

# ASU

ARIZONA STATE UNIVERSITY  
VOLUME 22 NUMBER 2

## Thrive

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### NEW GOLD RUSH

See how original research at ASU sparked a new carbon offset economy

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# Pioneering new frontiers

Never content to rest on its laurels, Arizona State University chooses instead to pioneer new frontiers. This edition of Thrive magazine celebrates stories that embody the unique ASU spirit — including our ability to rethink pressing sustainability issues, open up the work of one of our generation's seminal artists and reinvent the future of college athletics.

We start this magazine by looking at the big picture with a reintroduction to ASU's official charter and updated mission and goals.

**New American University: Toward 2025 and Beyond** summarizes the institutional framework at the core of all we do to help meet the needs of the communities we serve. It explains the "why" and "how" we can lead a new wave of American postsecondary institutions dedicated to generating positive social impact and supporting the comprehensive success of our community throughout their lifetimes.

We have made rapid and unprecedented progress toward our established aspirations, and, with your help, we will keep this pace and trajectory moving ahead. The engagement of our extended ASU community is vital to our ongoing progress, and I invite you to partner with us and share your ideas about taking our students and our university to the next level.

**Michael M. Crow**

President, Arizona State University

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# New American University

Toward 2025 and Beyond

## ASU Charter

ASU is a comprehensive **public research university**, measured not by whom it excludes, but by **whom it includes** and how they **succeed**; advancing **research and discovery** of public value; and assuming **fundamental responsibility** for the economic, social, cultural and overall health of the **communities** it serves.

Eight **design aspirations** guide ASU's ongoing evolution as a **New American University**. ASU integrates these institutional objectives in innovative ways to demonstrate excellence, access and impact.

### **Leverage Our Place**

ASU embraces its cultural, socioeconomic and physical setting.

### **Transform Society**

ASU catalyzes social change by being connected to social needs.

### **Value Entrepreneurship**

ASU uses its knowledge and encourages innovation.

### **Conduct Use-Inspired Research**

ASU research has purpose and impact.

### **Enable Student Success**

ASU is committed to the success of each unique student.

### **Fuse Intellectual Disciplines**

ASU creates knowledge by transcending academic disciplines.

### **Be Socially Embedded**

ASU connects with communities through mutually beneficial partnerships.

### **Engage Globally**

ASU engages with people and issues locally, nationally and internationally.

# Mission & Goals



## Demonstrate leadership in academic excellence and accessibility

- Maintain the fundamental principle of accessibility to all students qualified to study at a research university.
- Maintain university accessibility to match Arizona's socioeconomic diversity, with undifferentiated outcomes for success.
- Improve freshman persistence to **greater than 90 percent**.
- Enhance university graduation rate to **greater than 85 percent** and more than 32,000 graduates.
- Enhance quality while reducing the cost of a degree.
- Enroll **100,000** online and distance-education degree-seeking students.
- Enhance measured student development and individual student learning to national leadership levels.
- Engage all learners on all levels.



## Establish national standing in academic quality and impact of colleges and schools in every field

- Attain national standing in academic quality for each college and school (top 5 percent).
- Attain national standing in the learning value added to our graduates in each college and school.
- Become the leading university academically (faculty, discovery, research, creativity) in at least one department or school within each college and school.



## Establish ASU as a leading global center for interdisciplinary research, discovery and development by 2025

- Become the leading American center for discovery and scholarship in the integrated social sciences and comprehensive arts and sciences.
- Enhance research competitiveness to more than **\$815 million** in annual research expenditures.
- Transform regional economic competitiveness through research and discovery and value-added programs.
- Become a leading American center for innovation and entrepreneurship at all levels.



## Enhance our local impact and social embeddedness

- Strengthen Arizona's interactive network of teaching, learning and discovery resources to reflect the scope of ASU's comprehensive knowledge enterprise.
- Co-develop solutions to the critical social, technical, cultural and environmental issues facing 21st-century Arizona.
- Meet the needs of 21st-century learners through the universal learner initiative by increasing individual success through personalized learning pathways and promoting adaptability to all accelerated social-technical changes.



**Katie Chase and Keenan Thompson take the polar plunge during their study abroad exploration of Antarctica.**

#### Go

### Calendar of events

Celebrate spring with upcoming events highlighted on ASU's campuses. 6

#### Update

Discovering the birth of stars, solar efficiency and more. 8

#### Advance

## Forget balance

Live a more productive life by focusing on a feeling of well-being. 16

**Negotiating secrets:** 4 keys to improving negotiation outcomes. 20

**MedTech teamwork:** ASU and Mayo Clinic create an accelerator for startups. 22

#### Breathe

## Breathing ocean

Susanne Neuer's research helps prime the carbon pump. 26

## Carbon farming

Or how to save the world from thin air. 30



Susanne Neuer, right, and Bianca Nahir Cruz probe ocean microbes.

JASON RANSOM; JAROD OPPERMAN/ASU



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James Turrell's magnum opus on the edge of the Painted Desert will become accessible to more people.



High-intensity interval training, or HIIT, can be tailored to an individual's personal capabilities.

Less might be more when it comes to physical activity. 54

**Connect**

**Founders' Day:** Honoring the past, inventing the future. 58

**Alumni chapter listings, class notes** 59

**Wonder: Positive impact of awe** 64

**Visualize**

## Letting in the light

ASU and acclaimed artist James Turrell partner on Roden Crater, a masterwork of interdisciplinary exploration. 40

**Play**

## Winning debut

Herm Edwards proved Sun Devil Football made the right coaching choice. 48

Spencer Torkelson's home run odyssey. 53



After the first game of the season, a victory, Sun Devil Football players gave coach Herm Edwards the game ball, a sign he was the game's MVP.

KLAAUS OBERMEYER; PETER VANDER STOEP



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 [soundcloud.com/asualumni](https://soundcloud.com/asualumni)

## The Band Perry

Grammy Award-winning superstar sibling trio The Band Perry has forged a genre-defying identity. Since their groundbreaking crossover No. 1 single "If I Die Young" in 2010 they have become known for their boundary-pushing live performances. The band's combination of music, fashion and visual art has become a hallmark of their dialogue with their fans.

**Saturday, March 30,  
8 p.m., Coca-Cola Sun  
Deck, Sun Devil Stadium,  
ASU Tempe campus**

**Ticketed \$25+ "**



## Gin Blossoms with special guest Vesperteen

Gin Blossoms' indelible jangle-pop sound was evolving during radio's diverse mix of hair bands and grunge music superstars. In the late '80s, they started to grow a huge following as the No. 1 local music draw in Phoenix, and they certainly were the hometown heroes of their favorite hang, Tempe, Arizona. The band busted radio charts with hit singles "Hey Jealousy," "Allison Road," "Until I Fall Away," "Mrs. Rita," and "Found Out About You."

**Thursday, March 28,  
8 p.m., Coca-Cola Sun  
Deck, Sun Devil Stadium,  
ASU Tempe campus**

[asu365community  
union.com](http://asu365communityunion.com)

**Ticketed**

# Apr.



## Volunteer Income Tax Assistance for 2019 tax filing season

The W. P. Carey School of Business at ASU's West campus, in cooperation with the Internal Revenue Service, the Maricopa County VITA Network and A New Leaf, is serving as a Volunteer Income Tax Assistance site. VITA offers free income tax preparation for qualified low- to moderate-income taxpayers (generally, family income of no more than \$55,000 in 2018).

**Thursdays and  
Saturdays  
through April 13,  
times vary,  
CLCC 238,  
ASU West  
campus. Call  
623-847-4188,  
ext. 4516, for  
specifics.**

**Free**

## Big ideas on dialogue, power and discovery at TEDx ASU West

This year's live TEDx talks are built around the theme "Talking Back." This evening event will bring great ideas forward, providing a platform to share thoughts about dialogue, power, community and discovery. Come listen to a variety of speakers, from former NFL quarterback Sam Bradford to ASU natural sciences Assistant Professor Jennifer Hackney Price.

**Tuesday, April 2,  
6–9:30 p.m., La Sala  
Ballroom, ASU West  
campus**

[newcollege.asu.edu](http://newcollege.asu.edu)

## 'Wicked'

From the first electrifying note to the final breathtaking moment, "Wicked," the untold story of the witches of Oz, transfixed audiences with its wildly inventive story that USA Today calls "a complete triumph! An original musical that will make you laugh, cry and think."

**April 2–May 5, 7:30 p.m., ASU Gammage,  
ASU Tempe campus**

[asugammage.com](http://asugammage.com)

**Ticketed \$25+ Family**



## Restoring 'A' Mountain

Celebrate Earth Month 2019 by helping to restore walking and hiking trails on "A" Mountain, Tempe's only preserve. Let's walk the talk and give back to the iconic mountain we love too well! Bring your sunblock and a reusable water bottle. There's breakfast and lunch for you at the event. Tools will be provided.

**8:30–11:30 a.m.,  
Saturday, April 6, Hayden  
Flour Mill, Tempe**

[sustainability.asu.edu/  
events](http://sustainability.asu.edu/events)

**Free Family**

## Planting new trees

Join the ASU community and City of Tempe in planting 38 trees in a neighborhood park in honor of Rev. Jenny Norton and Bob Ramsey. This event is held in conjunction with Earth Fest, Bike to Work Day and other sustainability learning opportunities in celebration of Earth Month 2019.

**Saturday, April 13**

[sustainability.asu.edu/  
events](http://sustainability.asu.edu/events)

**Free Family**



## Machine Learning Day

Machine learning has reshaped relationships between data, computation and decision-making, resulting in massive improvements in quality and scale. Join researchers and practitioners to learn more about innovative discovery in the field.

Friday, April 19, 8 a.m.–3:30 p.m., University Center Building #120, ASU West campus

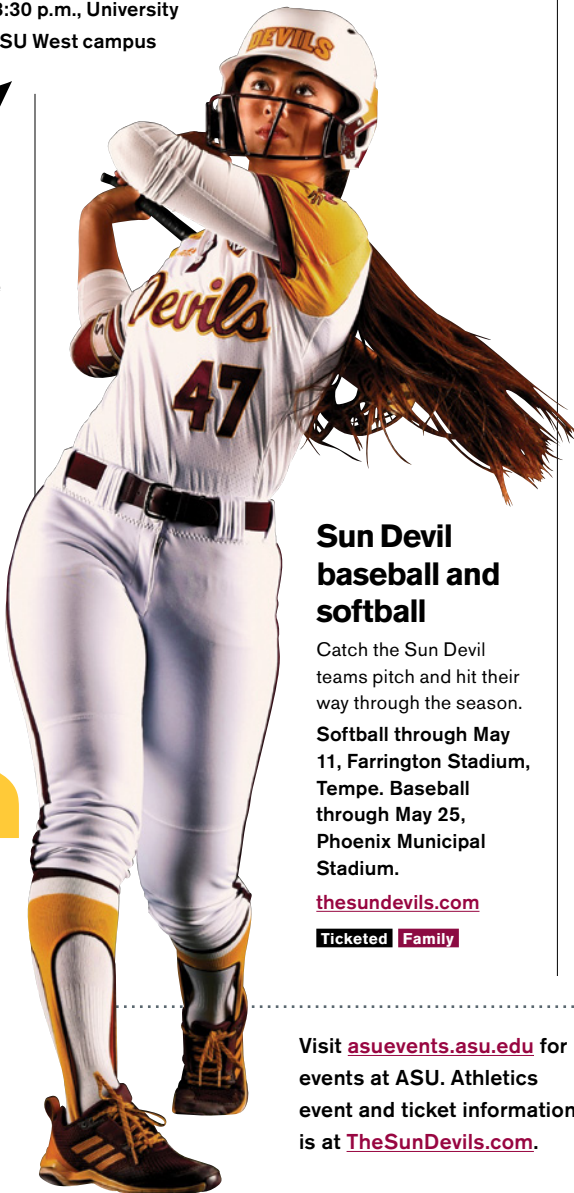


### Pat's Run

Pat's Run is held annually to honor Pat Tillman's legacy. Proceeds from the 4.2-mile run/walk benefit the Tillman Scholars program. Kids 12 and younger can register to run/walk 0.42 miles from the Kids Corner to Sun Devil Stadium.

Saturday, April 27, 6–11 a.m., Sun Devil Stadium, ASU Tempe campus

[pattillmanfoundation.org/pats-run](http://pattillmanfoundation.org/pats-run)



### Sun Devil baseball and softball

Catch the Sun Devil teams pitch and hit their way through the season.

Softball through May 11, Farrington Stadium, Tempe. Baseball through May 25, Phoenix Municipal Stadium.

[thesundevels.com](http://thesundevels.com)

**Ticketed Family**

Visit [asuevents.asu.edu](http://asuevents.asu.edu) for events at ASU. Athletics event and ticket information is at [TheSunDevils.com](http://TheSunDevils.com).

## Summer camps

Do your kids want to understand the basics of law? Do they desire to learn music from Phoenix Symphony members? Are they ready to dive into augmented reality? Find more information on camps for students in K–12 at [eoss.asu.edu/access/programs/summer](http://eoss.asu.edu/access/programs/summer)

**Ticketed Family**

A few highlights from this summer's lineup:

### Barrett Summer Scholars

Students will experience college firsthand alongside other academically talented students as they participate in a community of peers from across the state.

June 2–28, all campuses

### Civic Leadership Institute

Students join the ASU School of Civic and Economic Thought and Leadership and dive into a deeper understanding of the law and its principles. Activities include interactive lectures, discussions and readings with ASU student mentors.

June 16–21, Tempe campus, 10–12 grade

### MEF/ASU Music Camp 2019

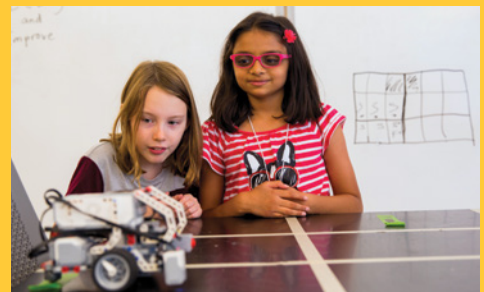
Your child will be enriched in music education with help from ASU School of Music members, Phoenix Symphony personnel and other exceptional performers and educators! After master classes and electives, join us for the free final performance.

June 17–22, ASU Gammage, ASU Tempe campus, 7–12 grade

### Digital Culture Summer Institute

From 3D modeling to animation, let your students explore the digital world and embrace their technical side while working with state-of-the-art technology in Digital Culture.

June 10–29, Tempe campus, 6–12 grade



### Check in at events to earn Pitchforks and rewards!


Log in to the Sun Devil Rewards app for ASU event listings, news, games and more. Earn and be rewarded! [sundevelrewards.asu.edu](http://sundevelrewards.asu.edu).



# May

**“This project shows that a promising new technique can work and has paved the way for decades of new astrophysical discoveries.”**

— JUDD BOWMAN, ASSOCIATE  
PROFESSOR, ASU SCHOOL OF EARTH  
AND SPACE EXPLORATION



v; to share  
impactful news  
and events;  
to inform

# Update

DISCOVERING  
THE BIRTH OF STARS

**Findings selected  
by Physics World  
magazine as  
one of its top 10  
“Breakthroughs  
of 2018”**

ASU cosmologist Judd Bowman and his research team created a time machine to discover the first evidence of the cosmic cradle using a cost-effective small radio receiver set up in the Australian Outback.

The researchers traveled back to 180 million years after the Big Bang to detect the first stars, a discovery that may surprisingly also shed light on the nature of mysterious dark matter.

Now Bowman's team is partnering to repeat experiments with a new radio array being built in South Africa. They are attempting to make the first 3D map of the early universe. They also hope to unlock the mystery of dark matter's role in the formation of the first stars.

## Block party power?

### Community gatherings help prevent crime

Want to seriously reduce crime in your neighborhood? Throw a party and bring in the love. That's essentially the big takeaway in a study headed by Cody Telep, an assistant professor in ASU's School of Criminology and Criminal Justice.

The two-year study examined the effectiveness of two interventions led by a community-based nonprofit organization in Seattle. The results showed that community-led prevention efforts — holding block parties, activities and events, building relationships and other nonenforcement alternatives — in high crime areas can have a positive impact on reducing crime and disorder.



Professor Kelly Knudson, left, works with graduate student and bioarchaeology PhD candidate Sofia Pacheco-Forés in the School of Human Evolution and Social Change's Archaeology Chemistry Lab.

## Around the world in 10,000 samples

Tucked away in a quiet corner of ASU's Tempe campus, the Archaeological Chemistry Laboratory analyzes aged samples from across the globe — such as plants, bones, dirt, textiles and hair — to reveal the secret lives and environments of ancient people. After 12 years, it has reached an impressive milestone by processing its 10,000th sample.

The chemicals it analyzes, called isotopes, are like fingerprints that the land leaves on organic matter. Each is a slight variation of an element, such as oxygen, that is unique to a specific area. So, if you grew up in New Hampshire and then lived in Arizona as an adult, the isotopic signature in your teeth and bones would show that you spent your adulthood in the Southwest but originally came from the Northeast.

The celebrated 10,000th sample, ACL-10000, is a humble water sample from southern Peru. However, as part of the Andean Paleomobility Unification Project, it's destined to have a lasting impact on the archaeological study of the Andes.

## Choline supplement may help in fighting Alzheimer's

Researchers at ASU's Biodesign Institute have found that choline — an important nutrient found in dark leafy greens such as broccoli — may help in the war against Alzheimer's. Choline, also available as a dietary supplement, protects the brain from the memory-stealing disorder in at least two ways — reducing the plaque-inducing amino acid homocysteine and reducing the activation of cells that cause brain inflammation. The study has established the transgenerational benefits of choline supplementation.



Follow Dutch the police dog on Twitter [@k9\\_dutch](#) and on Instagram [@k9\\_dutch](#).

## Trauma dog joins ASU PD

The newest member of the ASU Police Department will fight crime in his own sort of way: with a focus on crime victims, not perpetrators. Dutch, a Labrador retriever, has joined the department as its first trauma dog. "When someone has been a victim of a crime, it's something that's not normal, and so a lot of people, especially with violent crimes, they'll shut down," says Jason Latella, the ASU police sergeant who is the dog's handler. Petting a dog can be relaxing and bring down heart rate and blood pressure, helping the person to talk with officers, he adds.

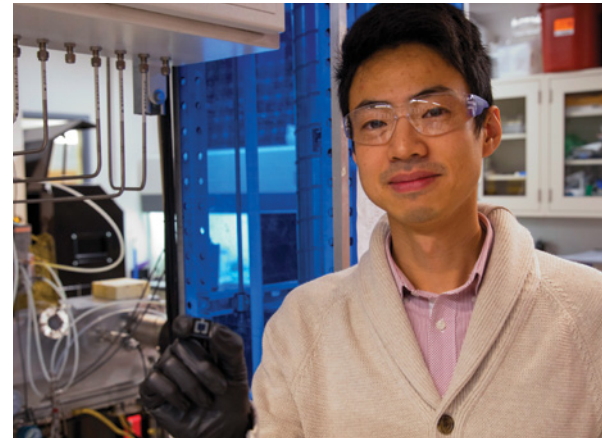
**\$617.7 million**

in ASU research expenditures for fiscal year 2018

## ASU research continues to rise

ASU research has quintupled since 2002, making it one of the fastest-growing research universities in the U.S. ASU reported \$617.7 million in research expenditures for FY18. According to National Science Foundation Higher Education Research and Development rankings, ASU is No. 44 in the country, ahead of the California Institute of Technology and the University of Chicago, and No. 8 among institutions without a medical school.

Keep up with the headlines at ASU by subscribing to the ASU Now newsletter at [asunow.asu.edu/subscribe](http://asunow.asu.edu/subscribe).

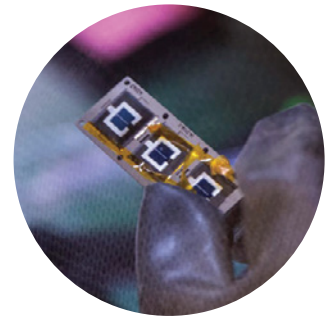


Assistant Research Professor Zhengshan "Jason" Yu's research focuses on silicon-based tandem solar cells to exceed the theoretical efficiency limit of single-junction silicon solar cells.

## ASU engineers break solar efficiency record

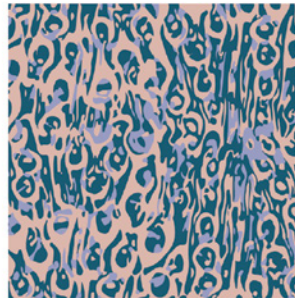
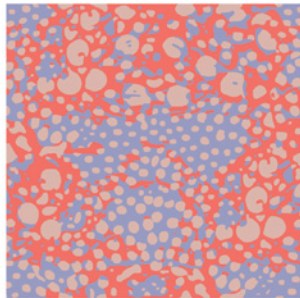
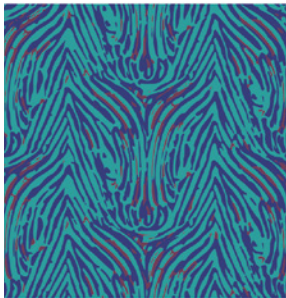
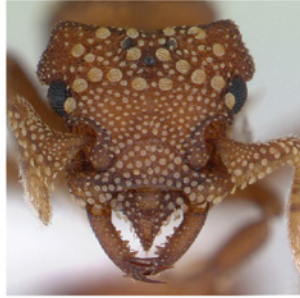
ASU researchers continue to break solar cell efficiency records in an effort to harness the sun's energy more economically as a renewable source for electricity.

In 2017, Assistant Professor Zachary Holman and Assistant Research Professor Zhengshan "Jason" Yu in ASU's Ira A. Fulton Schools of Engineering set a world record of 23.6 percent efficiency for a tandem solar cell stacked with perovskite and silicon. The number was a few percentage points shy of the theoretical efficiency limit for silicon solar cells alone.



Solar cell detail.

Now, the team has improved upon the record by nearly two percentage points, to 25.4 percent, in a joint project with researchers at the University of Nebraska-Lincoln, predicting they'll be nearing 30 percent tandem efficiency within two years.



These pillow patterns from a science-art collaboration on ants bring science into the home.

## Ant-patterned pillows raise biodiversity awareness

Clint Penick, an ant aficionado and assistant research professor in the Biomimicry Center at ASU, is offering a rare perspective of the insect kingdom's plucky picnic pests — by way of the pillow. Blending science with art for a practical finish, Penick and his fellow researchers have created a unique line of decorative cushions that



reflect their affinity for ants, one he hopes will help raise awareness about the beauty and benefits of the tiny armies

that service our ecosystems.

"We didn't just want to have ants on a pillow," Penick says. "We wanted the pattern to be more abstract, like how zebra stripes represent a zebra without showing the whole animal."

Find the pillows at [holotype.threadless.com](http://holotype.threadless.com). Sales proceeds support research efforts at ASU.

## Education, attitude matter when detecting fake headlines

People with higher education levels and more positive attitudes about news can more easily spot fake headlines, according to research by the News Co/Lab at ASU's Walter Cronkite School of Journalism and Mass Communication in collaboration with the Center for Media Engagement at the University of Texas at Austin.

In an exercise with two real headlines and

a fake one, 61.6 percent of the survey-takers could correctly identify the fake headline. For people with college degrees, the success rate rose to 67.7 percent. For those without college degrees, it fell to 56.7 percent.

"This suggests a need for a greater focus on news fluency," says Eric Newton, Co/Lab co-founder.

## 'Invisible labor' can negatively impact Mom's well-being

Knowing who needs to be where, on what day and at what time. Buying a bigger pair of pants before a child outgrows what is currently hanging in the closet. Always having a jar of unopened peanut butter on hand.

These caregiving tasks require mental and emotional effort and are examples of the invisible labor women contribute in caring for their families. Though men participate in housework and child care more today than in the past, women still manage the household, even when they are employed. Researchers from ASU and Oklahoma State University have studied how the management of a household is divided among partners and how the division of labor affects women's well-being.

Almost nine in 10 women surveyed felt solely responsible for organizing the schedules of the family. A large percentage of the women felt that it was mostly they who were responsible for being vigilant of their children's well-being. This clearly predicted feelings of emptiness in the women. It was also associated with low satisfaction levels about life overall and with the marriage or partnership.



## End of the earth: Students explore Antarctica

In December, an ASU crew of seven students, two faculty and one staff embarked on a 10-day research expedition in Antarctica — an adventure few U.S. universities have experienced. And yes, they had a cool time — from hiking a glacier, counting seabirds, taking a polar plunge and delving deeper into the mysteries of the frozen continent — all during days with 23 hours and 45 minutes of daylight.



ASU students Katie Chase and Keenan Thompson swim back to shore after doing the polar plunge. “Every day brought new challenges that we had to overcome as a group,” says Professor Diana Bowman of the School for the Future of Innovation in Society and the Sandra Day O’Connor College of Law.



ASU Rob and Melani Walton Teachers' Academies work with teachers across the U.S. to integrate sustainability into their classrooms and schools. One of their lessons includes visiting a local Goodwill recovery and distribution center to understand materials reuse.

## Rob and Melani Walton strengthen commitment to ASU

ASU has announced the permanent establishment of the Rob and Melani Walton Sustainability Solutions Service, furthering the university's efforts to become a global leader in sustainability education and applied research. The solutions service will serve as the umbrella entity for programs seed-funded in earlier investments by longtime supporters Rob and Melani Walton, whose total giving toward sustainability solutions at ASU has reached \$31.8 million.



## A tool to fight against teen suicide

For people of all ages, suicide is the 10th-leading cause of death, but for teenagers, it is the second, according to the U.S. Centers for Disease Control and Prevention.

ASU students Sonia Sabrowsky and Madison Sutton, both seniors in the Department of Psychology as well as members of the Courage Lab and the ASU Tillman Scholars Program, decided to do something to try to prevent teen suicide.

They founded the Home Base Initiative, a nonprofit that provides mental health resources for students, parents and educators. Sabrowsky and Sutton's initiative uses evidence-based interventions to promote better coping strategies for people suffering from suicidal thoughts. The initiative is also in the process of creating a community-based peer support network for high school students.

Learn more at [homebaseinitiative.org](http://homebaseinitiative.org).



## 'Incredible' power of touch

Jason Little hadn't felt his wife's touch with his left hand in more than seven years when he was matched with a prosthesis that connected to his nervous system.

"I closed my eyes, she put her hand in the prosthetic, and I closed it, and I was able to tell her I was touching her hand," says Little, who lost his left arm from the elbow down in a rollover accident. "She broke down. It was a pretty powerful moment."

The prosthetic hand, the first of its kind, is the culmination of 12 years of work by James Abbas, an ASU associate professor, and Professor Ranu Jung of Florida International University. With his old prosthesis, Little had to rely on visual or auditory cues that he was crushing something or letting it slip from his grasp.

"That's the only feedback I was getting previously," he says. "Now I can tell you whether an object is hard or soft. That's incredible to me."

v: to move forward;  
to rise in rank, position  
or importance; to  
make progress

# Advance

## EXPANDED CAREER SERVICES

Transformative philanthropic support will expand career services for students and create two research chairs in the W. P. Carey School of Business. The W. P. Carey Foundation will direct at least \$15 million to enhancing the number and quality of career resources for students, and \$10 million to recruiting prominent professors and researchers as endowed academic chairs.

In addition, the W. P. Carey Foundation is partnering with the ASU Foundation in launching a giving campaign to raise an additional \$25 million.

**Carey Career Services Associate Director Chris Holland talks with recent business administration graduate Selena Aguilar at the W. P. Carey School of Business.**

## Sync with yourself

Start by focusing on a feeling of well-being.  
**16**

## Secrets to negotiation

Four keys to improving negotiation outcomes.  
**20**

## Being conscious

What choices are you making?  
Do they line up with your values?



## Oscillating through time

Out of town for a big project?  
Maybe taking some extra  
family time once you return  
will work wonders for you.



May Busch is senior advisor and executive in residence in ASU's Office of the President. She is also a professor of practice in the W. P. Carey School of Business and chairs the Idea Enterprise. Find her at [maybusch.com/asuthrive](http://maybusch.com/asuthrive).

## Getting a dose of joy every day

Simple things  
can help break  
up the stressful  
moments.



# Forget balance

Instead, try these 5 ways to live in sync with your well-being

BY MAY BUSCH

I know it sounds sacrilegious, but I don't believe in work-life balance. I agree that it's important to have a life, and that it's hard, because most of us have too many competing priorities and too little time. But I don't believe in work-life balance because it's an outdated and overrated concept that's impossible to achieve for most of us. Instead, I focus on a feeling of well-being and of being "in sync" with yourself. This involves five aspects:

## Reframing



**Are you missing the game or are your kids learning how to be independent?**

### 1. Being conscious

This is about knowing what you want, exercising your free will and making conscious decisions about how to spend your time and energy.

When we make conscious choices, we have an excellent chance for our actions to be in alignment with what truly matters to us.

For example, my family is hugely important to me, yet I used to keep my head down and work until the task was done, no matter how late I had to stay. Without realizing it, I got myself in a situation where I hadn't had dinner with my family for months. And I only noticed when my husband got angry with me about it.

Then my boss sat me down and told me he was concerned about my working too much. He pretty much ordered me to leave the office in time to be home for dinner twice a week, and to come in late after taking the kids to school twice a month. I'm lucky to have had a great boss to help me become more conscious about my choices. If you don't have a boss like I did, you must learn to do this for yourself.

You'll be in alignment, which leaves no room for debilitating and draining emotions like worry and regret.

## 2. Oscillating through time

Recognize that you're going to be going through different wave patterns during your day, your week, your year. In fact, that's optimal rather than targeting a static level of balance and staying at that.

The former allows you to have the whole range of highs and lows, where the latter focuses on staying at a moderate level. And as Oscar Wilde said, "everything in moderation, including moderation."

For me, that meant being able to go all out on my business during a big three-week project, but then being able to take a break or a few days off to be with my family later in the month.

It's about achieving your optimal mix of activities over a longer time horizon, rather than insisting on "balancing the books" every day or every week, which can drive you crazy.

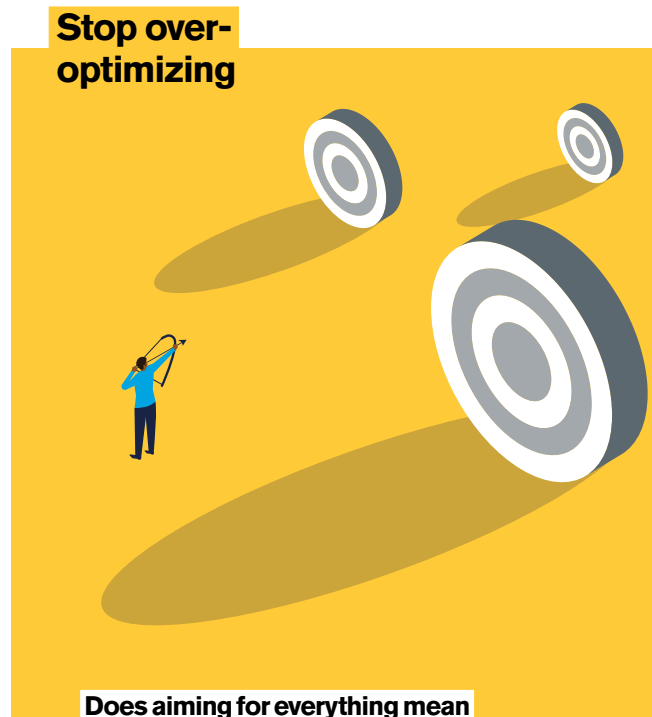
## 3. Getting a dose of joy every day

When I was getting stressed out at work, my mother used to tell me to take a minivacation every day; just closing my eyes for 2-5 minutes and imagining myself in my favorite vacation spot. It really did make me feel better!

This is the same idea, only it's about joy rather than peace.

Start by identifying those small simple things that make your heart sing and make sure you get some of it each day.

For me, it can be as simple as playing a favorite song at full blast, or dancing. These



**Does aiming for everything mean you can't get to the things you care about most?**

days, you can plug in your iPod equivalent and rock out for the length of a song pretty much anywhere. I was usually able to duck into a conference room, but if you can't, then worst case, there's always the facilities!

## 4. Reframing

This is about shifting your mindset to a more positive way of looking at whatever situation you're in.

This is a variation on being conscious. You want to be in charge of the way you frame things so that issues become opportunities, and problems can have solutions.

This "inner game" can either drag us down or pull us up, depending on how well we can reframe things in an energizing way.

As an example, one thing that used to bother me was not being able to be at a

performance or sports event for my three children, and not being home to send them to school or welcome them home after school.

Then my mother (who is a pediatrician) told me that this made our children independent. Not only was she right about that, it also made me feel more positive about my choices.

## 5. Stop over-optimizing

Sometimes we put unnecessary pressure on ourselves by setting up too many constraints. Then it becomes stressful to try to optimize it all, and you end up feeling drained.

I remember trying to keep everyone happy simultaneously – my boss, team, husband, three kids and even the dog. Plus, living up to standards of home decoration, housekeeping and

other social pressures. My own well-being wasn't even on the list.

Some of the things I did in the name of satisfying people didn't even matter to them, like folding the kids' laundry or personally sewing their Halloween costumes when I had million-dollar deals going on at work. Or feeling like I had to attend every client meeting, even if it meant taking two red-eye flights back to back.

Over the years, my husband and I have been reducing the number of constraints by getting clear on what really matters to each of us, and culling the rest.

For example, we've called a "truce" on celebrating Valentine's Day since neither of us cared that much about what is essentially a fabricated holiday. And we live with a messier house than either of us were brought up in.

So stop torturing yourself about work-life balance, and start focusing on having a feeling of well-being and living your life "in sync" with who you are and what really matters to you.

If that involves a big commitment in one area and less in another for now, go with it. You will keep oscillating and adjusting, because life isn't static. It's progressive. ■

Ideas. Insights. Inspiration. Check out May Busch's advice-and-tips blog at [maybusch.com/blog](http://maybusch.com/blog).

# Expand your skills with lifelong learning at your own pace

Develop skills for an ever-changing world by studying with ASU experts in leadership, interdisciplinary studies, technology management and more at your own pace, and earn certificates to support your continued career growth and advancement.

ASU's bundle of four Professional Skills Mastery courses are designed for anyone who wants to become a better problem solver and decision maker. If you want to tackle personal or professional problems

with confidence and make life changes and grow at your work, then these are for you.

## Professional Skills Mastery — Problem Solving and Decision Making

In this certificate-earning bundle, you will learn and receive the four courses ASU Continuing and Professional Education offers related to problem solving and decision making.

Students will take the following four courses, which contain videos for learning and assessments to check their understandings of the concepts:

- Identifying and Defining Problems
- Solving the Problem
- Thinking Critically
- Decision Support Tools

A library of courses are available for ASU alumni at a discount. Discover them at [courses.cpe.asu.edu/browse/alumni](https://courses.cpe.asu.edu/browse/alumni).

## Free career services for life for grads

ASU Alumni offers free career services for life to Sun Devil alumni, including job and internship connections, with access to thousands of job postings online; career advice in both virtual and in-person meetings; and career resources you can access 24/7. Register at [alumni.asu.edu/benefits/alumni-career-and-professional-development-services](https://alumni.asu.edu/benefits/alumni-career-and-professional-development-services).



# Howard Schultz talks opportunity

Growing up in poverty, Howard Schultz remembers hiding in the stairwell of his building to escape his apartment and wonder about his future. It also sparked his determination to succeed.

"I'm living proof of the success of this country," says Schultz, who visited ASU's Tempe campus in January to discuss his new book, "From the Ground Up: A Journey to Reimagine the Promise of America."

"I wanted to create something," he says. "I wanted to uplift and bring people along with me on the journey."

In his book, Schultz describes his poor upbringing in public housing and emphasizes the importance of education.

"Revenue growth is linked to innovation and education and immigration," Schultz says. "If we could be exposed to someone who is different from us, with different life experience or color of skin, we would learn something and be better for it."

**"I wanted to create something. I wanted to uplift and bring people along with me for the journey."**

—HOWARD SCHULTZ, FORMER STARBUCKS CEO



Former Starbucks CEO Howard Schultz listens to Starbucks College Achievement Plan partners at ASU's Tempe campus. In 2014, Starbucks partnered with ASU on a tuition-reimbursement program, and more than 2,400 partners have graduated since then.

## Know a person's prior beliefs

When entering a negotiation we all bring our own prior beliefs to the conversation. Knowing a person's prior beliefs can also help us find common ground, which is the foundation for building trust and relationships. This does not mean you should manipulate data to match your or their opinion. We should always be honest in our presentation. If the data goes against your counterpart's prior beliefs, help them understand why.

## Ask yourself what is your ideal outcome

Understand your price range and what other incentives you can accept or give before going to the negotiating table. Prepare by asking yourself a few questions: What is my ideal outcome? What is my ZOPA (zone of possible agreement) — the range in which you're willing to make a deal. And what is my BATNA — best alternative to negotiated agreement?



# secrets to better negotiation

## Remember we aren't as rational as we think

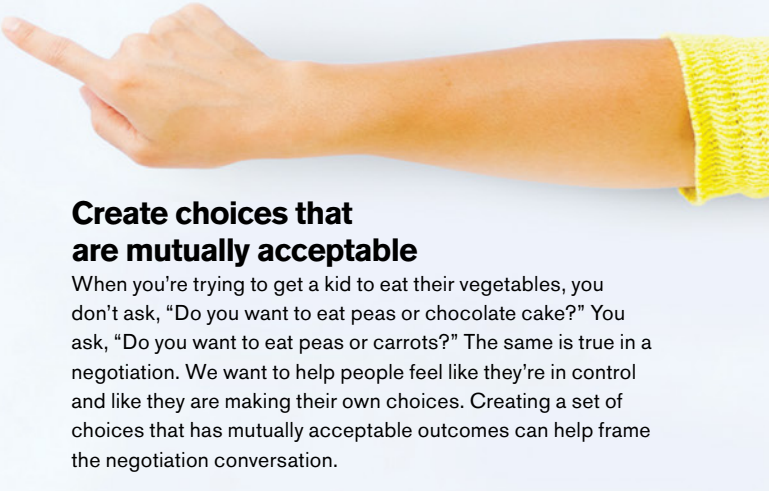
Although we love data, humans are not as rational as we think. In fact, people often don't make decisions based on data, but use data to justify emotional or irrational decisions.

For example, before buying something we research the product online and get recommendations from friends. Then, when someone asks about our purchase, we don't say, "I really wanted it." We use the data points to support our decision.



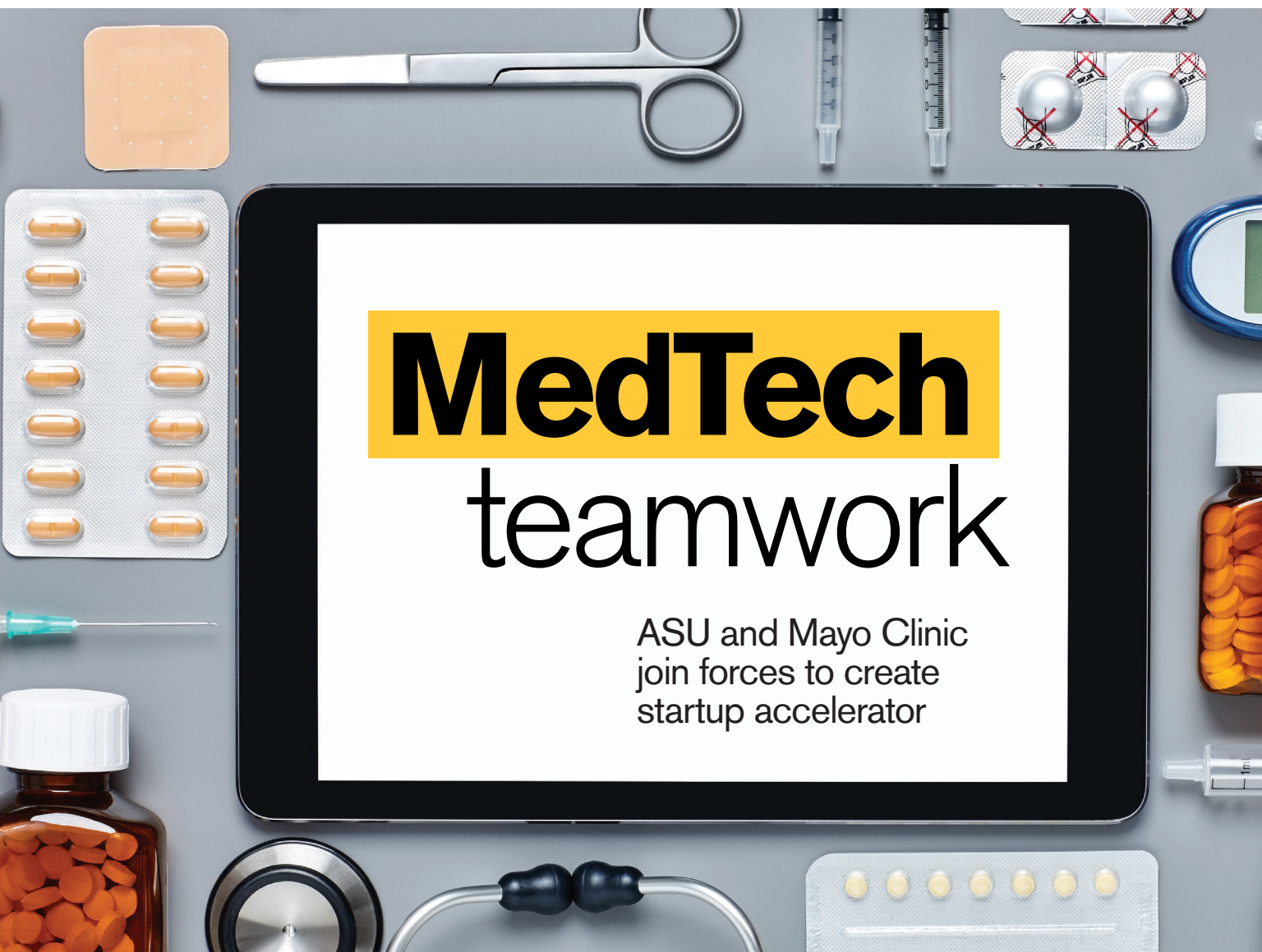
Theodore Cross, clinical assistant professor of leadership and management at ASU's Thunderbird School of Global Management

Think of all the times in your career that you've had to negotiate — with your employer or employees, with clients, with partners. From salary to sales agreements, it is a critical skill. Here are four steps in negotiations that are more likely to lead to an agreeable outcome for both you and your counterpart.



## Create choices that are mutually acceptable

When you're trying to get a kid to eat their vegetables, you don't ask, "Do you want to eat peas or chocolate cake?" You ask, "Do you want to eat peas or carrots?" The same is true in a negotiation. We want to help people feel like they're in control and like they are making their own choices. Creating a set of choices that has mutually acceptable outcomes can help frame the negotiation conversation.



# MedTech teamwork

ASU and Mayo Clinic  
join forces to create  
startup accelerator

**W**hen Steven Lester suggested Mayo Clinic create a program in Arizona to help startup companies take their businesses to the next level, he quickly determined ASU would be the ideal partner.

Now the two innovative institutions are harnessing their resources and venture expertise with the Mayo Clinic-ASU MedTech Accelerator. The program, launching this year, is designed for medical device and digital healthcare companies with applications that

could serve businesses nationwide.

“Beyond our great weather and low cost of living, we have access to top-tier research faculty, world-class physicians and a pipeline of talent coming out of our academic programs,” says Rick Hall, director of health innovation at ASU’s College of Nursing and Health Innovation and the accelerator’s co-managing partner. “The Mayo-ASU relationship uniquely positions Arizona as an attractive location for companies to accelerate growth.”



The operating team jointly responsible for developing and delivering the program comes from Mayo Clinic Ventures, led by co-managing partner Timmeko Love. MCV is a top-tier commercialization office and ranks in the top five of U.S. technology transfer offices in revenue and licensed technologies. MCV has a long-standing history of successfully collaborating with established and emerging health care companies, and has provided strategic funding to support these

## “The Mayo-ASU relationship uniquely positions Arizona as an attractive location for companies to accelerate growth.”

— RICK HALL, DIRECTOR OF HEALTH INNOVATION AT ASU'S COLLEGE OF NURSING AND HEALTH INNOVATION

collaborations.

Dr. Lester, chief medical officer and physician leader of the accelerator, explains the goal is helping startups bridge the development gap.

“We can help the participants to enhance the clinical and commercial interest and viability of their health care solution,” he says. “We want to truly translate idealism into action and help to invent the health care of tomorrow.”

Participants can expect to personalize business development plans in collaboration with Mayo Clinic and ASU, as well as accelerate go-to-market and investment opportunities. Hall says this concept provides businesses rare access to the university’s well-established startup network.

ASU has established a reputation as a patent powerhouse. University researchers submitted a record 285 inventions to Skysong Innovations in 2018, and the university ranks 17th worldwide for U.S. patents awarded, according to the U.S. National Academy of Inventors and the Intellectual Property Owners Association.

“The number of patents and amount of funding going to startups through the vehicles of ASU’s Entrepreneurship + Innovation and Skysong Innovations are significant,” Hall says. “This accelerator will allow outside health technology companies to benefit from the ASU support network, while also leveraging the extraordinary business development and research opportunities of Mayo Clinic.”

Learn more about the accelerator at [medtechaccel.com](http://medtechaccel.com).

— Amanda Goodman



Participants start with an accelerator immersion at Mayo Clinic’s Scottsdale campus and will be offered incentives to stay and work in Arizona.



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**[biodesign.asu.edu](http://biodesign.asu.edu)**

v: to take in oxygen and expel carbon dioxide through natural processes

# Breathe

## NATURAL CARBON CAPTURE

### Amazonian peatlands may soon switch from sink to source

Ecosystems that host a carbon dioxide-rich type of soil called peat, known as peatlands, are the most efficient natural carbon sink on the planet. When undisturbed, they suck up and store more carbon dioxide than all other vegetation types on Earth combined. But when peatlands are drained and deforested, they can release nearly 6 percent of global carbon dioxide emissions each year. Hinsby Cadillo-Quiroz, a microbiologist in ASU's Bidesign Institute, studies the Amazonian peatlands with his team of researchers. They are aiming to create a predictive model to better understand methane cycling at local or regional levels in the Amazon. This will be an important tool in managing ecosystems and predicting regional atmospheric conditions.

Cadillo-Quiroz (right), along with ASU undergraduate researcher Carlos Courtney (left) and high school student Jesus Fernandes, deploy a soil microbial community manipulation experiment in Quistococha, Iquitos, Peru.

### Priming the carbon pump

Susanne Neuer probes ocean world of microbes.

26

### Saving the world from thin air

Meet the ASU-inspired "used carbon salesmen."

30

# Priming the ocean's carbon pump

Biodesign Institute oceanographer Susanne Neuer researches the microscopic organisms that drive the ocean's absorption of carbon dioxide out of the atmosphere

**Story by** KRISTIN BAIRD RATTINI  
**Photo by** JAROD OPPERMAN

When it comes to climate change and carbon reduction, Susanne Neuer is thinking small — extremely small.

The ASU biological oceanographer is an expert on marine phytoplankton, microscopic algae found in the sunlit zone of waters all over the globe. As Neuer is quick to point out, phytoplankton may be small — too small individually to be seen with the naked eye — but they are mighty. Their size belies their critical importance to the biological carbon pump, the primary biological mechanism in the ocean's absorption of vast quantities of carbon dioxide from the atmosphere.

"The oceans take up a quarter to a third of all CO<sub>2</sub> emissions," she says. "Phytoplankton are one of the key players for how that works."





**Probing the world of microbes, Susanne Neuer, right, and PhD student Bianca Nahir Cruz observe different types of phytoplankton cultures in their ocean lab.**

As CO<sub>2</sub> emissions have soared, the ocean's role as a carbon lockbox has become ever more critical. Neuer's research examines how different types of phytoplankton prime the ocean's biological carbon pump — and how climate change might affect their ability to keep the pump running.

"The chemistry of the ocean is changing," she says. "We don't know yet what the consequences will be."

### Exploring the 'world within a drop'

Neuer has always been drawn to the "world within a drop." During her childhood in Germany, she spent summers in the waters of the Mediterranean Sea, exploring life below the surface. At 13, she saved up to buy her first microscope so she could examine water samples she drew from local ponds.

"The microscope opens up this whole other world that you can't see otherwise," she says.

Her academic career took her between Europe

and the U.S., with early field work in the Canary Islands. She came to ASU in 2004 and became tenured faculty in 2008, bringing an expertise that might seem out of place in the dry desert of Maricopa County, 350 miles from the nearest ocean.

But she notes that the delicate balance of life in the desert parallels increasing "ocean deserts" from the perspective of climate change. And distance hasn't deterred her from continuing work on a subject that captivated her: the biological carbon pump.

The biological carbon pump starts with a process that all schoolchildren learn about in science class: photosynthesis.

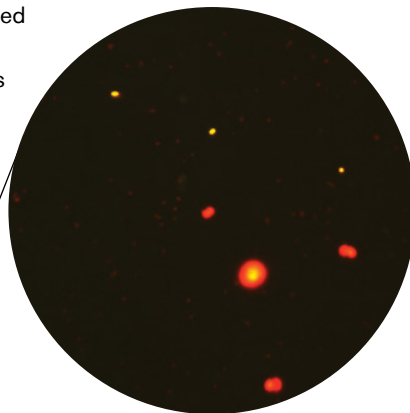
Marine phytoplankton use sunlight to absorb carbon dioxide that has dissolved into the water and convert it into carbon in their bodies.

"A fraction of those phytoplankton is grazed by larger zooplankton, and their carbon is incorporated into fecal pellets that sink," Neuer explains. "Phytoplankton don't need to die to aggregate; their cells are tiny, no matter if alive or not, so they float. Those that aggregate into larger particles, called marine snow, become heavy enough to sink to the depths of the ocean. The carbon in those particles and pellets is removed from contact with the atmosphere for tens to many hundreds of years."

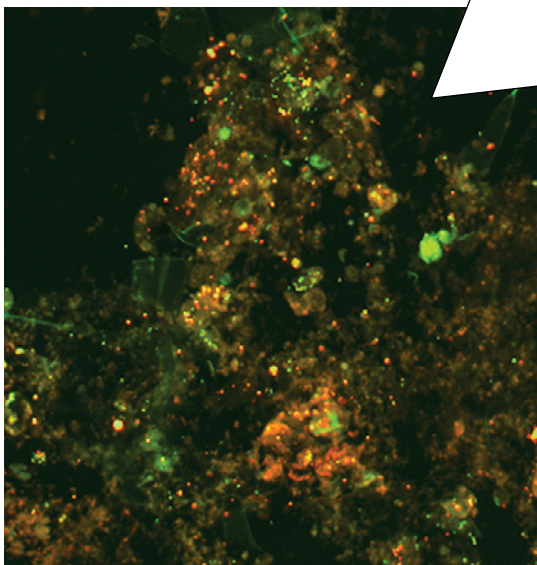
The pump is by no means a closed system. Bacteria, nutrient levels, even dust borne on the wind from the Sahara Desert and dropped in the ocean all exert an influence. To identify the elements and types of phytoplankton at work in the pump, Neuer plies the waters of the Sargasso Sea, a region of the North Atlantic off Bermuda.


### Oceans in the lab

Neuer's current research, funded by a National Science Foundation grant, focuses on the tiniest of phytoplankton, particularly picocyanobacteria, which thrive in the nutrient-poor Sargasso Sea. Previously, scientists considered them too small to play a role in the biological carbon pump. But Neuer's DNA analysis of the particles collected in her traps found that picoplankton overcome not only their size but lack of nutrients by sinking into the deep ocean. Her research team also discovered that



**This microscopic image of a seawater sample collected in the Sargasso Sea, above, shows some of the picocyanobacteria (*Synechococcus* and *Prochlorococcus*) and other small phytoplankton that constitute the foundation of the marine food web in the Sargasso Sea. They can also be identified in the sinking aggregates that the Neuer lab collects with particle traps, shown in the image, left.**





**“The enormous importance of these tiny organisms is unbelievable.”**

— SUSANNE NEUER,  
RESEARCHER IN THE  
BIODESIGN INSTITUTE

**Susanne Neuer’s research team works in the Sargasso Sea, a vast patch of ocean named after a free-floating seaweed called Sargassum. It hosts hatching and feeding grounds for many fish, including eel and tuna, with microscopic phytoplankton at the basis of the food web.**

some species produce a slimy substance called transparent exopolymeric particles, which creates aggregates heavy enough to sink.

“As the air and oceans warm, the projection is that we’ll have more of these smallest of cells that can deal better with low-nutrient situations,” Neuer explains. “These little guys will become more important.”

Back in Neuer’s lab on ASU’s Tempe campus, second-year environmental life sciences PhD student Bianca Nahir Cruz puts picocyanobacteria through the paces in roller tanks. These “oceans in the lab” simulate the long drop through the water column to the ocean floor. Cruz is studying how picocyanobacteria make the aggregates that eventually sink as marine snow.

“We know that marine snow in its natural environment is a complete community,

with a plethora of microbial interactions,” Cruz says. “We want to further study those interactions.”

Neuer’s NSF grant, “Aggregation of Marine Picoplankton,” is the first awarded to ASU’s new Biodesign Center for Fundamental and Applied Microbiomics.

“Being a biological oceanographer here in the desert can be isolating,” she says, “so it is wonderful to have this community of scientists who all have microbes in mind.”

### **Tiny microbes, enormous importance**

Among them is her partner on the NSF grant, Hinsby Cadillo-Quiroz. His team specializes in deciphering the roles of microbes in carbon cycling. Their field work usually takes them to compact soil survey sites in the Amazon rainforest. He’s excited to work

with Neuer on such a dramatically different site and scale.

“Microbes have the power to change the world we live in,” he says. “The carbon pump can be driven by trillions of microbes working at very small scales, perhaps a few micromillimeters, but they have large-scale consequences.”

Neuer is collaborating with other colleagues beyond CFAM. She plans to include ASU undergraduates in her first joint experiments with the Bermuda Institute for Ocean Sciences to investigate larger planktonic animals in the Sargasso Sea and their role in helping phytoplankton aggregate.

“When most people think of the ocean, they think of large creatures, like whales, dolphins or turtles,” she says. “But in reality, the ocean is run by microbes. The enormous importance of these tiny organisms is unbelievable.” ■



Klaus Lackner, a pioneer in carbon capture, views a greenhouse that will be fed carbon dioxide from his prototype materials at his lab in ASU's Center for Negative Carbon Emissions. Companies are building on his ideas to achieve climate goals.

air



# Saving the world from thin air

Envisioning a new approach  
to an old problem — removing  
greenhouse gases from the  
atmosphere

**Story by** MAUREEN O'HAGAN  
**Photos by** JAROD OPPERMAN,  
INTI ST. CLAIR

In the  
1990s,  
theoretical  
physicist  
Klaus  
Lackner  
had an  
idea. Was  
it possible  
to build a  
contraption  
that physically  
sucked  
greenhouse  
gases  
out of the  
atmosphere?

At the time, the idea was radical. Some people thought it was nuts.

Two decades later, many of the experts have come around to Lackner's view. Pulling carbon from the air is now seen as crucial, and Lackner has created such a machine. ASU has supported the vision, naming Lackner director of the Center for Negative Carbon Emissions at the university's Ira A. Fulton Schools of Engineering, where he's honing the technology. But so far, there are only a handful of other efforts to build carbon-sucking machines.

Which gave a group of ASU grads another idea. Instead of building the new technology, how about creating a marketplace that would incentivize carbon removal, whether by Lacknerian machines or some other method? Sure, it's still pretty radical, considering no one has done this before. But nuts? Hardly.

In 2018, the grads — Paul Gambill, Jaycen Horton and Ross Kenyon, along with Christophe Jospe, who worked for Lackner at CNCE — founded Nori. The Seattle-based company is flipping some basic ideas about climate change mitigation on their head. Instead of aiming at lowering CO<sub>2</sub> emissions, Nori focuses instead on Lackner's notion of pulling out the carbon that's already in the atmosphere. Instead of, say, taxing those who put CO<sub>2</sub> into the air, they want to pay those who remove it.

"It's a way of using markets to drive change," Jospe explains. "We're able to monetize what hasn't previously been monetized."





### **ARTIFICIAL TREES**

Klaus Lackner pioneered direct air capture, using artificial trees to remove carbon dioxide from the air. Made from a plastic resin, Lackner's artificial trees are 1,000 times more efficient than natural trees in reducing carbon emissions.

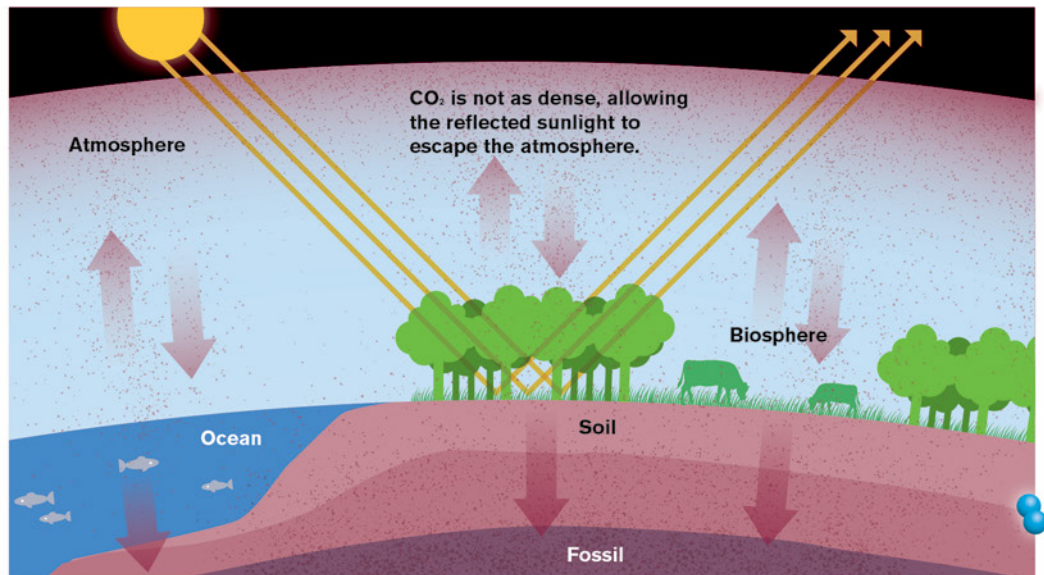
# From soil into the air and back

## Managing the carbon cycle

Carbon emissions have been increasing since the Industrial Revolution. Today, humans produce more than 36 billion metric tons of carbon dioxide each year, a byproduct of burning fossil fuels, among other things, trapping heat in the atmosphere. About half of these emissions are removed by the carbon cycle, including trees and the oceans. But the rest remain in the atmosphere, causing Earth's temperature to rise.

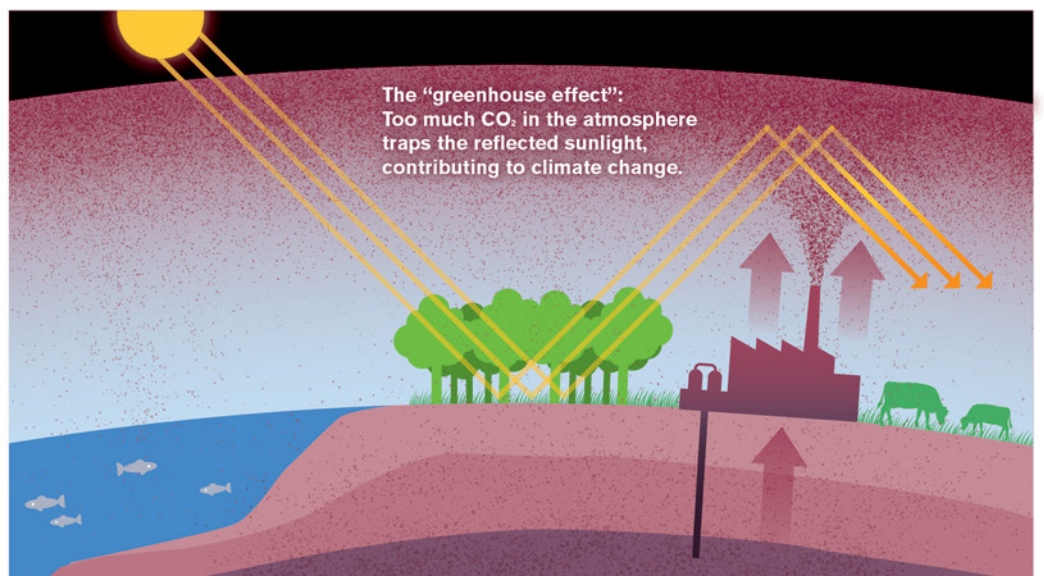
### The natural carbon cycle

The main reservoirs of carbon are the atmosphere, oceans, biosphere (animals and plants), soils and underground fossil reservoirs. Various processes transfer carbon between these reservoirs, including photosynthesis, respiration and ocean-atmosphere gas exchange. The carbon circulates, creating a balanced equilibrium.



### The unbalanced carbon cycle: climate change

Industrial processes use the carbon stored in fossil reservoirs (in the form of crude oil, natural gas and coal), and then expel it into the atmosphere, where it accumulates. The natural carbon cycle is unable to recycle all that excess carbon. Humans have released into the atmosphere more than 880 billion tons of CO<sub>2</sub> to date.



The carbon catcher developed by Klaus Lackner captures carbon dioxide from the air at rates much faster than trees and plants. The technology could be mass produced and deployed worldwide.

## How does it work?

1

### Trap

The tree is made of thin strips of plastic laced with negatively charged hydroxide ions. Wind blows air through the material and, through a chemical reaction, the CO<sub>2</sub> molecules stick to the hydroxides and form bicarbonate ions.

2

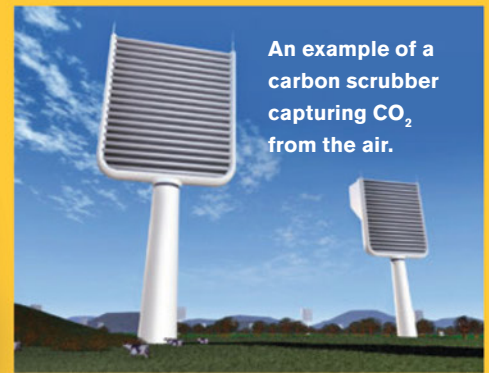
### Store

The CO<sub>2</sub> is now bound to the plastic strips as a bicarbonate — similar to baking soda. The air flowing through the filter has much less CO<sub>2</sub>.

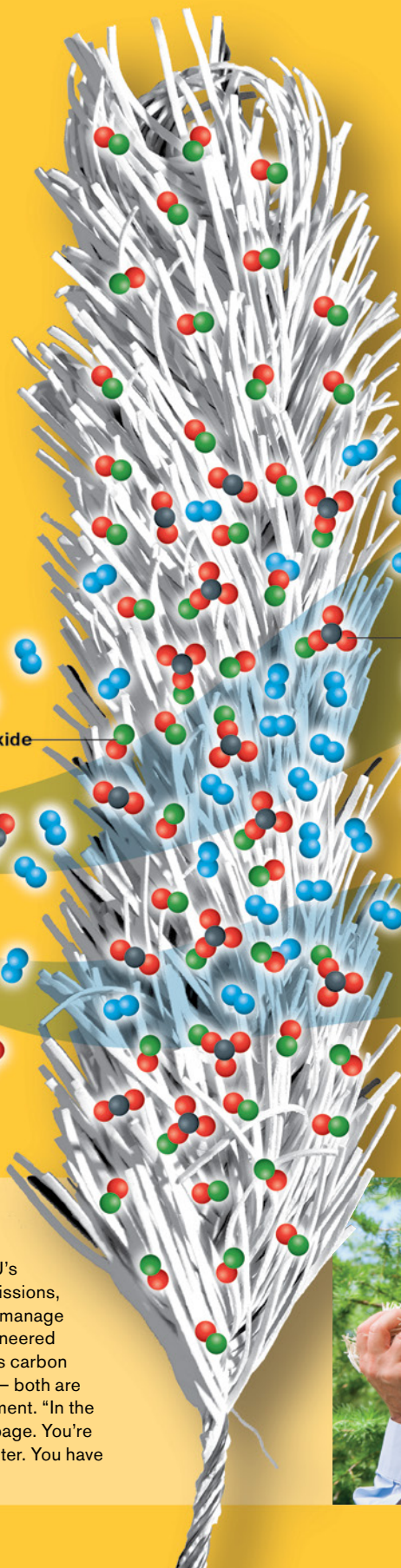
3

### Clean and reuse

When the filters are saturated with CO<sub>2</sub> they are rinsed with moist air, which lowers the affinity for CO<sub>2</sub>, causing the filters to release captured carbon dioxide. The CO<sub>2</sub> is compressed into a liquid that can be stored underground or used in industrial processes. The filters are reused to capture more CO<sub>2</sub> from the air.



An example of a carbon scrubber capturing CO<sub>2</sub> from the air.



## The inventor

**Klaus Lackner**, director of ASU's Center for Negative Carbon Emissions, has been thinking about how to manage carbon since the 1990s. He pioneered direct air capture and compares carbon removal to waste management — both are necessary for a healthy environment. "In the end," he says, "it's like your garbage. You're not allowed to dump it in the gutter. You have to put it away."



Christophe Jospe and Nori are working with farmers on removing CO<sub>2</sub> from the atmosphere and putting it back into the earth. The no-till process — regenerative agriculture or “carbon farming” — requires the planting of cover crops. “The potential,” says Jospe, “is vast.”



They like to call themselves “used-carbon salesmen” and they’re finding ways to do what seems unthinkable: making CO<sub>2</sub> a valuable commodity.

### **Carbon farming**

Carbon dioxide is a colorless, odorless gas that’s a byproduct of burning fossil fuels, among other things. Humans put more than 36 billion metric tons [MO<sub>2</sub>] of the stuff into the atmosphere each year, trapping heat and causing Earth’s temperature to rise.

“Even if we turned off all emissions worldwide tomorrow, we’d still have far too much CO<sub>2</sub> and other greenhouse gases in

the atmosphere, and we’d still get some of the catastrophic effects,” Gambill says. “We have to take action as soon as possible.”

In fact, the deployment of carbon capture and storage technology to absorb remaining fossil fuel emissions was one recommendation last year by scientists convened by the United Nations to avoid catastrophic damage from climate change by 2050.

The way the team at Nori views it, CO<sub>2</sub> is a waste product, and it should be treated like other waste products. We don’t throw our trash out the window, and we shouldn’t simply fling

our greenhouse gas into the atmosphere, either. We need a system to pick it up, just like our system of trash collection, and a market so that those who do the removal get paid for it. That’s where Nori comes in.

“We’re building a marketplace that makes it as simple as possible,” Gambill says. He wants to create a kind of commodity market for carbon, where the price is driven by market demand. Lackner liked the concept so much, he signed on as an adviser.

“In a way, it democratizes the problem,” Lackner says, by allowing everyone to take responsibility for



greenhouse gases.

Through the Nori interface, people who are able to remove carbon from the atmosphere can easily connect with people who are willing to pay for it.

“Nori is trying to create a new model for exchange,” says Michael Dalrymple, ASU’s director of University Sustainability Practices.

In traditional carbon markets, companies and organizations indirectly purchase offsets. ASU does this with a community impact twist. For example, Dalrymple explained ASU collects an \$8 carbon fee on every round trip of air travel by faculty and staff. ASU

then buys “community bundle” offsets from Urban Offsets, consisting partly of carbon offsets purchased from projects listed on offset registries. Urban Offsets directs some funds to the cities of Phoenix and Tempe to help defray the costs of planting urban trees — increasing shade, reducing heat islands and cleaning the air. In return, ASU gets additional offsets over time for carbon sequestered by those trees.

The Nori team decided to take a direct approach with some unlikely allies: farmers.

The excess CO<sub>2</sub> in the atmosphere was originally in the ground, bound up in

**“It’s a way of using markets to drive change. We’re able to monetize what hasn’t previously been monetized.”**

— CHRISTOPHE JOSPE,  
CHIEF DEVELOPMENT  
OFFICER, NORI

oil, coal or natural gas. Also, plants — whether they're grass or vegetables or trees — pull CO<sub>2</sub> out of the air through photosynthesis. To Gambill, all this makes the problem straightforward: "We should just take (the greenhouse gases) out of the atmosphere and put them back into the earth."

In recent years, farmers and scientists have learned that certain farming methods can help ensure that CO<sub>2</sub> pulled in by plants goes back into the ground and stays there. It requires forgoing tilling, planting cover crops, liberal use of compost and more. The soil gets healthier through this process, which means over time, the plants get healthier, too, and that means more money for the farmer.

It's called regenerative agriculture, or even "carbon farming," and some farmers have already made the transition. The problem is, the soil improvements take time, and upfront costs can be significant. Which brings us back to Nori. Through its marketplace, farmers using these methods can get credit for each ton of carbon they sequester in the soil. They then place those credits for sale in the Nori marketplace.

When the marketplace opens for business later this year, they aim to have enrolled enough farmers to sequester a million metric tons of carbon per year, Gambill says. That's equivalent to more than 112 million gallons of consumed gasoline.

"The potential," Jospe believes, "is vast."

### **Carbon gold rush**

There are bound to be skeptics. They say it's hard to measure carbon that's been isolated in the



**“Even if we turned off all emissions worldwide tomorrow, we’d still have far too much CO<sub>2</sub> and other greenhouse gases in the atmosphere, and we’d still get some of the catastrophic effects. We have to take action as soon as possible.”**

— PAUL GAMBILL,  
CEO, NORI

ground. True. Besides, there's only so much farmers can put there. And there are hurdles to making it stay there.

But Gambill, Jospe, Horton and Kenyon are pulling every thread, working with the experts to ensure public acceptance of the marketplace. Also, they're envisioning something much bigger than farmers. It requires the kind of thinking he developed at ASU.

Gambill studied computer systems engineering. It taught him to think in terms of solving problems, to "look at large, complex systems, trying to understand the boundaries, the potential inputs and outputs."

Climate change is an environmental problem, but it's also an economic problem, a social problem and an engineering problem. Gambill and Horton both worked at ASU's Decision Theater, which let them watch how societal questions play out in real life. Jospe got quite the education working for Lackner. "It's not a coincidence this idea came from people who consider themselves Sun Devils," says Jospe.

The team is confident it will go beyond farming. Gambill likens it to Apple, when it opened the first app store. There wasn't much for sale then, but Apple was certain that people would start dreaming up apps to fill the shelves. We all know how that turned out. Similarly, the Nori team believes if there's money to be made, people will be motivated to making more carbon-sucking solutions.

"We're creating a space where creativity can flourish," Gambill says. "It's going to be a gold rush to monetize carbon removal. We think people are going to do some really cool things." ■

v: form  
a mental  
image of;  
imagine

# Visualize



James Turrell spent years flying around the American Southwest to find the perfect location for his Roden Crater project, purchasing the site in the late 1970s and working on it since. See more in the Roden Crater video at [herbergerinstitute.asu.edu/roden-crater](http://herbergerinstitute.asu.edu/roden-crater)

## Letting in the light

At Roden Crater, James Turrell creates a masterwork of perception.

40

# LETTING IN

**“You’re walking along this really long tunnel and finally you reach this moment when you realize that you’ve been looking at the sky the whole time but you didn’t understand that until you reach a certain point. For me, it was almost a spiritual experience.”**

– KELLY FIELDER, MASTER’S STUDENT IN ASU’S HERBERGER INSTITUTE



# THE LIGHT

ASU, artist James Turrell partner  
on Roden Crater masterwork

**Story by** MARY BETH FALLER  
**Photos by** KLAUS OBERMEYER,  
JAMES TURRELL

**James Turrell's work at the Roden Crater is a fusion of art, engineering, astronomy, architecture and neuroscience — a natural fit with ASU, says Steven Tepper, dean of the Herberger Institute. "This is one of the best examples of an interdisciplinary exploration that we have."**

A masterwork of light and perception inside a dormant volcano sits in the desert of northern Arizona, where artist James Turrell has spent decades shaping the landscape into an immersive observatory.

His creation, Roden Crater, is one of the most important artworks in the world and seen by only a few hundred people every year. Turrell's work has turned it into an awe-inspiring example of the universe's ingenuity and our human place within it.

A new, innovative partnership between Turrell and Arizona State University will help complete the artist's magnum opus on the edge of the Painted Desert. The ASU Foundation and Skystone Foundation seek to raise at least \$200 million for the project, and they've already received a

\$10 million donation from rapper Kanye West, who visited the crater in December. "This is life changing," West wrote on Twitter. "We all will live in Turrell spaces."

The Roden Crater site, located on a dirt road about a half-hour drive from Flagstaff, is currently accessible only to invited visitors. Inside the crater, a volcanic cinder cone, those visitors can experience mind-altering tunnels, rooms and spaces.

One of the installations at Roden Crater is a 900-foot-long tunnel that acts as a pinhole camera. The experience is "mind-bending," according to Kelly Fielder, a master's student in ASU's Herberger Institute for Design and the Arts. She was among a handful of students who visited the site last fall in a lab class.

"You're walking along this really long tunnel and finally you reach this moment when you realize that you've been looking at the sky the whole time but you didn't understand that until you reach a certain point," she says. "For me, it was almost a spiritual experience."

Turrell, 75, who was born in California, is a pilot who spent years flying around the Southwest to find the perfect site for his project. He bought the site in the volcanic field near Sunset Crater in the late 1970s and has been working on it ever since.

"It's been designed to the quarter inch, with each of the







**Another Herberger field lab at Roden Crater is Wanda Dalla Costa's Indigenous Stories and Sky Science — significant because the crater is located in the ancestral homelands of indigenous groups. “We’ll ask ourselves, ‘Whose story is this, and how do we make it have value for the community?’” she says.**

21 spaces envisioned with full awareness of how it’s physically oriented to the cosmos and what is trying to be captured,” says Steven Tepper, dean of the Herberger Institute for Design and the Arts.

The ultimate experience of Roden Crater is not so much the earth, the structures or the architectural interventions Turrell has created inside, according to Olga Viso, a senior adviser to

Tepper and liaison between ASU and the Skystone Foundation.

“As James likes to say, the work is really about you seeing yourself seeing,” she says. “He’s creating conditions that allow you to pause, to sense, to isolate specific experiences like understanding the amplification of your own voice or of tracing the path or arc of the sun or moon across the landscape.”

The project evolved after Turrell



invited ASU President Michael M. Crow to the site last year to discuss a partnership with Michael Govan, president of the Skystone Foundation. Govan is also director of the Los Angeles County Museum of Art, which teamed up with ASU last year to increase diversity among museum professionals.

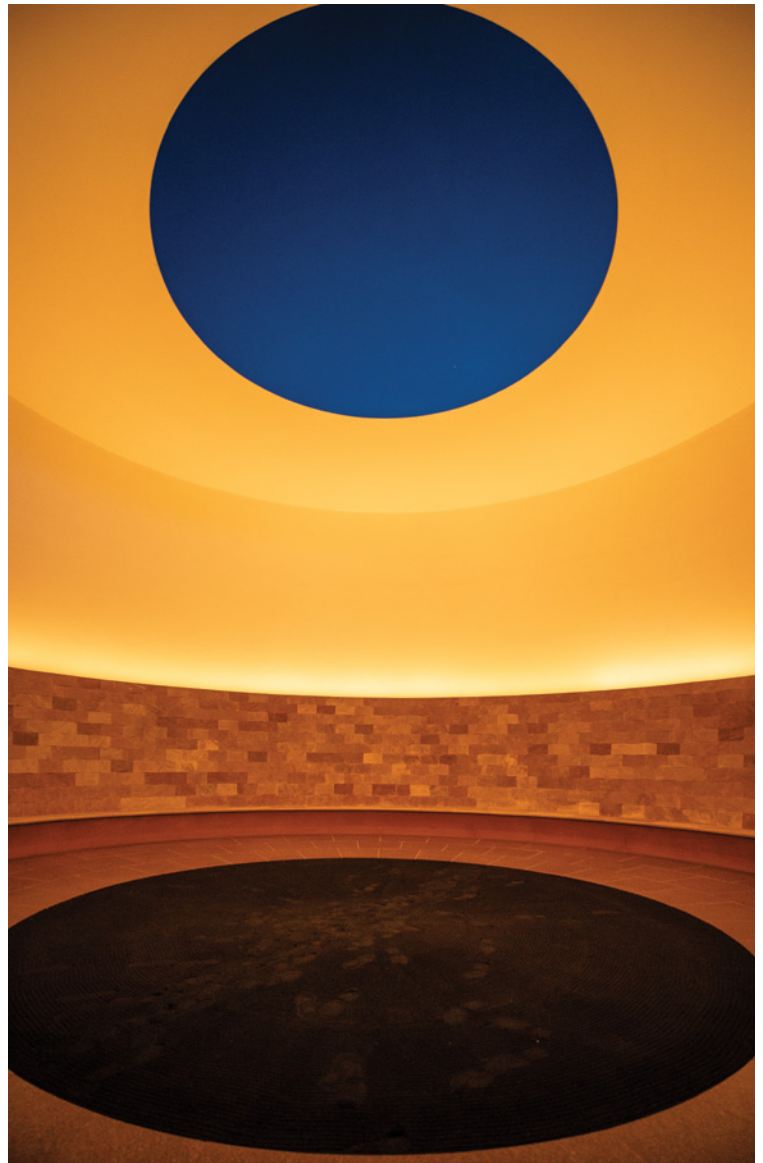
The project will preserve Turrell's legacy by building infrastructure at the site, including a visitor center,

that will ensure conservation of one of the nation's most renowned cultural assets.

While completion of Roden Crater is likely years away, the power of Turrell's work can be experienced by visiting "Air Apparent," just northeast of Interdisciplinary Science and Technology Building 4 on ASU's

Tempe campus. The work, part of Turrell's Skyspace series, was installed in 2012 and is open 24 hours and best enjoyed at sunrise and sunset, according to Viso.

"James is trying to show us that the sky, the earth, humanity and everything around us are in a constant state of evolution and transformation," she says. ■



**One of the installations at Roden Crater is a 900-foot-long tunnel acting as a pinhole camera that visitors walk through.**



**Sun Devil  
Women's  
Basketball**

**ASU 60**

**U of A 47**

## Rivalry fuels career bests and back-to-back wins

Sun Devil Basketball doubled the hoopla with two of their best games this season on consecutive nights — the men besting Arizona in overtime on Jan. 31 and the women completing a rare U of A sweep on Feb. 1. Remy Martin led the men's victory with 31 points — including eight in overtime — in front of the third-largest crowd in ASU history (14,731). But the career-high points weren't the best part. Martin said it was his best game "because it was U of A." Zylan Cheatham (22 rebounds) and Rob Edwards (19 points) also recorded career bests in coach Bobby Hurley's first win against Arizona in seven tries.

Courtney Ekmark (20 points and seven rebounds) and Kianna Ibis (19 points and 10 rebounds) led the No. 21 women to victory in a Territorial Cup Series rematch — their 28th victory in the last 33 meetings against Arizona.

Senior Kianna Ibis scored five points in the first minutes of the fourth quarter to help Sun Devil Women's Basketball pull away from Arizona in their Territorial Cup Series rematch on Feb. 1.

v: engage in activity for enjoyment and recreation

# Play

Sun Devil  
Men's  
Basketball  
ASU 95  
U of A 88

“It doesn’t matter if I had two points and four assists, a win against U of A makes it my best game ever.”

— REMY MARTIN

Remy Martin scored a career-high 31 points in the Sun Devil Men's Basketball victory against Arizona. Zylan Cheatham also grabbed a career-high 22 rebounds and Rob Edwards scored a career-high 19 points in the win.

## Winning debut

Herm Edwards proved Sun Devil Football made the right choice.  
48

## Fear the Tork

Spencer Torkleson's home run odyssey.  
53

PLAY

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**ASU's football coach  
silences skeptics with  
his winning ways**

**Story by** WENDELL BARNHOUSE  
**Photos by** PETER VANDER STOEP



**H**erm Edwards, ASU's football coach, has no auditory issues.

Sounds come through loud and clear. What he does have is an aversion to noise. And the ability to mute it.

That's a helpful trait considering the decibels cranked up when ASU hired Edwards in December 2017. He was 63, had never been a college head coach and had last been a National Football League head coach in 2008. Skeptics dismissed the hire as a Jurassic Park resurrection of a coaching dinosaur.

"I learned at an early age that you can never allow the perception of others to become your reality," he said recently in an interview. "We control our destinies as individuals. You have to do your work. If I had not been an athlete, I would not have gone to college. Any voices, anything in my way of achieving what I wanted, didn't matter."

Besides, he proved the naysayers wrong, delivering a winning record in his first season.

"We believe we're off to a good start," says Ray Anderson, vice president for university athletics. "We believe that those who said we were crazy and couldn't get it done, we believe that we have at least calmed their concerns ... because we haven't heard a lot from them recently."

Edwards, 64, was hired because of fit — both the job and the job candidate. ASU President Michael M. Crow and Anderson, who came to the university in January 2014, decided the football program needed not only a new coach but a new philosophy.

“A lot of people are fearful of change,” Anderson says, “especially when they don’t quite understand the reasons for it. As things progressed after I came on board, it became obvious that change was inevitable. It became clear we could not break out of mediocrity in the Pac-12. I give a lot of credit to President Crow for being willing to think outside the box.”

Sun Devil Football had become a way station instead of a destination. During Bruce Snyder’s nine seasons that ended in 2000, the Sun Devils were 13 games over .500 and appeared in the Rose Bowl after the 1996 season. The next three coaches lasted six, five and six seasons with records that hovered around .500. ASU, Crow and Anderson decided, was defining insanity — doing the same thing over and over in coaching hires but expecting a different result.

So, they came up with a new plan — a “New Leadership Model,” — bringing together management ideas and styles from the NFL, scaled to the college level.

“That’s one thing that really struck me is the fact that people didn’t realize, ‘Look they don’t think they’re getting their results from what they’re doing, (so) they’re changing.’ What’s wrong with that?” says Edwards, who describes his time away from coaching and working in television as a sabbatical a professor would take.

The athletic department got



Instead of taking a CEO approach to Sun Devil Football, Herm Edwards has been actively in the mix as the head coach. The Sun Devils responded with a winning record in his first season.

to work. One savvy move was transparency. Numerous national media outlets were invited to observe Edwards and his new staff. That resulted in some positive coverage. A September upset of Michigan State, then ranked No. 15 in the nation, also helped.

“That’s the media’s job — they have to give an opinion,” Edwards says of the initial skepticism. “I would never take it personal.”

ASU’s new plan led to the perception that Edwards would be a “CEO coach,” spending practices perched in a tower overseeing his kingdom. That was disproved when Edwards, who played defensive back for 10 seasons in the NFL, did hands-on coaching with the Sun Devils’ secondary.

And, after returning home from a loss at San Diego State, Edwards went straight to his office to break down the loss. His analysis led to the Sun Devils changing their offensive emphasis

**“He made some shrewd hires, especially on the defensive staff, and empowered his leaders, and they had a solid first season.”**

— BRUCE FELDMAN, NATIONAL COLLEGE FOOTBALL REPORTER FOR THE ATHLETIC

to more running, a strategy that helped throughout the season.

Jean Boyd, the football team’s general manager, says Edwards disproved another false perception. He works hand-in-hand with Edwards so the football coach can make final decisions without being caught up in the minutiae of management.

## “Herm made fools out of a lot of us in the national media.”

—BRUCE FELDMAN, COLLEGE FOOTBALL REPORTER FOR THE ATHLETIC

“People were skeptical about his relatability to the kids we’re recruiting, but high marks for him in that area,” Boyd says. “In some of the areas we’re recruiting in California, to have an African-American man walk into an African-American home has been a multiplier. He can relate. He’s respectful and respectable.”

The day he was hired, Edwards walked through the administration offices and stopped to say hello and chat whenever he saw someone in their office. On the way to a weekly news conference, Edwards saw two custodians. He knew their names and stopped to ask one of them about a recent surgery.

“If I had never gotten another

coaching job, I would have been fine, would have kept working in TV,” says Edwards, who sits in the back of the plane on team flights. “But I’ve always been competitive, and in the back of my mind I was always preparing if I got the chance to coach again. I saw this as a great fit.”

The Sun Devils finished 7-6 — the five regular-season losses were all by less than seven points — with an appearance in the Las Vegas Bowl, changing the national perception of ASU football.

“Herm made fools out of a lot of us in the national media,” Bruce Feldman, who covers college football for The Athletic, says. “He made some shrewd hires, especially on the defensive staff, and empowered his leaders, and they had a solid first season. There’s plenty of good young talent on this roster now, and the Pac-12 South is certainly up for grabs with USC backsliding so much and UCLA rebuilding.” ■



Coach Herm Edwards can relate to players 40 years younger than he is, says ASU football general manager Jean Boyd: “He’s respectful and respectable.” Here, he walks through the Tillman Tunnel with wide receiver Kyle Williams.



# 2019 Football Schedule

## AUGUST



**29 (THU) vs. Kent St.**  
TEMPE, AZ

## SEPTEMBER



**6 (FRI) vs. Sacramento St.**  
TEMPE, AZ



**14 (SAT) at Michigan St.**  
EAST LANSING, MI



**21 (SAT) vs. Colorado**  
TEMPE, AZ



**27 (FRI) at California**  
BERKELEY, CA

## OCTOBER



**12 (SAT) vs. Washington St.**  
TEMPE, AZ



**19 (SAT) at Utah**  
SALT LAKE CITY, UT



**26 (SAT) at UCLA**  
PASADENA, CA

## NOVEMBER



**9 (SAT) vs. USC**  
TEMPE, AZ



**16 (SAT) at Oregon St.**  
CORVALLIS, OR



**23 (SAT) vs. Oregon**  
TEMPE, AZ

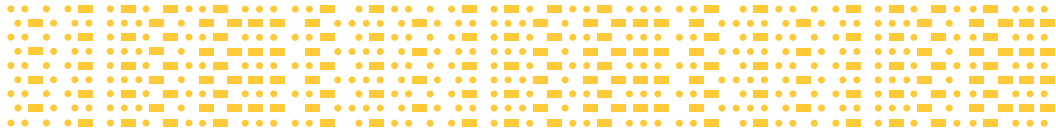


**29 (FRI) vs. Arizona**  
TEMPE, AZ

## DECEMBER



**6 (FRI) PAC-12 Football  
Championship Game**  
SANTA CLARA, CA



# ASU health tracker startup wins Arizona Innovation Challenge

Breezing, a wearable metabolism tracker developed by researchers at ASU's Biodesign Institute, has been selected one of 10 winners in the Arizona Innovation Challenge by the Arizona Commerce Authority.

The startup, founded by NJ Tao, director of the Biodesign Center for Bioelectronics and Biosensors, and Erica Forzani, a researcher in the center and an associate professor at the Ira A. Fulton Schools of Engineering, has developed a wearable device that offers precise assessments of a person's resting metabolic rate using sensor technology.

Breezing was selected from 20 finalists and more than 100 applicants for the



Breezing allows users to view their metabolic data in real time on a mobile app.

semiannual competition.

Breezing allows users to view their data in real time on a mobile app using indirect calorimetry, a precise technology for measuring metabolic rates. The technology measures a user's resting metabolism with a simple 10-minute breathing test. It is smaller than other metabolism trackers.

"This product can be a great fit for people who want to achieve a healthy weight scientifically and efficiently," Tao says. "Our clinical studies have already

proven that people lose more weight and adhere to healthier behavior when they have a clear picture of their metabolic data using Breezing."



Breezing health tracker works by users breathing normally into the device for 10 minutes.



## Positivity made possible by you

ASU quarterback Manny Wilkins has taken some tough hits. Not all of them have been on the football field. Family drug abuse. Domestic violence. How did Manny transform personal pain into positivity, becoming a leading voice against sexual violence? When you give to initiatives at ASU that contribute to student success, you're the answer to that question.

**We don't always see our generous donors, but you're always in the picture.**



Together, our potential is limitless  
GiveTo.ASU.edu

# Fear the Tork

**Spencer Torkelson,**  
sophomore  
**Jersey number: 20**  
**Position:** First base  
**Major:** Liberal studies

**25** home runs

As a freshman in 2018, Spencer led the nation with 25 home runs, one shy of the all-time NCAA freshman record.

**11** home runs

Spencer more than doubled Barry Bonds' previous Sun Devil freshman record of 11 in 1983.

"One year does not make a career but his talent and work ethic are elite. While I can't tell you exactly how it all plays out, it sure is going to be fun watching it all unfold over the next few years."

—Tracy Smith, ASU baseball coach

**3** one of only three players

Spencer is one of only three ASU players to hit 25 home runs in a season. He tied with Bob Horner (1978) for second in ASU single-season history, two shy of Mitch Jones' school record (27 in 2000).

**14** home runs

In Pac-12 games only, Spencer led the conference with 14 home runs.

**56** home runs

Spencer is on pace to surpass Bob Horner's ASU career record of 56 home runs, set 1976 to 1978.



# Less might be



# more

## when it comes to physical activity

Finding time to exercise can seem impossible, but that's no longer a valid excuse, according to ASU research.

The “go, go, go, keep going” of the traditionally recommended 30-minute daily workout has a new, shorter partner.

“Short bouts always do as well, and sometimes better, than longer bouts,” says Glenn Gaesser, professor of exercise science and health promotion at Arizona State University's College of Health Solutions.

He and ASU Assistant Professor Siddhartha Angadi have been working together for more than a decade to research the effects of high-intensity interval training, or HIIT — characterized by short bursts of intense activity — on



various health outcomes.

Experts have long agreed that adults should aim for roughly 150 minutes of moderate physical activity per week. When the national Physical Activity Guidelines were first published in 2008, it was thought those 150 minutes had to be accrued in bouts of at least 30 minutes of activity at a time for



meaningful benefits.

Gaesser and Angadi's research has shown that not

only can shorter bouts produce the same benefits as longer bouts, but ramping up shorter bouts from a moderate level (something akin to a brisk walk) to a vigorous level (where you're almost out of breath) might produce more health benefits than longer, moderate-level bouts.

For example, more than one study found HIIT was better at lowering blood pressure than traditional, continuous bouts of exercise.

A common misconception about HIIT is that it's too difficult for the average person, but HIIT is tailored to an individual's personal capabilities. Generally, one HIIT bout takes from 30 seconds to a few minutes. You can rest for as much time between each bout as you like, as long as you do enough each week to total 150 minutes.

That makes it easy to incorporate HIIT into a busy schedule; on a regular workday, you can get 30 minutes of physical activity by breaking every hour to climb the stairwell or take a brisk walk around the office building.

"People might not be able to do a 30-minute routine every day," Gaesser says, "but if you say you don't have two minutes here and there, I'm just not buying it."

— Emma Greguska



# FARM-FRESH TASTE.

## Brand-New Look.



NOURISHING ARIZONA SUN DEVILS® SINCE 1922.



OFFICIAL MILK OF SUN DEVIL® ATHLETICS

So Pure. So Fresh. So Shamrock.™

SHAMROCKFARMS.NET   

**v:** bring together or into contact so that a real or notional link is established

# Connect

## AIMING HIGH

Former ASU football player Anthony Lawrence fulfilled a childhood dream when he strapped into an F-16D Fighting Falcon at Luke Air Force Base in Glendale, Arizona. Luke's commander, ASU alum Brig. Gen. Todd Canterbury, invited the current ASU Online grad student and future Air Force pilot for the ride of his life. "The flight was amazing," says Lawrence, "from takeoff to landing."



Future 2nd Lt. Anthony Lawrence watches the canopy close on an F-16D before his flight at Luke Air Force Base in Glendale. Lawrence, who played cornerback for ASU's football team in 2016, plans to attend the Air Force's officer training and flight schools.

## Founders' Day

Signature event honors the past while inventing the future.

58

## Making a difference

Chris Jaap endows sustainability scholarship.

60

# Honoring the past, inventing the future

## Founders' Day

Founders' Day has been an Arizona State University signature event for decades that honors individuals who exemplify the spirit of the founders of the Territorial Normal School of Arizona, ASU's predecessor institution.

Hosted by the ASU Alumni Association, the event recognizes alumni, faculty and supporters — all leaders of the effort to advance an institution that has become the nation's largest public research university and holds the unique distinction of being ranked No. 1 in innovation for four consecutive years by U.S. News & World Report.

The annual Founders' Day Awards Dinner is slated for Wednesday, March 20, at the Arizona Biltmore, 2400 E. Missouri Ave., Phoenix. As part of the celebration, ASU President Michael M. Crow will provide an update on the university.

For more information on Founders' Day 2019, visit [alumni.asu.edu/events/founders-day](http://alumni.asu.edu/events/founders-day).



**Virginia G. Piper  
Charitable Trust**

The trust, which supports organizations that enrich health, well-being and opportunity for residents of Maricopa County in Arizona, was honored with the Philanthropist of the Year Award.



**Natalie Diaz, MFA**

ASU associate professor, College of Liberal Arts and Sciences, Faculty Research and Creativity Achievement Award



**Erika Camacho, PhD**

ASU associate professor, New College of Interdisciplinary Arts and Sciences, Faculty Service Achievement Award



**Anne Jones, PhD**

ASU associate professor, College of Liberal Arts and Sciences, Faculty Teaching Achievement Award



**Ian Gould, PhD**

ASU President's Professor, College of Liberal Arts and Sciences, Faculty Teaching Achievement Award



**Sky Kurtz, '04 BS**

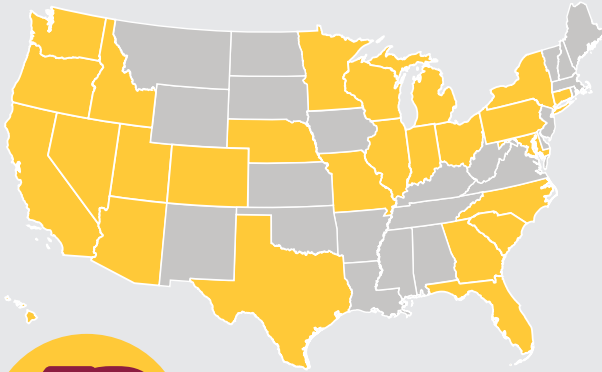
Founder and CEO, Pure Harvest, Young Alumni Achievement Award



**Denise Resnik, '82 BS**

Founder and CEO, DRA Collective, Alumni Achievement Award

# Participate in your local Tillman Honor Run



ASU Alumni, in partnership with the Pat Tillman Foundation, is proud to organize the annual Tillman Honor Runs nationwide to help honor fallen U.S. soldier and Sun Devil Pat Tillman and his legacy of service. Tillman Honor Runs are being hosted coast-to-coast by ASU alumni chapters nationwide. Find a race near you and receive an official Tillman Honor Run T-shirt for your run when you register by April 11.

Don't see your city listed? Go to [patsrun.com](http://patsrun.com) to sign up as a remote runner.

**Questions?** Send an email to Trish Thiele-Keating, director of chapter relations, at [trish.thiele-keating@asu.edu](mailto:trish.thiele-keating@asu.edu).

**Connect with your chapter** at [alumni.asu.edu/chapters](http://alumni.asu.edu/chapters)

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 Instagram  
 LinkedIn 
 Email

## Join a run in the following cities:

- Austin, Texas
- Chicago, Illinois
- Colorado (Denver)
- Dallas/Fort Worth, Texas
- Flagstaff, Arizona
- Georgia (Atlanta)
- Hawaii (Honolulu)
- Houston, Texas
- Idaho (Boise)
- Indianapolis, Indiana
- Las Vegas, Nevada
- Los Angeles, California
- Michigan (Detroit)
- National Capital (Washington, D.C.)
- Nebraska (Omaha)
- New England (Boston)
- New York (New York City)
- North Carolina (Charlotte)
- Northern California (San Francisco)
- Northern California (San Jose)
- Ohio (Columbus)
- Old Pueblo (Tucson)
- Orange County, California
- Philadelphia, Pennsylvania
- Portland, Oregon
- San Antonio, Texas
- San Diego, California
- Seattle, Washington
- South Carolina (Charleston)
- Southern Colorado (Colorado Springs)
- South Florida
- St. Louis, Missouri
- Twin Cities (Minneapolis)
- Utah (Salt Lake City)
- White Mountains (Pinetop, Arizona)
- Wisconsin (Madison)

# Class notes

## 2010s

**📍 Khashayar “Shay” Khatiri ’18 BA political science, ’18 BA history** recently raised and donated more than \$1.2 million for the Tree of Life synagogue in Pittsburgh where 11 people were killed by a gunman in 2018. A recent graduate of the School of Politics and Global Studies and the School of Historical, Philosophical and Religious Studies in ASU’s College of Liberal Arts and Sciences, Shay is a native of Iran who hopes to stay and work in the U.S. after finishing his graduate studies at Johns Hopkins. “I want to serve this country that has given me every opportunity to be happy. However I can serve it, I will,” he told the Times of Israel last November.



**Mitchell Menchaca ’10 BLS liberal studies** has been announced as

the executive director of the City of Phoenix Office of Arts and Culture. In his new role, Mitchell will oversee public art, grants, cultural facilities, arts learning and outreach. He returns to Phoenix after leading the local arts advancement department at Americans for the Arts in Washington, D.C., and most recently as executive director for the Association of California Symphony Orchestras. From 2004 to 2009, Mitchell was senior director of grants and programs at the Arizona Commission on the Arts.

## 2000s

**Nicholas Cagnetti ’17 BFA intermedia** has released his first graphic novel, co-authored by Daniel Ziegler, about a musician brought back to life as a monster and hopelessly pursuing the woman he loves. “The Spirit of the Shadows” reads as a love letter to classic horror films.

**Terri Waibel ’04 BA sociology, ’09 MSW social work** was recently named Young Professional Award recipient as part of the Athena Awards presented by the Greater Phoenix Chamber of Commerce. As a psychotherapist and owner of Chandler, Arizona-based Center for Compassion, Terri specializes in providing therapeutic support to individuals, children and families enduring the death of a beloved family member. She stays connected with ASU as a Master of Social Work field supervisor, mentoring and serving as a role model for others entering the field.

**Meghan Coppock ’16 BS sociology** has been named local development and events manager by Save the Family Foundation of Arizona after previously serving as a client service liaison. Among her manager’s responsibilities will be the successful execution of the agency’s annual signature event, Hearts of Gold Gala, including obtaining sponsorship and donations, budgeting and tracking.

# Small role, big difference

Christopher Jaap has discovered it's possible to pursue a passion for sustainability and renewable energy without switching careers. The Barrett, The Honors College alumnus has spent the majority of his 20-year career as a corporate attorney advising clients in the solar, renewable and smart energy industry, what he humbly calls playing a "very small role in an industry truly making a difference in the world." Recently the founding attorney with Ridgeline Law Office established the Christopher Jaap Endowed Scholarship to provide scholarships for ASU honors students who share his passion for sustainability.

ASU Thrive magazine caught up with Jaap, who divides his time between San Francisco and Sea Ranch, an environmentally sensitive northern California planned community, to learn why sustainability is a way of life for him and how professionals can make a mark in the renewable and smart energy industry.

## Is the solar, renewable and smart energy industry open to all types of professionals?

The types of roles people can play in the industry are more

diverse than I could list. Anyone passionate about the industry should seek opportunities where they can best apply their talents and find fulfilling work.

## When and why did you become passionate about sustainability and renewable energy?

I've been privileged to work with manufacturers, developers, construction teams, financial advisers and others — all participants in the broader solar, renewable and smart energy industry. I live in the San Francisco Bay Area, which strives for a zero-landfill goal and facilitates single-stream recycling and also composting for residents and businesses — making good habits easy.

I also spent significant time in China, where air quality in some regions could become so hazardous that residents and visitors routinely wore masks. I worked with several partners in China to develop utility-scale photovoltaic solar power. The experience crystallized in my mind the belief that individuals can play a small but important part in a larger effort, and make a positive difference for future generations.

## What inspired you to establish the Christopher



Christopher Jaap says "diverse" opportunities exist in the renewable energy field for those passionate about sustainability.

**"I was fortunate to receive scholarships that made college more accessible for me, and I want to do the same for others."**

— CHRISTOPHER JAAP

## Jaap Endowed Scholarship, and what are your goals for it?

My goal is to provide the opportunity for students to pursue their passions, for them to make a positive difference in the world for future generations. Looking ahead, I am eager to learn what the scholarship recipients will accomplish, whether it's developing an amazing new product that does something we have not even imagined yet or embarking on a trip and experiencing another culture's perspective in a way that sets him or her on a new and unexpected career path.

For many years, I have been a proud supporter of

ASU. I was fortunate to receive scholarships that made college more accessible for me, and I want to do the same for others. Now, with the initial contribution [\$25,000] seeding the fund, additional donations will grow the endowment, and proceeds from the invested funds will provide scholarships year after year, a "sustainable" source of support for students!

—Lori K. Baker

To donate to the Jaap Scholarship, visit [asufoundation.org/jaapsustainability](http://asufoundation.org/jaapsustainability).

**Danielle “Dani” Stringer ’09 BSN nursing, ’10 MS pediatric nursing** recently launched a children’s health site, [kidnurse.org](http://kidnurse.org). The Sun Devil graduate of the College of Nursing and Health Innovation created the site to provide health facts and advice to parents — access to pediatric health information when and where they need it. [Kidnurse.org](http://Kidnurse.org) has more than 2 million readers.

**Amy Pennar ’07 BS family and human development, ’07 BA psychology, ’11 MS family and human development, ’16 PhD family and human development**, a four-degree Devil, has been awarded a prestigious research grant by the Society for Research in Child Development that will help her study the long-term viral functioning of youth living with HIV.

🏈 **Randall McDaniel ’02 BS physical education**, a Sun Devil football great and NFL superstar, is celebrating 31 years of volunteer-turned-fulltime teaching elementary school students in the Minneapolis suburb of Crystal. He is also celebrating another honor for his pigskin prowess: A collegiate and pro hall of fame inductee, Randall was recently chosen as a Rose Bowl Hall of Fame member, Class of 2018, for his Sun Devil play as a pulling guard in the 1986 Rose Bowl.



**Nicholas Piccoro ’02 BA journalism, ’02 BA history** has been named the Arizona Sportswriter of the Year by the National Sports Media Association. The Arizona Diamondbacks beat reporter at The Arizona Republic/[azcentral.com](http://azcentral.com) is a first-time winner of the prestigious award.

**Debbie Kovesdy ’01 BAE special education** and her GenYes students at Phoenix Shadow Mountain High School have turned an entrepreneurial idea into reality.

GenTech began as a classroom, real-world business plan exercise that has blossomed into a teaching platform for all comers seeking tech device, app and operations support. [Gentechsupport.com](http://Gentechsupport.com) has partnered with companies Lumen and Cisco to provide computer services and device instruction while also offering “KidsTech Camps” for young learners.

**1990s**



**Leslye Barrett ’96 MM performance** participated as a member of “The President’s Own” United States Marine Chamber Orchestra at the funeral service of President George H.W. Bush at the Washington National Cathedral in Washington, D.C., on Dec. 5. An oboist, Master Gunnery Sgt. Barrett also performed as a member of the orchestra at the state funeral for President Gerald Ford in 2007. The co-principal oboe for “The President’s Own,” she joined the prestigious orchestra in 1997, a year after her graduation from ASU’s School of Music in the Herberger Institute for Design and the Arts.



**Nicole Carroll ’91 BA journalism**, editor in chief of USA TODAY, has been elected to the Pulitzer Prize Board. The Pulitzer Board comprises mainly leading journalists or news executives from media outlets across the U.S., as well as five academics or persons in the arts. “Nicole’s experience in regional newspapers and her current role as editor of USA TODAY will add important, new perspectives to our board discussions,” says Dana Canedy, administrator of the Pulitzer Prizes. Nicole is a 2008 inductee into the ASU Walter Cronkite School of Journalism and Mass Communication Alumni Hall of Fame.

## ASU alum awarded first-ever Piper residency

Innovation is, quite literally, in the house at a new, year-long, full-time Virginia G. Piper Fellow-in-Residence program at ASU, presented in partnership with the university’s Department of English and the College of Liberal Arts and Sciences’ humanities division.



Bojan Lewis

The inaugural Virginia G. Piper Fellow-in-Residence is Bojan Louis, an indigenous writer, educator, community organizer and Arizona native who graduated from the Master of Fine Arts program in 2009 with a focus in fiction. Louis hopes the coursework he will establish will create a haven for people who may not feel comfortable in academic spaces.

ASU Department of English: [english.clas.asu.edu](http://english.clas.asu.edu)

## Take a seat: Robel Chair in Business is alum’s gift

Charles J. “Chuck” Robel, a 1971 graduate of ASU’s W. P. Carey School of Business, has increased his longtime support of the university and business school with a \$3 million gift to establish the Charles J. Robel Dean’s Chair in Business.

The gift provides increased resources that will support the Robel Chair in conducting research, devoting time to service projects and other extracurricular responsibilities.

“I’m very proud to continue my association with the W. P. Carey School through this gift, and to help the school build on its reputation for excellence,” says Robel, a 2014 inductee into the school’s hall of fame.

Fuel ASU: [giveto.asu.edu/about-campaign](http://giveto.asu.edu/about-campaign)

## 1980s



**Mark Dewane '85 BS management** has been unanimously elected

chairman of the Maricopa County Special Health Care District Board of Directors and will oversee the Maricopa Integrated Health System, a public teaching hospital and safety net system of care.



**John "Jack" Furst '81 BS finance,** a distinguished private equity investor, was named 2018

Outstanding Philanthropist by the Greater Dallas chapter of the Association of Fundraising Professionals for his selfless work and charitable contributions to the Boy Scouts of America. This is not the Texan's first rodeo: Jack was the ASU Founders' Day Philanthropist of the Year in 2017 and has been widely recognized for his transformative support of the Sun Devil Stadium reimagination. The visionary behind turning the stadium into ASU 365 Community Union, his support is born from his belief that big spending on stadiums that are utilized just 2 percent of the time is an unsustainable model. His solution: Abandon conventional thinking and adopt an innovative rethinking that transforms the stadium from football field into a university asset utilized 365 days a year.



**Kathleen Duffy '81 BA communication** was recently named Athena Awards

Businesswoman of the Year, as presented by the Greater Phoenix Chamber of Commerce. Honored with the ASU Alumni Past Chair's Award in 2016, Kathleen was recognized by the chamber for her work as CEO and founder of Duffy Group Inc., a private candidate-recruitment company.

**Steven Shirley '80 MS criminal justice** has been appointed executive director of the National Defense Information Sharing and Analysis Center, the national defense sector's nonprofit organization formed to enhance the security and resiliency of the industry and its strategic partners. Steven will oversee the development and implementation of information-sharing mechanisms, services, working groups and partnership and collaborative engagements.

## 1970s

**Robert Brutinel '79 BS economics** will begin a five-year term as chief justice of the Arizona Supreme Court after having been elected as vice chief justice of the court in January 2018. A former Yavapai County (Arizona) Superior Court judge, Robert was appointed to the state's highest bench in 2010 by then-Gov. Jan Brewer. He is not the first Sun Devil alum to hold the chief justice title in the Grand Canyon State: **Ruth McGregor '74 JD** served as chief justice from 2004 through 2009, appointed to the court in 1998 by then-Gov. Jane Dee Hull.



**Robert Garner '76 BSE electrical engineering** Talk about innovation: A graduate of

what is today the ASU Ira A. Fulton Schools of Engineering, Robert designed a super-computer that has recently been recognized as the world's fastest by TOP500 List. A veteran of 30-plus years at IBM, Robert is well-known, too, for his earlier work at Sun Microsystems where he helped develop the Ethernet, which led to the development of the world's most-advanced microprocessors of the time, and for his work in restoring a 40-year-old IBM 1401 computer at the Computer History Museum in Mountain View, California.



**Lawrence Anderson '75 JD** was recently honored by the State Bar of Arizona Board

of Governors as the recipient of the 2018 John R. Sticht Disability Achievement Award. A graduate of ASU Law (today's nationally ranked Sandra Day O'Connor College of Law), Lawrence was recognized as a legal professional with a disability who advances access to justice for people with disabilities, and for demonstrating exceptional depth of inner strength, courage in the face of adversity and tenacity of purpose. He's in good company: the O'Connor College of Law was a recipient of the prestigious award in 2008!



**Richard Snedeker '73 BS journalism** is not resting in retirement, having

published his first book, a memoir: "30,001 Arabian Days." The story is a remembrance of growing up in Saudi Arabia in the 1950s and early 1960s while his dad worked for the oil giant Aramco. Richard's work unfolds in a series of vignettes detailing his fond and strange recollections of living for nearly a decade in the Persian Gulf city of Dhahran. Says the author, "How a tiny oil camp in the middle of Saudi Arabia's eastern coastal plain transformed the world is a neglected, if transformative, story worth telling."

## Stay in touch

Be a current Devil and stay connected. It takes just two minutes to complete a quick online update that will keep you in the know with ASU Thrive magazine, exclusive invites to special events and more. [alumni.asu.edu/update](http://alumni.asu.edu/update)

## Weddings and births

**Kylie Conley '05 BIS interdisciplinary studies** and Ronald Skipp were married on Sept. 1, 2018, in Saratoga County, New York.



**Lucille Katherine Mateus** was born to **Giancarlo Mateus '03 BS kinesiology** and **Kristi (Beckstrom) Mateus '09 MA communication** on Oct. 16, 2017, in Phoenix.



**Preston John Gervin** was born to **Matthew Gervin '01 BS management** and **Christine Gervin '05 BS marketing** on Oct. 25, 2018.

## Celebrate your wedding in ASU style at Old Main



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# On the front lines of the cyberwar

## Alum's generous gift establishes the Cybersecurity Education Consortium

Talk to Ed Vasko and you come away worried. Look at the string of letters after his name and you'll know you should be.

Vasko, CISSP, is a Certified Information Systems Security Professional and CEO of Terra Verde, a cybersecurity consultancy with clients around the globe. He left ASU in 1995 with a diploma from the New College of Interdisciplinary Arts and Sciences. He returned in 2016 with a gift — and a warning.



Ed Vasko

Vasko says we're losing the cybersecurity war "... to individual bad actors selling information via the dark web; to organized criminal groups stealing massive datasets of individual information to enact fraud; to nation-states looking to undermine our social and political systems and critical infrastructure."

Vasko's gift provided seed money for the Cybersecurity Education Consortium on ASU's West campus. CEC's mandate is to address the nationwide shortage of cybersecurity professionals: one applicant for every 10 cybersecurity jobs available. "This can only change through a concerted effort by industry, government and educational institutions," Vasko says.

Kim Jones is CEC's director. A West Point graduate with 30 years in chief security officer positions, Jones says Vasko is a master of crafting strategy out of threat. "Ed is one of a handful of executives I've met who think about issues holistically, understanding the strategic implications of a solution."

Jones' mission, in the center Vasko helped create, is to train cyberwarriors; "people ready and able to defend their personal data, their family's data, their community's data and, ultimately, the country's data," Vasko says.

And as each new class of cyberwarriors is ready to be called up, there are multiple positions for them on the front lines. Because the threat is already out there.

—Erik Ketcherside

## The positive impact of awe

Of all the emotions Michelle “Lani” Shiota studies, awe is the most miscalculated.

“Awe is often thought of as the Gucci handbag of emotions,” says Shiota, an associate professor in ASU’s Department of Psychology. “It’s nice if you can afford one, but that handbag is not something people actually need. I think this perception reflects a profound error in how we value the different benefits that emotion can provide.”

Inspired by her love of the arts and academics, the high school drama major pursued her interest in how emotions could predict and influence people’s behaviors. Shiota is currently working to understand whether awe can promote better health behaviors and mental well-being.

“When we feel awe, we are less influenced by our expectations,” she says. “We generally have a tendency to see what we expect to see, but awe can let us focus on collecting information about what is actually there.”





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<sup>1</sup>Average combined annual savings based on countrywide survey of new customers from 1/1/15 to 1/29/16 who reported their prior insurers' premiums when they switched to Liberty Mutual. Savings comparison does not apply in MA. <sup>2</sup>Based on Liberty Mutual Insurance Company's 2014 Customer Satisfaction Survey in which more than 81% of policyholders reported their interaction with Liberty Mutual service representatives to be "among the best experiences" and "better than average." <sup>3</sup>Accident Forgiveness not available in CA. Terms and conditions apply. <sup>4</sup>Coverage is provided on the optional Towing & Labor coverage endorsement. Applies to mechanical breakdowns and disabilities only, and may be subject to limits. <sup>5</sup>Optional coverage in some states; availability varies by state. Eligibility rules apply. Coverage provided and underwritten by Liberty Mutual Insurance and its affiliates. 175 Berkeley Street, Boston, MA 02116. ©2018 Liberty Mutual Insurance 18PERB10010 CW 2018/04 This organization receives financial support for offering this auto and home benefits program.



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