

# ASU

ARIZONA STATE UNIVERSITY  
VOLUME 22 NUMBER 4

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Naruro Hassan's extraordinary journey led her from war-torn Somalia to ASU

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# Why I'm so optimistic

Last month, I welcomed our newest and most accomplished class of nearly 14,000 individuals who are embarking on a transformative journey.

Every day, I'm touched by the stories I hear and as I read through the pages of this magazine, especially about Naruro Hassan's amazing journey and her sense of optimism and duty to help make our world a better place, I am reminded how many remarkable stories like these I encounter. These are stories that often get missed amid the discouraging drumbeat of daily news. I understand that the daily swirl of headlines can feed the worry that our best days are behind us. I'm not immune to those who question our future.

But, as an educator, I see the fundamental role education plays in spurring social and economic mobility. Higher education serves as a training ground for civil discourse. ASU is a place where people learn to engage and work with a variety of viewpoints, come to a consensus, advance new ideas and initiatives, and tap into our better selves.

In the arc of human history, we are living in extraordinary times that have taken us closer to our potential as humans. We are continuing on a path of enlightenment-based progress in our society that dates back more than 400 years. Rising literacy and lifespans, dramatically reduced poverty and hunger, accelerating technological achievements. These advances are grounded in the principles of equality, liberty and justice, and in the dedication to science and reason, creativity and education.

Yes, this time of year stirs my optimism, but these thoughts are evoked virtually every day when I meet students, teachers and others on a mission to achieve their personal potential, address problems and improve our world. It's this daily reality that fuels my confidence and deepens my belief that the centuries-old journey that has created our modern world will continue to lead toward a healthier, wealthier, more positive and more productive future.

**Michael M. Crow**

President, Arizona State University

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### Paul Tullis

The award-winning journalist has covered science, business, technology and the environment for The New York Times and National Geographic.

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**Saving oceans from the sky**

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Loren Aragon rocked the Tony Awards Red Carpet.



CHRIS BALZOTTI, JAROD OPPERMAN/ASU



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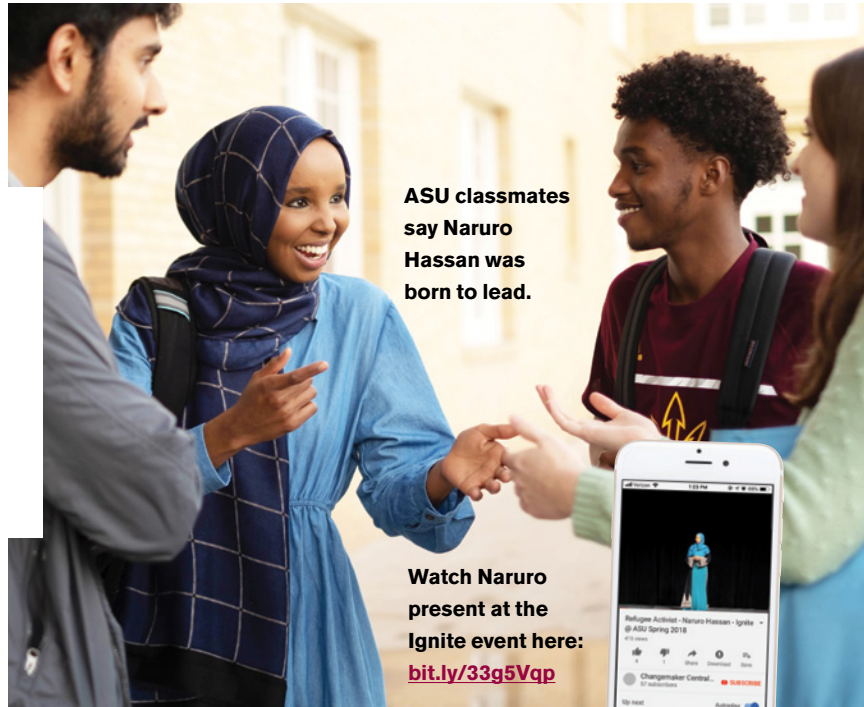


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## Survival, resilience, rediscovery

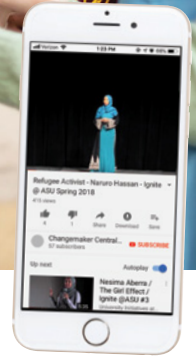
Naruro Hassan's extraordinary journey, including being separated from her family for 11 years, led her from war-torn Somalia to ASU. 44

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ASU classmates say Naruro Hassan was born to lead.

Watch Naruro present at the Ignite event here: [bit.ly/33g5Vqp](http://bit.ly/33g5Vqp)



Play like a Sun Devil

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The east side of Tempe campus, in the 1960s and today.



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# Sept

## Movie on the lawn

Bring a blanket to sit on and come prepared to snack on popcorn while viewing Disney's "Toy Story 4" on the big screen.

Friday, Sept. 20, 7 p.m., Fletcher Lawn, West campus

[eoss.asu.edu/welcome/events](http://eoss.asu.edu/welcome/events)

Free Family



## Honeybee-keeping 101

Did you know there are reportedly more than 120,000 beekeepers in the U.S. today ... who do it for fun? Join this growing interest in honeybees and learn ways to help stop the global decline of this flying insect in a range of courses offered by ASU's continuing education programs. **Beginning Sept. 28–29, course dates vary, School of Life Sciences bee lab, Tempe campus.** [sols.asu.edu/hobby-beekeeping](http://sols.asu.edu/hobby-beekeeping)

Continuing education Family



## 90-Minute Mastery: Speak Up! Improving Your Vocal Delivery

Want to strengthen your voice for TV, radio, podcasting and presentations? Arizona PBS Executive Producer Allysa Adams' exercises will improve your pitch, pace and articulation.

Friday, Sept. 27, 10:30 a.m., Walter Cronkite School of Journalism and Mass Communication, Cronkite 404B, Downtown Phoenix campus. [cronkite.asu.edu/news-and-events/events](http://cronkite.asu.edu/news-and-events/events)

Free

For more career-related events see pages 20-21.



## Earth and Space Exploration Day

Scientists and students bring earth and space research to life for participants through innovative hands-on activities. Experts from the Center for Meteorite Studies will examine your rock specimens to determine if they are meteorites. Free teacher resources will be available as well as contacts for outreach and more educational interactions with ASU scientists and students.

Saturday, Oct. 26, ISTB4, Tempe campus. [sese.asu.edu/public-engagement/events](http://sese.asu.edu/public-engagement/events)

Free Family

## How to research and write your family history

Get tips and inspiration to start documenting your family history in a series of community workshops focusing on topics such as journaling, writing about family and food, and writing about family for special occasions.

Many dates throughout the year, including Oct. 26. Locations include Tempe Public Library and Red Mountain United Methodist Church, Mesa. Full list of events at [cisa.asu.edu/family-history/events](http://cisa.asu.edu/family-history/events) Free Family



## Walk, Wag, Run 5K

Break out your walking/running shoes and bring your favorite, leashed four-legged friend to a day of exercise and fun in the sun. All dog lovers, walkers and runners welcome with all proceeds to benefit SummerUp Camp scholarships.

Sat. Oct. 26, 8:30–10 a.m., ASU West campus [newcollege.asu.edu/walk-wag-run-5k](http://newcollege.asu.edu/walk-wag-run-5k)

Ticketed Family



## Interactive art museum fun

ASU Art Museum's Playfest is a hands-on, interactive day of creative fun that includes art supplies and the opportunity to take home your self-created masterpiece. **Saturday, Nov. 9, 10 a.m.–3 p.m., ASU Art Museum, Tempe campus** [asuartmuseum.asu.edu/programs-and-events](http://asuartmuseum.asu.edu/programs-and-events)

**Free Family**

# Now!

## SHOWING (work x family)

This photography installation offers an opportunity to question our assumptions about the interaction between work and family life. What is it like to be pregnant at work? In what ways have familial roles shifted? How do we care for each other today? ASU Center for Child Well-Being is hosting this exhibition in conjunction with Working Assumptions, a nonprofit.

**Mondays–Fridays, now through Nov. 15, 9 a.m.–7 p.m., University Center, Downtown Phoenix campus.** [childwellbeing.asu.edu](http://childwellbeing.asu.edu)

**Free Family**



## Native American Heritage Festival and Veterans Day

Celebrate the culture and customs of indigenous peoples at the Native American Heritage Festival, featuring the 18th annual Veterans Day Weekend Traditional Pow Wow. Sample traditional foods, browse arts and crafts booths, and enjoy the stunning dancing, singing and drumming performances. Learn more about the symbolism, protocol and spiritual meanings of the dances, regalia and drums.

**Nov. 9, 11 a.m.–10 p.m., Fletcher Library Lawn, ASU West campus**

**Free Family**



## Blue Man Group's new tour

More than 35 million people on our blue planet have experienced the exciting and spectacular show that is Blue Man Group. And now, the Blue Men return with a new touring show featuring new and original compositions, acts, and instruments alongside iconic Blue Man Group moments based in joy, art, music, comedy, social commentary and profound absurdity. We see fun in your future.

Join us in Tempe and experience a new blue. **Nov. 15–17, ASU Gammage Auditorium, Tempe campus**

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

**Ticketed Family**

## Venture Devils Demo Day

Demo Day is the biannual showcase for top ASU-affiliated ventures in several categories to deliver investor-style pitches as they compete for more than \$250K in funding and support. All community supporters are invited to attend and watch all of the open boardroom pitches.

**Friday, Dec. 6, ASU SkySong** [entrepreneurship.asu.edu/venture-devils-demo-day](http://entrepreneurship.asu.edu/venture-devils-demo-day)

**Free**

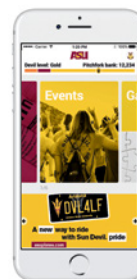
## Annual Economic Forecast Luncheon

Join business leaders to hear top national and regional experts present their economic forecasts and advice, including Harvard University's Robert Barro.

**Wednesday Dec. 11, 11:15 a.m.–1:15 p.m. at the Phoenix Convention Center.** RSVP at [wpcarey.asu.edu/efl](http://wpcarey.asu.edu/efl)

**Ticketed**

See [asuevents.asu.edu](http://asuevents.asu.edu) for additional ASU events.



**Check in at events to earn rewards!** Download the Sun Devil Rewards app today for ASU event listings, news, games and more. [sundeilrewards.asu.edu](http://sundeilrewards.asu.edu)



## 2019 football schedule



vs Kent State  
Aug. 29 (THU)  
TEMPE, ARIZONA  
**WEAR GOLD**



vs Sacramento State  
Sept. 6 (FRI)  
TEMPE, ARIZONA  
**WEAR GOLD**



at Michigan State  
Sept. 14 (SAT)  
EAST LANSING, MICHIGAN



vs Colorado  
Sept. 21 (SAT)  
TEMPE, ARIZONA  
**WEAR GOLD**



at California  
Sept. 27 (FRI)  
BERKELEY, CALIFORNIA



vs Washington State  
Oct. 12 (SAT)  
TEMPE, ARIZONA  
**WEAR GOLD**



at Utah  
Oct. 19 (SAT)  
SALT LAKE CITY, UTAH



at UCLA  
Oct. 26 (SAT)  
PASADENA, CALIFORNIA



vs USC  
Nov. 9 (SAT)  
TEMPE, ARIZONA  
**WEAR BLACK**



at Oregon State  
Nov. 16 (SAT)  
CORVALLIS, OREGON



vs Oregon  
Nov. 23 (SAT)  
TEMPE, ARIZONA  
**WEAR MAROON**



vs Arizona  
Nov. 30 (SAT)  
TEMPE, ARIZONA  
**WEAR GOLD**

Schedule Subject to Change

### FOLLOW US

- Sun Devil Football
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For tickets, please call  
**480-965-5812** or visit  
[TheSunDevils.com](http://TheSunDevils.com)



# ASU SUN DEVILS GAM



## Homecoming week

A time-honored tradition, ASU Homecoming brings together students, parents and alumni to celebrate our Sun Devil spirit. The weeklong festivities highlight all things Sun Devil through athletic events, fun on- and off-campus activities and entertainment.

Nov. 17–23 [homecoming.asu.edu](http://homecoming.asu.edu)

### Legends Luncheon:

#### Defenders of the Gridiron

The 2019 Legends Luncheon will honor Sun Devil Football's defensive standouts. Join us as we celebrate these players and their coaches at 11 a.m. on Friday, Nov. 22, Sheraton Phoenix Downtown  
**Ticketed Family**

### Lantern Walk

Lantern Walk was first celebrated in 1917. Each year, students, alumni, faculty, staff and friends climb to the top of "A" Mountain carrying lanterns to light up Tempe, following in the

footsteps of generations of Sun Devils. Meet at the base of "A" Mountain at 6 p.m. on Friday, Nov. 22; begin the climb at 7 p.m. **Free Family**

### Homecoming parade

Student organization floats, the ASU Marching Band, colleges, departments, community organizations, local celebrities and the most famous Sun Devil of all, Sparky, parade down University Avenue. Saturday, Nov. 23, four hours prior to kickoff of the football game.  
**Free Family**

### Block party

Come one, come all to this festival-like event filled with food, fun, entertainment and 100 tents of demos and information about many units and projects at ASU. Saturday, Nov. 23, immediately following the parade. The event is family friendly with plenty of bike parking. Please do not bring pets.  
**Free Family**

### Football game: ASU vs. Oregon

Sun Devil Stadium, Saturday, Nov. 23, time TBD.  
**Ticketed Family**

## Win a homecoming trip for four — and more!

Sun Devil Rewards is packed with perks for football fans, including the "I'm Coming Home" sweepstakes. One lucky Devil and three guests will win the ultimate homecoming weekend, including roundtrip airfare, two night hotel stay and exclusive lower level tickets to the big game, courtesy of Coca-Cola. Other sweepstakes include chances to win Best Seats in the Stadium tickets and autographed sports memorabilia. Download the app and enter today! For all the details, go to [links.asu.edu/homecoming-sweeps](http://links.asu.edu/homecoming-sweeps).



## Sparky's Touchdown Tailgates

Sparky's Touchdown Tailgates are pregame events that take place prior to home and away football games. We have giant backyard games (Jenga, Connect 4, mini golf and more), fun inflatable games, a photo booth and selfie station with a giant Sparky, an airbrush tattoo artist, cool giveaways and a Sun Devil Marketplace street sale. Food and beverages will be available to purchase on site. Also, mix and mingle with notable Sun Devils, including Mr. Sun Devil himself, Sparky!  
[alumni.asu.edu/events/gameday/tailgates](http://alumni.asu.edu/events/gameday/tailgates)

## Home games

Sparky's Touchdown Tailgates are held at College Avenue Commons, west of College Avenue and south of Sixth Street, within walking distance of our reinvented Sun Devil Stadium, three hours before kickoff.

**Free Family**

### On the road



**ASU at Michigan State**  
Sept. 14 (SAT, 1 p.m. MST)  
EAST LANSING, MICHIGAN



**ASU at California**  
Sept. 27 (FRI, 7:30 p.m. MST)  
BERKELEY, CALIFORNIA



**ASU at Utah**  
Oct. 19 (SAT, time TBD)  
SALT LAKE CITY, UTAH



**ASU at UCLA**  
Oct. 26 (SAT, time TBD)  
PASADENA, CALIFORNIA

**Ticketed Family**

## Devils on Mill

Join ASU students and community members to get hyped for the home football game. With food, ASU gear, music, carnival rides, games and activities, you do not want to miss out on this event!

Tailgate activities held between Forest and Mill avenues on Sixth Street, three hours before kickoff.  
[eoss.asu.edu/pab/devilsomill](http://eoss.asu.edu/pab/devilsomill)



# Impact crater

Blasted by an asteroid less than 100 million years ago, this unnamed crater is young in lunar terms. It's youthful age allowed the ASU-led Lunar Reconnaissance Orbiter's Narrow Angle Camera capture features not yet erased by the continual rain of small impacts that gradually soften lunar features.

Explore more lunar images at [roc.asu.edu](http://roc.asu.edu).

The impact threw out these large rocks, each the size of a house or bigger, that landed as a clump.

This central mound likely formed when freshly shocked rim material slumped down into the crater's center.

If you could stand on the rim of this little crater, you would see the Earth hanging low over the eastern horizon, moving slowly side to side and up and down as the lunar month rolls by.

A bright halo of ejected rock, shattered by the impact and flung outward, surrounds the crater. Close to the rim, the halo is continuous but it breaks up into streaks and rays farther out.



# Update in the news

■ The dark streaks likely come from impact-melted rock that was thrown high over the crater rim by the blast and fell to the surface shortly after the bright halo was in place.

## MOON MILESTONE

### Lunar camera marks decade of discovery

Launched a decade ago, the Lunar Reconnaissance Orbiter Camera represented our nation's first new scientific exploration of the moon since the Apollo missions 50 years ago. The discoveries made from that mission, and what the ASU-led Lunar Reconnaissance Orbiter Camera has seen, may pave the way to the first 21st-century human exploration of the moon, Mars and perhaps even farther beyond.

Mark Robinson, professor in ASU's School of Earth and Space Exploration, is the lead LROC

scientist. He and his team have used LROC to retrace the first human steps on the moon and have seen grand vistas, huge impact craters, ancient lava flows and evidence of icy deposits across its surface.

Recently, with NASA and commercial endeavors like Blue Origin revealing big plans to return to the moon as early as this coming decade, Robinson hopes ASU will continue to be the watchful eyes from above to propel the next generation of human and robotic exploration.

### Signature science of bees

Honeybee pollen can help track weapons of mass destruction and other activities. **11**

### MIT joins ASU in master's milestone

Top-ranked programs partner on first online stacked master's. **12**



## Carnegie-Knight News21 wins Murrow Award

Carnegie-Knight News21, the in-depth journalism collaborative based at ASU's Walter Cronkite School of Journalism and Mass Communication, has won the Student Edward R. Murrow Award for Excellence in Digital Reporting for a third straight year. This year's winning project, "Hate in America," a package of multimedia stories focused on acts of intolerance, marks the fifth Student Murrow Award for Cronkite, the most of any school nationally.

Explore the project at [hateinamerica.news21.com](http://hateinamerica.news21.com).



## Master's programs launched in D.C.

Midcareer professionals seeking a global focus can choose from three degree programs at ASU's location in the nation's capital

An executive Master of Arts degree in global affairs and management will be offered starting in January 2020 by the Thunderbird School of Global Management. The School of Public Affairs, in collaboration with the McCain Institute, offers an executive master of public administration created for public sector and public policy managers. Senior international affairs professionals lead the Master of Arts in international affairs and leadership from the ASU School of Politics and Global Studies and the McCain Institute.

Learn more at [washingtondc.asu.edu](http://washingtondc.asu.edu).



Valeria Rios and Timothy Herrera march at Hispanic Convocation in May.

## ASU earns prestigious honor for supporting Latino students

Young Latinos are one of the nation's fastest-growing populations. ASU has committed to serving its communities and those individuals who wish to pursue a degree regardless of background or socioeconomic status and to provide the support resources for success. For those efforts, the university was one of nine institutions to earn the prestigious 2019 Seal of Excelencia from the Washington, D.C.-based Excelencia in Education.

## How to avoid a rattlesnake bite

Beware desert dwellers, rattlesnakes are the No. 1 predator in the arid, barren wild. But it's rare if you ever see one, says Dale DeNardo, associate professor with ASU's School of Life Sciences. And the good news: "They're not out to get anybody," he says. "They want to be left alone."

If you do see one, try to enjoy it. "It's part of our natural environment, and they serve an important role," says DeNardo, who is also ASU's attending veterinarian. "They are not out to get you, so it's actually a great experience."

To avoid a rattlesnake bite, simply keep your distance, DeNardo says. But if you are bitten?

"Realize that you have lots of time and the bite is very rarely fatal," DeNardo says. "It's a serious thing and you'll need to seek immediate medical attention, but you don't want to run, you don't want to get your heart rate up. Just quickly but calmly make your way to a hospital by driving yourself or calling 911 and get yourself to a place where they can monitor you and give you an appropriate treatment."



### New podcast: "Zombified"

Athena Aktipis wants brains. Not because she's a zombie but because she's been zombi-fied. And so have you. By social media. By stress. By your friends. Even by loyal old Fido.

The only cure is to bring together as many brains from as many fields as possible to get a handle on how and why those noodley masses with synapses can be manipulated by forces seemingly beyond our control.

That's the premise of the psychology professor's new podcast, "Zombified," an exploration of how we are vulnerable to being "hijacked" by everything from parasites to algorithms, featuring informal conversations between Aktipis, her co-host David Lundberg-Kenrick and scholars from ASU and beyond.

Explore episodes at [zombified.org](http://zombified.org).

### Keep up with the headlines at ASU

by subscribing to the ASU Now e-newsletter at [asunow.asu.edu/subscribe](http://asunow.asu.edu/subscribe).



ASU researcher Chelsea Cook has identified more than 100 unique viruses in honeybees, hoping to understand how viruses impact health and behavior in bee colonies.

### Bee pollen's distinctive signature used to track weapons of mass destruction

Pollen sticks to everything, making it an invaluable tool to use for tracking the movement of weapons of mass destruction and other activities.

With the support of a multimillion-dollar grant from the Department of Defense, an ASU team of interdisciplinary researchers plans to use forensic palynology to do just that.

During the five-year project, part of the DOD Multidisciplinary University Research Initiative, the team will work on improving the U.S. government's ability to identify where and when WMDs are moving.

### Uber partnership expands

Eligible drivers and their family members will now have access to earn undergraduate degrees

The partnership between Uber and ASU provides a pathway to a fully funded college degree available to eligible drivers and their families nationwide. The ASU and Uber Education Partnership, which launched in eight cities in November 2018, offers the opportunity to earn an undergraduate degree through ASU Online or nondegree courses through ASU's Continuing and Professional Education program.

Uber estimates that 10,000 drivers would be eligible for the tuition-coverage program.

Learn more at [uber.asu.edu](http://uber.asu.edu).

MASTER'S MILESTONE

# ASU, MIT launch world's first online stacked master's on edX.org

ASU and the Massachusetts Institute of Technology, two of the top-ranked schools in supply chain management, have joined with edX.org to create the world's first stacked master's degree in the field. Both programs are rated among the top three by U.S. News & World Report.

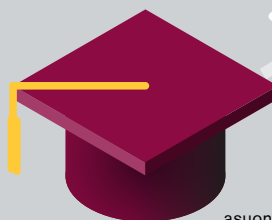
The unique credit pathway provides students who complete MIT's Supply Chain Management MicroMasters a seamless transition to a full ASU master's degree on edX, founded by MIT and Harvard.

"We are excited to strengthen our relationship with ASU to offer this innovative, top-ranked online master's degree program," says Anant Agarwal, edX CEO and MIT professor.

ASU's program will help prepare a highly technical global workforce for advancement in supply chain management careers across a diversity of industries. The program will launch in January 2020 with an application deadline of Dec. 16, 2019.

Learn more at [asuonline.asu.edu/online-degree-programs/graduate/supply-chain-management-ms](https://asuonline.asu.edu/online-degree-programs/graduate/supply-chain-management-ms).

**Master of Science in Supply Chain Management** can be achieved in 2.5–3 years or sooner.



## The MicroMasters online program at MIT in supply chain management

is a series of graduate-level courses that provides learners with skills that translate into career-focused advancement or a stepping stone toward credit in ASU's full master's degree program.

5 courses  
13 weeks per course  
2 final exams to earn credit  
Taught by MIT instructors

## The online Master of Science in Supply Chain Management at ASU

trains future leaders to develop and run supply networks in the way that best benefits the consumer and the company.

6\* courses  
7.5 weeks per course  
Taught by ASU instructors



\*based on successful completion of the MicroMasters

SOURCES: [edx.org/micromasters/mitx-supply-chain-management](https://edx.org/micromasters/mitx-supply-chain-management), [asuonline.asu.edu/online-degree-programs/graduate/supply-chain-management-ms](https://asuonline.asu.edu/online-degree-programs/graduate/supply-chain-management-ms)

## Women's bodies face new challenges as immune systems manage a modern world

Women get autoimmune diseases such as multiple sclerosis, lupus and rheumatoid arthritis eight times more than men do. On the other hand, women have a smaller risk of getting nonreproductive cancers such as melanoma or colon, kidney and lung cancer. So why is there such a big difference?

"We are proposing a new theory called the Pregnancy Compensation Hypothesis," says Melissa Wilson, assistant professor with ASU's School of Life Sciences. "Basically, women's immune systems evolved to facilitate their survival during the presence of an immunologically invasive placenta and pregnancy, and compensate so they could also survive the assault of parasites and pathogens.



Assistant Professor Melissa Wilson is a computational biologist whose research focus includes sex-biased biology.

"But now, in a modern, industrialized society, women are not pregnant all the time so they don't have a placenta pushing back against the immune system. The changes in their reproductive ecology exacerbate the increased risk of autoimmune disease. At the same time, we see a reduction in some diseases, like cancer."

Because the immune system varies between the sexes, says Heini Natri, a postdoctoral scholar with the ASU Center for Evolution and Medicine, it should be considered when developing treatments.



## ASU makes top 10 list of 'Best Buy' public U.S. universities

One of the most authoritative college guides in the U.S. has placed ASU in the top 10 list of "Best Buy" public universities in the nation.

The Fiske Guide to Colleges 2020 selected universities based on the quality of their undergraduate academics in relation to cost of attendance and specifically identified ASU for having "low average" student debt compared with peer institutions. ASU is the only Arizona university selected for the top 10 Best Buy list this year.

It shares the accolade with nine other powerhouse public schools, including the University of North Carolina at Chapel Hill, Purdue University, University of Florida and Texas A&M.



## Water may be simple way to combat Type 2 diabetes

Millions of people around the world living with Type 2 diabetes hear from their doctors that they should eat healthier and exercise more. But Stavros Kavouras, director of the Hydration Science Lab at ASU, thinks a key element is missing from this prescription — water. According to his research, drinking more water could be an effective and inexpensive way to improve the quality of life for diabetic patients and potentially help prevent the disease in others.

Kavouras led a study in which he regulated water intake among people diagnosed with Type 2 diabetes. The team examined the subjects after consuming ample water, according to the dietary guidelines from the Institute of Medicine, and a second time after decreasing their water intake to small amounts. They found that diabetic patients were able to regulate their glucose levels significantly better when they were properly hydrated.

## ASU President Crow named by Fortune as one of world's 50 greatest leaders

Fortune named Michael M. Crow one of the world's 50 greatest leaders, with the ASU president coming in at No. 44. Crow was the only college president to make the list, which recognizes people who are working to transform the world and inspire others to do the same. According to Fortune, Crow was honored because he "has spent 17 years reinventing 'party school' ASU as a higher-ed innovator, adding satellite campuses, online degrees and partnerships to educate Starbucks employees and Uber drivers."

# The environmental impact of the protein in our diets

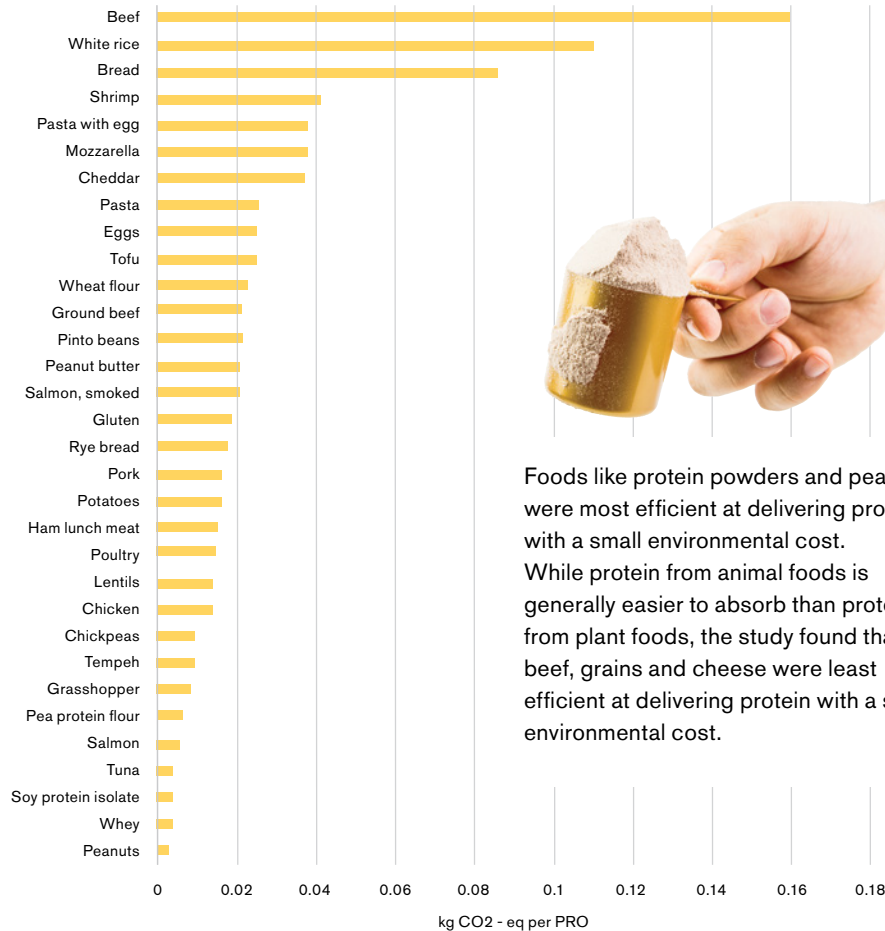
Whether you're a bacon fanatic, a vegan or somewhere in between, the choices you make about the foods you consume reverberate much further than your own body. As more consumers become aware of this, demand for sustainably sourced foods is on the rise.

Yet personal health remains an important

consideration. So how does the average consumer weigh both the nutritional quality and the environmental impact of a food? Thanks to recent research that included ASU College of Health Solutions professors Carol Johnston and Chris Wharton as authors, there now exists the basis for such a tool. Wharton,

Johnston and colleagues built an algorithm to assign a score to some commonly consumed protein-rich foods and ranked them based on their efficiency at delivering the most protein at the smallest cost to the environment. Values were calculated by taking into account that protein is absorbed differently depending on the food.

## Global Warming Potential Ratio for servings of food



Foods like protein powders and peanuts were most efficient at delivering protein with a small environmental cost. While protein from animal foods is generally easier to absorb than protein from plant foods, the study found that beef, grains and cheese were least efficient at delivering protein with a small environmental cost.



## Study: Teen confidence in law enforcement plummets

School of Criminology and Criminal Justice Assistant Professor Adam Fine has discovered that teenage perceptions of law enforcement have decreased dramatically, even as their confidence in other institutions has remained stable.

Fine and University of California-Irvine researchers found that until 2015 teens had the most confidence in religious institutions, followed by public schools and law enforcement, while they viewed the justice system least favorably. But from 2015 to 2017, their perception of law enforcement was as negative as the justice system.

Fine believes that's driven by the surge of content about policing on social media.

SOURCE Sustainability academic journal



## #10 in the world

ASU's ranking in patents, according to the U.S. National Academy of Inventors and the Intellectual Property Owners Association

## 130 Patents awarded

to ASU in 2018, up from 100 in 2017, a record

## \$109 million

raised by startups within Skysong Innovations' cumulative portfolio in fiscal year 2019, a record

## \$833 million

external financing raised to date by the 135-plus companies launched on ASU innovations

## 18 Startups

Skysong Innovations helped launch in fiscal year 2019, a record

## 301 Inventions submitted

to Skysong Innovations by ASU researchers in fiscal year 2019, a record

### RANKINGS

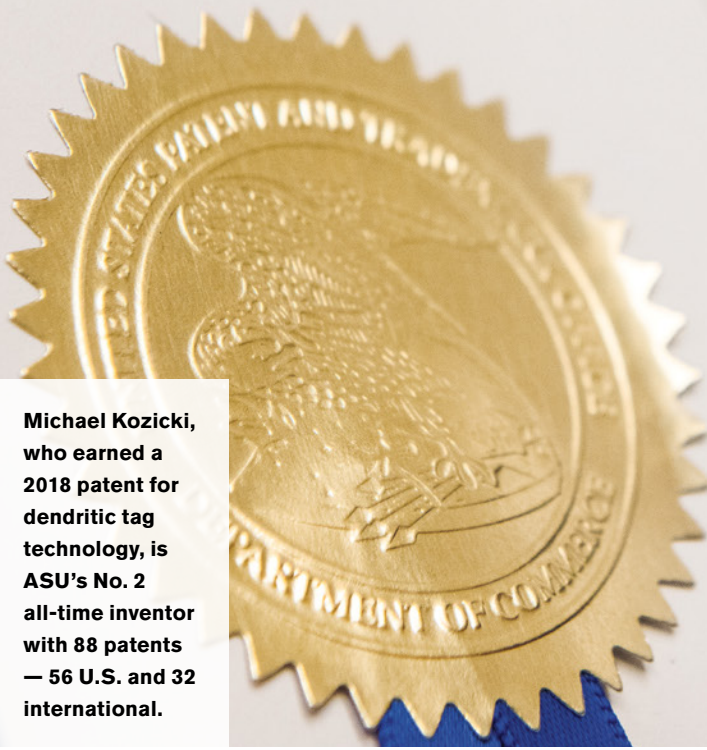
## ASU top 10 in the world for patents with Stanford, MIT and Harvard

ASU and Skysong Innovations set new benchmarks as a patent powerhouse in 2018.

The nation's No. 1 school for innovation according to U.S. News & World Report is now top 10 for patents worldwide among universities. ASU earned 130 patents in 2018, up from 100 the previous year, propelling the university from 17th to 10th, according to the U.S. National Academy of Inventors and the Intellectual Property Owners Association.

Other universities in the top 10 include MIT (2), Stanford (3) and Harvard (8). The University of Michigan tied ASU at No. 10.

Patents awarded to ASU in 2018 include technologies for flexible batteries — deformable batteries based on the Japanese paper-folding art of origami — and an immunosignature-based diagnosis of cancer in dogs developed by ASU scientist Stephen Johnston.

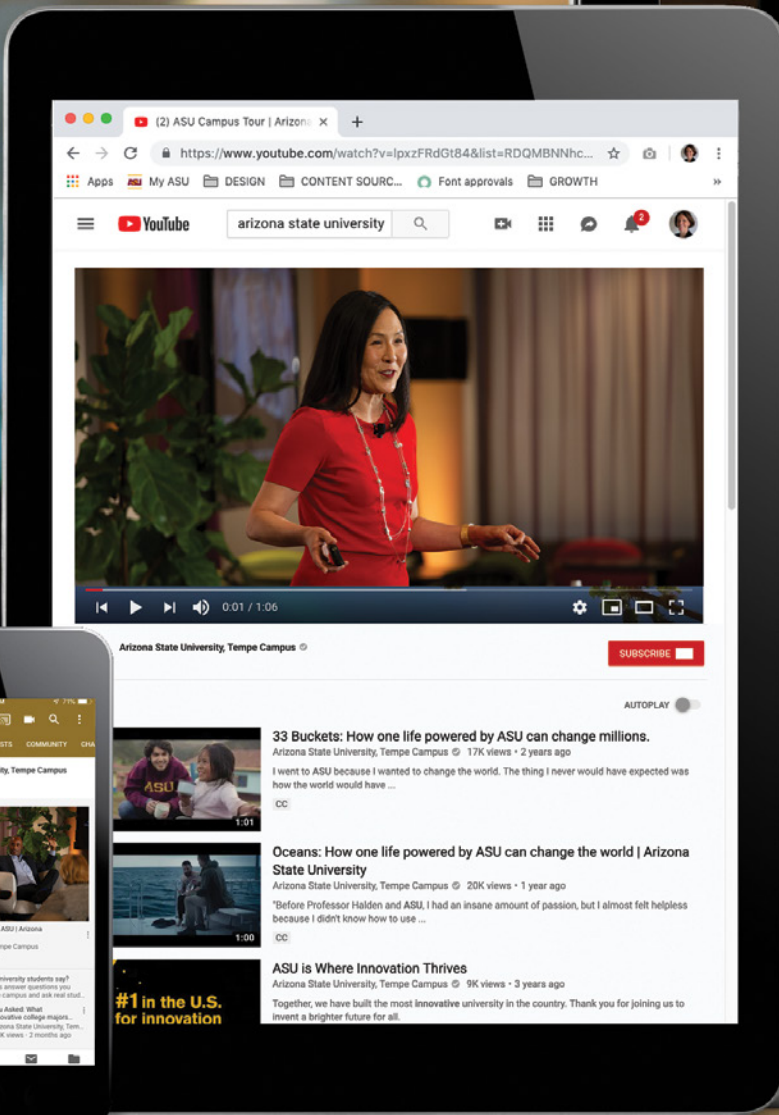


**Michael Kozicki, who earned a 2018 patent for dendritic tag technology, is ASU's No. 2 all-time inventor with 88 patents — 56 U.S. and 32 international.**



## Bringing innovation directly to you

ASU is launching a new series of innovation resources designed to deliver the nation's top innovators directly to you. Check out our new website at [alumni.asu.edu/innovation-you](http://alumni.asu.edu/innovation-you) or subscribe to our YouTube channel at [youtube.com/ASU](http://youtube.com/ASU)



# Advance your career



## **If I knew then ...**

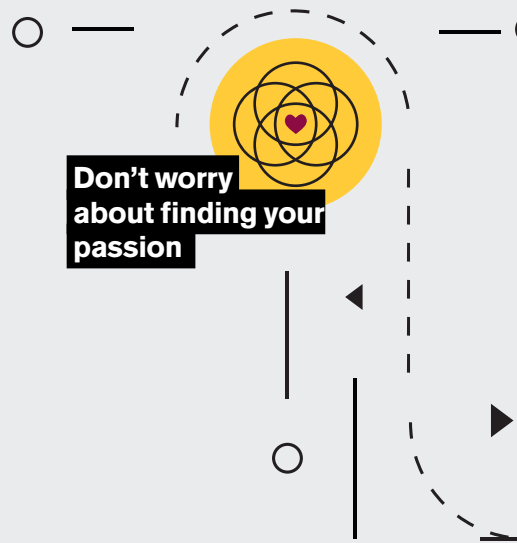
May Busch shares advice to her younger self. **18**

## **Cultural pride by design**

Or how to rock a red carpet. **24**



**Focus on your super strengths**



**Don't worry about finding your passion**

**Value people over tasks**



If I knew then what I know now ...

# Advice I'd give my younger self

BY MAY BUSCH

If I could go back to when I was starting my career, here are four things I would tell my younger self.

## 1. Focus on your super strengths.

Your super strengths are the things you do well and love doing. They're the things you do that come naturally to you. And when you're using those strengths, you feel like you're "in the zone" or "in flow."

Things feel "simple, easy and fun" when you're using your super strengths – they're effortless and easeful.

My super strengths have revolved around communicating with and influencing people. One boss put it this way: "May, you can say just about anything to anyone and get away with it." And I've described it as being able to "bring together disparate groups to collaborate toward a common goal."

Just because you like challenge doesn't mean you have to make things hard. And don't equate effort with achievement.

## 2. Value people over tasks.

As an achiever, I like getting things done. In fact, I like accomplishing tasks so much that I used to resent family members, friends and even my own team for interrupting me when I was in the thick of a project. The project could be as inconsequential as finishing an email or writing an equation in a spreadsheet.

I also used to think networking was a waste of time, or at least not as important as getting my work done. But the reality is our network of relationships is a key part of our success. It's people who put us in touch with new opportunities, innovative ideas and enriching experiences, and not tasks.

▶▶▶



**May Busch**

The former COO of Morgan Stanley Europe is now an executive coach, speaker, adviser, author and executive in residence in ASU's Office of the President. Find her at [maybusch.com/asuthrive](http://maybusch.com/asuthrive).

Don't give away your power



### 3. Don't worry about finding your passion.

I never knew what my passion was, or at least not how it related to my job or career. That's why I've never liked the typical career advice of "follow your passion." When you don't know, that kind of well-meaning statement can cause a lot of stress!

Instead of going around in circles trying to find my passion, what ended up working for me was to put myself out there and allow my passion to find me. Because finding your passion is a discovery process and not about thinking yourself into knowing.

The more you experiment, the closer you'll get to where you're meant to be.

### 4. Don't give away your power.

As a young person, I deferred to authority figures and just about anyone else who had an opinion. I assumed everyone else had more knowledge and expertise than me. I valued harmony so much that I kept quiet even when I disagreed. Those with louder voices intimidated me.

I also used apology language and said "sorry!" even when others bumped into me!

As a result, I gave away my personal power and made myself small and inconsequential without realizing it.

Whether it's a lack of confidence, not wanting to offend, or something else, you close yourself off to opportunity when you give away your power.

The good news is you can reclaim your personal power at any time. For me, it began with a shift in my mindset. If you need to reclaim your personal power, too, now would be a good time to start making the shift. ■

# Five things to stop saying at work right now

We might not always know what to say in certain business situations, but some things must be left unsaid

"Umm, hey, sorry to bother you, can you please, and correct me if I'm wrong, but can you just let me know if this is what you were looking for? If not, can I pick your brain for some ideas?"

Does this sound like a confident person? No! However, have we all said something like this when we were nervous or not totally confident? Yes. We've all been there. We gather the courage to send that email or have that conversation, but we

overlook the nuances of the words we use. In order to present that confident, smart, brilliant person who you are, here are some words you need to stop saying right now.

## "Can I pick your brain?"

First of all, gross! Not only is "can I pick your brain" not a great visual, but it also masks your true intent. You aren't looking to "pick someone's brain" (unless you are

## Career services for life

All ASU alumni have lifetime access to career fairs, webinars, and in-person and virtual networking opportunities, as well as a variety of career development resources. ASU Career and Professional Development Services can help you chart your career path. [alumni.asu.edu/services](https://alumni.asu.edu/services)

## Fall career fair

It's time to brush up that resume, put on your professional gear and head over to the fall career fair at ASU. Students and alumni are invited to attend the event, which will include reps from a diverse mix of industries looking to fill new employee and internship positions.

Sept. 24-26, 1-4 p.m., Memorial Union second floor, Tempe campus.

Free Networking Job Search

a zombie, in which case, way to be direct!). Most likely, you are asking for help and advice. Be confident and be direct instead. Ask, "Can I get your advice on xyz?" Then add a reason why they are the best person to help you.

### **"To whom it may concern ..."**

This phrase screams "I'm too lazy to do research!" You are already being fearless by reaching out to a company where you don't have a contact, so spend the extra few minutes and find a name to become a contender as well! When in doubt, add "if you are not the correct person, could you please forward this on to them" at the end of your email. Start building a relationship on the right foot by looking up a name.

### **"Sorry to bother you ..."**

Starting with an apology undermines your credibility. You have value! Your question or comment is valuable! Get straight to the point and say what you are

going to say! Don't apologize for taking up space or time ... you add to the conversation and there is no need to apologize for that.

### **"Correct me if I'm wrong ..."**

You don't think you're wrong, so confidently say what you have to say. Starting a thought or sentence with being unsure does not instill confidence. It may seem like a way to protect another person's feelings, or to show that you are open to feedback, but in reality, it makes it seem like you don't know what you are talking about. Don't worry, if you're wrong, people will tell you.

**"Can I pick your brain?"**

Most likely, you aren't wrong, just unsure.

### **"Just ..."**

This simple four-letter word diminishes anything that comes after it. "Just" is similar to an apology and makes it seem that you are coming from a place of insecurity. "Just" has become a qualifier, a way to not overstep some self-imposed boundary. You aren't "just" asking for something or "just" saying your thoughts, you are contributing!

Choose words that show your brilliance! Removing these five phrases will go a long way in changing how others view you by showing you as a confident and efficient communicator.

— Taylor Drake, '09 BA

*Taylor Drake leads marketing for a major litigation support firm in Los Angeles. At age 30, she co-founded Los Angeles-based Bluestocking Society, an online networking community for female professionals. Find out more at [bluestockingsociety.co](http://bluestockingsociety.co).*



## **Entertainment career fair and mixer**

If a career in film, media and/or television is your calling, then you won't want to miss the ASU Film Spark L.A. Entertainment Career Fair event in Santa Monica. Meet decision-makers and representatives from throughout the entertainment industry who are looking to fill career and internship positions – then stick around for a mixer that also includes ASU faculty and staff.

**Sept. 27, fair 1–4 p.m.; mixer 5–8 p.m.; Annenberg Community Beach House, 415 Pacific Coast Highway, Santa Monica, California.**

**Free** **Networking**  
**Job Search**

## **Alumni job fair**

For alumni looking to land a job or start a new career, this employment fair is for you. Bring your resume, dress professionally, compose a commanding introduction and meet professionals looking to fill positions in a variety of fields.

**Dec. 5, 3:30–6 p.m., Memorial Union second floor, Tempe campus** **Free** **Job Search**

## **Sign up to attend events and connect to resources**

Handshake is ASU's online resource for career and internship information, events, advising, job search and company research. You can sign up for the career events listed here and learn more about the employers who will be attending.

[career.asu.edu/handshake](http://career.asu.edu/handshake)

# Employment powerhouse

While ASU graduates make a billion-dollar impact on the state's economy, ASU makes a priceless impact on the career outcomes for students, based on rankings of 2017–18 graduates. Job recruiters tout ASU's diverse student population and innovative culture that develops a rich talent pool.

# 92%

of undergraduate alumni were employed or received at least one job offer 90 days after graduation.

93% of graduate alumni were employed or received at least one job offer 90 days after graduation

# \$50,529

Average salary for first job offer for undergraduate alumni

# \$68,496

Average salary for first job offer for graduate alumni

**22,742**  
Organizations requesting to recruit Sun Devils as of April 2019



## ASU in top 10 in the U.S. for Silicon Valley hires, ahead of MIT and UCLA

According to HiringSolved analysis, ASU graduates are finding jobs at high rates in this innovative part of the economy.

### Top industries for first job out of ASU

- Health care
- Higher education
- K–12 education
- Internet and software
- Government — local, state and federal
- Electronic and computer hardware

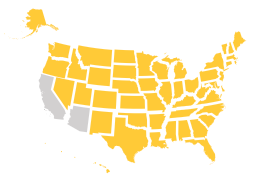
### Top locations for undergraduates' employment



Arizona 62%



California 12%



Other states 24%



International 1%

SOURCE: ASU Career and Professional Development Services





# ‘No recession in sight’ for 2020

ASU experts see robust road ahead for Arizona's economy

Arizona's economy is thriving and likely to flourish at least for another year, according to economic experts at Arizona State University.

“We’re coming off a super-strong year, and it’s giving us a lot of momentum,” said Lee McPheters. “There is no recession in sight for our forecast.”

Speaking at the annual economic forecast luncheon held by the Economic Club of Phoenix,

McPheters said 2018 surprised analysts like him. He predicted 69,000 new jobs would be added in Arizona for the year when 78,800 jobs were created. Arizona was fourth in the nation for job creation.

Arizona is also fourth in the nation for population growth, another key economic driver. “We’re continuing to get the benefit of more people moving here and a relatively robust birth rate,” McPheters said.

**Lee McPheters**  
Research professor of economics in ASU’s W. P. Carey School of Business and director of the school’s JPMorgan Chase Economic Outlook Center.

## What’s fueling the economy?

McPheters: “Less regulation is behind some of it. People argue about regulation and the long-term consequences, but I think it sustained the growth in 2017 and 2018.”

## Are we on the verge of a bubble?

McPheters: Construction is leading job growth and people remember the recession of 2008, when the vigorous housing market collapsed. But he noted a key difference between then and now: “As a percent of all jobs, construction is about 5.7%, not the 9 or 10% it was in 2006.”

The additional construction jobs are

supporting job growth: “It’s construction of office space, distribution space and public-sector investment.”

## What’s sounding an alarm?

McPheters: Affordable housing. Wages have gone up 12% while home prices have increased 31%. “That is putting a squeeze on people,” he said.

Stapp: “We are building what we need to house the population that is moving here and not building in excess, and that continues to push prices up. There’s no slack in the inventory.”

He added that new housing is gobbling up 6,000 acres a year in the

Valley: “Where do you get those 6,000 acres? We are pushing toward the edges again.”

## What are the biggest threats to Arizona’s economy?

Hoffman: “I worry about global graying. For the first time ever, we have more people 65 and older than 5 and younger. That will change the way people consume, what they’ll buy and how much they spend.”

Increasing national debt: “What’s driving it is mandatory entitlements. Nobody wants to hear this, but we simply do not have enough in receipts to pay for the Medicare that Baby Boomers expect.”

**Mark Stapp**  
The Fred E. Taylor Professor in Real Estate in the W. P. Carey School of Business.

**Dennis Hoffman**  
An economist and the director of the L. William Seidman Research Institute at the W. P. Carey School of Business.

# CULTURAL

A close-up, profile view of a person with a goatee and glasses, wearing a black t-shirt. They are focused on a task in their hands. They have a silver hoop earring and several beaded bracelets on their left wrist, including one with a pink tassel. The background is a blurred workshop or studio with various items hanging on the wall.

pride by  
design



Loren Aragon once engineered military shock absorbers; now he's dazzling the fashion world with inventive designs honoring Native American culture.

**Story by** BENJAMIN GLEISSER  
**Photos by** JAROD OPPERMAN

The gowns feature bold, geometric patterns that wrap around the body and turn people into works of art. Look closely at the sharp lines and vibrant colors — the designs mirror those found on pottery from the Acoma Pueblo of New Mexico.

Fashion designer Loren Aragon, '04 BSE in mechanical engineering, grew up in that Pueblo and proudly brings his heritage to life through these creations. And he's just as proud at being named the 2018 Couture Designer of the Year at Phoenix Fashion Week — the first Native American to receive that honor.

Aragon is the CEO and designer at ACONAV, a Native American couture fashion company based in Phoenix. He launched the company in 2016 with his wife, Valentina, who also attended ASU and hails from the Navajo Nation.

**“I’m intrigued by how things are created. I’m like a reverse engineer.”**

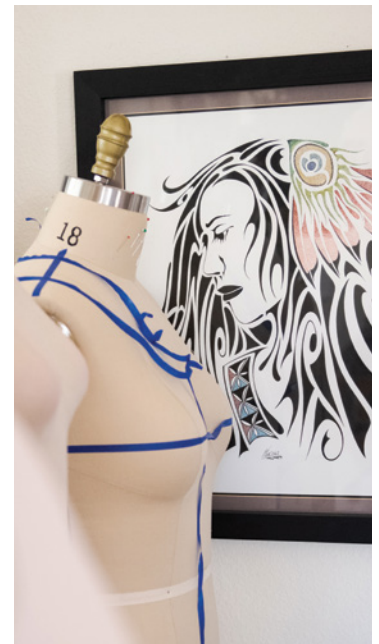
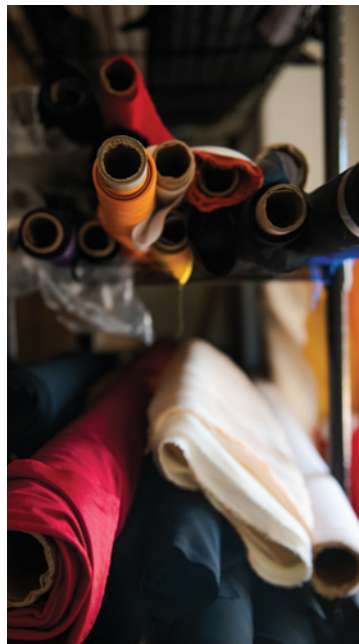
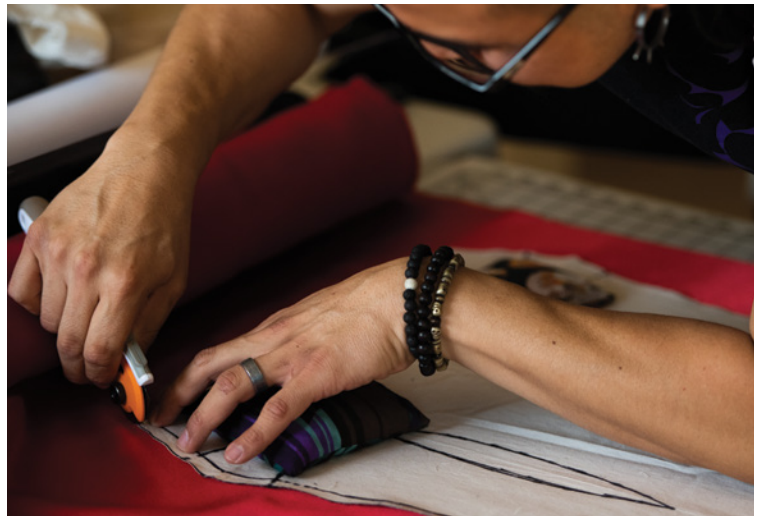
–LOREN ARAGON

The ACONAV (Acoma and Navajo) website describes its designs as celebrating the strength and empowerment of women through positive expressions that tie culture to modern style.

Interestingly, 10 years ago, Aragon was a mechanical engineer designing shock absorbers for military vehicles. And while a student, he studied robotics and designed prosthetics.

“Art and technology have always been in my background,” Aragon says. “I’m intrigued by how things are created. My grandfather was a mechanic who worked with gears and got dirt under his fingernails, and my mother was an artist and art teacher who came from a culture that was very active in pottery art. I’m like a reverse engineer – I research the past to understand how the origin of things affects the world today. My goal is to preserve our culture through fashion design.”

His work is attracting the kind of attention reserved for names on labels featured in chic boutiques. One of Aragon’s unique pottery-inspired couture creations was chosen to be displayed at Walt Disney World’s Epcot Center in Orlando, Florida. His work also turned heads at the 2019 Tony Awards, thanks to a striking gown he designed for Colleen Jennings-Roggensack, vice president of



Loren Aragon works with fabric he used for Colleen Jennings-Roggensack’s Tony Awards dress in his Maricopa home studio, which also features his artwork.

cultural affairs and executive director of ASU Gammage.

Jennings-Roggensack, the only Arizonan eligible to vote for Broadway’s highest awards, wore an eye-catching pattern Aragon calls “shattered details” printed on deep red cloth.

“The geometric pattern of fine-line details suggests the beginning of something new, like clouds

breaking to produce rain,” he says. “The color red, like a splash of color through our blood lines, is an homage to my ancestors. Red also represents the missing and murdered indigenous women and girls, and I’m proud to honor them.”

The dress is accented by a cape that functions as a scarf, which is a nod to an accessory girls in the Acoma Pueblo



ASU's Colleen Jennings-Roggensack, top, rocked the Tony Awards Red Carpet in Loren Aragon's couture dress, inspired by his Acoma Pueblo heritage. Below, model and designer embrace.

**“Our culture is based on a matrilineal system that honors the power and strength of women.”**

–LOREN ARAGON

wear to symbolize that they've become women. Plus, the cape playfully suggests a superhero, Aragon adds.

“Our culture is based on a matrilineal system that honors the power and strength of women,” he says. “We celebrate that women create life, and I emphasize that fact in my designs, that we look up to women.”

Jennings-Roggensack, who makes a point to always wear a gown to the Tonys that was created by an Arizona designer, says what impressed her about Aragon was he took time to get to know her before sitting down to the drawing board.

“I admired that he wanted to know who I was as a person,” she says. “Later, when he showed me the design, I immediately fell in love with it. It had a vertical feel that sweeps you upward. I would love to wear his other designs.”

After traveling to Santa Fe to explore Native artists' work for inclusion in Disney's Epcot Center, Jackie Herrera, assistant producer for Walt Disney Imagineering, chose to showcase Aragon in the Creating Tradition Exhibit of the American Heritage Gallery. The exhibit focuses on contemporary artists who use historical artifacts as inspiration for their work.

“I thought Loren's work was very inspired, and asked him to design a dress based on one of the pots the museum owned,” Herrera says. “The dress he made is beautiful. It's truly art, which is a word not usually used to describe fashion.”

Aragon admits it was “a big surprise” to be asked to contribute work to the Epcot exhibit. After researching the tradition behind the creation on that specific piece of pottery, he decided to marry

Acoma's matriarchal culture with Disney's princess culture, and create something that could be worn by Cinderella, Belle (“Beauty and the Beast”) or any Disney heroine.

“I listened to the voice of the past to create something that echoes into today,” Aragon says.

The list of influences stretches throughout his life. His first mentors were his mother, Hilda, a seamstress and an artist, and his uncle, Joseph Salvador, a metalsmith who taught him jewelry making and how to use his artistic skills to create pieces that celebrate the vitality in the Native way of life.

He also credits Thomas Sugar, a professor at ASU's Ira A. Fulton Schools of Engineering, for teaching how mechanical designs drawn on paper could be brought to life. Sugar remembers Aragon as “a very project-focused person. Loren took his creativity and problem-solving skills and today has created some beautifully designed clothes.”

Reflecting on his time at ASU, Aragon recalls designing jewelry and greeting cards to help pay for school.

“When I came to ASU,” he says, “I was an only child who felt sheltered, and school helped me gain the confidence to open my eyes to a different world and appreciate my culture more. It gave me confidence in what I was doing.”

What's next for Aragon?

“I'm previewing designs inspired by rain,” he says. “Rain is the Pueblo culture's source of life. Our ancestors prayed for rain, and my new collection will honor the sky, cloud formations and lightning.” ■



**ASU students in the summer study abroad film program admire a double rainbow at Karekare Beach on the west coast of Auckland, New Zealand. The program balanced the study of New Zealand's film industry with exploration of its natural wonders.**



# Explore the world

## WHAT A CLASSROOM

ASU film students expanded their horizons in July by exploring New Zealand's natural wonders and rich culture, taking a deep dive into the making of "The Lord of the Rings" franchise, including location tours of the Hobbiton film set and special-effects studio, Weta Workshop. "The exploration of film, the majestic landscape and the bicultural environment of New Zealand make this program a trip of a lifetime," says Michelle Martinez, director of the New Zealand Film and Media studies in The College of Liberal Arts and Sciences. The trip also immersed students in the indigenous Maori culture, including a cultural lesson, ceremony and meal at a traditional marae, a visit to the Maori Television Studio and tour of the Te Puia Maori Arts and Crafts Institute. For more, visit [mystudyabroad.asu.edu](http://mystudyabroad.asu.edu).

## Saving oceans from the sky

Greg Asner's mission to preserve coral reefs. **30**

## A refugee's story


Naruro Hassan's extraordinary journey from Somalia to ASU. **44**

Greg Asner and Robin Martin have transformed the understanding of coral reefs. Opposite, an overhead shot of coral reefs helped the Dominican Republic protect a growing tourism-focused coastline.

A photograph of two divers in black wetsuits and masks underwater. They are holding a clear plastic box containing electronic equipment. The diver on the right is holding a bunch of yellow and white plastic waste. The background is a deep blue ocean with a coral reef visible at the bottom.

# Saving oceans



An aerial photograph of a tropical coastline. The image shows a vibrant blue ocean with a visible coral reef structure. A sandy beach runs along the edge of the reef, with a resort area featuring buildings and swimming pools. The text is overlaid on the left and center of the image.

ASU researchers Greg Asner and Robin Martin are creating game-changing technology for preserving endangered marine life and shorelines

FROM  
THE

# sky

Story by PAUL TULLIS

Until recently, if you wanted to make a map of a coral reef, you had a lot of options, all of them bad. That's changing, thanks to a pair of recent additions to Arizona State University's faculty.

Greg Asner opened ASU's Center for Global Discovery and Conservation Science in January, joined by his wife and research partner Robin Martin, a biochemist and remote-sensing expert who has opened her own lab at the center and is an associate professor at the School of Geographical Sciences and Urban Planning.

Under Asner's leadership as principal investigator, and with contributions from ecologists, data scientists and global information systems experts, the

pair is creating the most detailed maps of coral reefs ever devised, using a unique suite of advanced technologies mounted on board a Dornier 228 turboprop aircraft, dubbed the Global Airborne Observatory, and artificial intelligence on the ground.

But the research is not academic. “We want to advance the pace at which we discover what’s going on out there, then apply it immediately.”

Asner and Martin moved to ASU from the Washington, D.C.-based Carnegie Institution

**“We want to advance the pace at which we discover what’s going on out there, then apply it immediately.”**

— GREG ASNER, DIRECTOR OF THE ASU CENTER FOR GLOBAL DISCOVERY AND CONSERVATION SCIENCE

for Science, an independent research organization with labs at Stanford University. The change reflects Asner’s stated objective. “It was the desire to scale up fast and generate a beehive of activity using the latest science and technology to find conservation solutions that are going to work,” he says. “ASU has a campus of startups. We’ve been given the keys to this startup.”

The two have been working on coral reefs for only five years, but they are already well known in the marine biology community.

## Making a better map

New high spatial resolution bathymetry provides a 3D view of the Lighthouse Reef in Belize using only satellite imagery, a “game-changing” method for measuring the seafloor in shallow waters.

Dark region represents deep lagoon.

Pale white strip shows shallow lagoon.

Small brown regions in the center are patches of reefs.

Deep blue bands show areas of deep ocean.

Nancy Knowlton, Sant Chair for Marine Science at the Smithsonian Institution, describes Asner as “very visionary, with a genuine skill set — a combination not a lot of people have. These mapping techniques would really transform our ability to understand what’s happening [to coral reefs] essentially in real time over the entire globe, and nothing like that’s been possible before.”

### Seeing the forest in the seas

If you could tell from a map whether the corals are alive, dead, or starting a process that could lead to their death, or in some instances, the species of coral, you would have some very valuable information: 25% of sea life relies on the less than 1% of the ocean floor that is comprised of coral reefs. Such sea life is an important source of protein for up to a billion people, and reefs provide the global economy \$375 billion annually in the form of food, coastal protection and tourism.

Some reefs are worth \$1 million per square kilometer per year. Yet humans are killing reefs — overdeveloping their coastlines, dumping sewage onto them, pulling off chunks for jewelry or souvenirs, upsetting their ecological balance with overfishing and acidifying their waters with carbon emissions.

Limited access adds to the challenge. Reefs are known to about 50% accuracy — that is, a reef we think covers 100 acres might actually cover anywhere from 50–150. This is like saying we don’t know where forests are.

Enter Asner and Martin. They spent two decades

mapping tropical forests to maximize the services those ecosystems provide various stakeholders, from governments to orangutans. Eventually they realized that the tools developed to map tropical forests could be applied to coral reefs. With thousands of hours of scuba diving under their weight belts, they also have a deep affinity for the undersea world.

“In the forest, once we got to scale and saw patterns, then we could say something bigger,” Martin says. “And the reefs community needed that.”

As with the forests work, the first step in mapping reefs is collecting samples from the water. Back in the lab, Martin measures the concentrations of different chemicals in the corals; these vary by species, and change depending on the health of the coral. These data are organized phylogenetically so relationships between species are understood.

Different coral species give off data on the spectrum of light, as well. “Using statistical models,” Martin explains, “we model the chemistry in the leaves to the spectra. That allows us to remotely sense the chemistry.”

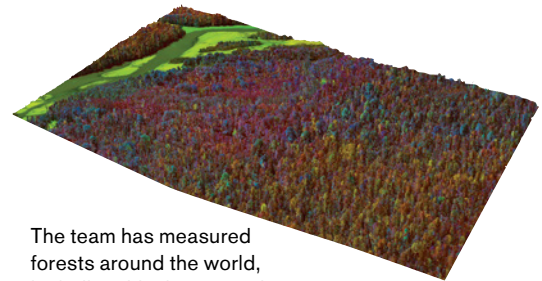
That is, from the Global Airborne Observatory. It combines five instruments that are fully fused: a high-powered, twin-laser lidar — like radar except with light instead of radio waves — that pings the ground beneath 500,000 times per second to provide 3D topography of the seafloor; two spectrometers, which measure 427 colors, most of them outside the range of visible light, to pick up the spectra

## Mapping biodiversity from the air

The Global Airborne Observatory, a Dornier 228 turboprop airplane packed with technology, can map 3D topography of various terrains.

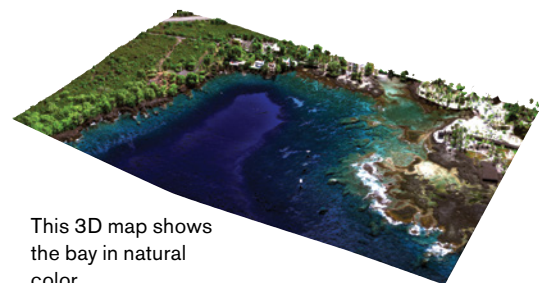


### Peru’s Amazon rainforest

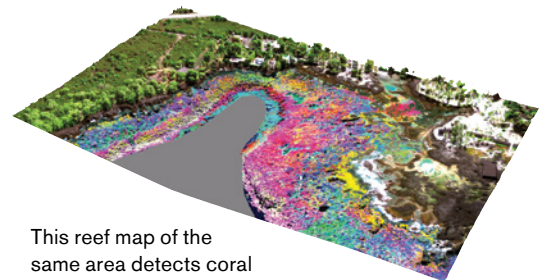


The team has measured forests around the world, including this riverscape in the Peruvian Amazon.

### Hawaii’s Honaunau Bay



This 3D map shows the bay in natural color.



This reef map of the same area detects coral bleaching and identifies different types of coral.

that Martin has matched to the chemistry; and two cameras with up to 6-centimeter resolution that solve the spatial part of the problem, and are used to interpret the spectral data.

Images are analyzed using a form of artificial intelligence known as “deep learning” to find corals and determine whether they are alive, dead or bleached — a process that results from warm-water events, which are increasing in frequency and severity as a result of global warming. It’s the same approach Google Photos uses to identify faces.

### Mapping ocean depths

In July, Asner and his GDCS colleagues elsewhere published a paper showing a method for measuring the seafloor in shallow waters using only satellite imagery — “game-changing” Asner said

Nudibranch is one of the small creatures who make their home in the coral reefs in Monterey Bay, California.



**“Using statistical models, we model the chemistry in the leaves to the spectra. That allows us to remotely sense the chemistry.”**

— ROBIN MARTIN, ASSOCIATE PROFESSOR IN THE ASU SCHOOL OF GEOGRAPHICAL SCIENCES AND URBAN PLANNING

on Twitter, because now they can map the depth of coastal oceans and reefs at higher resolution than previously possible. The analogy to forests would be that this new technique shows the heights of every part of a forest, while the finer-grain imagery collected from the observatory can identify the condition and sometimes the species of the trees in that forest.

The new method is significant because the seafloor is always covered by water and hence difficult to see with satellites. Now they can map the rough topography of the seafloor remotely with images that are easily acquired. The observatory’s suite of technologies provides information that is immediately actionable for conservation goals.

Asner is working with Planet Labs — the satellite imagery company that provided the images analyzed with the new technique — to develop a system to identify at the earliest stages where a bleaching event might occur so interventions can be planned.

“There are things we can do

to arrest or slow coral loss, but they must be used at exactly the right time and place,” says Andrew Zolli, who heads Planet’s global impact initiatives.

Such conservation applications are precisely Asner’s aim.


“Greg’s goal is not just to publish another paper, but to translate his discoveries into actionable insights,” Zolli says.

That’s already happening. Asner’s team contributes to the Allen Coral Atlas, an effort to map coral reefs worldwide and create a monitoring system that would track restoration progress. In what Lauren Kickham, senior director at Vulcan Inc., which coordinates the project, describes as “reverse Photoshopping,” Asner’s team corrects satellite images from Planet to strip away various effects to give “as true a picture as we can get of corals.”

Meanwhile, in the Caribbean, the observatory has flown over an area hit hard by back-to-back hurricanes the previous summer. The maps they created have already been used to help design the largest marine protected area in the Dominican Republic.

“By having a high-resolution map of the corals and the sea bottom, [planners] were able to include critical areas,” says Luis Solorzano, executive director for the Caribbean at The Nature Conservancy, a Washington, D.C.-based nonprofit that organized the project. “We hope this information will be used by other countries to improve their design and management of marine protected areas.”

The group operates coral



Greg Asner's research team could compare reefs before and after warming events to discover which genotypes are more resilient to warmer waters.



Reefs such as the Lighthouse Atoll in Belize comprise less than 1% of the ocean floor, but support 25% of sea life.

“nurseries” and anticipates leveraging the observatory to see if corals grown in the nurseries and seeded on damaged reefs are growing successfully. Asner’s team could also compare reefs before and after warming events to discover which genotypes are more resilient to warmer waters.

It’s a direction ASU President Michael M. Crow is happy to see. He describes the traditional academic approach as “rigid, siloed thinking” that has contributed to the side with all the facts in its corner losing the debate on climate change. His leadership has aimed to create instead a culture that’s “about the understanding and the solution, not about the protection

**“In the same way we lay down huge highways, we can be rebuilding reefs using science.”**

— ANDREW ZOLLI, LEAD OF  
GLOBAL IMPACT INITIATIVES  
FOR PLANET LABS

of the discipline.” Crow sees Asner fitting into that: “Greg is a fantastic scientist with fantastic tools to help us understand and manage ecosystems we’re not doing well by.”

Asner’s team is battling a vicious climate cycle. Coral reefs protect shorelines from the

storms that are getting stronger as a result of greenhouse gas emissions damaging those same coral reefs. Solorzano envisions marine bio-engineering projects to bolster reefs as a shield for coastal communities such as Miami, Florida, where he lives.

“In the same way we lay down huge highways, we can be rebuilding reefs using science,” he says. “Putting in materials to make them higher, reducing the energy of waves, facilitating the growth of [carbon-sequestering] mangroves — their value is so huge.”

With the right maps, this would be possible. ■

*Paul Tullis wrote about Greg Asner in the June 10, 2019, edition of The New York Times.*

**Nature-inspired solutions**  
for  
**global impact**

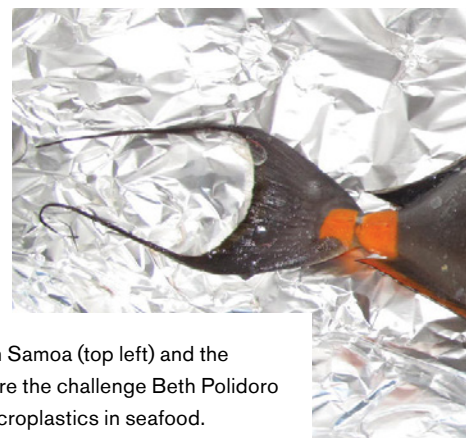
**[biodesign.asu.edu](http://biodesign.asu.edu)**

EXPLORE

**Tiny** little  
pieces of plastic

are getting into

e  
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Pollutants piling up in American Samoa (top left) and the Philippines (top right and left) are the challenge Beth Polidoro is tackling in her research of microplastics in seafood.





## Beth Polidoro and her ASU SWAT lab set out to make the world's oceans and the seafood we eat safe from microplastics and other pollutants

Story by Yael Grauer, '19 MMC

Photos by Beth Polidoro

Marine biologist Beth Polidoro did not always aspire to be a scientist. She first wanted to be a reporter, covering wars and human rights abuses across the globe. But a short stint working at a newspaper covering community events and writing movie reviews left her uninspired. She always loved spending time outdoors and was inspired to apply for a job at an environmental organization, which began her foray into science.

At her new job, Polidoro wrote a grant to teach kids how to use school gardens as part of their science classes. They got the grant, and she taught third-graders how to plant seeds.

Today, Polidoro reports on marine biology as leader of ASU's Salt Water Assessment Team lab and associate professor of environmental chemistry and aquatic conservation in the New College School of Mathematical and Natural Sciences. As a

scientist, she looks at pollution in the marine environment: where it comes from, where it ends up, and what the impact of chemicals are on both marine species and people who eat seafood. And the reporter in her really enjoys translating those findings in a way people can understand.

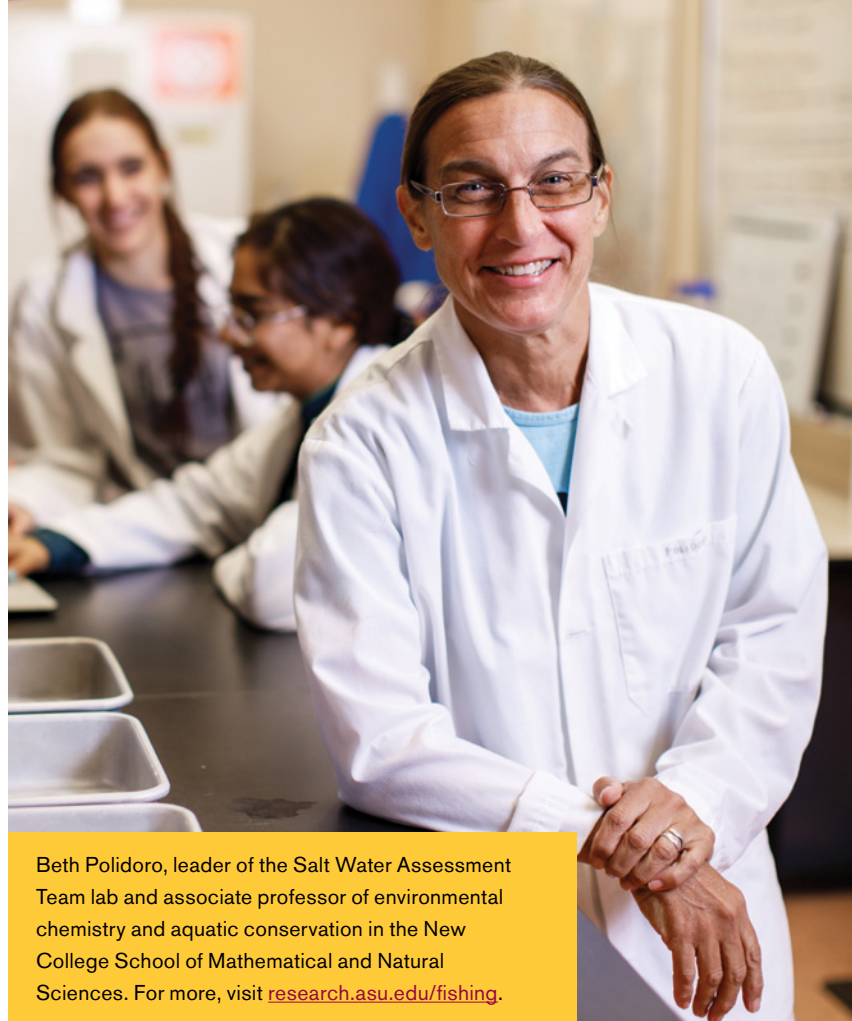
“I don’t really like to just go up to someone and say, ‘That piece of tuna that you’re eating has 25 parts per million arsenic and mercury in it,’ because people will just glaze over and not really know what it means,” she says. “But telling someone that eating a certain type of fish twice a week over their lifetime may put them at a 25 percent heightened risk of cancer, for example, is something they can understand and use to make better choices about what to feed their families.”

#### **Seafood scientist**

Polidoro doesn’t just translate what she finds in the field and the lab to health outcomes. She also uses it to help guide conservation and environmental policies. Although she looks at freshwater fisheries in Arizona, sampling fish that people are catching and looking for contaminants, she does most of her work overseas in developing

**“We’ve seen an explosion of research on how much plastic and other pollutants are getting into the environment, where that’s occurring, how they’re moving, how they’re degrading, where they’re ending up.”**

— BETH POLIDORO



Beth Polidoro, leader of the Salt Water Assessment Team lab and associate professor of environmental chemistry and aquatic conservation in the New College School of Mathematical and Natural Sciences. For more, visit [research.asu.edu/fishing](https://research.asu.edu/fishing).

countries — where the need is greatest.

“Here in the U.S. and in Europe, we’re really blessed,” Polidoro says. “We have lots of data, we have lots of scientists, we have lots of equipment and we have lots of capacity for looking at pollution and impacts. We have a lot of good regulations, too, monitoring and mitigating those pollutants from impacting the environment. Step outside those countries and you don’t see the same things at all. There’s very little regulation, practically no monitoring, and very little capacity to do those things.”

So Polidoro brings capacity to these places, not just sampling and analyzing contaminants but also helping them determine what the biggest risks to ecosystems

and human health are, which helps them mitigate those risks or work to reduce impacts.

Last year, while on sabbatical, Polidoro received a Fulbright grant to research microplastics in seafood in the Philippines and took her entire family with her. Her three children — ages 5, 6 and 8 — went to international school. Her husband, a wildlife biologist working as a director of conservation science at the Phoenix Zoo, conducted research of his own while she completed her research and conducted trainings on marine biodiversity risk assessment methodology.

The Philippines is the most biodiverse country in the world in terms of marine species with 4,000. By comparison, the Eastern



Beth Polidoro's Salt Water Assessment Team works the waters of the Caribbean Sea off Cuba, top; seafood specimens saved from the Gulf of Oman in the Middle East, left.



come to their houses with food to take home when they leave, so Styrofoam is part of the culture."

### Passing it on to students

Polidoro's work doesn't just benefit the communities with which she works. She also brings student researchers along, allowing them the opportunity to study the impact of plastic pollution on marine species and on human health in remote locations.

"She has an incredible track record with getting funding for her research, which she has translated into just amazing, unbelievable opportunities for the students who work with her," says Lara Ferry, associate dean of research and strategic initiatives for the New College of Interdisciplinary Arts and Sciences. "She's always thinking about how to leverage that success to pass it on to students and make sure students are getting new experiences. They're going to be the next generation of scientists and ... all of that makes them really

Tropical Pacific from California to Chile has about 1,000 species of fish. There are 60 species of corals, whereas the Philippines has 700. But the Philippines is also one of the world's top producers of plastic pollution as well as other contaminants.

"You walk down the street in the Philippines, and you see garbage everywhere. There are health impacts. People are concerned," Polidoro says. "They want to know what fish are more contaminated than others, and if I am eating fish that's high in contaminants, what is the dose I should be eating. They're also worried about environmental health, and the impacts to marine species and ecosystems."

Polidoro analyzed and

prioritized the impact of contaminants on marine species and habitats, developed assessment methodology for the Philippines' equivalent of the U.S. Endangered Species Act, and conducted trainings and workshops to jumpstart and help maintain the initiative.

She also worked with the American Samoa Environmental Protection Agency, the territory's equivalent of the U.S. EPA, on legislation to ban Styrofoam products and to develop economical and environment-friendly alternatives.

"That's huge because in American Samoa, Styrofoam is king," Polidoro says. "Everyone has stacks of takeout containers in their homes to send guests who



The Philippines is a top producer of plastic pollution, threatening 4,000 marine species in some of world's most biodiverse waters, including Dauin National Marine Sanctuary.

well-rounded and well-equipped scientists.”

Erin Murphy, '23 PhD in biology and society, spent two weeks in the Philippines with Polidoro and collected sediment and shellfish at Tanay (a town east of Manila) and seafood from the local market alongside local students for later analysis at Polidoro's West campus lab.

“All of Beth's work is really collaborative with professors who are already in the area,” she says. “She's very good at working in different communities and listening to the voice of locals and understanding what they want and what they need in their communities.” And, Murphy says, local residents appreciate the value of learning about the health risks of microplastics.

While Polidoro's work is transforming customs in the Philippines, American Samoa and elsewhere, she has changed some

**“She's always thinking about how to leverage that success to pass it on to students and make sure students are getting new experiences.”**

— LARA FERRY, ASSOCIATE DEAN OF RESEARCH AND STRATEGIC INITIATIVES FOR THE NEW COLLEGE OF INTERDISCIPLINARY ARTS AND SCIENCES

of her own habits. She doesn't drink from plastic bottles or heat plastic in the microwave, doesn't wear makeup and is careful about what's in the sunscreen she uses. Still, she remains hopeful.

“I truly believe that the amount of awareness and research and collaboration that has happened over the past five years in terms of trying to better understand and better mitigate pollution is

enormous,” she says. “We've seen an explosion of research on how much plastic and other pollutants are getting into the environment, where that's occurring, how they're moving, how they're degrading, where they're ending up. And all sorts of groups are getting involved, not just research organizations, but governments, nonprofits, citizen groups.”

And she's noticed people are more likely to bring their own bags to the grocery stores or use metal water bottles instead of plastic.

“I think people say, ‘Oh, pollution, I don't care about that. Oh, the environment, I don't care about that.’ You don't want clean air to breathe? You don't want clean water to drink?” Polidoro says. “Because if you don't, 30 years down the road, you might not feel so good. There's a connection between conservation and the environment and your own health and your ultimate happiness.” ■

EXPLORING THE WORLD

## Summer as an intern in L.A.

Alisa Murphy savored her taste of working in the entertainment industry during an internship with Terence Patrick, photographer for James Corden's "The Late Late Show" in Los Angeles. Murphy, a graduate student in ASU's Walter Cronkite School of Journalism and Mass Communication, earned the internship after reaching out to Patrick on Instagram. She experienced her biggest "a-ha" moment while visiting Patrick's workspace at CBS: "I watch the 'Late Late Show' almost every night, so being there backstage and seeing where Terence works and where the 'Late Late Show' is filmed was really incredible! That will definitely be a day I won't forget!" — Ellen Chang

See more  
summer intern  
stories at  
[asunow.asu.edu/thrive-magazine](https://asunow.asu.edu/thrive-magazine).

EXPLORE

# Survival,

Naruro Hassan, left, with her sister, Nafiso, right, and their friend, Hafsa Omar, middle, at Papago Park in Tempe.

# redisc



# resilience,

Naruro Hassan's extraordinary journey led her from war-torn Somalia to ASU

Story by FERNANDA SANTOS  
Photos by HOUSEBLEND

# overy

Naruro Hassan took a seat among 10 other undergraduate research fellows in John Carlson's "Inquiry into Religion and Conflict" course one sweltering morning in August 2017, a student like all others who qualified for the program, but also a student unlike any other in class. Carlson, interim director of Arizona State University's Center for the Study of Religion and Conflict, recalls Hassan's colorful hijab, bright red lipstick and Converse sneakers peeking out from the rim of her floor-length skirt. Maria Dooling, one of the fellows, remembers her booming voice, commanding attention.

"When she speaks, everyone really listens," says Dooling, who is graduating in December with degrees in biochemistry and political science. "It's like she was born to lead."

Hassan is a refugee with an extraordinary story of survival,

resilience and rediscovery that began in war-torn Somalia and, after long, trying chapters in a remote refugee camp in Kenya, is unfolding at ASU, where her academic pursuits are as ambitious as the goal she has set for herself. She is majoring in history, minoring in philosophy and African studies, and has pursued certificates in Religion and Conflict and Political Thought and Leadership, with eyes on becoming a human rights lawyer. As a student researcher, she assisted Carlson with his justice book project and is working with ASU Professor Keon McGuire on his research project, "The Lived Experiences of Black Muslim Students Attending Predominantly White Institutions."

Drawing from her refugee experiences, Hassan also works with the Humanitarian African Relief

Organization, one of the largest groups aiding refugees and displaced people in Africa.

"You dream about who you want to be, what you want to do, but you don't know if any of it is possible," she says about life at the refugee camp in Kenya. "You wonder, 'Is this opportunity ever going to be available to me? Am I ever going to leave this place?'"

"There were a lot of other kids at camp who were smarter than me, who wanted to change the world for the better, but who didn't have this opportunity. I have this opportunity. Now I have to honor my blessings. I want to be the voice for people who are marginalized, for the people who are left behind."

Hassan was 16 when she

arrived in Phoenix on June 11, 2014, 11 years after she was separated from her parents and older sister and brother during their desperate escape from the Somali capital of Mogadishu. She had no idea where they were or even if they were alive. "I just kept hoping that I would see them someday," she says.

The Somali Civil War erupted when Mohammed Siad Barre, a dictator who had ruled the Somali Democratic Republic for 22 years, was forced to flee in 1991, after rival militia groups took control of Mogadishu and unleashed a deadly and destructive struggle for power. A 2017 report by the United Nations High Commission for Refugees indicates that more

than 2 million people have been displaced by the bloody conflict, including about 800,000 living as refugees in Kenya, Yemen and Ethiopia. According to the Centers for Disease Control and Prevention, some 47,000 Somalis came to the U.S. as refugees between 2010 and 2016. Hassan, now 21, is one of them. Her family witnessed the horrors befalling their neighbors

and sensed the violence creeping closer to them. That, Hassan says, is why they escaped. In the chaos, she became disconnected from her family. She was 5 and ended up accompanying friends on the arduous journey to the Kakuma Refugee Camp in the impoverished northwest corner of Kenya, near the country's borders with Uganda, South Sudan and Ethiopia. She spent the next 10 years there.

Naruro Hassan spent 11 years separated from family.

**"I have this opportunity. Now I have to honor my blessings. I want to be the voice for people who are marginalized, for the people who are left behind."**

— NARURO HASSAN





Naruro Hassan, right, and Maria Dooling take notes during their Religion and Conflict class. "When she speaks, everyone really listens," Dooling says of Hassan. "It's like she was born to lead."



Kakuma was established in 1992 to house the young refugees known as the “Lost Boys of Sudan.” By the time Hassan arrived, it was home to more than 100,000 refugees and asylum seekers from Sudan, Ethiopia and Somalia. She says the camp represented “immense human suffering ... always dusty, always hot.” There were no paved roads, no hospitals and no buildings other than houses made of mud, and hours-long wait for food that often wasn’t enough for everyone.

What Hassan had was a sense of gratitude for being alive. She cobbled together a family of sorts from the friends she had accompanied to Kakuma and the children she met there, savoring little things like playing soccer with friends and eating together.

At school, she learned English and Swahili, Kenya’s lingua franca, and also math and science, even though there were no books. She discovered her passion and skill for debate at Kakuma, while discussing with other young refugees the messy politics of their home countries.

She longed for a bigger platform to learn and share her experiences as a refugee, even though she knew that the odds of leaving the camp were stacked against her. But the experience galvanized her.



**“Because we’re all interconnected. Our freedom, our justice, it’s all interconnected. I can’t be selfish. We have to look out for each other.”**

— NARURO HASSAN

“I was somebody who didn’t have a country,” Hassan says, “and I thought, ‘I’m not going to be dehumanized again. I have to fight back.’”

Then she caught the luckiest of breaks.

Her mother, Zahara Omar, who had by then been resettled in Phoenix and become a U.S. citizen, never stopped searching for Naruro. She finally found her youngest child after traveling to Kenya and sponsored her to come to Arizona. Naruro joined her sister, Nafiso, a nurse, and

her brother, Mohamed, who is studying computer engineering at ASU, in the apartment the family shares in northeast Phoenix.

Hassan enrolled at Camelback High School as a junior and found herself educating classmates who seemed to know little about where she had come from — “Is Africa a country?” one of them asked — while learning new things from new people she met, including one of her best friends, who was born in Mexico. She also became aware that her skin color and religion not only set her apart, but also made her a target.

“In the U.S., I have so many identities in me that are marginalized,” Hassan says. “Being black is marginalized here.



Naruro Hassan, right, greets her mother, Zahara Omar. They were reunited in 2014.

EDUCATION  
FOR HUMANITY

## ASU takes lead in refugee education

Only 1% of the world's refugee population of more than 68 million has access to higher education. Education for Humanity, an ASU-wide initiative, is helping to change that by offering rapidly deployable online courses to displaced people. It addresses the critical barriers they face in pursuing a degree: access, cost and credentials.

For example, says Nicholas Sabato, director of country programs for Education for Humanity, a South Sudanese refugee can take college algebra in Adjumani, Uganda, to gain credits that transfer into a Ugandan institution.

Starting in January 2020, Education for Humanity will take a lead role with the Connected Learning in Crisis Consortium, the primary convening body for organizations promoting higher education in emergency situations.

"This work is not only important for refugees themselves, but is a critical endeavor in the best interest of the global community at large," Sabato says. "And we are proud to be a part of it."

Learn more at [edplus.asu.edu/what-we-do/education-humanity](https://edplus.asu.edu/what-we-do/education-humanity).

Being Muslim is marginalized. Being a woman, a refugee. I'm someone that shouldn't be here, who doesn't belong."

Hassan credits her opportunities at ASU with broadening her perspectives and shaping her activism.

"She's someone who has lived a very unique set of experiences and can articulate in very concrete terms that these are not an abstraction, that this is what it means to live in a war-ravaged country, this is what it means to be separated from your family because whole populations have been forced out of your country and into refugee camps," Carlson says.

Hassan is a co-founder and vice president of the Somali Student

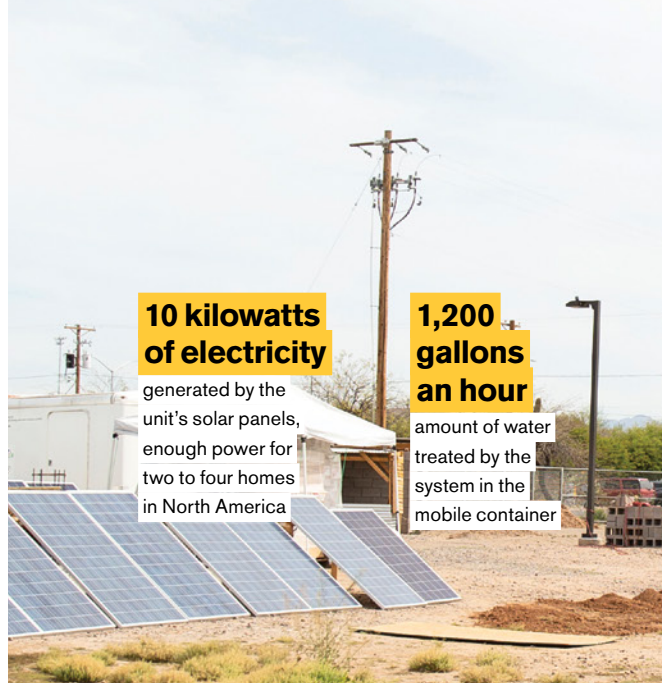
Association and the outreach director for Voices of Empathy, a student-led group that she helped start to advocate for the rights of immigrants, women and workers. Through a series of speaking engagements and internships — she has taught English and computer classes to refugees, organized voter registration drives and spoken at Ignite, a TED-style event on campus — Hassan has crystalized her role as an agent of change.

"I'm going to fight for refugees and I'm also going to fight for black people, for Native Americans, for Mexicans, Latinos," she says. "Because we're all interconnected. Our freedom, our justice, it's all interconnected. I can't be selfish. We have to look out for each other." ■

# Medical clinic in a container

“The real game changer is that it comes with its own water purification system and solar power. Water and power are practically nonexistent right now.”

— JOE DICARLO, GLOBAL AMBASSADOR FOR MEDICAL TEAMS INTERNATIONAL



**10 kilowatts of electricity**

generated by the unit's solar panels, enough power for two to four homes in North America

**1,200 gallons an hour**

amount of water treated by the system in the mobile container



The container is designed to be mobile and self-sufficient, such that it can be located based on need, not on existing infrastructure.



## ASU engineers develop deployable, self-powered health care for refugees in Uganda camp

Health care will no longer be a remote possibility for thousands of refugees in Uganda, thanks to ASU researchers led by Nathan Johnson, an assistant professor in the Polytechnic School engineering program, and Cody Van Cleve, a graduate student in the Ira A. Fulton Schools of Engineering.

Their team converted a 40-foot shipping container into a self-sustaining medical clinic with solar power and water treatment for the Ayilo II refugee settlement in the African nation.

“This project will save lives in Uganda,” says Joe DiCarlo, global ambassador for Medical Teams International, which was working with the United Nations High Commission for Refugees as the primary care provider at the Ayilo II camp. “The real game changer is that it comes with its own water purification system and solar power. Water and power are practically nonexistent right now.”

Ayilo II’s existing health care center serves more than 12,000 South Sudanese refugees out of a cement block building and a few tented structures with no direct water supply. Unreliable electricity limits the ability to provide consistent care.

But container clinics such as the ASU prototype will ultimately equip medical service providers with self-sufficient facilities in areas that can be reached by truck, rail or ship.

“I’m honored to work on projects that will make a difference in people’s lives,” Van Cleve says. — Terry Grant

In the construction area at ASU’s Polytechnic campus, Cody Van Cleve (left) gives visitors a tour of the shipping container converted to a rapidly deployable, solar-powered medical clinic — part of a \$2 million project funded by the U.S. Office of Naval Research.

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# Play like a Sun Devil

## REPEAT TITLE FEAT

Samantha Noennig completed the second season sweep of NCAA shot put titles by Sun Devil Athletics in the past two years. Noennig, '20 BS in health sciences, won June's outdoor competition in dramatic fashion, rocketing from seventh to first with a throw of 59 feet, 6.25 inches. She also won the NCAA indoor championship. Her title sweep matched Maggie Ewen's feat for ASU in 2018.

**Samantha Noennig gave Sun Devil Athletics its second consecutive indoor-outdoor sweep of NCAA shot put titles. "I wasn't about to go down easy," she says, "so I just let it happen."**

## Record run

Eno Benjamin returns after a record-setting season for Sun Devil Football.

**54**

## Hockey history

Sun Devil Hockey scores an NCAA first with trip to China.

**55**

# RUN

## Eno Benjamin's record

Eno Benjamin, a sports business major, returns to Tempe for his junior year after one of the greatest seasons by a running back in Sun Devil Football history.

**“Likely the best back out West, he is a very strong NFL candidate.”**

— PAUL MYERBERG,  
USA TODAY

### His favorite class

Accounting (not surprising, since he's become an expert at piling up big numbers).

### First in the Pac-12 and ninth nationally

for rushing touchdowns, with 16 in 2018.

## #5 in the U.S.

Eno's national ranking in rushing yards, becoming the first Sun Devil running back to finish in the top 10.

### Breaking the single-season record for rushing yards

with 1,642 in 2018, surpassing the previous school mark of 1,565 yards by Woody Green in 1972.

### Breaking the single-game record

with 312 rushing yards vs. Oregon State on Sept. 29, 2018, surpassing the previous school mark of 250 yards by Ben Malone in 1973, also against Oregon State.





## Hockey

## ASU makes history with China trip

Sun Devil Hockey made history in August as the first NCAA hockey team to visit Beijing. Their 12-day trip included an exhibition tournament, exploring the Great Wall of China, Tiananmen Square and the Forbidden City.

They also won the Fu Xing Cup, their first international tournament championship, finishing 4-0-1 and outscoring opponents — which included four professional teams from Russia and China — 21-12.

It marked a special homecoming for ASU redshirt freshman forward Peter Zhong, a Beijing native and the first of three Division I Chinese native hockey players to play in a collegiate game.

Sun Devil Men's Basketball follows up on Nov. 9 in Shanghai with a regular-season matchup against Colorado in the fifth Pac-12 China Game.



Sun Devil Hockey jerseys for the Renaissance Cup in Beijing featured the team and players' name in Chinese on the front and back.

## Sports

## Sun Devil Hall of Fame welcomes 6 athletes and a golf team

Sun Devil Athletics will welcome seven new inductees to the Sun Devil Athletics Hall of Fame during ASU's football game on Oct. 12 against Washington State.

Six former student-athletes from five different sports and an undefeated National Championship team will make up the 2019 class. Kaitlin Cochran (softball), Pam Godward (gymnastics), Mike Leake (baseball), Joe Spagnola (football), Sarah Stevens (track and field), Brett Wallerstedt (football), as well as the 1995 women's golf team will all be honored at halftime of the Sun Devils-Cougars game at Sun Devil Stadium.



Courtney Ekmark scored 20 points in the women's basketball 60-47 victory against Arizona on Feb. 1.

## Series Trophy

## Sun Devils reclaim Territorial Cup

The Territorial Cup Series Trophy returned to Tempe after Sun Devil Athletics won the 2018-19 regular season tiebreaker with a higher finish over Arizona in the Learfield IMG Directors' Cup standings. The Sun Devils registered their best Directors' Cup finish since 2012-13 — 19th with 821 points — as ASU jumped from No. 31 last year.

Led by Zahid Valencia's second consecutive national championship, coach Zeke Jones' wrestling team posted 64.5 points with a 12th-place finish in the NCAA Championships, followed by 64 points from the women's basketball team, 60 from the women's golf team and 58.5 by the men.

**Sun Devil Women's Basketball reached the NCAA Tournament's Sweet 16 under Coach Charli Turner Thorne.**



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s/Jill Andrews, Publisher, 9/01/2019



# Connect with alumni

## ONE MORE REP

Jonathan Barlow, '14 BS in exercise and wellness, always loved sports as well as coaching and teaching, but not the idea of becoming a gym teacher. Then he found his dream job — “almost like a schoolteacher, but for athletes.” Now 29, Barlow has trained more than 2,000 athletes, including 300 from the National Football League. As a strength and conditioning coach at Phoenix-based Exos, he helps discarded players work their way back into the NFL. “The key is finding a way to keep them challenged mentally, like they would during football season, and positive,” he says.

**Jonathan Barlow encourages athletes while finishing conditioning at the Exos facility in Phoenix. In the background, Keionta Davis — a defensive end with defending Super Bowl Champion New England Patriots — rests during a break in his workout.**

## Linking together

How to stay connected with ASU on LinkedIn.

58

## Then and now

See two perspectives of the ASU campus.

60

## Alumni Networking

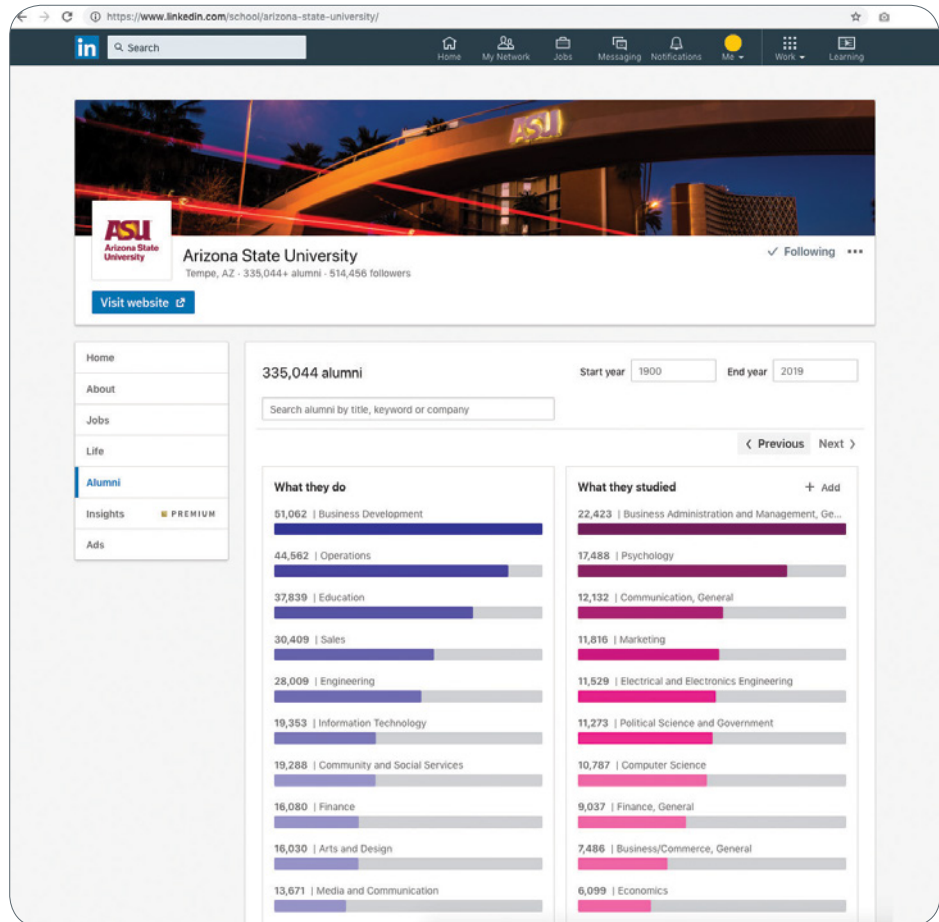
# Linking together

When Sun Devils connect and help one another, great things happen. It's easy to sustain and grow your personal network within the ASU alumni web of connections through LinkedIn.

## What can you find on ASU's LinkedIn page?

From the latest research news to alumni news, ASU's LinkedIn page can help you grow as a professional and keep you connected to the ASU community.

- **Find the latest employment opportunities** within ASU.
- **Connect with other Sun Devils.**
- **Get the latest news** on faculty accomplishments and alumni achievements.



## What are other ASU alumni doing now?

You can search the ASU alumni network for local connections in your area or for Sun Devils with specialized skills. On the homepage, click on Alumni to see different ways of searching the network.

## Build your ASU networks

It's not only about who you know, but about who your connections know. That's the power of ASU's alumni network. Join the official ASU Alumni group to connect with other members.

[alumni.asu.edu/linkedin](http://alumni.asu.edu/linkedin)

## Share your promotions and other updates

Update your LinkedIn page with key updates including a new career path, a change in responsibilities, a promotion.

[linkedin.com/school/arizona-state-university/alumni](https://linkedin.com/school/arizona-state-university/alumni)



## Get involved with chapters in the US and worldwide

Join a local chapter in your area or one based on your special interest or college. Attend events and meetups to catch up with friends or make new connections. Visit [alumni.asu.edu/chapters](http://alumni.asu.edu/chapters).

### Don't see a chapter you're looking for?

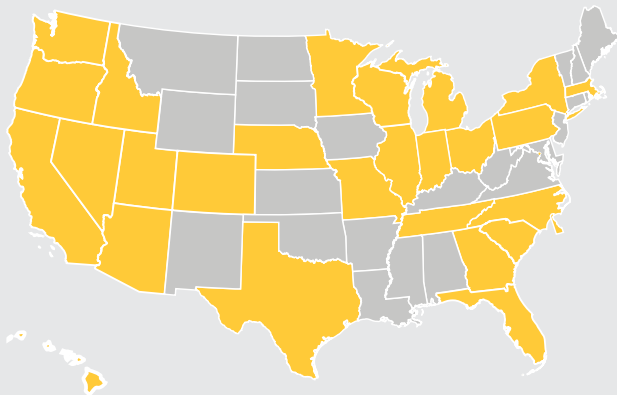
Send an email to Trish Thiele-Keating, director of chapter relations, at [trish.thiele-keating@asu.edu](mailto:trish.thiele-keating@asu.edu).

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### Special-interest chapters

- Aguila [f](#) [t](#) [in](#) [✉](#)
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- ASU Black Alumni [f](#) [in](#) [✉](#)
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- Catholic Newman Center [✉](#)
- Devils' Advocates [f](#) [in](#) [t](#) [✉](#)
- Devil's Horns [f](#) [t](#) [✉](#)
- Doran Community Scholars Alumni [✉](#)
- Hispanic Business Alumni [f](#) [in](#) [✉](#)
- Iranian American Club [f](#) [t](#) [✉](#)
- LDS ASU Alumni Chapter [f](#) [✉](#)
- Leadership Scholarship Program [f](#) [in](#) [✉](#)
- LGBT Devils' Pride [f](#) [@](#) [t](#) [✉](#)
- Los Diablos [f](#) [t](#) [✉](#)
- Medallion Scholars Alumni Club [✉](#)
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- Starbucks College Achievement Plan [f](#) [✉](#)
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See [alumni.asu.edu/chapters](http://alumni.asu.edu/chapters) for links to the chapters.



### Local chapters

- Austin, Texas [f](#) [in](#) [t](#) [✉](#)
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- New England (Boston, Massachusetts) [f](#) [✉](#)
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### Sun Devil Pride

## Tag your ride

Let the world know you are a proud Sun Devil with the ASU license plate — one of ADOT's top seven selling specialty plates. Proceeds from each plate support today's students and tomorrow's leaders through the ASU Alumni Association's Medallion Scholarship program, which incorporates components of leadership, scholarship and service. Scholars are selected from Arizona high school students who have been awarded the Dean's Scholarship.

[alumni.asu.edu/services/asu-license-plates](http://alumni.asu.edu/services/asu-license-plates)



### For the Kids

## Connect for life, young Devils!

Sun Devil Generations is an innovative, exciting and entertaining program designed for young Devils — those from birth to eighth grade. Join other Sun Devil families for fun challenges, learning games, downloadable kits, contests and prizes. Visit [alumni.asu.edu/services](http://alumni.asu.edu/services).

Connect with all of the chapters at [alumni.asu.edu/chapters](http://alumni.asu.edu/chapters)

**Originally used as a parking area**, in 2005 was developed into the Fulton Center. The building becomes the home of the ASU Foundation, university administration, university initiatives, and The College of Liberal Arts and Sciences administration.

**Palo Verde West**, today home to The College of Liberal Arts and Sciences residential community.

Old Main

President's house, now the Virginia G. Piper Center

**Science Hall**, built in 1908 and one of ASU's original buildings, today houses the University Club. It also served as the Fine Arts Annex before becoming the University Club. The building is listed on National Register of Historic Places.

**Physical Science Center**, now the George M. Bateman Physical Sciences Center, wings A-H.

Palm Walk

**Engineering Center**, built between 1957 and 1964, is home to research and instructional labs for the Ira A. Fulton Schools of Engineering and the Harrington Bioengineering Program.

Orange Street

Van Ness Ave now walkways within campus, no longer a road

# Then

## 1960s Aerial view of east side of Tempe campus

Before the Biodesign Institute, Wells Fargo Arena and other transformational changes, this comprised the east side of ASU's campus, looking back from The Church of Jesus Christ of Latter-day Saints and what is now University Drive.

**Palo Verde Hall** was later redeveloped into Tooker House, a new home to the Fulton Schools coed residential community.

**Palo Verde East**, today a coed freshmen hall home to the Ira A. Fulton Schools of Engineering residential community.

**Sun Devil Stadium**, which opened in 1958, now has a seating capacity of 53,599 — almost double its original capacity of 30,000.

**Forest Hydrology Lab**, which opened in 1964, is now ISTB5, renovated in 2007. The area is also home to the Barry M. Goldwater Center for Science and Engineering.

**8th Street** now **University Drive**

**Tyler Street**

**Van Ness Avenue to McAllister Avenue** (far right, not pictured) is now home to Tyler and McAllister malls and structures, including Noble Science Library and parking.

**LDS Church** was built in 1964, just behind what is now McAllister Mall. It was rebuilt in 2007 on the same footprint and includes the Tempe Institute of Religion.

# Now

## 2019 East side of campus growing and thriving

Anchored by Biodesign buildings A, B and C, and James Turrell's Skyspace sculpture, today's panoramic view includes light rail, the Novus Innovation Corridor, a reinvented Sun Devil Stadium and more.

**Mirabella**, a senior living community under construction in downtown Tempe, will provide access to campus activities for teaching and learning for its residents.

**Noble Science Library**, which became ASU's second major library facility in 1983, is home to the Map and Geospatial Hub and a growing open stack print collection.

**The Goldwater Center**, built in 1992, contains research and instructional labs for bioengineering, chemical and materials engineering, chemistry, electrical engineering, industrial engineering, mechanical engineering, aerospace engineering and physics.

**Tooker House**, which opened in 2017, replaced the old Palo Verde Hall. The state-of-the-art residence hall is a seven-story, 1,600-person, coed living and learning community for engineering students.

**The Biodesign Institute** is master-planned as four interconnected buildings that will comprise 800,000 sq. ft. Currently, three buildings are complete and house more than 1,300 faculty, staff and students. Biodesign was the first facility in Arizona to earn platinum-level LEED certification from the U.S. Green Building Council for environmentally friendly design.

**Biodesign A and B**, below left, honored for innovative construction, include 1,000 tons of structural steel — the weight of 153 elephants — and 24,000 square feet of glass curtain wall, which would cover half a football field.

Orange Street

Fulton Center

Palo Verde West

Palo Verde East



**'A' Mountain** earned its first letter — N — in 1918, when ASU was Tempe Normal School. The present "A" stands 60 feet tall and was built of reinforced steel and concrete in 1955.

**Sun Devil Stadium** also will be home to 365 ASU Community Union, your place for cardio and concerts, festivals, farmer's markets and more. Visit [asu365communityunion.com](http://asu365communityunion.com)

**Novus Innovation Corridor**, adjacent to the Tempe campus, is a 350-acre development that will offer more than 10 million square feet of urban office, retail and residential development with collegiate athletic venues. Learn more at [novus.asu.edu](http://novus.asu.edu)

**PowerParasol**, a 24-foot high solar-panel structure, covers a vast 5.25 acres — 800 parking spaces. The sustainable solar energy from the panels generates 2.1 megawatts of electricity — enough to power about 500 homes.

**Valley Metro Lightrail** runs from Mesa to Phoenix, connecting ASU's Tempe and Downtown Phoenix campuses.

**ISTB7**, a new high-performance research facility under construction, will include innovative endeavors focusing on the sustainability of food, water and energy.

Manzanita

Wells Fargo Arena

**Biodesign Institute cancer cactus garden** features an array of crested cacti. The Arizona Cancer Evolution Center is now a hub for international explorers who are innovating cancer research.

**Biodesign C**, below, the third building in the Institute's compound, opened in September 2018 and houses the Compact X-ray Free Electron Laser (CXFEL) — believed to be the first of its kind in the world.

University Drive

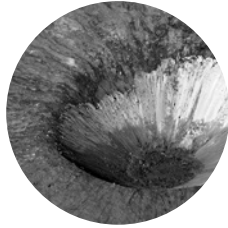
Rural Road

**A desert garden**, one of the largest areas of green space on the Tempe campus, includes James Turrell's "Skyspace: Air Apparent" public art installation.

# How does your ASU IQ rank?

**1. ASU moved up from No. 17 to what place in the global patent rankings?**

- a.) 12
- b.) 16
- c.) 10
- d.) 14



**2. ASU's Lunar Orbiter Reconnaissance Camera is marking how many years of discovery?**

- a.) 7
- b.) 15
- c.) 1
- d.) 10

**3. Loren Aragon's Native American couture design appeared on the red carpet of what awards ceremony?**

- a.) Emmys
- b.) Oscars
- c.) Grammys
- d.) Tonys



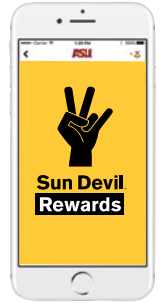
**4. Which ASU professor is a Nobel laureate?**

- a.) Leland Hartwell
- b.) Edward Prescott
- c.) Sidney Altman
- d.) All of the above

**5. Where does ASU rank in the nation for sustainability?**

- a.) No. 10
- b.) No. 15
- c.) No. 5
- d.) No. 25

Answers: 1. c, 2. d, 3. d, 4. d, 5. c



Play ASU trivia and other activities on Sun Devil Rewards. Test your skills, earn rewards!

Download the Sun Devil Rewards app today for ASU games, news, event listings and more. [sundevilrewards.asu.edu](http://sundevilrewards.asu.edu)



## Family

### Made possible by you

In 1952, Phyllis and Frank Saylor fell in love while carpooling to their ASU student-teaching jobs. "ASU is a part of us and our family," Phyllis says.

When they took care of their estate planning, they created a gift that will provide scholarships for ASU education students.

For Phyllis and Frank, giving to ASU is giving to family.

**When you plan for your family, please remember the ASU family.**



Together, our potential is limitless  
[GiveTo.ASU.edu](http://GiveTo.ASU.edu)

Shop in stores or online: [SunDevilCampusStores.com](http://SunDevilCampusStores.com)



## Exclusive Apple® Offer for ASU Alumni\*

- Exclusively through the Sun Devil Campus Store
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[bit.ly/ASUApple](http://bit.ly/ASUApple)

### Visit the stores on the Tempe Campus

Sun Devil Marketplace | 660 S College Ave, Tempe, AZ | 480-965-4488  
Sun Devil Campus Store | 525 E Orange St., Tempe, AZ | 480-965-3191



 Authorized Campus Store  
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Trade in older hardware for  
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Microsoft

 **SUN DEVIL**  
CAMPUS STORES

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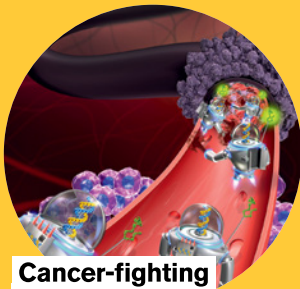


\*ASU Alumni or student verification required to purchase. See store for details. Online prices reflect the education discount. With online purchase include your month/year of graduation in the comments section. Sun Devil Marketplace is the Apple Authorized Service Provider location. TM and © 2019 Apple Inc. All rights reserved.

# Top 10 in the world for patents

among universities granted U.S. patents

U.S. National Academy of Inventors and the Intellectual Property Owners Association

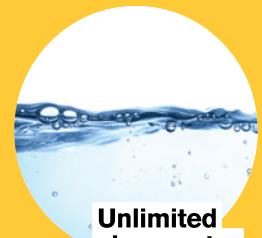


**Cancer-fighting nanobots**

ASU Biodesign Institute  
Center for Molecular Design  
and Biomimetics

ASU faculty, students and alumni are leading discoveries that move our world forward.

From patents and startups to new technologies and bioscience breakthroughs, our innovation mindset fuels extraordinary outcomes with real-world impact.



**Unlimited clean water**

ASU startup  
Zero Mass Water