care at a clinic for indigent patients. He loved the California beaches

and taught lifeguards about the risks and proper emergency treatment of neck and spinal injuries. He was also actively involved in fighting for the water quality of Newport Bay. He was named Newport Beach Citizen of the Year in 2014. Survivors: his wife of 65 years, Nancy (Thorne), '55; daughters, Susan, '82, and Barb Skinner Fallon, '80; and three grandchildren.

**Wade Newsom Acton**, '54 (speech and drama), of San Francisco, October 13, at 86. He served in the Navy as a radio public service officer. In his civilian career, he worked in public relations for Standard Oil (later Chevron). After leaving his position at the Chevron Museum in San Francisco, he worked with the San Francisco Convention and Visitors Bureau. He also volunteered at the Mission Language and Vocational School, the International Institute, and City College's Adult Learning and Tutorial Center. He loved traveling, attending the theater, listening to Stanford football games on the radio, and his church communities at Holy Innocents and St. Luke's. Survivors: his brother, Eugene, MS '57.

**William Berl "Bill" Goodheart Jr.**, '55 (philosophy), MD '64, of Larkspur, Calif., December 25, at 85. After his internship and residency in Chicago, he trained as a psychiatrist at the University of California Medical Center in San Francisco and the C.G. Jung Analytic Institute. In addition to his private practice in San Francisco and Marin County, he taught in the department of psychiatry at the University of California Medical Center, the C.G. Jung Institute and the Center for Integrative Psychoanalytic Studies in Berkeley, which he co-founded. He enjoyed numerous activities, including family backpacking trips, fishing, sailing, sculling, a monthlong solo hike on the John Muir Trail and several years of modern dance training. Survivors: his wife, Marianna; sons, Ross and Matthew; and two grandsons.

**Mildred Ilene King**, '55 (nursing), of Claremont, Calif., October 4, at 86. She worked with some of the first infants to undergo open heart surgery at Presbyterian Hospital in New York, then returned to California and shifted to public health. Over 36 years in San Bernardino County, she advanced to deputy director of child health and disability and received many commendations for her work in creating and implementing outreach programs to safeguard infant, child and adolescent health. She also enjoyed sailing, bird-watching and needlework. Survivors: her children, Cheryl Scott and Eric Brusstar; four grandchildren; three great-grandchildren; and brother.

**Isabel Louise Leask Meade**, '55 (political science), of Alexandria, Va., October 1, at 85. She served her community through the League of Women Voters, Fairfax County Library Board, the American Association of University Women, and Good Shepherd Housing. She enjoyed politics, community events, travel, reading and playing bridge. She was predeceased by her husband of 57 years, Tom, and son David. Survivors: her sons, Tom, Jimmy and Michael; eight grandchildren; great-grandson; and brother.

**William Michael "Mike" Conner**, '57 (political science), of Vacaville, Calif., November 7, at 83. He was a member of Delta Chi. Soon after beginning his career as an insurance broker, he founded his own agency, retiring in 2018. He also served two terms on the Vacaville City Council. He was a lifelong fan of Stanford and its athletic teams and especially enjoyed family trips to the Caribbean, Mexico and Lake Tahoe. Survivors: his wife of 62 years, Claire; children, Kelly Spaeth, '80, Brian and Kevin; nine grandchildren; great-granddaughter; and two brothers.

**Michael J. Farguson**, '57 (mechanical engineering), of La Jolla, Calif., November 19, at 86. He served in the Air Force. At Stanford, he played football, boxed and was a member of Sigma Chi. After positions with Alcoa and Easton and earning his MBA from USC, he founded an aluminum supply company. He then shifted course to auto sales and over 30 years expanded the business to include four dealerships. He also enjoyed skiing, boating, and playing tennis and golf. In retirement, he founded a chapter of an organization for business people committed to the Catholic faith, and he was named a Knight of the Equestrian Order of the Holy Sepulchre of Jerusalem. Survivors: his wife of 59 years, Karen; children, Steven, Heidi Calmette and David; seven grandchildren; great-granddaughter; and sister.

**Lawrence Jack "Larry" Hall**, '57 (history), of Cedar Park, Texas, October 1, of head and neck cancer. He was a member of Alpha Sigma Phi. He served as a Navy and Naval Reserve pilot. He was a pilot for TWA for more than 30 years. He was predeceased by his wife of 45 years, Nancy. Survivors: his children, Randall and Karen; two granddaughters; and two sisters.

**William Harwood "Bill" Juvonen**, '58 (history), of Stamford, Conn., December 22, 2018, at 81. He was a member of Zeta Psi. In the Marines, he was a carrier-based fighter and helicopter pilot. In civilian life, he was a sales manager for Pan Am and Cessna, vice president for Canadair and later Polaris Aircraft Leasing, and co-founder of Flight Services Group, a corporate aircraft operator. He was an avid sportsman and enjoyed fly-and-deep-sea fishing. Survivors: his wife of 43 years, Karen; children, Nancy Fallon and Jim; five grandchildren; and sister.

**Karl George Hufbauer**, '59 (engineering science), of Seattle, January 28, at 82. He was a member of the wrestling team and Alpine Club. He pursued further education at Oxford and earned a PhD from UC Berkeley. He taught history for more than 30 years at UC Irvine and served as department chair. He published two books and numerous articles on the history of science. In retirement, he had a second career as an artist working in stone. He also enjoyed rock climbing, hiking and scuba diving. Survivors: his wife of 59 years, Sally (Brannon), '59; children, Sarah, Benjamin and Ruth; six grandchildren; and two siblings.

## 1960s

**Michael Harris Benjamin**, '60 (psychology), of Mesa, Ariz., October 22, at 81. During his career in real estate and property management, he owned and managed resort properties in Washington state and at Lake Tahoe. He was an avid fan of Stanford sports, especially basketball and football. Survivors: his wife of 55 years, Cynthia; children, Cynthia Benjamin Hill, '87, and Ben McIlvain; three grandsons; and great-granddaughter.

**Bernard Gilmore "Gil" Dowd Jr.**, '61 (history), of San Francisco, October 31, at 80. He was a member of Delta Tau Delta and the football and rugby teams. He earned his MD from Marquette U. After completing his residency at UCSF, he practiced surgery for 34 years in Modesto, Calif. Most of his days began early with jogging and attending mass before he saw patients. He also enjoyed traveling, handball, skiing, biking, hiking, scuba diving, fishing and river rafting. Survivors: his wife, Molly; children, Gil III, Kathleen Belzer, Kevin and Kristen Addicks; 11 grandchildren; and sister.

**Bruce George Hanson**, '61 (political science), LLB '65, of Seattle, October 21, at 78. He was on the golf team and a member of Phi Kappa Psi.



He returned to Seattle to raise his family and practiced law there for more than 50 years. Survivors: his wife, Linda (Gogins, '62); and daughters, Sara Cook and Mia Wise.

**Victoria Valerie Post Sant**, '61 (history), of Washington, D.C., December 11, 2018, at 79, of ovarian cancer. In the world of philanthropy, she was known for her personal engagement and persistent effort. She supported the empowerment of girls and reproductive health, environmental conservation and the arts. She served on the boards of the National Symphony Orchestra, National Museum of Natural History, National Gallery of Art, World Wildlife Fund, National Geographic Society and Museum of Modern Art, among many others. She was awarded Stanford's Gold Spike Award for her volunteer efforts, including service on the Board of Trustees and several advisory councils. Survivors: her husband of 50 years, Roger; children, Alison Sant-Johnson and Alexis; stepchildren, Shari Plummer and Michael; six grandchildren; two brothers; two stepsons; and half-sister.

**William Wallace "Bill" Sterling**, '61 (history), of Philo, Calif., December 1, at 80. He was a member of Theta Chi and grew up on campus as the son of university president Wallace Sterling. He was awarded a Rhodes Scholarship and earned his JD from Harvard. He practiced law in San Francisco while pursuing numerous intellectual interests, including mythology, ornithology and botany, and he was a serious student of German, Latin, Greek, Sanskrit, Pali and Spanish. His deepest

commitment was to the study and promotion of Zen and Tibetan Buddhism. He served on the board of Tibet House in New York City and the International Committee of Lawyers for Tibet. Survivors: his wife of 36 years, Yvonne Rand, '57; children, Alinor and Maury; two stepchildren; three grandchildren; and sisters, Susan Sterling Monjaue, '63, and Judy Sterling Plunkett, '66, MA '67. **John Lunt Winther**, '61 (civil engineering), MBA '63, of Orinda, Calif., November 9, at 80, of cancer. He was president of Sigma Alpha Epsilon. During his varied entrepreneurial career, he patented several inventions, owned a tourist attraction on Shasta Lake, created a large-scale water development project, ran a farming company and partnered in a real estate investment business. He loved hiking and fishing in the Sierras, hunting waterfowl on the Delta, and passing on his love and knowledge of nature to his children, grandchildren and the boys in his Scout troop. Survivors: his wife of 55 years, Patricia; children, Kirsten Winther Gardner, MD '97, and John; and six grandchildren.

**Richard Chapman "Dick" Warmington Jr.**, '64 (electrical engineering), of Saratoga, Calif., September 9, at 76, of cancer. He was a member of the crew team and Delta Upsilon. He earned his MBA from Harvard and spent 33 years with Hewlett-Packard's international operations. He led the company's South Korea operations for four years and was CEO of its Asia Pacific operations from 1996 to 2000. He had a second career in school

administration and helped to found Chadwick International School in Songdo, Korea. His travels included witnessing both peaceful and troubled political transitions, Olympic games and World Cup matches, and descending 2 miles underground into a South African gold mine. He also loved golf, sailing and hiking. Survivors: his wife of 51 years, Caroline; and children, Jade and Michael.

**Daniel Leith Anderson Jr.**, '68 (history), of Whites-town, Ind., December 4, at 74. He was on the golf team. After graduation, he served in the Peace Corps in Honduras. After law school at Indiana U., he worked for Oracle, Sybase and Hewlett-Packard. He founded the Golf Lab in Palo Alto for golf club fitting and later moved the operation to Indiana as the Indy Putting Lab. Survivors: his former wife of 39 years, Bonnie Anderson; children, Brett, '18, and Ryan; grandson; and three sisters.

**Nancy Jean Holland**, '69 (philosophy), of Saint Paul, Minn., January 25, at 72, of lung cancer. She earned her PhD at UC Berkeley and taught philosophy at Hamline U. She was recognized for her outstanding teaching and scholarly work, which included four books, two edited volumes, and numerous articles and chapters. She was also the author of several romance novels. Survivors: her husband, Jeffrey Koon; children, Gwendolyn and Justis; and brother, Glenn Holland, '74.

**Allen Jerome Krasner**, '69 (English), of Rockville, Md., April 30, 2019, at 72. After graduation, he served in the Navy. He was a retail and marketing

## Trader Joe's Founder Offered Shoppers Novel Goods, Cool Vibe

As a Stanford undergrad, Joe Coulombe met Alice Steere, '53, MA '54, and was introduced through her family to dishes far removed from his paternal grandmother's New England boiled dinners and what he once described as the "Southern suicide cuisine" his mother's folks served: "a lot of bacon fat poured on greens." At the home of his future in-laws, he sampled Dungeness crab and sourdough bread, steamed artichokes, jug wine and olive oil. "Think of it. I'd never even seen olive oil," he told *Los Angeles* magazine.

Roughly 25 years later, Coulombe opened Trader Joe's, an innovative grocery store, rich with personality and both basic and offbeat products, that would amass a cultlike following.

**Joseph Hardin Coulombe**, '52, MBA '54, grew up on an avocado farm near San Diego, served in the Air Force and spent a decade in the grocery business before launching Trader Joe's in 1967. He died February 28 at his home in Pasadena, Calif. He was 89.

Starting in 1958, Coulombe ran a string of convenience stores—until he was persuaded to try something new. The tuition assistance offered by the GI Bill was changing the culture of the country, he believed. So when he conceived of Trader Joe's, he selected store locations near centers of learning, he explained in a 2011 interview, because he figured educated people wanted something different. "Trader Joe's is for overeducated and underpaid people, for all the classical musicians, museum curators, journalists—that's why we've

always had good press, frankly!"

Coulombe said one of his guiding principles was to avoid badgering customers. "When I was selling Kirby vacuum cleaners at Stanford door-to-door, that's where I learned negative selling," he said in 2011. "You go in and say, 'Well, I really don't think you can afford this.'" He later learned a better way. "You never give an order to a customer."

The stores—now totaling more than 500 in 42 states—are distinctive for their tropical vibe and friendly staff in Hawaiian shirts. Coulombe's initial inspiration, according to his son, Joseph, was *Trader Horn*, the memoir of an African adventurer that he discovered at his in-laws' house. Besides TJ's wide-ranging, quirky product line and emphasis on healthy foods, the stores popularized the inexpensive Charles Shaw wines, priced at \$1.99 and known as Two Buck Chuck.

Coulombe sold the grocery chain to the German company Aldi in 1979 but stayed at the helm until he retired in 1988.

He and his wife loved attending the opera and tasting wines, according to Carol Fagan Henry, '61, MA '62, a philanthropist who



co-founded the Los Angeles Opera with Alice Coulombe and others. Henry and her husband, Warner, '59, MBA '63, visited Paris with the Coulombes. "We loved fine and simple dining and wine tastings," Henry says. "There was no Two Buck Chuck in our lives."

In addition to his wife of 67 years and his son, Coulombe is survived by his daughters, Charlotte Schoenmann, '81, and Madeleine, and six grandchildren. —John Roemer

executive for more than 30 years in the wine and beverage industry. Survivors: his wife, Roberta; children, Michael, Julie McCormack and Stephen; nine grandchildren; and sister.

# 1970s

**Donald William Funkhouser**, '71 (physics), MS '72 (geophysics), of Houston, December 14, 2018, at 69, of a heart attack. He spent his career as a geophysicist working for Western Geophysical in Houston, Mexico City, Saudi Arabia and London. He was passionate about computers and programming and an avid sports fan, especially baseball. Survivors: his wife of 38 years, Jane; sons, Jonathan and Christopher; his father and stepmother, Lawrence and Jean; and three siblings, including Tom, '72.

**Evan H. Shu**, '74 (architecture), of Melrose, Mass., January 12, at 66. He earned his master's degree from Harvard. After working for several architectural firms in Boston, he founded his own firm. He was elected to the College of Fellows of the American Institute of Architects for his online efforts to promote and disseminate knowledge about computer-aided design. He was a senior deacon, moderator, committee chair and historian of Boston's Old South Church and sang in three church choirs. He was predeceased by his children Melanie and Noah. Survivors: his wife of 29 years, Annamarie; children Nathaniel and Amanda; and two sisters.

**James Chi-Min Hu**, '75 (biological sciences), of College Station, Texas, January 23, at 66, of liver disease. He was a varsity fencer and *Stanford Daily* cartoonist. He earned a PhD in molecular biology from the U. of Wisconsin. After a postdoc at MIT, he became professor of biochemistry and biophysics at Texas A&M and bioinformatics director of the Center for Phage Technology. His research focused on microbial genetics. He loved teaching and mentoring students, cooking good food, and seeking out great restaurants and watching sports. Survivors: his wife, Deborah Siegele; and sister, Diana, '78.

# 1980s

**Ramond Scott Chan**, '81, MS '82 (electrical engineering), of Los Altos, September 2, at 59, in a diving boat fire off the coast of Santa Barbara, Calif. He was on the cycling team. He worked for 20 years as an electrical engineer in Silicon Valley before switching course to become an AP physics teacher. He found great satisfaction in helping students understand a subject he loved and motivating them to pursue degrees in the sciences. He enjoyed traveling with his family, continuing his scientific research at Stanford's particle physics lab, and scuba diving in order to catalog and conserve reefs near Timor Leste. His daughter, Kendra, perished with him in the accident. Survivors: his wife, Vicki Moore, '83; son, Kevin; parents, Ray and Ida; and two sisters.

**Donald Haglund De Grasse**, '86 (mechanical engineering), of Austin, Texas, June 6, 2019, at 55, of brain cancer. He played rugby, was a member of Zeta Psi and loved working in the physics department's machine shop. He went on to design notebook computers for Apple and Dell, including work on two of the most popular notebooks of their time, the Apple PowerBook and Dell Latitude. Survivors: his wife, Martha (Moody, '87); children, Daniel, Andy and Sarah; mother, Marilyn; brother, Bob, '76; and two sisters. **Craig Journey**, '86 (public policy), of Palo Alto, November 20, at 56. For 16 years, he was the chief solutions architect and principal developer

at HighWire Press. He enjoyed cooking, planning family vacations, coaching his sons' sports teams, attending their games and performances, and date nights with his wife. Survivors: his wife of almost 23 years, Erika; sons, Henry, Ed and Charlie; father, Peter, '62, MA '64, and stepmother, Gloria; and two siblings, including Steve, '88.

# 1990s

**Walter D. Harp**, '92 (political science), of Mercer Island, Wash., November 26, at 49, of leukemia. He worked as a marketer and entrepreneur in Washington, D.C., and Taipei before pursuing an MBA at Columbia. He was an enthusiastic athlete, world traveler and Scrabble player. Survivors: his wife of 25 years, Angela Lean; children, Luke and Sofia; mother and stepfather, Sharon and Leland Flora; father and stepmother, Doug and Mary; grandfather, Thomas; and two siblings.

**Daniel Taylor Jones**, '94 (psychology), of Tarzana, Calif., October 29, at 47. He was in the marching band. He tackled a would-be Cal infiltrator during the half-time performance of the 1991 Big Game. He was a database architect, software developer and entrepreneur. He enjoyed composing music, writing comedy and woodworking. Most of all he enjoyed spending time with his family, especially in Maine. Survivors: his wife, Nadia; children, Mateo and Milena; mother, Joan; father and stepmother, Wilmot and Martha; and six siblings, including Elizabeth, '84, and Ken, '92.

# BUSINESS

**John George Mathrusse**, MBA '53, of Mountain View, May 28, 2019, at 96, of cancer. He was a Navy pilot at Pearl Harbor at the time it was attacked. He retired from the Naval Reserves after 30 years at the rank of commander. He spent most of his career at Lockheed in the missiles and space division and also worked as a CPA. He was an avid golfer and loved visiting Hawaii, but what mattered most to him was his family. He was predeceased by his wife of 54 years, Maxine. Survivors: his children, Susan Tseng and James, MA '81; sweetheart, Miriam; five grandchildren; and great-grandchild.

**Donald Hugh Smith**, MBA '54, of Los Angeles, November 29, at 92. He served in the Air Force. During his career, he was an international executive for Ford, Parker Pens and Xerox. He served his community as a Los Angeles city commissioner and was active with The Music Center, Los Angeles Gay and Lesbian Center, Labor Day LA and Log Cabin Republicans. Survivors: his partner, Arturo Puertos Rodriguez.

# EDUCATION

**Frederick Oliver Pinkham**, MA '48, EdD '51, of Holland, Mich., November 26, at 99. He served in the Army during World War II. He was assistant to the president of George Washington U. and then became president of Ripon College. He was appointed an assistant administrator for USAID and later served as president of the Population Crisis Committee. Later in his career, he was a program officer for the David and Lucile Packard Foundation, and was co-founder and associate director of Stanford's Morrison Institute for Population and Resource Studies. He was predeceased by his wife, Helen Kostia. Survivors: his three children.

**Louise Mary Notti Coughlin**, MA '51, of San Francisco, January 8, at 90. She taught at the secondary level in San Francisco and for the community college adult education program. Her greatest joy was spending time with her family. She was

predeceased by her husband of 56 years, Dan, MA '51. Survivors: her children, Lisa Clay, Michael, Sean and Alison; and three grandchildren.

**John Jacob "Doc" Wittich**, PhD '52, of Champaign, Ill., August 2, at 97. He served in the Marine Corps during World War II. He taught psychology at the U. of the Pacific, was dean of admissions at DePauw U., and an administrator at the College Center of the Finger Lakes and College of the Pacific. He then became president of MacMurray College in Jacksonville, Ill. In retirement, he continued to work in college administration as a fund-raiser and consultant. He also enjoyed swimming, singing with the men's chorus he founded, writing, cartooning, tennis, travel and woodcarving. He was predeceased by his wife, Leah, and son, John. Survivors: his daughters, Nan Zvonar and Jane Tock; five grandchildren; and two great-grandchildren.

**Lois Marie Herrmann**, MA '68, of Washington, D.C., January 14, at 74, of cancer. She began her State Department career with the U.S. Information Agency and finished at the Bureau of Public Affairs. She enjoyed overseas postings in Venezuela, Serbia, Bosnia and Croatia. She drafted speeches and documents for senior department officials and was a key member of the press team for presidential summits and major international conferences. She also served on the department's task forces on political and humanitarian crises. She was a board member for the Public Diplomacy Association of America, Stanford University Alumni Association and Theodore H. Barth Foundation. In retirement, she volunteered at the Smithsonian with the Steinway Diary Project.

**Martin Lee Harris**, MA '72, PhD '76, of Katy, Texas, January 2, at 80. He taught at CSU Sacramento and worked for the California Department of Education. His focus was technology in the classroom and education administration, and he wrote an introductory book on data processing. He was an advocate for services for people with developmental disabilities and a supporter of the Special Olympics. Survivors: his wife, Ann; two daughters; and two grandchildren.

# ENGINEERING

**Frank Centolanzi**, Gr. '55 (mechanical engineering), of Santa Clara, Calif., February 21, 2019, at 90. While at the NASA Ames Research Center, he traveled the world to study tectonics and worked on reentry heat shields for the Apollo and Space Shuttle programs. He was also dedicated to home and garden building projects. He was an avid outdoorsman and enjoyed camping, boating, fishing and hunting. In retirement, he bought a motorhome and explored the country with his wife and friends, including a three-month trip to Alaska. Survivors: his wife of 68 years, Lorraine; children, Patrick, Peggy Bradley and Jean Chapelle; and three grandchildren.

**Hsung-Cheng Hsieh**, Engr. '57 (electrical engineering), of Ames, Iowa, December 2, at 90, of complications from a stroke. He earned his PhD in applied mathematics from UC Berkeley. He held visiting appointments at Wichita State, the U. of Iowa, and the U. of Michigan and advanced to full professor in the electrical engineering department at Iowa State U. His areas of research included plasma physics, semiconductors, and photonic devices and light wave technology. He also held senior visiting appointments in England and Japan. Outside of work, he enjoyed tennis, travel and ballroom dancing. Survivors: his wife, Janet Anderson-Hsieh; daughter, Hilda Holman; and granddaughter.



**Gordon Dent Collins**, Gr. '62 (mechanical engineering), of Los Altos, November 4, at 95. He served in the Army Signal Corps during World War II. As an electrical engineer in the atomic energy division of General Electric, he worked on nuclear submarines, liquid sodium technology, fast breeder reactors and electromagnetic pumps. He also founded Collins Recording to serve student and professional musicians in the Bay Area. He was a dedicated Boy Scout leader, an avid golfer, a ham radio operator, and a guitar and callopie performer. He was recognized for his service by the California Music Educators Association and the Elfun Society, an organization of General Electric employees and retirees. He was predeceased by his wife, Louise; son Daniel; and a granddaughter. Survivors: his children Patrick, Christine and Gordon Jr.; and eight grandchildren.

**Dilip B. Adarkar**, PhD '63 (mechanical engineering), of Manhattan Beach, Calif., November 24, at 83, of natural causes. He spent more than 30 years in the aerospace industry. He worked first as an engineer for Douglas Aircraft and then in international marketing. In retirement, he served his community as a volunteer for several civic organizations and was active in Indian and U.S. politics. Survivors: his wife, Chitra (Joshi, MS '62); children, Ashwin, '86, MS '87, MBA '92, Swati and Sachin; and seven grandchildren.

**George Norton Oetzel**, PhD '65 (electrical engineering), of Boulder, Colo., October 17, at 83, of heart failure. He was a senior research engineer at SRI International in Menlo Park for nearly 40 years. He was an avid runner, mountain climber and cyclist. He also enjoyed folk and Scottish country dancing, birding and attending concerts. Survivors: his wife of 40 years, Martha; children, Ken and Donna; and four grandchildren.

**Nestor Martin**, MS '66 (civil engineering), of The Woodlands, Texas, December 17, at 81, of cancer. He was a captain in the military of his native Argentina. During his career with Bechtel, he lived and worked in Argentina, Lebanon, Saudi Arabia, Venezuela and many other countries. In retirement, he enjoyed tennis, golf and serving as president of the Casa Argentina in Houston. He loved the tango, soccer, a good *asado a la parrilla* and his mother's empanadas. Survivors: his wife of 56 years, Ana; daughters, Alexandra Harmon, Vanessa Sarria and Constanza Jones; and brother.

**Robert M. Kelly Jr.**, MS '68 (electrical engineering), of Shrewsbury, N.J., December 8, at 74. He spent his research and managerial career at AT&T Bell Laboratories, where he focused on applied research in digital signal processing and communications. After retiring, he continued to research and teach in the department of software engineering at Monmouth U. and at Stevens Institute of Technology. As a senior warden, church historian and vestry member for more than 40 years at Christ Church Shrewsbury, he worked to map and preserve the cemetery, leading to collaboration with scholars and students in history, anthropology, art and communication. He was predeceased by his wife, Annemarie. Survivors: his daughter, Kristen Kormann; and brother.

**Charles Henri Bimont**, MS '71 (operations research), of La Celle Saint Cloud, France, January 8, at 71. He held senior management positions with Texas Instruments, IBM and EADS. He had a lifelong passion for aerospace, mountaineering and the sciences in general. Survivors: his wife, Zoulia; and children, Thomas and Chloe.

## HUMANITIES AND SCIENCES

**Garner Handy Tullis**, MA '67 (art), of Pietrarubbia, Italy, December 5, at 79. He served for more than 50 years in various U.S. security agencies and the military, including with Air America during the Vietnam War. As founder of the International Institute of Experimental Printmaking, he collaborated with painters and sculptors in California and New York. He taught at Bennington College, Stanislaus State, UC Berkeley, UC Davis, Harvard and the U. of Urbino in Italy, and also as a visiting artist in Australia, Europe and South America. The Cleveland Institute of Art, Serbian National Museum of Art and Martha Jackson Gallery in New York featured his work in solo exhibitions, and his work is held by the Museum of Modern Art in New York and other prominent public and private collections. Survivors: his four children; five grandchildren; and two siblings, including Barclay, MS '64, PhD '70.

**Maite Careaga Tagüeña**, MA '02, PhD '05 (political science), of Bogotá, Colombia, January 21, at 49, of cancer. She initially taught leadership at the Instituto de Empresas and Carlos III U. in Spain. After moving to Colombia in 2010, she founded and directed a center for leadership in the public sphere at the Universidad de Los Andes as well as programs to promote grassroots leadership in former conflict areas to advance the peace process in Colombia. Survivors: her husband of almost 20 years, Jose Quintero, MA '00, PhD '03; children, Tania, Lara and Martin; mother, Carmen; and brother.

## LAW

**Leslie Mann Jr.**, LLB '50, of Scottsdale, Ariz., December 8, at 101. He served in the Navy during World War II and for more than 20 years in the Navy Reserve, retiring at the rank of commander. He practiced law in Pomona, Calif. He was predeceased by his wife of 63 years, Virginia. Survivors: his son, Les; grandson; and great-grandson.

**Thomas Holmes Thorner**, JD '56, of Tiburon, Calif., October 29, at 87. After serving with the Judge Advocate General of the Air Force, he worked in the law office of Melvin Belli in San Francisco. He was also an attorney for the Marin Municipal Water District and served on numerous civic boards. He later founded an investment firm focused on innovative start-ups that funded more than 50 technology and medical companies. Together with his wife, he traveled to all seven continents and more than 100 countries. He supported the civil rights movement and later helped found Marin Alternative to address environmental and social justice issues, including wetland preservation and opposition to the Vietnam War. Survivors: his wife of 58 years, Brittmarie; children, Priscilla, Peter and Todd; and six grandchildren.

**David M. Van Hoesen**, LLB '58, of Orinda, Calif., December 23, at 88. He joined the San Francisco law firm of Thelen, Marrin, Johnson & Bridges and was later a partner in several small law firms, where he specialized in construction litigation. He enjoyed doing his own construction work on the family cabin and various home expansions, and he also enjoyed hunting, fishing, cooking, traveling, scuba diving, bowling and playing softball. He was a longtime member of the Commonwealth Club and was quarterly chairman in 1978. Survivors: his wife of 64 years, Kay; children, Katrina Presti, Derek, Karen and Ted; 10 grandchildren; two great-grandchildren; and two sisters.

## MEDICINE

**Woodring Erik Wright**, PhD '74 (medical microbiology), MD '75, of Arlington, Texas, August 2, at 70, of multiple myeloma. He held a postdoctoral fellowship at the Pasteur Institute in Paris before joining the faculty at the University of Texas Southwestern Medical Center in Dallas. His research on muscle, telomere length, telomerase activity, and anti-cancer therapies resulted in more than 320 published articles, reviews, and book chapters and 27 patents. At UT Southwestern, his course on the biology of cells and tissue, enhanced by songs he wrote and played on guitar, earned him students' vote for outstanding teacher award five times. Survivors: his wife of 47 years, Beth; sons, Benjamin and Joshua; two grandsons; and sister, Colleen Suzanne Wright Rand, '67, PhD '71.

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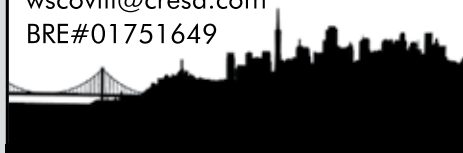
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*Postscript*

DOROTHY CHIN

# Life Cycles

A beachside bike path led me back to the Farm.



► **UNTIL RECENTLY**, my 9-year-old sons, Owen and Sam, did not ride bikes. Having separated from their dad when they were 2, I was too busy and drained from nailing down the “mom” stuff—making sure they felt loved and ate their vegetables—to have time for sports. Then the boys got bikes, and off we went to the school parking lot.

Owen, two minutes older than Sam, wanted to go first. I held on to the back of his bike as he started pedaling, and as he picked up speed, I let go, as I had seen dads do in those heartwarming real estate commercials. “Keep going, Owen!” I exhorted as I ran beside him, thrilled by my boy’s freedom as he realized he was on his own. Both he and Sam learned

to ride almost instantly that day.

After a few afternoons of running after them as they rode in a big loop around the neighborhood park, I told them I used to love riding my bike, too, and maybe I should start riding with them. “Used to?” they said. “You say ‘used to’ about a lot of things. You used to play basketball, you used to play tennis.”

“Well, I used to not have any children,” I wanted to say. I dusted off my old 10-speed that had been sitting in the garage, unused since my college days. (Yes, I *used* to go to college.) An afternoon in the shop and it was all ready to go.

Let me say this for the record: Relearning how to ride a bike is not just like riding a bike. Were the tires always this skinny? It

felt so wobbly. When I turned to avoid a hedge, the bike didn’t, and I crashed. Also, my bottom was really sore after a few rounds.

Nevertheless, the boys and I decided to take our bikes on the path along the beach. Owen rode in front, then Sam, and I held up the rear, so to speak. I climbed on and started pedaling slowly. Then, as I went faster, feeling the sun and wind caressing my face, it all came back to me. Looking down at my thighs pumping and the wheels turning, I saw myself on campus again, going from my dorm in Governor’s Corner to Building 80 in the Quad, where I spent my afternoons in the human biology office, then pedaling back as the sun was setting, its golden hues reflecting off the sandstone

buildings. I felt the same exhilaration now as I did then, watching my boys flying ahead, the tails of their hoodies flapping in the wind behind them.

“Mom!” Owen exclaimed when we stopped. “Did you see me fly over that bump?” “Mom!” Sam shouted. “Did you see me soar over that bump?”

“Boys,” I said as I very slowly dismounted, “did you see me pedal gingerly over that bump?” They laughed, and I felt a sense of peace about where we were and the road we were traveling on, bumps and all. ■

DOROTHY CHIN, ’85, a professor of psychology at Santa Monica College, lives and soars with her kids in Santa Monica, Calif.



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