

# ASU

ARIZONA STATE UNIVERSITY  
VOLUME 23 NUMBER 2

**Thrive**<sup>®</sup>

# Building resilience in the silicon desert

**ASU and industry  
partners are helping  
create and power a  
new Arizona economy**

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Arizona State  
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**THE FUTURE OF  
HEALTH CARE IS  
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Alumni, students  
and researchers are  
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the medical field

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WATER CRISIS  
DROP BY DROP**

Startup's award-  
winning technology  
creates sustainable  
drinking water

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ASU® graduates have invested in themselves, and MidFirst Bank continues to find new ways to invest in ASU®. This year, we are providing a new opportunity for the December 2019 and May 2020 graduating classes.

**One graduating senior will be awarded \$20,000 to help launch the next phase of their life. One swipe of an ASU® Debit Card is all it takes to win, and every swipe is another entry.\***

For more details, visit [midfirst.com/asu20k](http://midfirst.com/asu20k).



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WELCOME

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## Designed to launch

A team of engineering students and a professor, working in the laboratory, conducts experiments that result in a discovery that prompts a new idea. The concept advances, is tested, retested and results in a product. Then, the product moves to the marketplace and generates demand.

Demand leads to the start of a company, either on a shoestring budget or fueled by a group of angel investors. The startup refines the product and hires employees — not just engineers, but salespeople, marketers, finance professionals, administrative staff. Its need for services, vendors and infrastructure creates a supply chain. Those businesses flourish and hire more people. Momentum builds.

At ASU's Ira A. Fulton Schools of Engineering, this scenario happens again and again — by design. Solution-based research and support of entrepreneurial skill building fuels economic growth and spawns high-value, high-wage jobs.

In this issue, we highlight multiple success stories that resulted from research at ASU, including Zero Mass Water's Hydropanels that produce drinkable water using sunlight and air (p.36), NeoLight's LED medical device that helps save babies with jaundice (p.42) and many new wearable health technologies by ASU alumni and faculty (p.44).

Nearly every occupation will soon be impacted by technology and will require reskilling or upskilling. To close the gap, ASU is committed to workforce development and preparation. We are moving toward a lifelong learning approach that ensures all individuals, regardless of age or socioeconomic background, have the knowledge and skills necessary to compete successfully in the 21st century.

We are confident, with the help of a public investment for the next fiscal year proposed to the legislature by the Arizona Board of Regents, ASU can help transform the entire state economy.

**Michael M. Crow**  
President, Arizona State University  
[asuthrive@asu.edu](mailto:asuthrive@asu.edu)

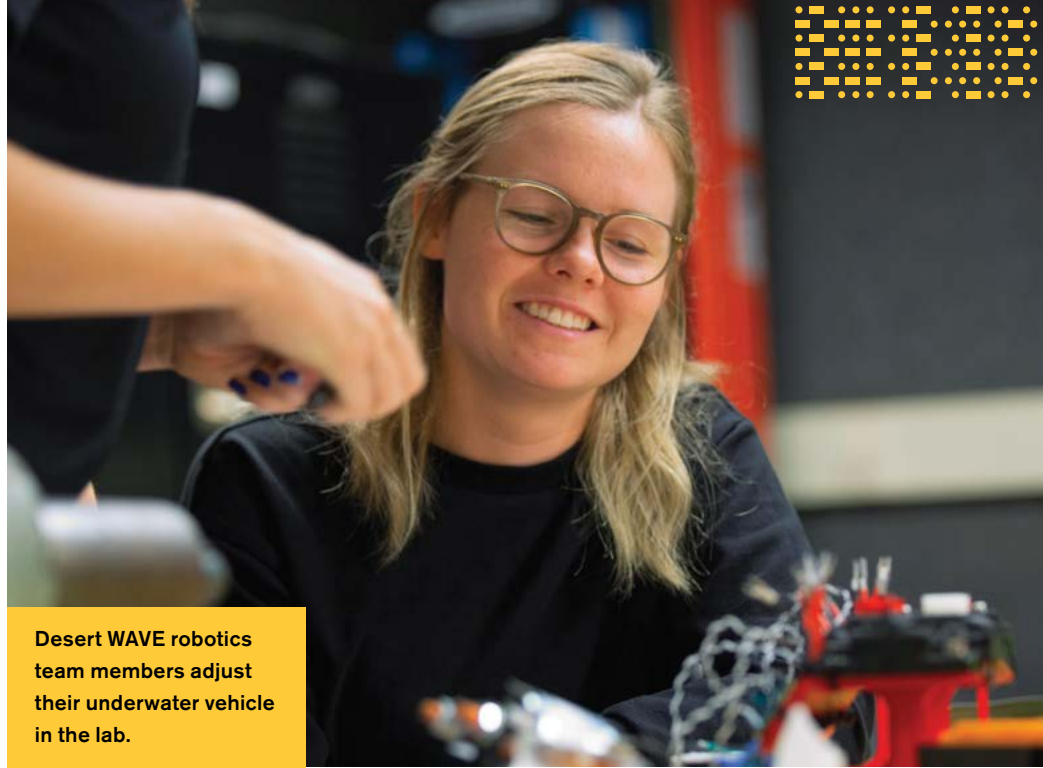
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Travis Witzke carries his HemaPorter, a medical storage container for challenging environments.

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ERIKA GRONEK; JEFF NEWTON

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Hayden Library, which hosts 2 million visitors annually, is reopened after a \$90 million renovation.



JAROD OPPERMAN

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NCAA National Champion and Founders' Day honoree Anthony Robles, whose story will be captured in a new movie.

[youtube.com/ASU](https://youtube.com/ASU)  
[youtube.com/ASUathletics](https://youtube.com/ASUathletics)

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**Check for updates:** information about event dates and times may have changed since the press date. Please check the provided websites for more information.

# Apr.

## 'The Crucible': an allegory for the ages

It is 1692, and the Salem witch trials create a fear that spreads from the courtroom to the town when a group of young girls is accused of witchcraft. Those charged with witchcraft point fingers at others to save themselves and gain power. When "The Crucible" landed in theaters in the 1950s, it was an allegory for the persecution of communists in the McCarthy era, which had gripped America with paranoia and fear. **April 2–5, Paul V. Galvin Playhouse, 51 E. 10th Street, Tempe** [herbergerinstitute.asu.edu/box-office](http://herbergerinstitute.asu.edu/box-office) **Ticketed Under \$25**

## 'America's Storyteller' Colson Whitehead

Pulitzer Prize- and National Book Award-winning author Colson Whitehead will give this year's Jonathan and Maxine Marshall Distinguished Lecture. Author of "The Underground Railroad" and many other successful novels, Whitehead illuminates a dark time in American history. Dubbed "America's Storyteller" by Time magazine, the eminent writer has garnered numerous awards including a MacArthur Fellowship, a Guggenheim Fellowship, a Whiting Award and the Dos Passos Prize.

**Thursday, April 9, 6 p.m., Old Main, Carson Ballroom** [thecollege.asu.edu/marshall-lecture](http://thecollege.asu.edu/marshall-lecture) **Free**



## Sharing heritage and traditions

Native American dancers and singing groups from the U.S. and Canada will share their heritage and traditions with the community at ASU's 34th annual Pow Wow. The social gathering reinforces the common bond and spirituality existing between individuals from many North American nations through singing and dancing. American Indians represent an increasing percentage of the student population at ASU, who, with pride, seek academic and cultural enrichment by maintaining and sharing their culture with the community.

**April 10–12, Sun Devil Stadium** [asu365communityunion.com](http://asu365communityunion.com) **Ticketed Family Under \$25**

## Smart machines

Machine learning, data mining and artificial intelligence power self-driving cars, bring us smart assistants like Siri and Alexa, pinpoint cyberfraud, personalize our shopping experiences and predict traffic on our GPS. Hear from experts about the latest breakthroughs at Machine Learning Day. **Friday, April 10, 8:30 a.m., La Sala Ballroom, West campus** [newcollege.asu.edu/machine-learning-day](http://newcollege.asu.edu/machine-learning-day) **Free**



## Let's talk about the big blue marble

In celebration of the 50th anniversary of Earth Day, the Julie Ann Wrigley Global Institute of Sustainability Lecture Series will present a talk by "Real-Life Lorax," Meg Lowman. Author, scientist and treetop explorer, the sustainability champion will share her passion for trees and forest conservation.

**Thursday, April 30, 5:30–7 p.m., Marston Exploration Theater** [sustainability.asu.edu/events](http://sustainability.asu.edu/events) **Free Family**

## Yoga at the Museum



Do you need a break from your busy schedule? Yoga at the ASU Art Museum is a dynamic class that brings attention to core strengthening, balancing poses, inversions, breath and meditation. Props and mats are included. All levels welcome! **Wednesdays, 1–2 p.m. through May 6, ASU Art Museum, 51 E. 10th Street** [asuartmuseum.asu.edu/programs-and-events](http://asuartmuseum.asu.edu/programs-and-events) **Free**



## Run to honor Tillman's legacy

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

**Saturday, April 18, 7:05 a.m., ASU Tempe campus** [pattillmanfoundation.org/pats-run](http://pattillmanfoundation.org/pats-run) **Ticketed \$25+ Family**

See page 7 for more Tillman Honor Runs around the U.S.

# May

## What innovation looks like

Learn what ASU engineering students are doing to tackle real-world challenges. Collaborating with industry partners around the globe, students at The Polytechnic School work on creating solutions to tackle societal needs. The Innovation Showcase presents innovations from undergraduate, graduate and faculty projects. **Friday, May 1, 3–5 p.m., Sun Devil Fitness Complex and Cooley Ballroom, The Polytechnic campus** [poly.engineering.asu.edu/innovation-showcase](http://poly.engineering.asu.edu/innovation-showcase) **Free Family**



## Pitch perfect

Watch the Sun Devil Baseball and Softball teams swing for the fences in another great season. Sun Devil Baseball enters the season with five of the top-100 MLB draft prospects in the nation, according to Baseball America, including the top prospect in the country Spencer Torkelson, Alika Williams (#32), Gage Workman (#48), Justin Fall (#67) and R.J. Dabovich (#77). Sun Devil Softball is returning 12 players from last season's roster, including key players Kindra Hackbarth, Maddi Hackbarth, Bella Loomis, Samantha Mejia and Cielo Meza. **Baseball through May 23 at Phoenix Municipal Stadium and Softball through May 9 at Farrington Stadium** [thesundevils.com](http://thesundevils.com) **Ticketed Family**

Visit [ASUevents.asu.edu](http://ASUevents.asu.edu) for events at ASU.

Visit [TheSunDevils.com](http://TheSunDevils.com) for athletics event and ticket information.



## Experience the 'circle of life'

Winner of six Tony Awards, including Best Musical, "The Lion King" brings to life a story of the young lion Simba whose father, King Mufasa, tells him that there is a balance to all life. Simba's evil uncle, Scar, plots to take over the Pride Lands of Africa ruled by Mufasa. When son and father are lured by Scar into a stampede of wildebeests, Mufasa is killed. Fleeing for many years, Simba returns as an adult to reclaim his kingdom and release the savanna from Scar's reign of terror, completing the "circle of life."

**June 17–July 12, ASU Gammage Auditorium, Tempe** [asugammage.com](http://asugammage.com) **Ticketed Family \$25+**



**Check in at events to earn Pitchforks and rewards!** Log in to the Sun Devil Rewards app for ASU event listings, news, games and more. Earn and be rewarded! [sundevilrewards.asu.edu](http://sundevilrewards.asu.edu)

# June

**Check for updates:** information about event dates and times may have changed since the press date. Please check the provided websites for

## Summer camps for makers, builders and coders

S'mores? Been there. Campfire songs? Done that. Building robots and coding games? Now we're talking. This summer, treat your junior Sun Devil to a whole new level of fun and learning at ASU's Fulton Summer Academy. Students in grades 1-12 will have the opportunity to experience life on campus and take part in instructor-led engineering design challenges and activities.

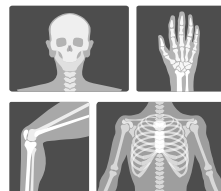
[outreach.engineering.asu.edu/summer-programs](http://outreach.engineering.asu.edu/summer-programs)

**Ticketed Family**



Engineering summer camps run throughout June and July.

# Community



## Ask a Biologist: busy bones

Tour a virtual skeleton and learn how bones heal in an online multimedia module from the Arizona Science Center and ASU's Ask a Biologist.

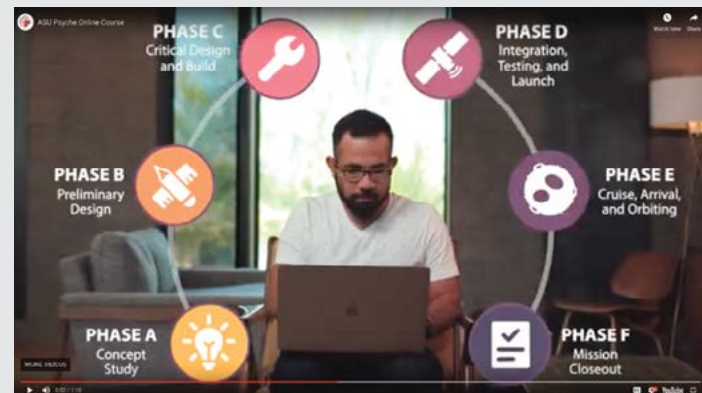
[askbiologist.asu.edu/busy-bones](http://askbiologist.asu.edu/busy-bones)

**Free Family**

## New launch of Crash Course YouTube Learning Playlists

"Study Hall," a series of educational videos focused on critical topics such as algebra, composition and chemistry, is being co-developed by ASU faculty members and the team behind John and Hank Green's prominent educational YouTube channel, Crash Course. The series will begin in the spring.

[youtube.com/asu](http://youtube.com/asu) **Free Family**



## Learn from an ASU-led NASA Mission

While instruments and components of the Psyche spacecraft are being designed and built across the country, the Psyche Mission management team, led by ASU, is launching a series of free online courses called the NASA Psyche Mission Innovation Toolkit. The courses are based on the real-world challenges and skills associated with the Psyche Mission's science, engineering, technology and teamwork. Course 1: the process and lifetime of a space mission. Course 2: inclusive mindset: tools for building positive team culture.

[psyche.asu.edu/get-involved/innovation-toolkit/](http://psyche.asu.edu/get-involved/innovation-toolkit/)

**Free**

## Is your company emergency prepared?

Disasters and emergencies can occur at any time and anywhere, so it is essential to be prepared to minimize the impacts of such events. As part of your continuing and professional education, you can earn a certificate that teaches participants about emergency preparedness and business continuity, from a facility manager's perspective.

**Emergency Preparedness and Business Continuity Certificate. 22 AIA HSW Credits.**

[pdt.engineering.asu.edu/programs](http://pdt.engineering.asu.edu/programs)

**Ticketed**

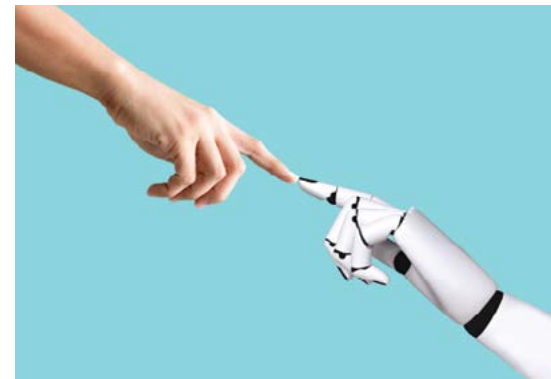
## Mind, body and spirit

ASU has joined forces with Mayo Clinic to offer a Health and Well-Being Certificate for individuals seeking to learn about mindfulness, sleep, nutrition, physical activity and holistic well-being. From managing stress to building resilience, you'll learn how to make healthier choices and boost your quality of life. At the end of the training you'll earn a professional certificate and a badge to place on your LinkedIn account to showcase your advanced abilities in health and wellness practices.

**Courses and certificate online, self-paced.**

[courses.cpe.asu.edu/browse/cmcr/mayo/programs/health-and-well-being-certificate](http://courses.cpe.asu.edu/browse/cmcr/mayo/programs/health-and-well-being-certificate)

**Ticketed**



## Success in the digital age

The age of automation is here. That's why it's more important than ever to have a liberal arts education equipping you with the intellectual versatility you need to succeed in the developing information economy. Hear Meg Richardson share insights in her talk, "Liberal Education: How Not to Get Automated Out of a Job by 2030." Richardson is chief of staff to the president of Devex, a media platform for the global development community. She engages and manages key influencers and business development opportunities.

**Monday, April 6, 12-1:15 p.m., School of Civic and Economic Thought and Leadership, Social Sciences Building, Room 109, 951 S. Cady Mall, Tempe**

[scetl.asu.edu/student-events](http://scetl.asu.edu/student-events)

**Free**

## Forge new partnerships

Calling all women entrepreneurs! Here's an opportunity to network, learn about business, celebrate your accomplishments and share success strategies. The Positively Powerful Woman Awards and Education Summit recognizes strong, powerful women whose mission is to empower other women in business. Expect an upbeat, inclusive environment in which you can explore sponsorships, learn from speakers and knowledge experts and forge media partnerships. The event is open to the public.

**Friday, April 17, 8 a.m.-4 p.m., Sun Devil Stadium**

[positivelypowerful.com/insights/2020-positively-powerful-woman-awards](http://positivelypowerful.com/insights/2020-positively-powerful-woman-awards)

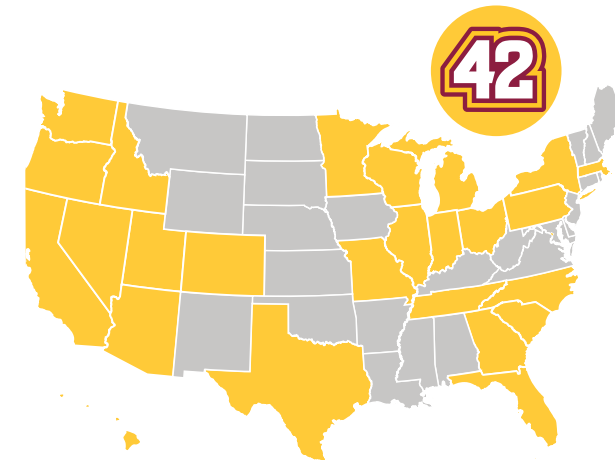
**Ticketed Networking**



**Joel Martin**

Summit host Joel Martin is an international leadership trainer, executive coach, speaker, author and consultant specializing in working with people who want to accelerate their success and be happier and more fulfilled. She is the author of "How To Be A Positively Powerful Person" and "Get the Me Brand Awareness (MBA) the Positively Powerful Way."

## Participate in your local Tillman Honor Run



The ASU Alumni Association, in partnership with the Pat Tillman Foundation, is proud to organize the annual Tillman Honor Runs nationwide to help honor fallen U.S. soldier and Sun Devil Pat Tillman and his legacy of service.

## Join a run in the following cities:

Austin, TX	April 18
Chicago, IL	April 18
Denver, CO	April 18
Dallas/Fort Worth, TX	April 18
Flagstaff, AZ	April 18
Atlanta, GA	April 18
New York, NY	April 18
Philadelphia, PA	April 18
Honolulu, HI	April 18
Houston, TX	April 18
Boise, ID	April 18
Indianapolis, IN	April 18
Las Vegas, NV	April 18
Los Angeles, CA	April 18
Detroit, MI	May 2
Nashville, TN	April 18
Boston, MA	April 18
Charlotte, NC	April 18
San Francisco, CA	April 18
San Jose, CA	April 4
Columbus, OH	April 18
Tucson, AZ	April 18
Orange County, CA	April 18
Pittsburgh, PA	April 18
Portland, OR	April 18
San Antonio, TX	April 18
San Diego, CA	April 18
Seattle, WA	April 18
Charleston, SC	April 25
South Florida, FL	April 18
Colorado Springs, CO	April 18
St. Louis, MO	April 18
Minneapolis, MN	April 18
Salt Lake City, UT	April 18
Pinetop-Lakeside, AZ	April 4
Madison, WI	April 18

## Stay up to date

Update your info to stay in the know with exclusive invites to special events and more.

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

## COMPETITION AND BEYOND

### Desert WAVE team builds robots — and community

In its second year, the all-women robotics team Desert WAVE, which placed third in the world and first in the country in the 2019 RoboSub competition, is off to an active start. They are building a second robot to communicate with Phoenix, their original underwater vehicle. The team is also working with the Chandler-based all-female high school team Degrees of Freedom. In December, both teams helped make the holidays more accessible for local children who face challenges operating interactive toys.



Desert WAVE member Jessica Dirks works on the vehicle during competition in top photo. In group photo, from back row left: team members Samantha Ehrle, Rebekkah Wagen, Whitney Foster, Bridget Koehl and Maria Espinoza. Front row: Samantha Nieto, Paulina Garibay Jaquez, sponsor Shebbie Jacques, Diana Lee Guzman and Andrea Schoonover.



**Top tech in 'Popular Science'**  
Klaus Lackner's MechanicalTree featured.  
11

**National Academy of Sciences honoree**  
Lindy Elkins-Tanton receives major award.  
12



### 'Demon' named top physics book of 2019

Physics Professor Paul Davies' newest book, "The Demon in the Machine," takes aim at one of the great outstanding scientific enigmas — what is life, how and why does it emerge, and what distinguishes the living from the nonliving? The book, which was published in October in the U.S., was named the top physics book of 2019 by Physics World, a publication of the U.K. Institute of Physics.

"You might think a topic like the emergence of life would be quite overwhelming," says Tushna Commissariat, the reviews and careers editor at Physics World. "But Professor Davies' aim is to lay out a basic explanation of how matter (living and otherwise), information and entropy interact. For a topic like this, he is the ultimate guide."



## Prose and purpose for the '20s

Alberto Ríos, a Regents Professor in the Department of English and Arizona's first poet laureate, was asked by The Arizona Republic to usher in a new decade with a reflective composition on purpose and resolve in the Grand Canyon State, also known as the Copper State.

The result is "Copper and Oranges" — 37 lines from a literary witness of Arizona's horizons of growth in cities and citizenship. The original poem caps an illustrious decade of high-profile acknowledgments for Ríos that included a world tour of sorts — rock band U2 included Ríos' poem "The Border: A Double Sonnet" on its 2017 stadium tour — and a nod from media mogul Oprah Winfrey, who has quoted Ríos' words for inspiration and affirmation.

Read the full poem at AZCentral.com at [bit.ly/2RjybDs](http://bit.ly/2RjybDs).

### Strides in sustainability

**28%**

Reduction in ASU greenhouse gas emissions since fiscal year 2007

Read more about ASU's fourth annual sustainability report at [asunow.asu.edu/20191106-asu-news-asu-makes-strides-sustainability](http://asunow.asu.edu/20191106-asu-news-asu-makes-strides-sustainability).

**4,000** TONS

Amount of university waste diverted from landfills in fiscal year 2018, the highest since ASU began keeping track in 2007

### Popular Science picks MechanicalTree as top technology

Popular Science magazine has given one of its highest accolades to a device developed by ASU researchers that can pull carbon gas from ambient air. The device, developed by ASU Professor Klaus Lackner and his colleagues and commercialized by Silicon Kingdom Holdings in Dublin, is called MechanicalTree. It is the world's first passive direct air capture technology — it does not draw air through with energy-intensive devices but allows the wind to blow air through the system.

According to the description by Popular Science: "A forest of 1,200 mechanical 'trees' ... is poised to pull more carbon dioxide out of the air than any human-made endeavor before it. ... A cluster of 12 can suck a metric ton of the gas out of the atmosphere every day; a full lot, like the pilot one SKH is planning to install ... can remove up to 36,500 metric tons annually. That's nearly 1,844 American households' worth of emissions."



The MechanicalTree is the world's first passive direct air capture technology. One device accomplishes the equivalent carbon capture of 1,000 natural trees.



### ESPN host joins Cronkite School's Hall of Fame

Matt Barrie, an ESPN SportsCenter anchor and studio host for the network's college football coverage, has been named the newest member of the Alumni Hall of Fame at ASU's Walter Cronkite School of Journalism and Mass Communication.

Barrie, who also hosts a podcast and calls college football games for ESPN, is a 2001 graduate of the Cronkite School, where he earned his bachelor's degree.



### Improving health outcomes for Medicaid patients

College of Health Solutions researchers have received a \$2 million grant from Arizona's Medicaid agency to evaluate and improve the quality of care for thousands of the state's Medicaid patients.

Professors William Riley and George Runger will work with approximately 150 Arizona clinics, hospitals and criminal justice organizations over the next three years to better integrate primary care and behavioral health services. The ASU team will provide timely performance measure reports with the goal of improving the care for patients who are enrolled in the state Medicaid program administered by the Arizona Health Care Cost Containment System, or AHCCCS.

Participants will review their data regularly while it's still possible to improve. "This means that rather than waiting up to a year and a half to receive feedback on their performance, they will receive information within two to three months," Riley said.

This research is part of AHCCCS' Targeted Investments Program, a \$300 million, five-year plan that funds initiatives to make Arizona's health care system less fragmented, more cost-effective and focused on quality outcomes.

### 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).

## PLANETARY SCIENCE

## National Academy of Sciences honors ASU professor for major science contributions

The National Academy of Sciences has announced that School of Earth and Space Exploration Professor Lindy Elkins-Tanton has been awarded the 2020 Arthur L. Day Prize and Lectureship in recognition of her lasting contributions to the study of the physics of Earth and for illuminating the early evolution of rocky planets and planetesimals.

“Professor Elkins-Tanton is richly deserving of this prestigious recognition. Her groundbreaking research advances our understanding of space, while her mentorship inspires the next generation of scientists,” says Sethuraman Panchanathan, the executive vice president of ASU’s Knowledge Enterprise and the university’s chief research and innovation officer.

The world’s leading figure in her field, Elkins-Tanton heads ASU’s Interplanetary Initiative and the NASA Psyche Mission.

Learn more about the NASA Psyche Mission led by Lindy Elkins-Tanton at [psyche.asu.edu](https://psyche.asu.edu).



### Prediabetics may be ‘exercise resistant’

Obesity is the single largest cause of diabetes. And the advice to solve it is often the same: Get off the couch. Hit the gym. Run around the block. However, for people who are both prediabetic and obese, exercise may not help them counteract the negative effects of obesity on diabetes, according to a new study by School of Life Sciences Associate Professor Christos Katsanos.

The problem is in the mitochondria, the powerhouse of cells. Previous work in Katsanos’ lab found that for people who are prediabetic and obese, proteins — the building blocks of mitochondria — are modified in a way that is not optimal for them to process fats and glucose.

Another study found that exercise was not a solution — certain populations of mitochondria were impaired in obese individuals after a 45-minute cycling session.

“Exercise did not stimulate the mitochondria of these people to produce enough energy,” Katsanos said. “We call these people ‘exercise resistant.’”

Former graduate student Katon Kras compared the results to differences that we might observe in driving a race car versus a Yugo. Both contain engines that run the car (mitochondria), but the race car responds quickly to small changes while a cheaper car might not.



## Caring for family matters most

An international team of researchers led by evolutionary and social psychologists from ASU surveyed more than 7,000 people from 27 countries about what motivates them, and the findings go against 40 years of research.

People surveyed consistently rated kin care and mate retention as their top motivators. Kin care is defined as caring for and supporting family members. Evolutionary psychological research has long focused on how people find romantic or sexual partners and how this desire affects other behaviors, like consumer decisions.

The results show that people who ranked mate-seeking as the most important were less satisfied with their lives and were more likely to be depressed or anxious. Those who ranked kin care and long-term relationships as the most important rated their lives as more satisfying.

## Understanding the magic of dogs

Studies show that people with dogs exercise more, stress out less and have better self-esteem. What’s more, dogs offer a special kind of companionship to humans — love. ASU animal psychologist and Professor Clive Wynne’s new book, “Dog is Love: Why and How Your Dog Loves You,” tells us why dogs’ capacity to love makes them such suitable companions for humans.

“[My dog Xephos is] so affectionate — and this is what makes dogs special, what makes dogs unique. It’s this exaggerated, ebullient desire to form strong connections. We’re such different species. We have such different body shapes; yet, we read each other’s emotional expressions extremely well,” Wynne said.

Wynne changed his research from birds, rats and marsupials, noting his interest in the human-animal relationship. “I’ve been lucky. Since I turned to dogs, it’s been magic.”



Professor Clive Wynne with dogs from the Arizona Animal Welfare League & SPCA.



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**“Students ... conducted themselves in an exemplary and professional manner, one that was characterized by **civil discourse and respect.**”**

— ARIZONA REGENT KARRIN TAYLOR ROBSON, '88 BA IN POLITICAL SCIENCE AND HISTORY, '94 JD, WHO ENVISIONED THE REGENTS' CUP EVENT

PRACTICE MAKES PERFECT

## Team wins Regents' Cup for debate

Thirty-six students on two-student teams from Arizona's public universities competed this fall during the daylong Regents' Cup debate competition, showcasing Arizona's public universities' commitment to freedom of expression. Subjects debated included how (if at all) social media sites should regulate speech, free speech on college campuses, and whether the U.S. should have tougher libel, slander and defamation laws. ASU students Valielza O'Keefe and Joshua Pardhe took first place in the event, each winning \$16,600 in a one-time scholarship.

English and communication junior Yumna Samie and her debate peers practice persuasive storytelling and Oxford-style debate in preparation for the Regents' Cup.

## ASU @ Mesa City Center breaks ground

ASU broke ground in mid-January on ASU @ Mesa City Center, a state-of-the-art project that will contribute to the revitalization of downtown Mesa and train students in one of the biggest industries in the U.S.: media production.

The three-story academic building, scheduled to open in spring 2022 at the northwest corner of Pepper Place and Centennial Way, will offer programs in the Herberger Institute for Design and the Arts in digital and sensory technology, experiential design, gaming, media arts, film production, and entrepreneurial development and support.

ASU @ Mesa City Center will host about 800 students and will include an exhibition gallery, screening theaters, production studios, a fabrication lab, a cafe that will be open to the public, classrooms and collaborative spaces for projects with the community and industry.



The new building will house media arts, gaming, film production programs and a digital Innovation Studio connected to the startup community.



### Before you buy that beach house, assess its climate risk

As the seas rise along the Gulf Coast of the U.S., thousands of communities must decide how to adjust to a new environment. Two ASU professors are part of a team developing a new tool to help homeowners assess their risk and make informed decisions.

Research Professor Melanie Gall and Associate Professor Natasha Mendoza of the Watts College of Public Service and Community Solutions are working with researchers from eight other institutions to create a Zillow-type app that will tell residents the likelihood they'll face a weather disaster and how much it might cost to avoid it.

"We want to provide information to residents to learn more about the resilience of their house," Gall says.



State Farm Insurance Chairman and CEO Michael Tipsord, left, ASU Foundation CEO Gretchen Buhlig and ASU President Michael M. Crow.

### State Farm, ASU announce partnership on Pathways for the Future initiative

The university will prepare learners of all ages to succeed in a transformed workplace thanks to a \$30 million gift from State Farm that will fund new programs and scholarships.

The funding will drive the new State Farm Pathways for the Future workforce-development initiative, which will target high school and community college students as well as adults in the workforce who need to update their skills on the go.

"I have a concern that the technological advancements that are occurring in today's society have the real risk of leaving segments behind," said Michael Tipsord, CEO of State Farm.

"You combat that through this continued upskilling of individuals to deal with whatever it is that the world may present. I want our people to have all the opportunities to be able to develop skills and learn in a way that continues to make them relevant and competitive."

State Farm's regional headquarters sits just north of Sun Devil Stadium, and Tipsord said that ASU President Michael M. Crow was influential in attracting the corporate campus to Tempe. Crow said the partnership is a perfect pairing of two entities that are focused on embracing the future of technology while supporting families and individuals.

# Advance your career

#### THE POWER OF NATURE

When most people go out and experience nature, they usually dictate the terms and have an agenda. "We encounter nature in a technological way because we're delineating, calculating, categorizing and classifying," says Sharon Harvey, who teaches sustainability courses at ASU at Lake Havasu and directs the general studies degree program. "I try to teach students to open themselves up to awe and mystery and listen. Once it captures our attention, our emotions are aroused, and then it's transformative."

**Sharon Harvey, professor and general studies program director, encourages her students to allow nature to reveal itself to them, through active observation and meditation.**

#### Power of small wins

Little victories build big successes.

18

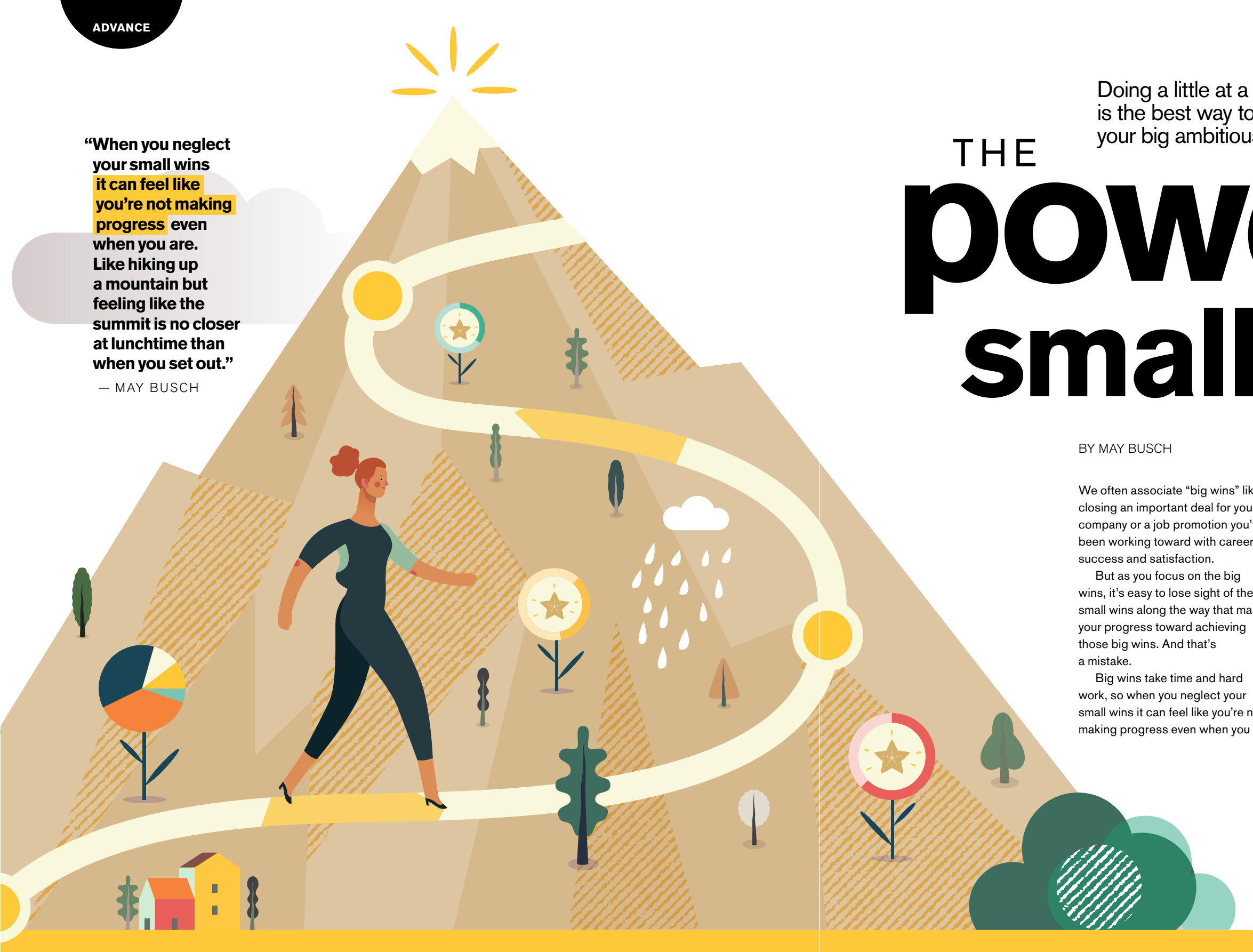
#### Manage stress

6 tips from ASU experts.

22

“When you neglect your small wins it can feel like you’re not making progress even when you are. Like hiking up a mountain but feeling like the summit is no closer at lunchtime than when you set out.”

— MAY BUSCH



Doing a little at a time  
is the best way to reach  
your big ambitious goals

# THE power OF small wins

BY MAY BUSCH

We often associate “big wins” like closing an important deal for your company or a job promotion you’ve been working toward with career success and satisfaction.

But as you focus on the big wins, it’s easy to lose sight of the small wins along the way that mark your progress toward achieving those big wins. And that’s a mistake.

Big wins take time and hard work, so when you neglect your small wins it can feel like you’re not making progress even when you

are. Like hiking up a mountain but feeling like the summit is no closer at lunchtime than when you set out.

Not only is this discouraging, it can even derail your progress toward those bigger goals.

### Winning as progress

Instead of waiting until the big win to celebrate, why not reframe “winning” to mean progress?

This means looking for milestones that represent progress toward your big win. Celebrating each progress step as a “small win” builds positive momentum, the kind that keeps you (and your team) motivated to move forward.

Small wins are everywhere once you learn to spot them. Like finally getting a call back from a client that you’ve been calling and



**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](https://www.maybusch.com/asuthrive).

calling, getting a compliment from your department head, or beating the traffic to get to the office in time for an important meeting.

The beauty of “small wins” is they can lead to bigger impact and broader implications later on. Celebrating small wins as significant steps toward your larger goals helps you focus on the path or the process rather than the endpoint alone. This in turn changes how you feel and perform ... for the better.

### How to create small wins in your career

Many small wins will be things you're already doing without

giving yourself credit, like finishing a presentation deck on time or helping a new colleague navigate office politics. Start celebrating them!

Other small wins will be the kind you create by investing in your development, which stacks the deck in your favor. Instead of just speaking up at a meeting, you could develop the skill of speaking with impact. And rather than run from meeting to meeting without time to think, you could learn strategies for getting a grip on your calendar and finally feel productive.

It all comes down to what you aspire to in terms of the “big wins” in your career and life. Is it a job promotion? Growing your business? Or something else entirely?

Whatever those future “big wins” look like for you, start focusing on the path by asking yourself:

- What are the “small wins” I can celebrate?
- What investments can I make in my development along the way?

The best way to create more small wins (that lead to big wins) is to make your career development part of your normal day. Don't wait until “later” when you have “more time” to work on your big ambitious goals because we all know that time never comes.

Take a moment to ask yourself, “What small win will I celebrate today?” ■



## Mentors give back through network

Tara Boucher, '99 MS in technology, signed up to be a mentor after establishing her career working with the Starbucks corporate office, Visa and USAA because she loves ASU and working with students. She says the impact is felt on both sides of the mentoring relationship.

“The feeling of giving back is great,” she says.

Boucher, who lives in San Antonio, connects with students and alumni remotely.

Boucher says her own career has benefitted from mentorship and she has noticed that students she's met tend to not know their own potential, so she enjoys encouraging mentees to get on-the-job experience and persist beyond rejection. Boucher says it's important for people to have someone to bounce ideas off of.

“It doesn't always seem appropriate at work to open up and seek advice, so it's great to be able to offer that to someone,” she says.

Apply to become a mentor at [mentorship.asu.edu](http://mentorship.asu.edu).

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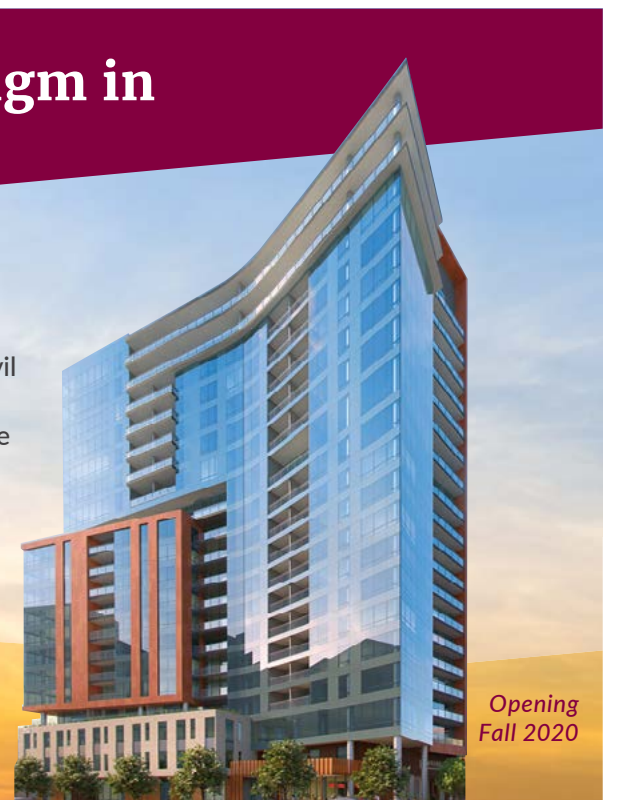
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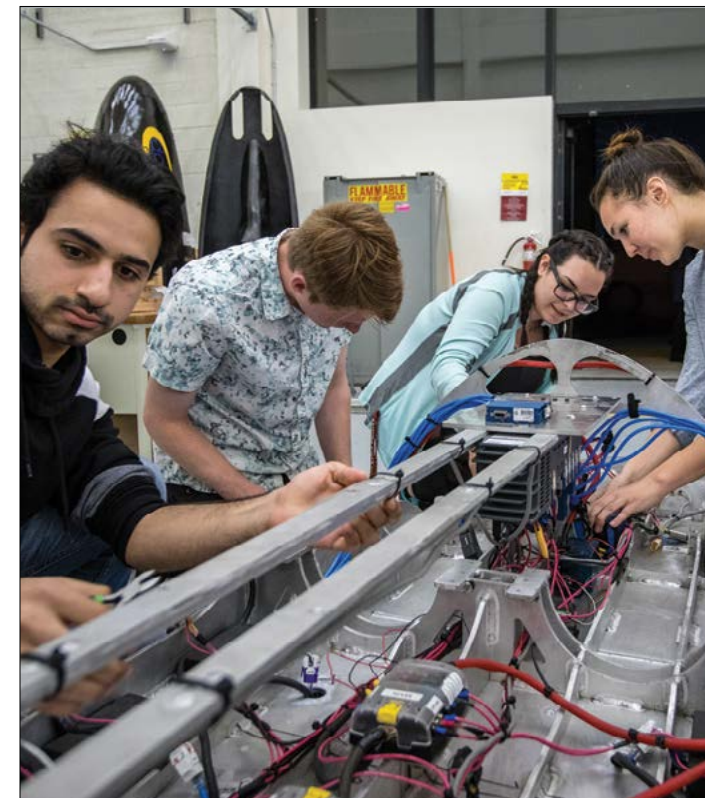
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“Please remember that you can accept yourself as you are and at the same time be inspired to become a better, more generous or deeper version of yourself.”

— TERI PIPE, ASU CHIEF WELL-BEING OFFICER AND EDSON COLLEGE PROFESSOR

# 6 ways to manage your stress

## in work and in life

ASU health experts on mindfulness, heart health, whole foods and more

BY EMMA GREGUSKA

The hard part of setting goals isn't necessarily deciding what resolutions to make — it's keeping them. Fortunately, ASU abounds with experts on everything from heart health to screen time to mindfulness. So if you're in the market to make some lifestyle changes, here are some suggestions from experts at ASU's College of Health Solutions and Edson College of Nursing and Health Innovation, along with helpful tips for making them stick.

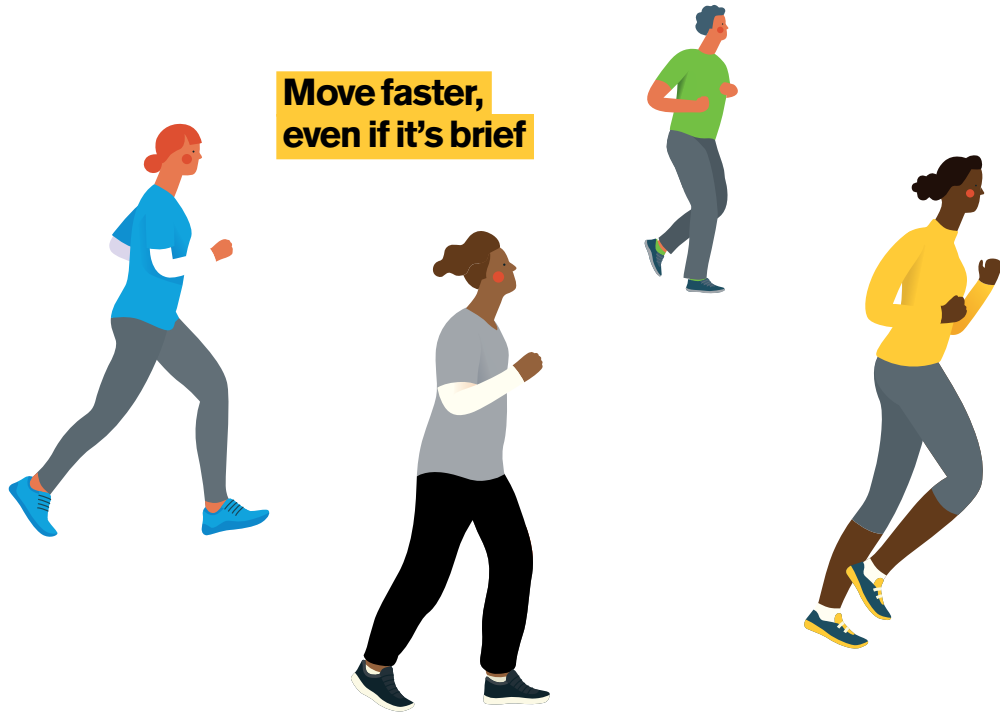
### Be more mindful

Before you start getting down on yourself or dismiss your resolutions as a lost cause, ASU's Chief Well-Being Officer and Edson College Professor Teri Pipe advises you to take a moment and consider self-acceptance as the first step toward personal growth.

“Resolutions often take us to a place of negativity or remedying a perceived weakness,” she says. “Instead, please remember that you can accept yourself as you are and at the same time be inspired to become a better, more generous or deeper version of yourself. Self-acceptance

Mayo Clinic Alix School of Medicine student Ryan Smith practices a meditation during a four-day course at the ASU Center for Mindfulness, Compassion and Resilience. For mindfulness resources, see [mindfulnesscenter.asu.edu](https://mindfulnesscenter.asu.edu).

## Move faster, even if it's brief



and becoming a better person are not mutually exclusive; in fact, they go hand in hand."

As the founding director of ASU's Center for Mindfulness, Compassion and Resilience, Pipe knows that the practice of mindfulness has benefits for both mind and body.

### Move faster, even if it's brief

Strapped for time but still want to keep your ticker in tiptop shape? Have no fear. CHS Assistant Professor Siddhartha Angadi conducts research on the effects of high-intensity interval training, or HIIT — characterized by short bursts of intense activity — on cardiovascular and metabolic physiology in severe chronic diseases.

He has found that not only can shorter bouts of physical activity produce the same benefits as longer bouts, but that if the shorter bouts are ramped up from a moderate level (something akin to a brisk walk) to a vigorous level (where you're almost out of breath

but not quite), they may even produce more health benefits than longer, moderate-level bouts.

"Less can be more for a fitter you," Angadi says. "Just 10 minutes of high-intensity interval training three times a week can improve your cardiovascular and metabolic fitness."

### Get more fiber

Though he recently published work outlining a new tool that allows consumers to weigh both the nutritional quality and the environmental impact of protein, CHS Assistant Dean of innovation



## Get more fiber

and strategic initiatives Chris Wharton says the average person probably doesn't need to worry much about their protein intake.

"Chances are, you're doing just fine getting (more than) enough protein," he says. Instead, focus on fiber. Adults should shoot for 30 to 50 grams daily, primarily from vegetables, whole grains, beans/legumes and fruits for the best returns on health.

You may not be the most popular guest at dinner parties, but, he says, "The more gas you have, the healthier your diet likely is."

### Stay hydrated

Most Arizonans know the immediate importance of hydration in the desert, but it turns out water intake can have effects on long-term health as well. CHS Assistant Dean of graduate education and Professor of nutrition Stavros Kavouras directs the Hydration Science Lab at ASU, where he is studying the impact of water intake on health and performance, as well as its effects on chronic disease outcomes.

Most recently, Kavouras found that drinking more water could improve the quality of life for patients with Type 2 diabetes and potentially help prevent the disease in others.

He calls water "the forgotten nutrient," and was quoted in a May 2019 ASU Now story saying, "People forget to drink water, forget to study water, they just forget to include water in anything. The MyPlate, the USDA's current nutrition guide, does not even include water because every dietary guideline needs to be

evidence-based and we have little evidence for water."

In order to ensure you're well hydrated, Kavouras recommends monitoring the number of times you use the restroom throughout the day (if it's been several hours and you haven't been to the bathroom, that's an indication you haven't been drinking enough water), as well as the color of your urine. Dark yellow urine indicates dehydration. He also suggests his own personal habit of keeping a full glass of water in front of him at all times.



## Stay hydrated

### Reduce your screen time

If a food-based diet isn't your speed, Wharton suggests going on a screen time diet. He and colleagues are working to develop more accurate ways to measure people's screen time usage, associated health effects and potential interventions.

According to Wharton, the benefits of logging off are exponential.

"Reducing the time you spend with screens simultaneously opens time to plan healthier meals and cook, be active and spend time with family, friends and neighbors," he says. "Because screen time is one of the greatest sources of sedentary time behind sleep and work, it is actually a gateway behavior. It's really hard to be healthier in other areas in life if you don't give yourself the gift of time to pursue healthier habits.

Your screens are eating all the time you need to be healthier and happier."

### Sit less, stand more

Sitting is not the new smoking — CHS Associate Professor Matt Buman and colleagues successfully debunked the insidious health myth in a paper published in September 2018 — but it can still be detrimental to your health. Too much sitting, Buman says, can lead to health issues such

as heart disease, diabetes, stroke and high blood pressure — all of which can be life-threatening.

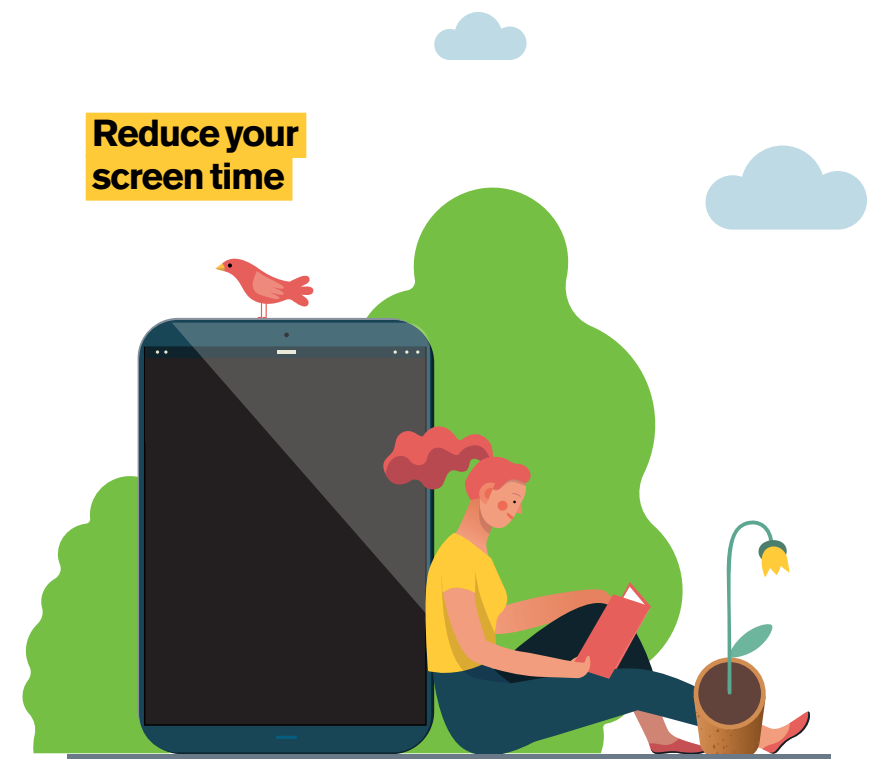
Because many modern day jobs require employees to be

sedentary at a desk, Buman's research is focused on developing interventions for excessive sitting in the workplace.

"While reducing your sitting time at work doesn't take the place of regular exercise, adequate sleep or a healthful diet, it's an important part of an overall healthy lifestyle," he says.

Consider wearing comfortable shoes so you're more likely to want to move throughout the day, breaking up long periods of focused work with a short standing or moving break (as an added bonus, the quick break can improve your focus and productivity), using the restroom on a different floor or getting up to talk to your coworker face-to-face instead of sending an email. ■

## Reduce your screen time



**“Everything starts and ends with people. It is the right team that will win in the end.”**

— JEFF COX, CO-FOUNDER AND EXECUTIVE CHAIRMAN OF RADIUSAI, WHO WORKS OUT OF INDUSTRIOUS COWORKING SPACE IN TEMPE



# Transform

## PARADIGM SHIFT

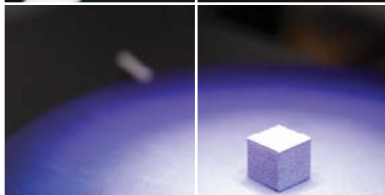
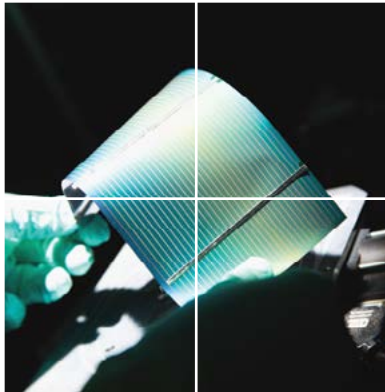
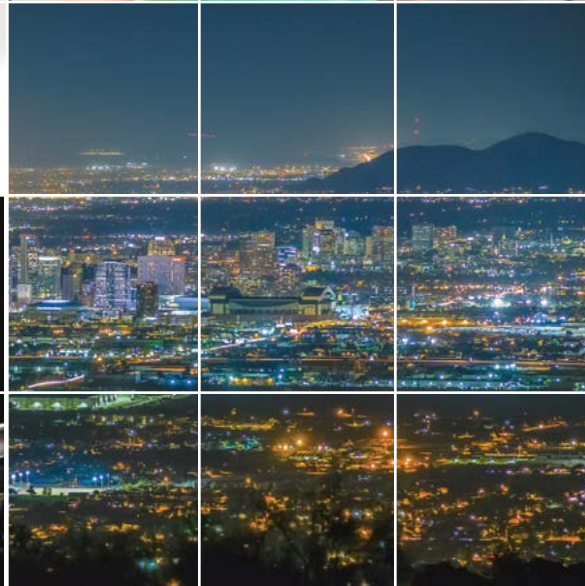
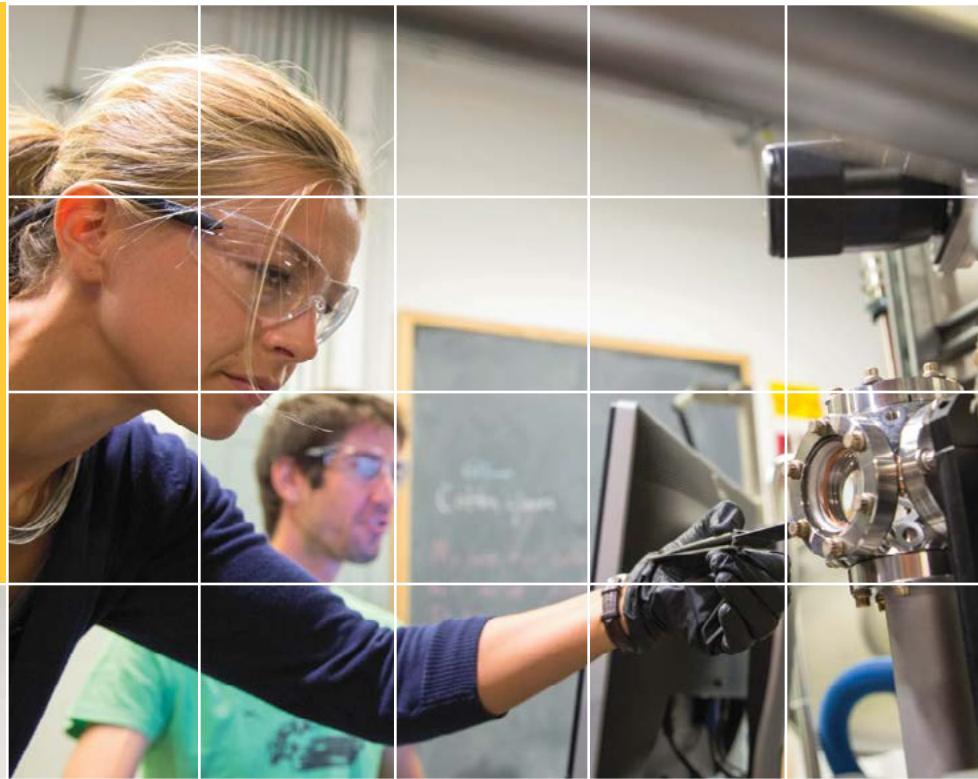
### Changing IP video surveillance — for the better

Jeff Cox, '94 BS in marketing, co-founded RadiusAI in 2017 with the goal of using artificial intelligence to help save jobs and improve employee and business efficiency — without collecting personally identifiable information or using facial recognition. Cox partnered with ASU's School of Computing, Informatics and Decision Systems Engineering, and hired ASU PhD students to help bring the product into the marketplace. One of the many uses is that RadiusAI can analyze real-time analytics to help businesses optimize decisions and improve sales.

**Making the silicon desert**  
Helping to create a new economy for Arizona.  
28

**Solving the water crisis**  
Cody Friesen's company creates clean water from air.  
36

ASU, together with industry partners, venture capital and government backing, is helping Arizona transform the economy



ASU faculty and students are working with industry partners to solve problems, such as helping to make the electrical grid safer and more robust, advancing the 3D printing of metals, improving solar tech, driving new manufacturing technologies — and more.

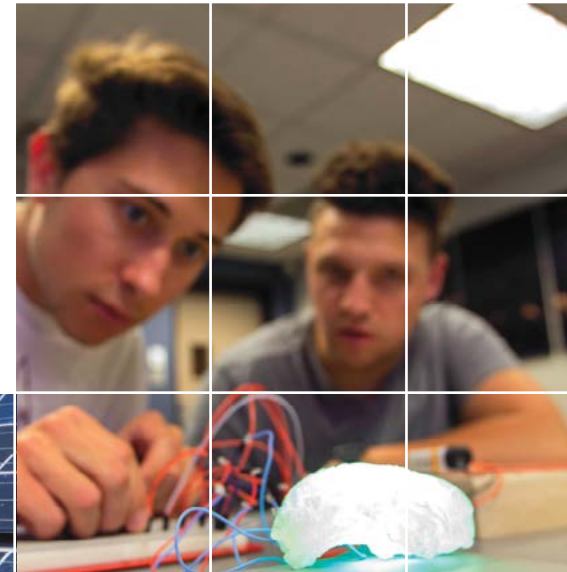


# Building resilience in the silicon desert

Story by CRAIG GUILLOT

Long before IBM, Apple and Google set up shop in Silicon Valley, the area was home to government-funded research operations that developed electronics and communications devices. While it is now known as a global epicenter of technology, only some of the economic development came about through the muscle of venture capital; the rest came from government funding. Several U.S. cities, from Denver and Seattle to Washington, D.C., have similarly built upon government investment in universities to build thriving economies.

The Phoenix metro area has emerged as a global hotbed of innovation that can become a new type of Silicon Valley — with continued investment, analysts say. A key part of creating a resilient economy relies on the current ASU partnerships with industry in areas such as medical tech, wearables, advanced manufacturing, sustainability and communications. Through innovation centers, the university is supporting research, helping







Students participate in Devils Invent, where they design and build solutions to real-world problems submitted by the community and industry.

to bring new products to market and driving entrepreneurship and industries that benefit the entire state.

Arizona is home to thousands of tech companies, and a report by the National Academy of Inventors ranked ASU in the top 10 universities for patents awarded worldwide in 2018, the most recent year for which rankings have been released. With a top engineering talent base, an established tech sector and a thriving startup scene, economic developers and analysts say it's now time for the region to double down and create a future in new disruptive industries.

While Phoenix has many key components to develop a new innovation economy, it also needs state government investment, in addition to incoming federal government grants and private funding, to create in a "big and thoughtful way," says Inc.

columnist Dustin McKissen.

To that end, the Arizona Board of Regents is requesting state funding for a new economy initiative, including \$46 million for ASU in fiscal year 2021 to enable the state's transformation by preparing the workforce and making metro Phoenix the leading U.S. producer of engineering talent. Part of the plan is to better fund K-12, and to increase access to higher education across the state, including in rural areas, as well as to improve high school completion and college attendance rates. Another focus is the creation of additional innovation centers that leverage university expertise to solve industry-identified problems.

In Silicon Valley, it was ultimately government funding and public policy that fueled development, says Margaret O'Mara, author of "The Code:

**Real-world impact**

**ASU named one of the nation's top universities for tech commercialization**

ASU ranks ahead of Harvard, Duke, Johns Hopkins, USC and UC Berkeley

— MILKEN INSTITUTE

**"Hubs of innovation and talent generation will feed the local companies and draw others in. This in turn drives the economy and spurs further reinvestment."**

— HANS STORK, SENIOR VP OF R&D, ON SEMICONDUCTOR

Silicon Valley and the Remaking of America" and history professor at the University of Washington.

Until the 1940s, the California valley was largely agricultural. With an influx of federal funds to support Cold War electronics, Stanford University focused its curriculum on sciences and engineering to support federal research labs developing new communication devices, O'Mara says. Such government backing eventually helped to pave the way for Intel, AMD, NVIDIA and an entire new economy. In 1971, a journalist dubbed it "Silicon Valley USA."

Government support can often provide the boost that industry and researchers need to bring distant ideas to market. "[These] are things that the market is not going to do by itself," O'Mara says.

O'Mara writes that government investment "flowed ... in ways that gave the men and women of the tech world remarkable freedom to

define what the future might look like, to push the boundaries of the technologically possible, and to make money in the process." That, coupled with tech-friendly tax regulations and business-friendly policies, all helped Silicon Valley grow large, writes O'Mara.

**Creating a resilient economy**

With an already established legacy of mainstay semiconductor companies and talent and

business-friendly laws, Phoenix metro and Arizona are thriving in areas like medical tech, the internet of things (IoT), sensor-enabled technologies and manufacturing and are poised for additional growth, says Chris Camacho, president and CEO of the Greater Phoenix Economic Council.

"By fostering an environment that promotes entrepreneurial thinking and innovation at scale, we have made significant progress in areas that include additive manufacturing, solar energy and wearable technologies, among others," says Kyle Squires, dean of the Ira A. Fulton Schools of Engineering at ASU. "With an investment to help establish science and technology centers where faculty, students and industry collaborators can grow ideas, share resources and provide advanced training, the Fulton Schools will be primed to catalyze the tech ecosystem in the Phoenix metropolitan area and



Students at ASU work with mentors, faculty members and industry partners to solve problems.



Avnet CEO Bill Amelio presents awards at the ASU Innovation Open.



Associate Professor Dan Bliss, along with students and other researchers, is working on making tech in our devices less expensive, more energy efficient and more powerful.

help launch companies that will drive future industries.”

**Public-private partnerships**  
Using a mix of private money, grants from the National Science Foundation and the U.S. Department of Defense’s Defense Advanced Research Projects Agency (DARPA) and other national government agencies, along with venture capital, ASU is participating in the establishment of various public-private partnership centers that help local companies get new products onto the market faster. These centers, and the new economy they can help create, not only benefit engineers but can also lead to a diverse range of jobs to benefit all Arizonans.

“Hubs of innovation and talent generation will feed the local companies and draw others in,” explains industry partner Hans Stork, senior vice president of research and development at

**“A big role the state can play is in providing the funding that creates an ecosystem where [industry and academia] bring something to the table and we work on relevant problems.”**

— DHRUV BHATE, ASSOCIATE PROFESSOR

ON Semiconductor, a global semiconductor supplier based in Phoenix. “This in turn drives the economy and spurs further reinvestment.”

The best prospects are those areas where there is an opportunity to build something new, and where industry partners are willing to participate, says Gregory Raupp, director of the MacroTechnology Works Initiative and research director of the WearTech Applied Research Center.

In September 2019, the WearTech Applied Research Center opened as a joint venture between the Fulton Schools and the Partnership for Economic Innovation, a collective dedicated to expanding economic potential in Phoenix. (Learn more about medical wearables on page 44.)

Another promising area is in communications. Dan Bliss, ASU associate professor and director of the Center for Wireless Information Systems and Computational Architectures, his team and industry partners are striving to improve wireless communications for personal, machine and IoT systems by creating more sophisticated protocols and computation engines. “We are actively pursuing the commercialization of multiple pieces of this technology,” Bliss says.

While many of us are still using mobile phones on the 4G network and anticipating 5G, George Trichopolous and Ahmed Alkhateeb, assistant professors of electrical engineering in the Fulton Schools, are preparing for the implementation of 6G by 2030. By exploring the capabilities of wireless signals in the unused range above 100 GHz, they believe they can demonstrate innovative 6G use cases, such as better enabling IoT devices.

At the Manufacturing Research and Innovation Hub at The Polytechnic School, Dhruv Bhate conducts research on additive manufacturing, including how 3D-printed metal parts may be used in aircraft to save space, time and money. Through America Makes, a collaborative organization that supports additive manufacturing technology, the lab

**Educating the workforce that industry needs**

## ASU is the nation’s largest producer of future engineers

**Currently graduating 4,500 engineers and technologist students each year**

With state investment, the number will rise to 5,000 by 2025.

**240% increase in student enrollment over the past 10 years**

**23,903 students in fall 2019**

**#10 most technology graduates hired by top 25 technology companies**

— BUSINESS INSIDER AND HIRINGSOLVED SURVEY, 2017

### STEM professionals needed to grow the economy

The U.S. will be short 1 million STEM professionals by 2025 if the gap is not addressed.

— BUREAU OF LABOR STATISTICS

**\$1.5B in additional state taxes collected 20 years after the start of the new economy initiative**

— ARIZONA BOARD OF REGENTS

**30,000 to 40,000 new high-wage jobs in Arizona by year 20 of the initiative**

— ARIZONA BOARD OF REGENTS

is testing how such parts may be able to withstand extreme loads and temperatures for NASA and the Department of Defense.

“There are many questions that have to be answered before that technology can be inserted in the product,” Bhate says. “A big role the state can play is in providing the funding that creates an ecosystem where [industry

and academia] bring something to the table and we work on relevant problems.”

With a \$1.75 million grant from the NSF, ASU engineers and other experts are striving to make electrical grids smarter and safer by reducing data losses, outages and cybersecurity threats.

“We need electric power systems to have as much accurate

real-time data analytics as possible,” says Lalitha Sankar, associate professor of electrical, computer and energy engineering in the Fulton Schools. “We don’t want to be doing forensics that determine the cause of problems only from gathering evidence after the fact. We want to see patterns in the data that help predict what’s starting to happen on a grid. We also need to visualize these patterns to the operator succinctly and meaningfully to further aid the operator in distinguishing between normal and abnormal operations.”

Instead of trying to compete in a market of ordinary, mass-produced electronics, working hand-in-hand with industry can help identify new high-value technologies that researchers can bring to market, Raupp says.

“If we can focus around the idea of a versatile, agile manufacturing with rapid technology development and platforms that can be built on quickly creating the next version of whatever we need ... that’s the kind of idea we want to create,” Raupp says.

### Funding and fueling the silicon desert

Continued growth of the Phoenix area’s innovation economy depends on the ability to maintain a highly educated and trained workforce. In addition to technology jobs, these new industries will also help to create mid-level jobs in sales, retail and production, along with professional, managerial and cybersecurity jobs.

It’s important to continue building, Bliss says, because disruptive technologies and groundbreaking innovation

**Building a robust economy**



**AZ ranked 7th in the nation for startup success**

— WALLETHUB

**300+ tech companies now in downtown Phoenix**

compared with 67 in 2012

**100,000 increase in bioscience jobs**

in metro Phoenix from 2007 to 2019

**60% of the Phoenix metro area workforce is employed in advanced industries**

such as manufacturing, business and financial services, technology, biosciences and health care, up from 48% before the 2007 recession.

— FORBES

can take years of R&D before coming to market. And while ASU graduates more than 4,500 engineers and technologists per year, that isn't enough to support existing companies, and not enough to help build the new emerging economy.

"People underestimate how long it takes to move technology to market, because they only see the last 2%. If you open up your phone, there are 50 years of research that went into that," Bliss says.

Such long-term investments can yield an impressive return for the state. If new business opportunities increase by as little as 10%, the 10-year state and local fiscal impact will grow by another \$700 million with 25,000 new jobs created, according to the Arizona Board of Regents.

In addition to training the workforce for tomorrow's opportunities, many of ASU's students, graduate students and postdoctorates will likely go on to form new startups. Raupp is personally working with seven startups around medical technology, half of which were

**"People underestimate how long it takes to move technology to market ... Open up your phone, there are 50 years of research that went into that."**

— DAN BLISS, ASSOCIATE PROFESSOR

based upon ASU technology and spinoffs. "We're providing the talent that can go into these startups, but we're also teaching and training people to be entrepreneurs," Raupp says.

Camacho believes the state is in the midst of a historic economic transition that will not only attract new capital in these sectors but also give birth to more homegrown companies and potentially make Phoenix the next Silicon Valley.

"Just in the past decade we've seen massive amounts of entrepreneurial activity and that will continue to compound over the next 20 years. I am extraordinarily optimistic about the future of our region and state," Camacho says. ■

**Work with experts on your research**

- **Collaborate with expert faculty and staff** at ASU Core Research Facilities. Get access to numerous technologies, such as electron microscopes, prototyping, DNA sequencing and more. Connect with an ASU business concierge: [concierge.asu.edu](http://concierge.asu.edu).
- **Use tools at a public makerspace.** ASU and the City of Chandler created the ASU Chandler Innovation Center (ACIC) + Hub249 Makerspace. The space offers tools and equipment, from 3D printers to woodsaws to pottery kilns, design software, classes and more. Go to [entrepreneurship.asu.edu/asu-chandler-innovation-center-acic](http://entrepreneurship.asu.edu/asu-chandler-innovation-center-acic).



**Innovators: Work with WearTech Center to commercialize your research**

WearTech is a demonstration Velocity Applied Research Center established by the Partnership for Economic Innovation (PEI).

In response to industry needs and challenges, WearTech builds project teams of multi-disciplined engineers, business leaders, legal professionals, and regulatory and policy experts.

These real-world problems need your expertise and technologies. Finding solutions and developing new products requires rapid response R&D teams and talent.

**Working with the Center can accelerate the development of your technologies and research. The Center will:**

- Assist you with finding industry investors interested in your technologies.
- Provide access to engineering lab equipped with rapid prototyping and testing capabilities.
- Provide access to strategic partnerships with university tech transfer teams for licensing option and commercialization pathways.

For more information, please contact [weartech@azpei.org](mailto:weartech@azpei.org)

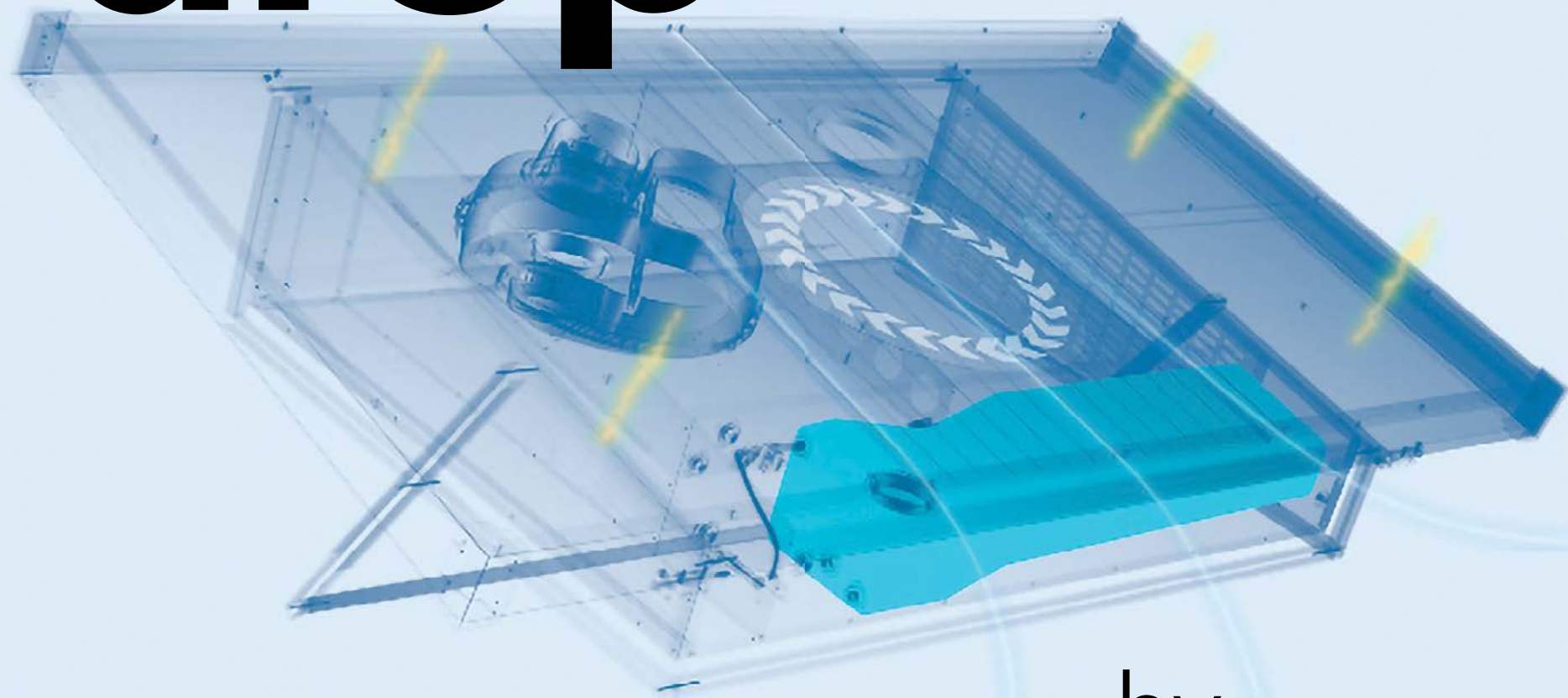


Solving  
the world's  
water crisis

# drop

Startup's award-winning  
technology creates sustainable  
drinking water

Story by LORNET TURNBULL



An X-ray view of Zero Mass Water's SOURCE Hydropanel, which emerged from research at ASU, uses solar power and a small battery to generate drinking water from sunlight and air.

by  
**drop**



# The bead of an idea hit Cody Friesen as a teenager hiking mountain trails in Arizona's sunbaked Sonoran Desert.

He grew up in the hot, arid region but near an area of lush cotton fields and citrus orchards fed by irrigation canals Native Americans built thousands of years ago.

He was keenly aware of the incongruous reality — how inhospitable that same desert can be to the landscape and wildlife within it. “Here we lived in this very water abundant area, yet, really, we’re in the middle of the desert,” he says.

A similar juxtaposition struck Friesen years later when visiting countries with abundant annual rainfall, “and yet there’s nothing to drink.”

The experiences became the engine for his award-winning technology that absorbs moisture from thin air and converts it into clean drinking water.

The founder of Scottsdale-based Zero Mass Water and an associate professor of materials science and engineering at Arizona State University, Friesen developed SOURCE Hydropanels to address one of the globe’s most pressing

challenges: water scarcity.

The creation contributed to Friesen earning the 2019 \$500,000 Lemelson-MIT Prize, the largest cash prize for invention in the U.S. It honors outstanding inventors who translate their ideas into technological inventions that have been adopted and bring significant value to society.

“Cody Friesen embodies what it means to be an impact inventor,” says Carol Dahl, executive director at the Lemelson Foundation. “His inventions are truly improving lives, take into account environmental considerations and have become the basis for companies that impact millions of people around the world each year.”

Friesen donated the prize to a Zero Mass Water project with Conservation International to provide Hydropanels to the Bahía Hondita community in Colombia.

“Cody’s inventive spirit, fueled by his strong desire to help improve the lives of people everywhere, is an inspiring role model for future generations,” says

Michael Cima, faculty director for the Lemelson-MIT Program.

## A global problem

SOURCE Hydropanels are essentially solar panels that produce water instead of electricity and require no additional power source to do it. Hydrophilic membranes inside the panels trap water vapor from air blown across them by a solar-powered fan.

The vapor-turned-water then flows through mineral cartridges, giving the water an ideal taste. Even in arid desert regions like Arizona and soggy, overcast areas like the Pacific Northwest, each Hydropanel can reliably deliver an average of 5 liters of water a day.

Five years after Friesen launched Zero Mass Water, his Hydropanels have been installed in more than 35 countries and across dozens of applications in hospitals, farms and homes — including two at Friesen’s home in Scottsdale. They provide the family of four humans and two dogs with water for drinking and cooking.

The Hydropanels also can be found in aboriginal communities in Australia and an orphanage for Syrian refugees in northern Lebanon; in desert regions in the Middle East and sub-Saharan Africa, where concerns over a global water shortage grow more intense; and someday in Flint, Michigan, where residents are still grappling with a five-year-old water crisis.

“Those are not vacation hotspots, but rather places where there’s a tremendous amount of human capacity limited by all the challenges that we know exist,”

Friesen says. “So whether we’re talking about Flint, Michigan, 194 schools in Arizona with lead in their pipes, the 750 water main breaks a day across the United States, the one person who dies every 10 seconds from waterborne illness — this is a truly global problem.”

Water, the essence of life, covers more than two-thirds of the earth’s surface, but barely 3% of it is drinkable. Nearly 1.7 billion people — one-quarter of the world’s population — currently live in areas of high water stress, including Arizona, California, Colorado and New Mexico.

The United Nations projects that by 2050 more than 5 billion people could suffer water shortages due to climate change, increased demand and polluted supplies.

Friesen loves to talk about big solutions to these kinds of global problems. His voice grows excited as he describes the “leapfrog” technology that allows people in developing countries with access to smartphones to easily connect via the internet to the rest of the world. And about how solar energy is generating electricity in many of those areas without the need for bulky, expensive infrastructure.

“If we could do for water what solar does for electricity,” he says, “we could fundamentally shift the axis of the planet and improve the human condition with respect to water.”

## ‘Perfect water’ for schools

Across the U.S., SOURCE Hydropanels have been installed in schools where aging pipes have leached unsafe levels of lead into drinking water, forcing



At Copper King Elementary School in Phoenix, an array of SOURCE Hydropanels (top) delivers quality drinking water to students.

Fulton Schools Associate Professor Cody Friesen's company Zero Mass Water now employs 91 people.



**“The most valuable water on the planet is the water you put inside your body.”**

— CODY FRIESEN

administrators to shut off water fountains. A July 2018 report from the General Accounting Office (GAO) found that 43% of schools test for lead in drinking water and 37% of those that tested showed elevated lead levels, a known neurotoxin particularly harmful to young children.

It's a major focus for Friesen and his company. “We want to ensure that the kids have perfect water — independent of whatever their surroundings are,” he says. “And that’s been a big, big thing for us as we continue to scale the business. It’s probably one of the most impactful spaces that we operate in — education.”

In Phoenix, for example, the Pendergast Elementary School District’s partnership with Zero

**“We want to ensure that the kids have perfect water — independent of whatever their surroundings are.”**

— CODY FRIESEN,  
INVENTOR AND CEO,  
ZERO MASS WATER

Mass Water is part of the district’s commitment to sustainability programs as well as expansion of a robust science, technology, engineering, art and mathematics (STEAM) curriculum.

At Copper King Elementary School, where about 10 panels were installed two years ago, students use their own reusable containers

to get water from a SOURCE-fed dispenser outside the STEAM lab.

Principal Janine Ambrose says students get to see real-world engineering up close through the partnership. They get a kick knowing their water is being drawn from thin air — a new source of fascination with each new school year’s cohort of students.

“It’s definitely a learning experience for our kids here, who get to learn about and see these panels work,” Ambrose says. “We’re always looking for ways to expand the curriculum and how we can educate our kids about the environment and the sustainability of the environment, especially here in Arizona with water.”

The Hydropanels are all connected to the cloud allowing

the Zero Mass Water team to monitor their performance. A typical two-panel array, which costs \$4,500 including installation, will produce about 10 liters of water a day. But hundreds or even thousands of them have the capacity to supply drinking water for entire communities — much like an array of solar panels can produce enough electricity to power a city.

#### Culture of innovation

Friesen developed the technology with the backing of an 11-member team of researchers at ASU’s Ira A. Fulton Schools of Engineering. He lauds a culture that continues to build and flourish under ASU President Michael M. Crow, advancing high-impact translatable research, taking what engineers

and innovators imagine, and creating and developing “from the lab bench to the marketplace” to engender global change.

It’s the reason Friesen returned to ASU 15 years ago, after earning his BS in engineering and materials science here in 2000 and a PhD in the same discipline from MIT in 2004. It’s also, he says, why he stays.

With one of the largest engineering schools in the country, ASU is the No. 1 school for innovation in America according to U.S. News & World Report, with an environment that inspires inventions like his. Within that nurturing culture, Friesen developed the world’s first rechargeable metal-air battery, able to withstand almost limitless discharges. He sold the company, Fluidic Energy Inc., in 2018.

“Most universities think about how great they are because of who they exclude,” Friesen says, borrowing a line from Crow. “ASU is very focused on how they create greatness and prominence by who they include.”

It’s similar, Friesen says, to how he’s developing technologies in his research group, focused “not on how to create a technology for the elite, but rather, how do you take creative technology that is inclusive of broader humanity, and use it to solve fundamental problems?”

The next step, what he calls Renewables 2.0, must involve developing and deploying technology for the cause of social equity across the globe. That, he says, “is the fundamental underpinning of why I founded this company.” ■

“Siva saw a problem and **it struck a chord** in his heart.”

— VIVEK KOPPARTHI, '14 MS IN MANAGEMENT, NEOLIGHT CEO, ON THE INSPIRATION FOR NEOLIGHT

SAVING LIVES

## Alumni startup fights jaundice

Each year, about 60% of newborns are born with jaundice, too much bilirubin that manifests as a yellowing of the baby's skin. It is usually treated with phototherapy — exposing the newborn to blue light for a few days after birth. But in parts of the developing world that lack access to electricity, tens of thousands of infants die or develop brain damage every year from untreated jaundice.

Sivakumar Palaniswamy and three fellow ASU alumni founded NeoLight to provide phototherapy with LEDs that use 98% less electricity than a standard incubator, so the device can be used in more places.

The FDA-approved NeoLight, shown here under the baby, treats newborns for jaundice in homes or hospitals. The founders won a \$25,000 grant from ASU's Edson Student Entrepreneur Initiative and parlayed that into an additional \$600,000 seed investment.

### Medical wearables

ASU and industry partners are transforming health care.

44

### The power of the pitch

Teaching student and alumni entrepreneurs how to get started.

51

# The future of health care is

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Alumni, students and researchers are creating devices that revolutionize the medical field

Story by DANIEL OBERHAUS  
Photos by JEFF NEWTON

TouchPoint Solution CEO and co-founder Vicki Mayo wears the company's device that helps users cope with stress; it was named best in health and wellness at the 2019 Consumer Electronics Show.



It's a feeling familiar to us all. We sense it when we're waiting for the results of a medical exam, preparing to ask our boss for a raise, or rehearsing to ask our crush on a date. It's called stress, and it's the body's natural reaction to a tense, uncertain situation.

Nick Hool, a current graduate student in engineering who in 2016 completed his BSE in bioengineering, knows all about it. Hool has been an avid golfer for most of his life, but he still feels the rush of nerves when he steps onto the green to tee off. But after years of research, he believes he may finally have a solution — no pills or weeklong meditation retreats required.

Hool's solution, developed with two other ASU engineering students, is a small pair of earbuds he calls the P57 ONE. Instead of piping in music, the earbuds deliver a weak electric current to the inner ear to stimulate the nerve that regulates our fight-or-flight response. As Hool discovered, the earbuds produce a rapid decline in the wearer's stress levels, which he hopes may one day include professional athletes, soldiers and anyone who wants to bring a little more calm to their life.

Hool is currently conducting clinical trials under the auspices of his company, Hoolst Technologies, which got a big boost when it won \$100,000

in the ASU Innovation Open in 2018. Hoolst is one of the first to take up residence at the new WearTech Applied Research Center, which is plotting the future of wearable technology at Park Central in midtown Phoenix.

A collaboration between the Partnership for Economic Innovation and the Ira A. Fulton Schools of Engineering, WearTech opened its doors last September to ASU students, faculty and local companies. ASU has long been in the forefront of medical technology, and the center aims to accelerate the transition of these technologies from the lab to the market by forging links between industry and academia.

"We've come to a point in time where you can take the rich functionality of microelectronics and put it in new forms, fits and functions," says Gregory Raupp, a professor of chemical engineering and research director of the WearTech Applied Research Center. "It's as simple as putting on your clothes to adapt to this new technology."



Grad student Chris Lue Sang wearing a device by FlexBioTech, co-founded by Jennifer Blain Christen, Karen Anderson and Joseph Smith, that makes electronics to help diagnose disease.

**"We've come to a point in time where you can take the rich functionality of microelectronics and put it in new forms, fits and functions."**

— GREGORY RAUPP, PROFESSOR OF CHEMICAL ENGINEERING AND RESEARCH DIRECTOR OF THE WEARTECH APPLIED RESEARCH CENTER

#### **Wearable tech goes mainstream**

Until a few years ago, wearable tech was rarely seen outside a lab or a clinic, where doctors used the devices to gather critical patient data or help with recovery. Some of these devices tracked the mundane ebb and flow of brain waves or glucose levels. Others, like the sophisticated robotic exoskeletons developed by Tom Sugar, a professor of engineering, had more esoteric medical applications like helping the recovery of stroke victims. These technologies improved countless lives, but it took the arrival of wearables like the Apple Watch and Fitbit to truly catapult wearable tech into the mainstream.

Not only could these consumer devices monitor various vital statistics like sleep patterns and heart rhythms, they were fashionable and affordable to boot. People became obsessed with tracking their health, and the so-called "quantified self" movement was born. Consumer wearables quickly grew beyond mere tracking technology, and

**Wearable health care devices by the numbers**

**1.3M**  
lives saved

by wearables by 2020  
— SWISS FIRM SOREON RESEARCH

**\$200B**  
saved

Estimated global health cost savings from wearable tech over the next 25 years  
— DELOITTE

**50%**  
reduction in hospital visits

Projected reduction in hospitalizations through use of home monitoring devices of chronic diseases

**\$56.8B**  
market value

market projection for wearable tech by 2025  
— MARKETANDMARKETS



HemaPorter is a smart cold storage container for securely transporting blood and organs in environments that lack access to electricity.

devices for a host of therapeutic and performance-enhancing uses began to hit the market. Today, wearable tech is estimated by industry analyst CCS Insight to be a \$25 billion global industry expected to double in size within five years.

**Taking wearables from the lab to the market**

With the WearTech Applied Research Center joint venture, ASU is helping to ensure that Phoenix is at the forefront of the wearables revolution. The center provides a space for Sun Devils and local industry partners working on wearables to host meetings and do testing as they prepare their products for the market. Raupp and his colleagues at WearTech also help the center's partners navigate the legal hurdles associated with launching new medical devices, and the team helps industry partners

find novel commercial applications for their technologies.

Some of the tenants, like Hool, are relative newcomers to wearable tech. Others, like Jennifer Blain Christen, an assistant professor in the School of Electrical, Computer and Energy Engineering, have been researching digital health technology for decades. In 2016, Christen, along with Mayo Clinic medical oncologist and immunologist Karen Anderson, MD, PhD, associate professor at the Biodesign Institute, and Joseph Smith, '14 PhD in electrical and electronics engineering, co-founded FlexBioTech, a company that makes flexible, bio-safe electronics for disease diagnostics. The company grew out of Christen's National Science Foundation-funded research on smart patches that could sense the presence of biomarkers that might

indicate health problems in users' sweat and provide data analytics to smartphones.

Christen has spent most of her career delving into the tricky material problems associated with wearable devices — how to make the electronics smaller, faster and cheaper without sacrificing the quality of the data or the user experience. For decades, hardware limitations were the major bottleneck preventing the widespread adoption of wearable tech. No one wants to look like they're wearing a computer. In this sense, Christen says that the WearTech center came along at an ideal time.

"We're finally able to make small wearable devices, and the cost has become so much more accessible," Christen says. "It doesn't take \$10,000 to get started making something; for \$30 you can go

get a microprocessor that's small enough to wear on the body."

Christen and her colleagues were able to surmount the technical challenges involved with creating a device no thicker than a bandage that could detect the concentration of particular molecules and wirelessly relay that data to a computer. Yet, finding a commercial application proved challenging.

WearTech helped Christen form a partnership between FlexBioTech and True Mobile Health, a Phoenix-based medical services provider. True Mobile Health was looking for a way to monitor alcohol and illicit substances in patients just released from addiction treatment centers, a possible use case that Christen hadn't previously considered. In the future, she says the smart patch might also be used as a diagnostic tool for common diseases like the flu or mono, monitoring stress and

keeping tabs on infection.

As a neuropsychologist and founder of Phoenix-based Serin Center, Amy Serin, '96 BS in psychology, appreciates the challenges of bringing a new device to the market. As part of her clinical practice, Serin developed TouchPoint Solution, which makes a wearable technology that helps users cope with debilitating stress by using two devices that alternate vibrations. The alternating vibrations essentially tell the brain to turn down its stress response. According to Serin, it's the high-tech equivalent of listening to some calming music, but exerts a much more rapid and powerful effect on the brain.

When Serin was studying psychology at ASU as an undergrad in the mid-'90s, the first flip phone, the Motorola StarTAC, was the hottest mobile device on the market, so no one was talking about wearable digital devices that are also mini-computers. Today, mental health professionals are abuzz about her device, which has proven effective for reducing stress in autistic children, those suffering from post-traumatic stress disorder, and those dealing with the routine anxieties of daily life. It recently was named the best in health and wellness at the 2019 Consumer Electronics Show by Digital Trends, a commercial success that Serin attributes to the device's effectiveness and the fact that it was the first of its kind to hit the market.

Serin co-founded TouchPoint Solution in 2015 and began selling the devices in 2017. Last year, she says the device was used more than

1 million times by people around the world. Serin says she was able to get TouchPoints in front of customers quickly by marketing it as a general purpose wearable rather than a medical device.

Claiming that a device has medical benefits requires the tech to undergo rigorous FDA clinical trials, which can take years. Many of the wearables being tested at the WearTech center, such as Hool's earbuds and Christen's smart patches, are being developed as medical devices, which opens them up to markets inaccessible to nonmedical technologies. The lengthy process of getting FDA approval makes the support of WearTech all the more important for getting these medical products out of the lab and into the real world.

But the wearables revolution doesn't stop at the doors of the WearTech center. In April, the first cohort of the MedTech Accelerator, a collaboration between ASU and Mayo Clinic to foster the development of early stage medical technologies, began a six-to-12-month program.

Lukas-Karim Merhi is the co-founder and CEO of BioInteractive Technologies, one of six companies that is part of the first MedTech Accelerator cohort. He is using his time with the MedTech Accelerator to develop TENZR, a digital wristband that monitors hand, wrist and elbow movements to help patients recover from a variety of injuries, ranging from carpal tunnel syndrome to golfer's elbow. Merhi expects TENZR to enter the market later this year, and says the MedTech Accelerator is helping him further refine the device.



**"I live in the world of a lot of digital economy stuff that is flashy, but does it solve real-world problems? You folks are solving real-world problems."**

— LEN LANZI, MANAGING DIRECTOR OF THE PREACCELERATOR, AT THE 2020 ASU INNOVATION OPEN COMPETITION

"We've had unparalleled access to stakeholders in the Mayo system," Merhi says. "We've learned a lot through our conversations with surgeons, administrators, therapists and clinicians, and intend to run a trial at Mayo Clinic for the different indications we assist with."

Like many entrepreneurs, Army veteran Travis Witzke, '11 BS in management and '15 MBA, invented a product because of the need he

Student researcher Brandon Martin (pictured) and Tom Sugar, a professor in the Ira A. Fulton Schools of Engineering, designed an exoskeleton that can help warehouse workers beat fatigue.

saw in his everyday life. He parlayed his harrowing experiences on the battlefield into Desert Valley Tech to develop the HemaPorter. It's a smart cold storage container for securely transporting blood and organs in war zones and other environments lacking access to electricity or reliable medical facilities. Witzke recently won \$10,000 in the Ashton Family Venture Challenge and was one of six firms to receive a \$30,000 grant from the Flinn Foundation last year to further develop the device.

Institutional support from the WearTech Applied Research Center and the MedTech Accelerator, combined with the enterprising spirit of ASU alumni like Witzke, are rapidly turning Phoenix into a wearable tech capital. It's only a matter of time until more of these devices will be coming to a wrist near you. ■

**"Learning you can actually take an idea and start a company and hire people and bring in revenue and have an impact in your community, is such a significant empowerment."**

— JI MI CHOI, ASU ASSOCIATE VICE PRESIDENT OF ENTREPRENEURSHIP + INNOVATION



BIG MONEY

**Power of the pitch**

Every semester, in classes and extracurricular activities, students have the opportunity to learn entrepreneurial skills like evidence-based pitching. They pitch their ideas in competitions such as ASU Launch Days and biannual Demo Day challenges. Competitors won a total of \$150,000 in seed money at the most recent Demo Day in December. Some of these winners go on to the ASU Innovation Open held every January, which draws entrepreneurs from around the globe. This year's participants competed for more than \$300,000 in cash prizes and other funding to support their ventures.

Alumni and community members can apply to be part of ASU Venture Devils to receive entrepreneurship and pitch training, mentorship and access to funding opportunities. Every year, ASU awards, with Edson endowment dollars and other philanthropic gifts, more than \$1 million for promising business ideas.

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

ASU students across disciplines learn how to pitch a business idea and gain the skills and know-how to start a successful business.



**BUILT FOR COLLABORATION**  
Hayden Library has gone through many changes since it opened in 1966, including a time from 1989–2020 when it could only be accessed by an underground entrance. It reopened in 2020 after \$90 million in improvements.

**Students studying at night in Hayden Library.** This photo from 1984 shows the original above-ground entrance and stained glass windows that were incorporated into the redesign.

**Hayden Library reopens**  
Turbocharged for the 21st century.  
**54**

**Honoring education champs**  
Founders' Day winners.  
**60**

For the latest in library resources, including online learning material for study and research from home, see [lib.asu.edu](http://lib.asu.edu).

# Hayden Library reopens its doors

After a major reinvention, the library provides maximum accessibility, engagement and support

**Story by** BRITT LEWIS

**Photos by** JAROD OPPERMAN

A welcome gift arrived for Sun Devils on the first day of the spring semester — a sleek, new, state-of-the-art library. Originally built in 1966, Hayden Library has been reinvented and reopened for the 21st century, with an eye toward maximum accessibility, engagement and support for the university's growing student population.

The revamped five-story tower at the center of ASU's Tempe campus features nearly double the student space, more study areas, community-driven book collections, two reading rooms, research services and interdisciplinary learning labs, and an entire floor devoted to innovation.

"Hayden Library has been the engine of intellectual discovery for generations of Sun Devils," says University Librarian Jim O'Donnell, a professor in ASU's School of Historical, Philosophical and Religious Studies. "We just turbocharged it for a new generation."

**“Hayden Library has been the engine of intellectual discovery for generations. ...**

**We just turbocharged it for a new generation.”**

— JIM O'DONNELL,  
UNIVERSITY LIBRARIAN

Perhaps the most obvious indication of the library's reinvention is its wide plaza and above-ground entryways; an underground entrance was the sole entrance from 1989-2020.

Although the dust may still be settling in Hayden Library, one thing is clear: The books are back. It took approximately 20 days, 30 truckloads and 9,000 new shelves — along with four years of careful planning for how those books would best be displayed, curated and delivered. Now, the library features more than 30 different collections.

“Our team employed a community-centered and data-informed approach to designing the collections for Hayden Library,” says Lorrie McAllister, associate university librarian for collections services and strategy.

In 2017, McAllister co-authored a widely shared white paper on emerging design practices that is now shaping the curation and delivery of academic library print collections at ASU at a time



The renovated library includes nearly 50,000 more square feet of space, including places for collaboration. It also boasts more than 75 miles of data cabling to more effectively support nearly 2 million visitors each year.

when campus space and digital resources are in high demand.

As a result of this work, ASU students, faculty and staff will encounter a series of newly featured collections, such as “Untold Histories” and “The Southwest Before the U.S.”

Meanwhile, the Future of Print initiative, with support from The Andrew W. Mellon Foundation, continues to explore the interests, needs and expectations of 21st century academic library users to reinvent print and library resource use at ASU.

“A great example of how the ‘Future of Print’ project has influenced the Hayden collections design is our new Sun Devil Reads collection, designed with students

and in-person browsing in mind, organized by themes and with lots of eye-catching cover art,” McAllister explains.

The library also boasts sustainability achievements, such as the use of recycled materials — approximately 80% of materials used in the renovation were diverted from a landfill. About 13% of the building's annual energy expenses are met by Hayden Library's highly reflective rooftop photovoltaic solar power system, helping to lower the impact of the urban heat island effect. Overall, the renovation has reduced the library's annual energy costs by 47%.

As for water, low-flow fixtures installed throughout Hayden



reduce demand for potable water by 37%, and appropriate plant selection, coupled with high-efficiency irrigation systems, reduce irrigation's demand for potable water by 80%.

“We've greatly benefited from smart, sustainable design practices that have come a long way since the 1960s, when Hayden Library was built,” O'Donnell says.

Tomalee Doan, associate university librarian for engagement and learning services, says, “This renovation represents a bold step forward in executing a transformative vision of the academic library, both in maintaining the integrity of what a library historically has provided and building a bridge to meet future demands our students and scholars expect today.” ■

The library has open areas for students to study, ground-floor special collections and a Makerspace lab where users can learn to use a 3D printer and other tools. The photo on the left shows how the library's original stained glass was incorporated into the design.



# ‘How do we become more human and more humane?’

What if we imagine ASU as an art-science university? What if art was embedded across the university as a catalytic ingredient, leading to lifelong learning and positive social impact? ASU-Leonardo Initiative Executive Director Diana Ayton-Shenker is posing big questions at the intersection of art and science.

ASU and Leonardo/The International Society for the Arts, Sciences and Technology are embarking on a new initiative led by Ayton-Shenker. The partnership provides leadership for the advancement of ASU's work in the area of art-science research, connecting it with Leonardo and Leonardo Music Journal, both published by the MIT Press.

Since joining the ASU-Leonardo partnership last fall, Ayton-Shenker has been meeting and collaborating with community stakeholders across ASU to get a sense of how the university's uniqueness and similarities have created and can create an impact on 21st-century problems.

She has begun working with Professor Leland Hartwell, Nobel Laureate, to develop and co-teach a new Humanities Lab and is working with faculty and students in the School for the Future of Innovation in Society and the School of Arts, Media and Engineering in the Herberger Institute for Design and the Arts.

**To learn more about the ASU-Leonardo Initiative, go to [leonardo.asu.edu](http://leonardo.asu.edu).**

## Leonardo

Leonardo was founded in 1968 in Paris by kinetic artist and astronautical pioneer Frank Malina. Published by The MIT Press, Leonardo is the leading international peer-reviewed journal on the use of contemporary science and technology in the arts and music.

## Leonardo Music Journal

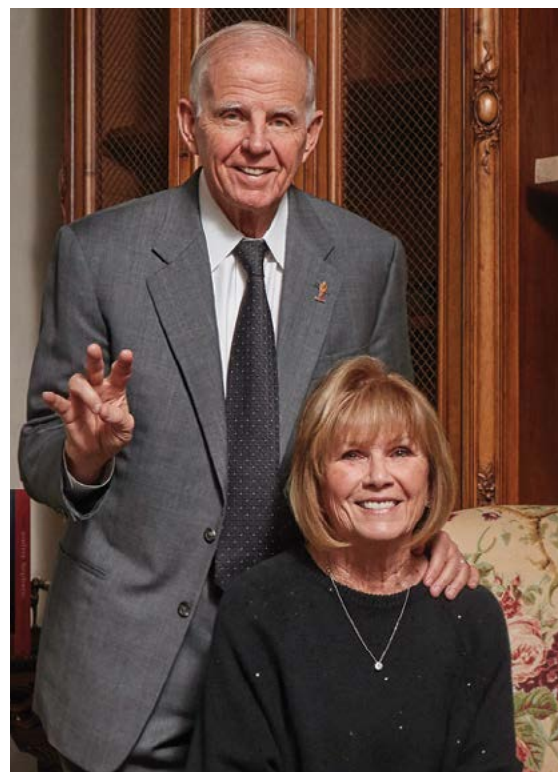
Leonardo Music Journal, also published by The MIT Press, is the companion annual journal to Leonardo. It is devoted to aesthetic and technical issues in contemporary music and the sonic arts.



**Diana Ayton-Shenker**  
CEO of Leonardo/The International Society for the Arts, Sciences and Technology, she is an award-winning social entrepreneur and author of four books, including "A New Global Agenda: Priorities, Practices, and Pathways of the International Community"; her work has been featured in the World Economic Forum Agenda, Huffington Post and on NPR.

# Honoring champions of higher education

## Founders' Day



**Annette and Leo Beus**

Having enriched ASU through their longtime generosity and support, the Beuses are honored with the Philanthropists of the Year Award.



**Devoney Looser, PhD**

Foundation Professor of English, Department of English, The College of Liberal Arts and Sciences, Faculty Research Achievement Award.



**Richard Herrera, PhD**

Associate Professor, School of Politics and Global Studies, The College of Liberal Arts and Sciences, Faculty Teaching Achievement Award.



**James P. Collins, PhD**

Professor of Natural History and the Environment, School of Life Sciences, Faculty Service Achievement Award.



**Anthony Robles, '11 BIS in interdisciplinary studies**

NCAA Wrestling Champion, author and motivational speaker, Young Alumni Achievement Award.



**Karrin Taylor Robson, '88 BA in political science and history, '94 JD**

Founder and President, Arizona Strategies, Alumni Achievement Award.

### Carrying forward the tradition of transforming student lives, the university and our world

Founders' Day has been an Arizona State University signature event for decades that honors individuals who exemplify the spirit of the founders of the Territorial Normal School, ASU's predecessor institution. Their groundbreaking research, excellence in teaching, unparalleled success and visionary philanthropy is fundamental to the university's trajectory toward becoming a New American University.

Hosted by the ASU Alumni Association,

Founders' Day 2020 was held on Feb. 25 at the Arizona Biltmore in Phoenix. The event recognized alumni, faculty and supporters — all leaders of the effort to advance an institution that has become the nation's largest public research university and holds the unique distinction of being ranked No. 1 in innovation for five consecutive years by U.S. News & World Report.

For more information on Founders' Day 2020, visit [alumni.asu.edu/events/founders-day](http://alumni.asu.edu/events/founders-day).

**Check for updates:** information about event dates and times may have changed since the press date. Please check the provided websites for more information.

# Play like a Sun Devil®



### HOLE IN ONE

For the first time in nearly three decades, you can watch the NCAA tournaments tee up in your own backyard. ASU and Grayhawk Golf Club will host the 2020 through 2022 NCAA Division I Men's and Women's Golf Championships in Scottsdale, Arizona. It becomes the first time a university and golf course will host the championships for three consecutive seasons. The championships will be contested on Grayhawk Golf Club's Raptor course, a Tom Fazio design that is listed among the "Best Public Golf Courses in Arizona" by Golf Magazine.

May 22–27 (women) and May 29–June 3 (men)  
 Grayhawk Golf Club, Scottsdale  
[thesundeils.com/ncaagolf](http://thesundeils.com/ncaagolf)

**"We are thrilled for the opportunity to host the nation's elite in our own backyard."**

— RAY ANDERSON, VICE PRESIDENT FOR SUN DEVIL ATHLETICS

**Boundless spirit and resolve**  
 Anthony Robles turns adversity into success  
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## Wrestling

## Always 'unstoppable'

With boundless spirit and resolve, Anthony Robles turns adversity into success, on his terms

Known nationally for his stellar career as an NCAA Wrestling Champion, author, motivational speaker and most of all for his ability to conquer adversity, Anthony Robles makes a habit out of always seeing the bright side of life.

Born without his right leg, Robles knew his dream of becoming a champion wrestler would be hard to achieve.

His early wrestling career was fraught with challenges. Yet he went from being last in the city of Mesa to finishing high school as a two-time Arizona State Champion and a high school National Champion with a 96-0 record.

At ASU, Robles was a three-time All-American and the 2011 NCAA National Champion. He served on the President's Council on Fitness, Sports and Nutrition, is a two-time ESPY Award recipient — and was inducted into the National Wrestling Hall of Fame and the Arizona Sports Hall of Fame. For nine years Robles has been the leading wrestling analyst for ESPN and, since 2015, for the Pac-12 Network.

Later this year, a film produced by Dwayne Johnson based on Robles' 2012 memoir "Unstoppable: From Underdog to Undefeated: How I Became a Champion" will be released in theaters.

**"My mom raised me with my head in the clouds, so I believed I could do anything I set my mind to. This way of thinking compelled me to walk onto the wrestling team to prove to them, and the world, anything was possible."**

— ANTHONY ROBLES, '11 B.S. IN INTERDISCIPLINARY STUDIES, RECIPIENT OF THE FOUNDERS' DAY YOUNG ALUMNI ACHIEVEMENT AWARD

See Anthony Robles on ASU's YouTube channel at [youtube.com/asu](https://youtube.com/asu).

## Senior experience

## Sun Devil seniors take in 'Kings of Harlem'

Sun Devil senior student-athletes along with several other special guests were treated to a memorable experience with a viewing of "Kings of Harlem," courtesy of Vice President for University Athletics Ray Anderson and his wife Buffie.

The event, which began in 2016, is a tradition the Andersons created to expose student-athletes to an educational, cultural, arts-oriented evening many have not experienced in their young lives.

"The outcome of this experience is to provide something new," Buffie stated. "Being in an environment that maybe they've never been in before. We found out after the first year that many of the student-athletes have never been to theater."

That idea has blossomed over the years and the Andersons have delivered a unique experience each

time, including a showing of "The Last Gold," at Galvin Playhouse in 2017 followed by unforgettable performances of "Hamilton" in 2018 and "Wicked" in 2019 at Gammage Auditorium.

This year's experience had a familiar feel to several Sun Devils and was held on the court of Desert Financial Arena.

The 90-minute show brought the audience back to Harlem, New York, and followed the journey of the 1939 Harlem Rens basketball team, an all-black pro team which was founded several years before the well-known Harlem Globetrotters.

The play not only provided a distinctive history lesson to those in attendance but life lessons through the character portrayals of each player on the roster and their beloved coach.



The Andersons learned years ago that many student-athletes had never been to the theater. They now host student-athlete seniors for a show each year. This year, "Kings of Harlem" was staged in Desert Financial Arena for the student-athletes.

## 2020 Football Schedule

## SEPTEMBER



3 (THU) vs. Northern Arizona



12 (SAT) at UNLV



19 (SAT) vs. Brigham Young



26 (SAT) at USC

## OCTOBER



3 (SAT) vs. Oregon State



10 (SAT) vs. UCLA



24 (SAT) at Colorado



31 (SAT) at Washington State

## NOVEMBER



7 (SAT) vs. California



13 (FRI) at Oregon



21 (SAT) vs. Utah



28 (SAT) at Arizona

Schedule subject to change.

For tickets, please call 480-965-5812 or visit [TheSunDevils.com](https://TheSunDevils.com)

## 500 wins for Turner Thorne

At the end of January, Sun Devil women's basketball head coach Charli Turner Thorne captured her 500th career victory in dramatic fashion as the team scratched and clawed out a 76-75 thriller in triple overtime over Pac-12 foe USC in Tempe. It was her and the program's first-ever triple overtime game as Reili Richardson buried a game-winning 3-pointer for a career-high 24 points. Coach Turner Thorne and the Sun Devils are striving for their 15th NCAA appearance together in her 23 years leading the team.

LOOK UP

### Wilderness Astronomy

Postdoctoral astrophysics researchers Melodie Kao, left, and Parke Loyd, of the School of Earth and Space Exploration, observe the countless stars, and a few shooting stars, in the near-dark sky by the Tom Mix Memorial, south of Florence, Arizona, this winter. The two are offering their Wilderness Astronomy course in the spring, in which students will learn concepts in astronomy, physics, planetary science and outdoor camping that help them better understand and better explore Earth. The course highlight is a week-long backpacking trip during spring break near Sedona.

For opportunities for alumni and community members to learn about astronomy and planetary science, see [sese.asu.edu/public-engagement](http://sese.asu.edu/public-engagement).




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<sup>1</sup>Average savings based on countrywide survey of new customers from 8/1/16 to 8/1/17 who reported savings from prior premiums when they switched to Liberty Mutual. Savings comparison does not apply in MA. <sup>2</sup>The property damage must be covered by your policy, and repairs completed by a Guaranteed Repair Network Vendor. Guaranteed Repair Network not available in Rhode Island or Massachusetts. In Massachusetts we offer you our Superior Service Program (SSP), which is similar to the Guaranteed Repair Network, however, the estimate is completed by a Liberty Mutual appraiser. For more information, speak with your Liberty Mutual Claims Representative. <sup>3</sup>Optional coverage. Subject to a deductible. May vary by state. Coverage provided and underwritten by Liberty Mutual Insurance and its affiliates, 175 Berkeley Street, Boston, MA 02116 USA. Equal Housing Insurer. ©2019 Liberty Mutual Insurance 11489673  
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Intellectual Property Owners Association

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