

# ASU

ARIZONA STATE UNIVERSITY  
VOLUME 24 NUMBER 2

## Thrive<sup>®</sup>

**PLUS**  
**GLOBAL BLUEPRINT  
FOR A LIVABLE PLANET**  
Mapping Earth to stem  
biodiversity loss and  
climate change

**SAVING LIVES  
THROUGH INNOVATION**  
Mayo ASU Medtech  
Accelerator leads to new  
breakthroughs

**ECONOMIC IMPACT**

# Becoming shatterproof

What it will take to  
build an antifragile  
economy in Arizona

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# Building what's next

Preparing students, startups and structures to become antifragile for a changing world

In our labs, classrooms and startup spaces, we are working together with students and industry to meet the challenges of a complicated world that is changing at a faster rate than ever before. We are a nimble and complex institution committed to public impact, student success and continuous improvement. We are purpose driven, seeking to create value and success for ASU students, leading in use-inspired research and discovery, collaborating with businesses and acting as a positive catalyst for Arizona's economy.

Technology and innovation are vital to Arizona's long-term economic outlook as well as to managing its short-term challenges from the COVID-19 pandemic.

As we continue to manage our way through a public health crisis while planning for the economy of the future, our graduates will have a critical role to play. ASU engineering and technology graduates attract major companies, start new ones and help those here continue to grow and create high-wage jobs, supporting the state's economic development strategy.

In this issue, we highlight research in all phases – from exploration to actionable technology to business implementation. From the Mayo ASU MedTech Accelerator bringing deep insights from doctors and patients to health care tech to solar panel innovation to new therapies for cancer, ASU research is fueling economic vibrancy.

Fast-growing sectors like manufacturing, information technology, health care, business services and energy are education-intensive, demanding both knowledge-based and applied skills. ASU's colleges and partnerships are ahead of the curve in meeting the assignment to prepare Arizona's workforce of tomorrow. ASU continues to bring together faculty and industry leaders, identifying specific workforce needs, developing training programs and creating long-term partnerships. We look forward to partnering to achieve the antifragile economy we are capable of creating.

**Michael M. Crow**

President, Arizona State University

[asuthrive@asu.edu](mailto:asuthrive@asu.edu)

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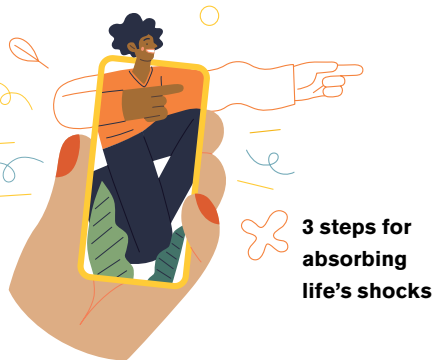
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JAROD OPPERMAN/ASU; GREG ASNER

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Please visit [magazine.asu.edu](https://magazine.asu.edu) for the digital magazine with embedded videos and links.

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## Biophilia: Designing with the power of nature to heal and nourish our communities

The intrinsic relationship we have with the natural world is well proven in science, demonstrating profound physical and physiological health and benefits, including reduced stress and tension and higher levels of creativity, learning, productivity, healing and happiness. The term for our biological connection and affinity for the natural world is biophilia, or love of life. Join Sonja Bochart, a design leader in health and wellness, for a webinar. Bochart works nationally as a designer, and biophilia and sustainability consultant. Her portfolio includes award-winning educational, community, international, cultural, residential and corporate spaces.

**Wednesday, March 31, 1:30 p.m., online, hosted by The Design School in the Herberger Institute for Design and the Arts**  
[asuevents.asu.edu](https://asuevents.asu.edu)

**Free Family Online**

# Apr


## Digital Masterclass: 'Art from Around the World: India'

Henna was brought to India in the 1500s. Its beautiful symbols and creation are an important part of festivals and celebrations, especially weddings. Participants in "Art from Around the World: India" will use basic henna designs to decorate an envelope and make a card.

**Monday, April 5, 4 p.m., online, on-demand after initial presentation**  
[asugammage.com/digitalconnections](https://asugammage.com/digitalconnections)

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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.

First Woman Creates Sun and Moon  
(Navajo/Diné)



First Woman marked two large circles on the slab of quartz, making Jo'hannaa'ei (Sun) and TL'ehonaa'ei (Moon).

## 'Machine Learning Day'

In the last decade, machine learning has reshaped the relationships among data, computation and decision-making, allowing for order of magnitude improvements in quality and scale. "Machine Learning Day" brings together researchers and practitioners to report research on the theory and practices of machine learning, data mining and artificial intelligence. Highlights include keynote speeches from top researchers, presentations and poster sessions.

**Friday, April 9, 8:30 a.m.–5 p.m., online**  
[asuevents.asu.edu](https://asuevents.asu.edu)

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O'odham Cloud Brothers  
(Akimel O'odham and Pee-Posh/Maricopa)



Cloud said to the brothers, "Show me you are truly my sons!" The twin boys created lightning, followed by loud thunder.

## 'Traditional Stories of Light'

The ASU Art Museum collaborated with Vanessa Moreno (Purépecha, Tepehuán), Eunique Yazzie (Diné) and Dustin Lopez (Diné, Yaqui, Laguna Pueblo) to create the "Traditional Stories of Light" coloring book representing traditional stories involving light from the Native American peoples of the Southwest.

Friday–Sunday, 11 a.m.–5 p.m., ASU Art Museum, 51 E. 10th St., Tempe. Stop by the museum for a free coloring book or download the digital version.

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

Free Family Online



Support for this project was provided by Dr. Kathryn Medill, the audience experience coordinator for the ASU Art Museum. Funding for this project was provided by Presidential Strategic Initiative Funds.



## Digital Masterclass: 'Friendly Monsters'

Let's have fun creating funny monsters and learning about expression, texture, collage and watercolor techniques. We will also create backgrounds for your monster's play world. Students will discover drawing techniques and tapping into their imagination as well as discussing emotions in a safe and supportive way. Students will need their own supplies, including paper, watercolors or markers, crayons, scissors and glue.

Online, on-demand  
[asugammage.com/digitalconnections](http://asugammage.com/digitalconnections)  
[livestreamlibrary](http://livestreamlibrary)

Free Family Online

## An evening with climate fiction writer who explores the American West



Join the Virginia G. Piper Center for Creative Writing and award-winning author Claire Vaye Watkins, whose book, "Battleborn," says Antonya Nelson in The New York Times Book Review, is a "dense and haunting story, told in the lyric and associative method of a poem, taking place over 150 years and populated by characters who invented the American West — miners, movie stars, millionaires, maniacs. Visionaries, in short, charismatics and opportunists."

Friday, April 9, 6–7 p.m., online

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

Free Family Online

## Virtual yoga

LiveWell Yoga offers free, one-hour yoga classes led by local community instructors.

Classes are open to the public, and all levels are invited to practice, whether you are a beginner or an expert. Registration is required for each class, but nothing more is needed to participate.

Tuesdays, 12 p.m., Saturdays, 9:30 a.m., until May 1, online

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

Free Family Online



Visit [asuevents.asu.edu](http://asuevents.asu.edu) for events.

Visit [thesundevils.com](http://thesundevils.com) for athletics.



## Check in to online 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)

# May



## Pat's Run 2021 – virtual or with your local chapter

It's time to put on your running shoes and join your local Pat Tillman Honor Run! Each spring, the ASU Alumni Association, in partnership with the Pat Tillman Foundation, coordinates the annual Tillman Honor Runs around the U.S. to honor the legacy and impact

of former Sun Devil and Army Ranger Pat Tillman. These 4.2-mile fun runs/walks are hosted by ASU Alumni chapters and clubs, and are open to the community. For spring 2021, select cities will be hosting Tillman Honor Runs in person. The runs will have limited capacity for participant registration and will be managed within all local health and safety guidelines. Participants and volunteers will be required to wear a mask during the event. Registration for the in-person Tillman Honor Runs is open now. An updated list of host cities is available online.

See [alumni.asu.edu/events/tillman-honor-runs](https://alumni.asu.edu/events/tillman-honor-runs) for more information on local and virtual options.

Family Ticketed

# Career



## Alumni and new graduates recruiting event

If you are looking to take that next step in your career, then be sure to attend this exclusive recruiting event designed to connect you with employers who have open employment opportunities and want to hire ASU alumni.

Thursday, May 13, 3–5 p.m., online, registration required.

[career.asu.edu/events](https://career.asu.edu/events) Free Networking Job search Online

## Master's and PhD hiring event

Join us for this exciting career event designed to connect you with employers who have open employment opportunities across a variety of functions and industries, who are looking to hire master's and PhD students.

Friday, March 19, 1–3 p.m., online, registration required

[links.asu.edu/mphd](https://links.asu.edu/mphd)

Free Networking Job search Online

## Cyber careers hiring event

Are you interested in a career that allows you to manage and safeguard data through technology? Do you enjoy leading change and innovation? Cyber career jobs include roles in information technology, information security, systems administration, desktop support, forensic analysts, computer network analysts and more. Join us at this virtual event to meet with employers with cyber career-related positions that are looking to connect with talented individuals like you.

Wednesday, March 24, 11 a.m.–1 p.m., online, registration required

[links.asu.edu/cybcare](https://links.asu.edu/cybcare)

Free Networking Job search Online

## Making Smart Money Moves

Join the ASU Alumni Association as financial guru Emily Schwartz of MidFirst Bank, tackles a variety of personal finance topics. The series will offer workshops on budgeting, managing debt, the psychology of spending, hobbies that won't break the bank and so much more! A full list of topics can be found on the registration site. Every second Tuesday of the month, now through Dec. 14, 5:30–6:30 p.m., online

[asuevents.asu.edu/moneymovesseries](https://asuevents.asu.edu/moneymovesseries)

Free Lifelong learning Online







ASU for You is a flexible and growing set of digital educational assets to meet the needs of a rapidly changing, technology driven world. It is designed for people of all ages at all stages of their educational, career or lifelong learning journey — wherever in the world they may be.



## K–12 teaching resources, programs and playbooks

**For parents**

### Miacademy and more

Whether you're supplementing your child's learning or home-schooling at length, find the support you need. ASU for You offers university curated online lessons, printable worksheets, educational games, virtual field trips and more.

[asuforyou.asu.edu/parents](https://asuforyou.asu.edu/parents)

**Free** Lifelong learning  
**Online**

**For educators**

### ASU Prep Digital

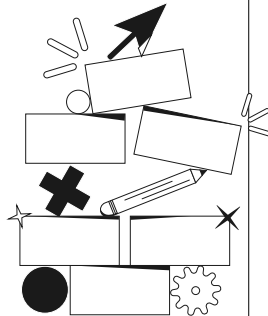
Tutoring, online courses, training videos for teachers or parents teaching at home, programs for schools — it's all here. Accelerate your progress with these remote digital learning tools and achieve your high school, college, career and life goals on your schedule.

[asuforyou.asu.edu/educators](https://asuforyou.asu.edu/educators)

**Free** Lifelong learning  
**Online**

## User experience, analytics and software engineering: Digital skills bootcamps have you covered

Jump-start your career in UX/UI design, data analytics or software engineering with a digital bootcamp offered by ASU and Thinkful, an innovative online skills accelerator. The best part? You'll earn a digital badge and accompanying professional certificate from ASU Learning Enterprise to verify your hard work and skills learned.



[asuforyou.asu.edu/professionals](https://asuforyou.asu.edu/professionals)

**Lifelong learning** **Online**



Penny Ziessman learns the American Sign Language sign for "coffee" during a class with Professor Pamela Howard as part of the Osher Lifelong Learning Institute.

## Lifelong learning classes and resources for adults

What have you always wanted to know? From innovation workshops to the mindset needed for a NASA mission, from citizen science to cultural immersion, it's never too late to learn something new! Explore university curated resources, perfect for lifelong learners with an insatiable curiosity and thirst for knowledge.

[asuforyou.asu.edu/50plus](https://asuforyou.asu.edu/50plus)

**Lifelong learning** **Online**

## COVID-19 testing and vaccines

ASU has managed COVID-19 since January 2020, a demanding journey that led to the creation of saliva-based COVID-19 tests, a daily health check app and a series of protocols on our campuses to fight the spread of the virus. The next step is vaccines. In Arizona, the COVID-19 vaccine is allocated through state, local and tribal health jurisdictions. The state of Arizona is using a vaccine prioritization phased approach. In order to be vaccinated,



you will need to be a member of the current phase, schedule an appointment and provide appropriate identification once you arrive at the vaccination site.

**Learn more about the vaccine at [coronavirus.asu.edu/vaccine](https://coronavirus.asu.edu/vaccine)**

**Learn more about ongoing saliva testing at [biodesign.asu.edu/research/clinical-testing/testing/](https://biodesign.asu.edu/research/clinical-testing/testing/)**

Community





School of Social Work graduate students Brandon Falk, left, and Ronald Bookman, far right, chat with resident Douglas Meyer, center, during a meetup in Civic Space Park in downtown Phoenix.

**GATHERING TOGETHER**

**Outdoor activities, food support, phone check-ins keep older adults connected**

The COVID-19 pandemic has been hardest on the most vulnerable people, and ASU students have been working to reach out in downtown Phoenix. Residents at the Westward Ho apartments – low-income, older adults and those with disabilities – have faced extra burdens over the past year including further isolation when they couldn't see friends and family in person. ASU's Community Collaborative, active for several years, provides students with real-world experience and enhances the quality of life for residents. In response to the pandemic, the ASU team began offering outdoor, socially distanced activities for residents, including social hours and mindfulness sessions.



# Update in the news

**Film school  
renamed  
for Poitier**

Honoring his  
life and work.

**10**

**Future of  
urban life**

New story  
collection  
explores what  
cities will  
become.

**13**



## SkySong expected to generate \$58.2 billion in impact over next 30 years

SkySong, the ASU Scottsdale Innovation Center, "is a job creator with outsized ripple effects" on economic development in the region. The estimate is part of a comprehensive new study conducted by Elliott D. Pollack and Company to gauge the project's effect on regional economic growth. It found that the SkySong public-private-university partnership was a catalyst in making SkySong a major part of Arizona's economic development picture. SkySong specifically generates an estimated annual impact of 9,350 total jobs, \$584.4 million in wages and \$1.3 billion in economic activity.



## Film school renamed after trailblazing actor and filmmaker Sidney Poitier

ASU has renamed its film school after the first Black man to win the Academy Award for Best Actor, Hollywood icon Sidney Poitier, who is now 94. The move signifies the university's commitment to inclusivity and diversity, according to ASU President Michael M. Crow.

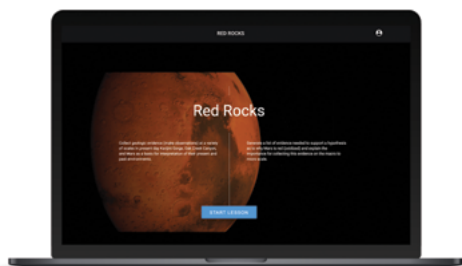
We are "deeply committed to the premise of inclusivity, and The Sidney Poitier New American Film School is an extension of that impact in an area of academic pursuit that will be advanced by representation of greater diversity and perspective," Crow says. "What we're doing here is not just recognizing Sidney Poitier for his lifetime of achievements and his legacy, but naming our New American Film School for a person that embodies that which we strive to be — the matching of excellence and drive and passion with social purpose and social outcomes, all the things his career has stood for."

The Sidney Poitier New American Film School, with nearly 700 students, is one of five schools in the Herberger Institute for Design and the Arts. The school soon will add two locations in addition to its current home on the Tempe campus: a new state-of-the-art facility in downtown Mesa that will be completed in fall 2022 as the primary home for the film school, and ASU's new center in downtown Los Angeles which will open later this year.

## ASU recognized nationally for innovative and effective learning in virtual environments

Well before the pandemic, ASU's Center for Education Through eXploration was transforming learning by developing and deploying digital learning experiences that are engaging, adaptive and transdisciplinary.

Recently, the ETX team was recognized nationally for its innovative efforts by the National Association of Geoscience Teachers. The team has been recognized for its development and implementation of online immersive Virtual Field Trips. Called "iVFTs," these experiences take the established idea of a computer-based virtual field trip and add adaptive feedback for richer interactivity. The award recognizes the iVFTs for their innovative enhancement of student learning, advancement of the discipline of geoscience education and broad societal impact.



ETX Center Director and President's Professor Ariel Anbar and his team have created online science courses for nonscientists, empowered educators to create and share next-generation courseware and technology through the Inspark Science Network, and created Infiniscope, which uses cutting-edge education to bring NASA science to high schools and middle schools.

Access Infiniscope and other innovative learning technology at [asuforyou.asu.edu](http://asuforyou.asu.edu).



## A germ of an idea: Turning the Zika virus into a helpful tool

What if the Zika virus put its natural abilities to good use to help treat mental illness and neurodegeneration? Benjamin Bartelle, an assistant professor of biomedical engineering, is exploring how to make it happen. The mosquito-borne virus caused an outbreak in the Americas in 2015 and was most notably characterized by rashes and microcephaly in newborn babies. Bartelle believes the virus can be engineered into a tool to deliver therapeutic treatments associated with mental illness, severe depression, schizophrenia and neurodegenerative diseases and disorders.

**Keep up with the headlines at ASU by subscribing to the ASU News e-newsletter at [news.asu.edu/subscribe](http://news.asu.edu/subscribe).**



## Research finds taxpayers get more than 4 times return on investment in Maricopa County parks and recreation

Maricopa County residents realized a \$4.85 return on investment for every dollar the county Parks and Recreation Department spent on operating costs at its eight parks in 2019, according to an ASU economic impact study.

The study, led by School of Community Resources and Development Associate Professor

Deepak Chhabra, indicates the parks and recreation system generated more than \$93 million in direct spending during that timeframe, and that \$82 million of that money came from visitor expenditures, while \$10 million resulted from overall operating expenditures.

**\$1 → \$4.85**

**For every dollar invested in parks, over four times the benefit was generated.**

"The Maricopa parks are an economic powerhouse as evidenced by the high leverage ratio and other positive study findings," Chhabra says. Maricopa County Parks and Recreation Director R.J. Cardin says this number is double what was estimated four or five years ago.

In addition, the study found total direct spending generated \$9.5 million in federal taxes and \$5.84 million in state and local taxes.

## Centering the user and ‘working backward’ to innovate the future of cities for economic growth

ASU Smart City Cloud Innovation Center, powered by Amazon Web Services, and known as “the CIC” (pronounced “kick”), brings together collaborations among ASU faculty, students and technologists to help organizational leaders ideate possible solutions for current challenges and design an innovative approach using technology.

The CIC employs Amazon’s innovation process known as “working backward,” which puts the customer at the center of the discussion and designs a solution based on their needs. This process enables community members to better navigate current digital transformations and develop free, open-source prototypes of the possible solutions.

Through ASU CIC’s partnership with the Greater Phoenix Economic Council, ASU’s 22 neighboring municipalities now have a prototype for a data-sharing platform that allows targeted opportunities for economic growth. Using artificial intelligence and machine learning, multiple points of business-related intelligence are organized to support economic growth throughout the Valley.

Other projects include the city of Phoenix’s revitalization of 19 call centers and website to streamline common activities such as water bill payments to extend the ability to engage customers outside of business hours.



## Understanding origins of Arizona’s Sunset Crater eruption

Around A.D. 1085, along the southern rim of Northern Arizona’s elevated Colorado Plateau, a volcano erupted, forever changing ancient Puebloan fortunes and all nearby life. Among the 600 or so volcanoes that dot the landscape of the San Francisco volcanic fields, this one blew. It was the very first (and last) eruption for what came to be known as Sunset Crater, aptly named for its multihued, 1,000-foot-tall cinder cone.

Today, School of Earth and Space Exploration scientist Amanda Clarke and her team have been working to solve the mysterious root cause of the Sunset Crater eruption and any lessons learned to better understand the threats similar volcanoes may pose around the world today.

## Study of ancient cities can offer lessons for today

York, England, was founded by the Romans in A.D. 71. At about A.D. 200, the ancient Mesoamerican city of Teotihuacan was the biggest city in the world. And Phoenix was settled in 1867. What do they all have in common? A lot more than you would think, according to a recent paper authored by ASU archaeologist Mike Smith of the School of Human Evolution and Social Change, Jose Lobo of ASU’s School of Sustainability, and a colleague at the University of Colorado.

Anyone can pick out the differences between a small Iowa town and Manhattan. There’s generally going to be more crime and

**“I was certainly surprised to find that the same quantitative patterns fit for ancient cities as fit for modern cities.”**

— MIKE SMITH, ASU  
ARCHAEOLOGIST, SCHOOL  
OF HUMAN EVOLUTION  
AND SOCIAL CHANGE

more wealthy people in the latter. There will also be more innovation and more patents. All of that is obvious. The difference is there will be more of those things per person in New York. That was

true in an ancient city as well. The authors used a scaling framework to analyze 12 examples of ancient cities and 25 modern cities.

“How do people interact in the built environment?” Smith said. “When people live in a city and move around in cities, there are certain constraints: You can only travel so far. You have to eat a certain amount of food. There’s certain constraints on what people can do in cities. In spite of that, these scaling relationships point out sort of very deep similarities because the way people move around in the city and the implications of their interactions with others, that’s what turns out to be almost the same in ancient and modern cities, which is rather remarkable.”




## URBAN MORPHOLOGY

### **What will cities look like in 2100? In a year of change, a new anthology examines the future of urban life**


Cities were changing before the pandemic. Big cities, like London and Mumbai, India, were becoming bigger. Coastal cities, like New York, Miami, and Venice, Italy, were armoring up against sea level rise. But after COVID-19 struck, something new happened. People fled cities for the suburbs and countryside. The capability to work remotely has been around for a few years, but now millions of people embrace it as their lifeline. Rents in the country's most expensive cities, like New York and San Francisco, have dropped and vacancies have risen. No one saw this coming.

What will cities look like in the future? That's the idea behind "Urban Infrastructure: Reflections for 2100," a new anthology co-authored by ASU engineering professor Mikhail Chester, an expert on preparing infrastructure for coming challenges. What functions will cities serve? Who will live in them and why? Forty experts from around the world shared their reflections for cities in the year 2100 in a series of science fiction short stories, essays and poems.

**Learn more about solutions, engagement, education, research and implementation at [sustainability-innovation.asu.edu](https://sustainability-innovation.asu.edu)**



**Pandemic migration is changing the populations of major cities, including the Phoenix metro area.**



**“We’re trying to build robotic devices to help people, to assist people... to make the work less fatiguing, easier.”**

— TOM SUGAR, ASSOCIATE DEAN, BARRETT, THE HONORS COLLEGE AT THE POLYTECHNIC CAMPUS, AND ENGINEERING PROFESSOR

#### GREAT STRIDES

### On the cutting edge of robotics

Twenty-five faculty members at ASU are researching the cutting edge of robotics. Seven of them have won the NSF CAREER award, the National Science Foundation’s most prestigious award in support of early career faculty members. It’s safe to say, ASU is poised to make great strides in the field.

“We have talent,” exoskeleton roboticist Tom Sugar said. Some of their research has gone out into the world and become reality, like a prosthetic hand that can feel. Some of it, like a flying swarm of tiny robots, is a long way off.

Learn more at [robotics.asu.edu](https://robotics.asu.edu)



## Honors colleges partner to address issues of injustice, incivility and political disengagement

Barrett, The Honors College and Macaulay Honors College at City University of New York are partnering to launch the Justice and Equity Honors Network, an interdisciplinary collaboration that will engage honors students and faculty members in teaching and learning about issues of injustice, incivility and political disengagement.

"It's important for young people to keep learning, to stay engaged and to keep training ourselves to be better humans," says Elon Graves, a student in Barrett, The Honors College at ASU and a journalism major who has served as vice president of the ASU Black Student Union at the Downtown Phoenix campus.

"We're always responding to brutality against Black and brown bodies. We all keep having to teach and protest," to bring issues to light, Graves says.



### Virtual play "Antigone in Ferguson."

Her comments came during a panel discussion that followed a December online performance of the play "Antigone in Ferguson" by the internationally acclaimed troupe Theater of War. An audience of more than 1,000 people from throughout the U.S. and abroad attended the event, which was co-hosted by Barrett, The Honors College and Macaulay Honors College at City University of New York.

Future phases will add more honors colleges to the network and a certificate program.



### 'Alexa, play Cronkite News'

Listeners will now be able to use this phrase on their Amazon smart device to access briefings from Cronkite News, a news outlet embedded within the Walter Cronkite School of Journalism and Mass Communication at ASU. Cronkite News, the world's largest media outlet operated by a journalism school, has implemented the voice-activated "play" feature on devices such as Amazon's Alexa, which allows users to immediately listen to news briefings on their smart home devices.

The student media outlet made its smart speaker broadcast debut in fall 2019 with its Cronkite News 2Go briefings, becoming the first student-powered newsroom in the nation to broadcast by smart speaker.

**Learn more about Cronkite News at [cronkite.asu.edu/real-world-experiences](https://cronkite.asu.edu/real-world-experiences).**



### JEDI Task Force mission: A new dawn in social change

Supporting calls to action for social change, the Justice, Equity, Diversity, and Inclusion programs are supported by seed grants to support novel and impactful contributions to promote equity and inclusion.

"The efforts in the School of Earth and Space Exploration, and many other units, are working diligently to prioritize justice, equity, diversity and inclusion. We strive to meet this critical moment in our nation's history to find ways to improve people's lives with new and innovative solutions that will ultimately enhance greater scientific discovery and impact," says Dean Patrick Kenney of The College of Liberal Arts and Sciences.

One of the JEDI programs includes creating Science in a Box Educator Kits to bring more science activities into the classroom through free science curricula for teachers and parents. It was designed by graduate student Linnea McCann and Associate Professor Patrick Young.

"The next school year will provide new challenges for educators and students due to the recent coronavirus-related school closures," says graduate student Aliya Hoff. "It is more important than ever to create opportunities for students in difficult situations to remain engaged with learning in creative and supportive ways. We hope that our kits will provide improved classroom experiences in the next year to offset some of these negative impacts."

The interdisciplinary programs involve members of multiple schools and departments.

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# Advance your career

## WORKING FOR PEACE

### Nobel Peace Prize win reflects decades of work around the world

After nearly 30 years of working on crises around the world, alumna Brenda Barton was able to see her humanitarian organization achieve the ultimate recognition. The United Nations World Food Programme, which works to eradicate hunger and poverty, won the Nobel Peace Prize in 2020 — an honor that Barton called a “lifetime achievement award” for the WFP. Barton started working for the organization not long after graduating from ASU in 1984 with a degree in business administration and marketing. She started in communications, establishing the first field-based communications office, where she was often among the first humanitarians on the ground during a crisis. She is now the WFP country director in the Philippines.

### Building your antifragile career

May Busch recommends an approach. 18

### Pursuing passion

Jaime Casap on how to support young people finding their way. 20

# Build an **antifragile** career



**May Busch**

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



**3 steps  
for absorbing  
life's shocks**

A colleague once told me, "I want people who can operate with a compass, not a map. It's the single most important quality."

Because in a challenging and uncertain environment, there is no road map.

Times like these favor those who can embrace challenge, absorb life's shocks and emerge better and stronger. Just as these antifragile qualities are key for your personal success, the same is true for your career.

Here are three steps to build your antifragile career.

### 1. Evaluate your time.

Time is one thing you can't get back or make more of, so you owe it to yourself to spend it on activities that will set you up for success whatever the future brings. Make time for constructive, forward-looking thoughts and activities. Look at this time as an adventure, one where you might need to anticipate risk in different ways.

What might the landscape look like in 12 months' time? What will be needed to succeed then? And what do you need to do now to prepare?

### 2. Assess your positioning.

Positioning is about how you present yourself to the world, especially to those who matter for your future success. This means reaching out to others, being clear about what you want them to know about you, and presenting that in the best, most effective light.

To what extent do you need to adjust the language you use and the strengths you emphasize

**"When there's no road map for the future, use these action steps as the compass to help you forge forward."**

— MAY BUSCH

in order for your stakeholders to see you in the right way given your aspirations for the future?

When the world is full of disorder, the key is to form a view on what the future could bring and present yourself as being able to adapt.

### 3. Choose your approach.

For much of my career, I believed, "If you want something done right, do it yourself." While that served me well as a junior analyst, as I got more senior, I came close to burning myself out, which was the wake-up call I needed to change my approach.

The current environment is serving as a wake-up call for all of us. The way you're used to doing things might not serve you well going forward.

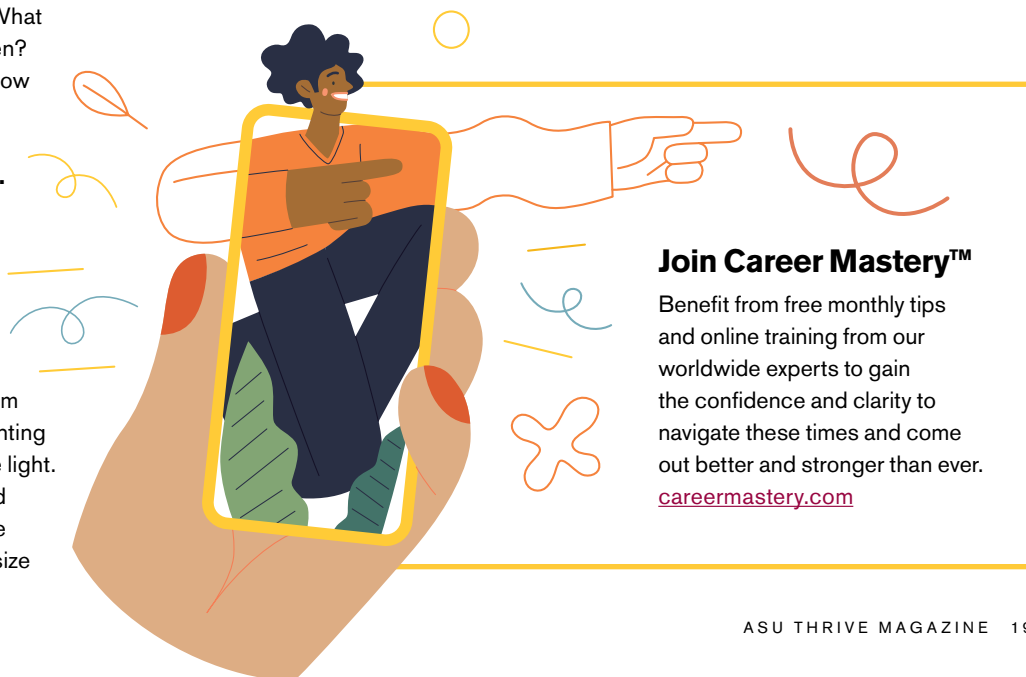
So, this is an ideal time to look at how you want to adapt your approach so you can have an easier time and thrive no matter what's going on around you.

In times of change, the most important shift you can make is to embrace improvising.

### Create your ideal career.

When there's no road map for the future, use these action steps as the compass to help you forge forward. And taking steps toward building your antifragile career doesn't have to be time-consuming. As long as you're consistent, investments in yourself add up over time.

To prepare yourself to thrive in uncertain career situations, there's nothing more valuable than investing in yourself and building your capacity to embrace change and thrive in it. ■



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How to help your kids  
discover their own path



**Jaime Casap,**  
'93 MPA in public administration, evangelizes the potential of digitalization as an enabling capability in pursuit of promoting inquiry based learning models. He collaborates with school systems, educational organizations and leaders focused on building innovation into our education policies and practices. He was previously the chief education evangelist at Google. Subscribe to his YouTube channel at [youtube.com/jaimecasap](https://youtube.com/jaimecasap)

# Pursuing passion

"I think I am going to be a business or marketing major," my 18-year-old daughter said when we were discussing what she wanted to focus on at ASU back in 2012.

The answer surprised me. "What made you decide to focus on those areas?" I asked her. She said when she did her research on jobs, it seemed that most of the work closest to the areas she was interested in fell into the business marketing space. She was practical and safe, so she picked a major that gave her the best chance to find a "job."

This is a talented filmmaker who has been making movies and videos since she was 5 years old. In fifth grade, she started the media club at her middle school and wrote, produced and directed a news broadcast to students every day. She could sit in front of editing software for 20 hours and edit a video.

"What do you think about my plan?" she asked me. I said something that even surprised me. I said, "Business major, huh? Well, no, I'm not paying for that. If you major in art, if you get a degree in film practices or production, I'll pay for it."

Here she was trying to be practical and logical regarding her higher education, and I'm the one who said no. I pushed back on practicality for her passion.

She graduated with her degree in film and media production from ASU's Herberger Institute for Design and the Arts. She was a rock star in the program. Her senior capstone project was entered into many film festivals, a film still showcased by professors for incoming students.

While studying, she got a job in film production and editing at a local company where, at 20, she became their entire creative marketing department, with

the competition trying to steal her away.

Today, at 28, she is one of the most valued editors and storytellers at Courageous Studios, the brand studio of CNN, CNN Business, and HLN. She has made dozens of videos seen around the world millions of times.

I don't share this story with you to brag about my daughter. OK, maybe there is a little of that. I share this story because it's a lesson on purpose and passion.



The most important thing we can do for the young people in our lives is to help them find their purpose and their passion, and to help them discover and identify their talents and gifts.

**Tips to help discover a passion**

Most people are terrible at knowing who they are and what their strengths are. You can help them by providing a realistic and accurate reflection. Here's how:

**“Business major, huh? Well, no, I’m not paying for that. If you major in art, if you get a degree in film practices or production, I’ll pay for it.”**

— JAIME CASAP

**Identify what lights them up.**

It can be an activity they love to participate in. It can be the types of books and movies they like to dive into. What is that thing they feel compelled to do from an inner passion? All you needed to say to my daughter is, “Do you want to make a video?,” and she was all in.

**Look for patterns.**

If the young person seems to be interested in lots of different activities, you may think it would

**Elaine Casap has been framing the world through a camera throughout her life. The photo above is from one of her hikes in the Cascade Mountains.**



**Elaine and her father, Jaime Casap, in New York City. At right is a picture of Elaine at the Rock of Guatape in Colombia while traveling South America.**

be hard to find focus. However, ask, “What do the activities have in common?” If you look hard enough, you’ll start seeing patterns.

**Help them identify and set goals.**

Helping young people identify their short- and long-term goals is a way for them to discover their passions and skills. If they set a goal and then struggle to meet it because they aren’t that passionate about it, that says a lot. It’s never too early to start. We help our 6-year-old singer-songwriter identify goals. At the end of 2020, she said that by the end of 2021, she wants to have written a song.

**Listen more than talk and ask lots of questions.**

Adults tend to want to be problem-solvers for young people. Instead of sharing your experiences and projecting onto young people, listen and ask many questions. How many parents would have told their moviemaking daughter not to be a business major? Ask:



- Why is X so important to you?
- Why do you get so excited when you do X activity?
- What is important to you?
- How do you want to interact with the world?
- What can you see yourself doing every day?
- What do you dread?

**Without judgment or comment, help them gain experience in whatever they want.**

I walk around the world believing I could have been a world-class Olympic swimmer. All three of my kids, including the 6-year-old,

are master swimmers. My oldest was one of the fastest high school swimmers in Arizona. I never got the chance to swim and wish I had participated in more activities, and I am making up for that now.

My wife didn’t discover how great she is at endurance sports until she was 33, and now she professionally coaches others.

Let young people dive into whatever they find enjoyable — swimming, whitewater rafting, knitting, competitive frog jumping, anything. Our 6-year-old is into gymnastics, dance, swimming, science experiments, space, Legos and wanting to help homeless people. Support their interests, and don’t make them do it if they suddenly lose interest.

You have an opportunity to be a mentor, guide and coach to the young people in your life. Do not force them in a practical direction. Let them explore who they are, what they care about and what they’re good at. ■



**Elaine Casap capturing video for a nonprofit in Buenos Aires.**

**For more career and education advice, subscribe to my YouTube channel at [youtube.com/jaimecasap](https://youtube.com/jaimecasap)**



## Thunderbird entrepreneurship program lifts women's startups to keep communities afloat during the pandemic

An entrepreneurship program created by the Thunderbird School of Global Management at ASU has taught women around the world how to start businesses and keep them afloat during the COVID-19 pandemic. The Academy for Women Entrepreneurs reached 5,000 women in 53 countries in 2020, its second year. It is run by the U.S. Department of State's Bureau of Educational and Cultural Affairs, the same unit that runs the Fulbright educational exchange program.

"[The academy] allows women to use their revenues to help their communities to grow, and it's never been more important than in the time of COVID," says Tracy Bame, president of the Freeport-McMoRan Foundation, one of the supporting partners of the program.

AWE teaches women the DreamBuilder online curriculum, which was created a decade ago by the Thunderbird School of Global Management and the Freeport-McMoRan Foundation.



**DreamBuilder modules are available to anyone in English and Spanish at [dreambuilder.org](https://dreambuilder.org)**



## Remote working could shift how employees identify with companies

The COVID-19 pandemic has forced many employees out of the office and into their homes. A recent Gallup poll shows that 62% of employed Americans report having worked from home during the crisis, twice as many as in mid-March 2020. But the key is that workers now have no choice in the matter, according to Regents Professor Blake Ashforth in the W. P. Carey School of Business. He studies how people identify with organizations, which has produced research on topics such as stigmatized jobs and bullying.

Last fall, he and his co-authors published a paper finding that a key to bonding with remote colleagues is "cadence," defined as being able to predict how co-workers interact, and that managers should set aside personal time during conference calls for workers to have some fun.

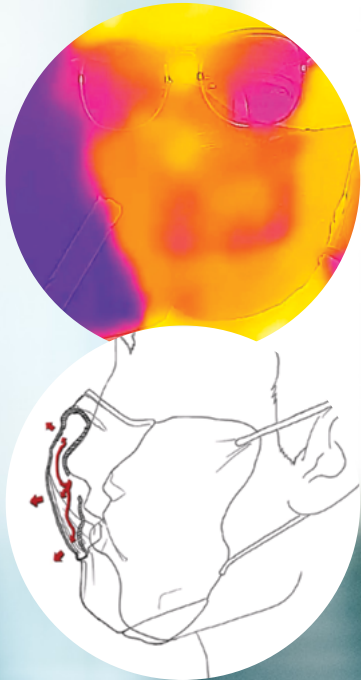


## ASU researchers awarded grant for advancing workplace wellness

**The team will use design, artificial intelligence and sensor technology to improve the overall functionality of workplace wellness**

With workplace wellness programs on the rise, an ASU team of interdisciplinary researchers is asking big questions about how to improve the overall functionality, impact, engagement and economic cost of workplace wellness.

The team was recently awarded a one-year planning grant from the National Science Foundation for \$150,000 to develop a prototype of the "Future Workstation." The grant was led by Pavan Turaga, interim director of the School of Arts, Media and Engineering. The team includes faculty from the School of Arts, Media and Engineering, The Design School and the College of Health Solutions. Most businesses tend to have wellness programs in place, but they are lacking in certain areas. For example, there's often a gap between the economic status of employees and the availability of workplace wellness tools.



The Floemask design above features a bifurcated chamber design in which air exhaled from the nose is kept in a separate chamber from the face and mouth. Your face stays cooler, the air you breathe is fresher, and the flow of air stays away from glasses where it would otherwise cause fogging.

**“We went through several design iterations, but trying to create something that doesn’t fog your glasses and doesn’t leave hot air on the face is not an easy task.”**

– NIKHIL DAVE, UNDERGRADUATE EARNING A DOUBLE MAJOR IN NEUROSCIENCE AND INNOVATION IN SOCIETY, STUDENT REGENT ON THE ARIZONA BOARD OF REGENTS AND TEAM LEAD FOR THE FLOEMASK PROJECT

#### IMPROVING THE FLOW

### **Student team’s fog-free mask design wins top prize in \$1 million worldwide competition**

A student team from ASU’s Luminosity Lab has won \$500,000 of the million-dollar XPRIZE Next-Gen Mask Challenge to redesign the face masks used to prevent the spread of COVID-19 by making them more comfortable, functional and affordable. The contest invited young adults ages 15 to 24 from around the world to shift the cultural perspective around mask-wearing behavior by developing the next generation of surgical-grade consumer masks. It drew nearly 1,000 entries in more than 70 countries. The biggest problem the ASU team cracked was masks fogging up eyeglasses. The mask is now moving into the early phases of production.



# Catalyze new growth

Tarun Suresh, a member of the Luminosity Lab Floemask team, demonstrates the challenge of foggy glasses that the team set out to solve.

## **Building an antifragile economy**

Thriving in response to shocks and disorder.

**26**

## **Saving lives**

Mayo and ASU collaboration yields health care innovation.

**34**

PPE Response Network

Luminosity Lab

# B E C O M I N G

**“Antifragile” describes something that “thrives and grows when exposed to volatility, randomness, disorder, and stressors and loves adventures, risk, and uncertainty.”**

— NASSIM NICHOLAS TALEB, ECONOMIST WHOSE RESEARCH INCLUDES RISK AND PROBABILITY

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in annual economic activity

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— 2020 STUDY BY ELLIOTT D. POLLACK AND COMPANY

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— SKYSONG INNOVATIONS, E+I

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**students**

in engineering and technology programs at ASU, up from 8,000 12 years ago

— IRA A. FULTON SCHOOLS OF ENGINEERING

**#6 in the U.S.**  
**for total research expenditures**

among universities without a medical school

— NATIONAL SCIENCE FOUNDATION

Zoom R&D Center

OncoMyx Therapeutics

Biodesign Institute

SkySong, the ASU Scottsdale Innovation Center

Skysong Innovations

Phoenix Biomedical Campus


Regher Solar

Ira A. Fulton Schools of Engineering

WearTech Center

Hooolest Performance Technologies

NeoLight



MedTech Accelerator

Arizona Health Solutions Corridor

# SHATTERPROOF

## What it will take to build an antifragile economy in Arizona

Story by SARA CLEMENCE

Sunny. Sprawling. Rugged. Many words come to mind to describe the Phoenix metropolitan area. “Fragile” often isn’t one of them. But a decade ago, the Valley was the poster child for an easily upended economy. Between 2000 and 2007, the area’s economy boomed. Housing prices doubled. Unemployment dropped to 3.1%. Then the real estate bubble burst, seriously damaging the state’s economy.

“The Great Recession showed us that the gravy train that existed then was an unhealthy, unsustainable growth model,” says Chris Camacho, president and CEO of the Greater Phoenix Economic Council.

ASU has been at the forefront of creating a very different model for the Valley — one that isn’t just resilient in the face of change, but “antifragile.”

According to economist Nassim Nicholas Taleb, the opposite of fragile is something that thrives in response to shocks and disorder. Examples include parts of Colorado and Washington state where amid the turmoil of the COVID-19 pandemic, some communities continue to flourish.

An antifragile economy doesn’t just benefit people at the top. The focus on all levels of the economy can mean more educational opportunities, higher wages and more stability for everyone.

ASU Research Park

ASU Polytechnic campus

Human Machine  
Integration Lab  
wearable robots

Drone Studio

## But what does it take to create an antifragile economy?

For starters, an educational system that serves people of all backgrounds and ages, from preschool through continuing education. A workforce that, as a result, is technically skilled, adaptable and creative — not to mention homegrown. An antifragile economy can't rely on importing brainpower while locals settle for lower-wage jobs.

Diversity is key — in all forms, from ideas to the student population to industries.

"It's not antifragile if you have a small number of people with the wealth and power and a large number of people with very little," says Neal Woodbury, chief science and technology officer at ASU. "There has to be a mechanism by which a diversity of thought can come to the forefront. Otherwise, you don't have that breadth of capability to rise to the occasion."

Eric Yuan, Zoom's CEO, credited a "well-educated, skilled and diverse talent pool" and ASU's engineering program when the company announced last year that it would open an R&D center in Phoenix.

But an antifragile economy doesn't depend on attracting existing companies — it generates its own, giving birth to entirely new fields by providing antifragile skills.

One example is the Ira A. Fulton Schools of Engineering's new master's degree in modern energy production and sustainable use developed to help students from other fields get skilled in engineering-related industries.



### Research centers launch startups

Startup Regher Solar launched out of the Quantum Energy and Sustainable Solar Technologies (QESST) Engineering Research Center by Stanislaw Herasimenka, an assistant research professor in electrical engineering. Regher recently received a \$1.8 million award from the U.S. Department of Energy, to develop a facility that will let academics work with industry partners to test solar ideas.

That's what brought graduate student Martin Flores to the program. "I look forward to a well-rounded experience that will allow me to choose from among many different directions," Flores says.

This is all part of the approach that ASU is taking: championing entrepreneurship and risk-taking, as well as educational inclusion, to

reinvent the Valley's economy, on multiple fronts.

### Inclusive education

The COVID-19 pandemic highlighted how different life can be for people with — and without — college degrees.

Last April, as restaurants, stores and other businesses shrank or



**ASU startup Regher Solar's flexible solar cells (top left inset) for satellites are cheaper and faster to make than traditional cells (shown here) and more resistant to radiation damage in space.**

shuttered, the U.S. unemployment rate shot up to 14.7%. But people who didn't graduate from college were more than twice as likely to lose their jobs than workers with a college degree. By September, when businesses were rehiring, just 4% of college-educated people were still jobless, compared to 8% of high school-educated workers.

**“As you produce people, you produce ideas, which turn into companies. Those turn into job catalysts, which turn into revenue for our state and our county.”**

— CHRIS CAMACHO, PRESIDENT AND CEO,  
GREATER PHOENIX ECONOMIC COUNCIL

Lack of education doesn't just impact individuals and families, but entire communities. Companies gravitate to places with plenty of skilled workers; those jobs help create other jobs. More knowledge means more potential for startups.

“As you produce people, you produce ideas, which turn into companies,” Camacho says. “Those turn into job catalysts, which turn into revenue for our state and our county.”

Arizona lags behind — 20% of high school freshmen in the state finish college, compared to 40% across the U.S. Unlike the many colleges that take pride in their exclusivity, part of ASU's mission is to make higher education accessible.

On the K–12 front, the university has partnered with local school districts to ensure that kids are ready for the challenges of college and to boost college-going rates. Examples are an outreach program to encourage first-generation students to attend college and a program that helps foster kids succeed at the university. Community college partnerships let students attending two-year schools easily transfer to ASU and take classes in their home community.

ASU's efforts aren't just about volume, but diversity. The Hispanic community is the fastest-growing

in Arizona, yet lags behind in college attendance.

“That's probably the most economic potential to be unlocked,” Camacho says.

Overall, Hispanic enrollment at ASU has doubled over the past 12 years, and diversity has increased dramatically at the Fulton Schools. A centerpiece of the university, the engineering program has expanded from about 8,000 to 25,000 students in the last decade.

Kyle Squires, dean of the engineering schools, says that the percentage of Hispanic students is higher than national averages. That's not enough: “We want to become the go-to destination for Hispanic students,” he says. “Their premier choice.”

ASU also has been a leader in serving nontraditional students who can be left out of higher education. In engineering, more than 30 online programs, including undergraduate and graduate degrees, are available.

**A culture of entrepreneurship**

Mariana Bertoni, an expert in multiple engineering fields and an associate professor in the School of Electrical, Computer and Energy Engineering, credits a monthlong training program at ASU for helping her develop her ideas into a viable business. That program, the National Science



### From research insight to market deliverable

Mariana Bertoni leads the lab DEFECT (Defect Engineering for Energy Conversion Technologies) focusing on how defects can affect electrical and optical properties of material. She also is chief technical officer at Crystal Sonic, an ASU startup that uses a process she invented in which sound waves are used to cut the expensive crystal wafers that microchips are built on, preventing waste and saving money.

Foundation's Innovation Corps Site, is an entrepreneurship boot camp for researchers. It's just one of many ASU initiatives designed to ensure that smart ideas don't die on whiteboards or inside labs.

Bertoni's company, Crystal Sonic, uses sound waves to cut the expensive crystal wafers that microchips are built on, preventing waste and saving money. With assistance from a \$200,000

fellowship from the Fulton Schools and participation in Venture Devils, she's raised \$2 million in seed capital to pay for dedicated space and hire staff.

The J. Orin Edson Entrepreneurship + Innovation Institute, which administers the NSF I-Corps, has created many programs like Venture Devils, and provides fellowships, workshops, mentorships, a makerspace and

venture capital. It supports more than 700 entrepreneur teams, and has raised more than \$34.4 million in external funding for ASU's entrepreneurial programs.

Fostering a risk-taking entrepreneurial culture is as crucial to establishing an antifragile economy as running a robust engineering program and educating future technologists, Squires says.





**Learn more about ASU's impact on the Arizona economy at [impactarizona.asu.edu](https://impactarizona.asu.edu)**

"We want to drive that with talent, and ideas that translate from the lab out into the community," Squires says. "Tech companies are probably the core of future economic expansion, company formation, and supporting the non-tech sector in some cases."

Early support from ASU can lay the foundation for outside grants and investments. Swift Coat, which specializes in spraying

nanoparticle coatings onto surfaces to protect them from dirt, sun and other hazards, was born out of the Fulton Schools. Since then it has raised \$180,000 in business plan competitions and \$1 million from the U.S. Department of Energy's Solar Energy Technologies Office, among other funds.

Entrepreneurship is such a cornerstone of an antifragile economy that ASU continually reinforces it, including with a new Master of Science in innovation and venture development degree, a transdisciplinary partnership among the Fulton Schools, the W. P. Carey School of Business and the Herberger Institute for Design and the Arts. The program is led by Cheryl Heller, a business strategist and design world icon.

Serial entrepreneur of D3 Designs and other companies and industrial designer Travis Arden ('10 MS in engineering) has come back to Arizona for the program to learn "what I don't know" to help him build better businesses.

"My experience and time in industry was fruitful, but I wanted to do things that had a more positive impact," Arden says.

### **Innovating with industry**

Cities around the country have been trying to breathe new life into their economies by better utilizing local universities, observes Douglas Holtz-Eakin, president of the American Action Forum, a center-right advocacy group based in Washington, D.C. The strategy gets mixed grades, Holtz-Eakin says, in part because typically universities don't listen well, especially to the business community.

But at ASU, collaborating with outside stakeholders, including big companies, startups, small businesses, Native American tribes, schools and nonprofits is part of the ethos. These partnerships are vital not only to building an antifragile economy, but to fulfilling ASU's educational mission.

"We want our industry partners engaged with our students before they even start their first year of engineering school," Squires says. "We refer to it as the 'Fulton difference.'"

The university has developed or is working on seven innovation corridors, facilities that bring together students, faculty, startups, established companies and support infrastructure. The Arizona Health Solutions Corridor expands on the university's partnership with Mayo Clinic. ASU Research Park focuses on wearable technology, flexible displays, and other cutting-edge technologies. The others also provide interdisciplinary resources to accelerate innovation in other industries.

Stanislau Herasimenka, an assistant research professor in electrical engineering, launched his startup out of the Quantum Energy and Sustainable Solar Technologies (QESST) Engineering Research Center. He and his partner in Regher Solar are developing solar cells for satellites — the super-thin cells are cheaper to make than traditional cells, and more resistant to space's radiation damage. He was able to leverage an ecosystem of resources at QESST. Regher recently received a \$1.8 million award from the U.S.

**“We bring together a variety of different companies and other kinds of entities to work with each other. It’s not random — the intention is to create a community that is greater than the sum of its parts.”**

– NEAL WOODBURY, CHIEF SCIENCE AND TECHNOLOGY OFFICER AT ASU

Department of Energy, to develop a facility that will let academics work with industry partners to test solar ideas.

Skysong Innovations helps bring technologies developed at ASU to market, supporting tech transfer, licensing, startup launch and major investments.

SkySong, the ASU Scottsdale Innovation Center, has generated more than \$130 million in state tax revenues and launched 160-plus startups, says Neal Woodbury, chief science and technology officer at ASU. It is expected to provide an economic impact to Arizona of nearly \$58.2 billion over the next 30 years.

“We bring together a variety of different companies and other kinds of entities to work with each other,” Woodbury says. “It’s not random — the intention is to create a community that is greater than the sum of its parts.”

One recent success is OncoMyx Therapeutics, which creates virus-based cancer treatments. The company raised \$25 million in 2019 and spun off from ASU last year.

Partnering with industry is a win-win for everyone, including mature companies, which benefit from a direct pipeline to research and to coveted engineering graduates.



### **Turning a virus into a tool**

OncoMyx Therapeutics is developing oncolytic immunotherapies to treat cancer, based on the work of Grant McFadden, director of the Biodesign Center for Immunotherapy, Vaccines and Virotherapy, and a professor in the School of Life Sciences at ASU. McFadden’s team has designed an oncolytic virus to specifically kill cancer cells without harming normal cells.

“From a company perspective, it’s competitive,” Squires says. Engineering undergraduates are often hired before they’ve started their senior year.

### **Preparing for the future**

Amid the good news, challenges remain. Arizona’s economy remains stubbornly fragile, with too much income disparity and declining GDP. The state has only recovered two-thirds of pandemic job losses.

The coming years will be crucial, says Camacho of the Greater Phoenix Economic Council.

The Valley needs to take advantage of the current situation to drive investment and policy decisions, so the economy emerges more dynamic and competitive, or it will be left behind, he says. “The next decade sets the trajectory for the next 50 years.” ■

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# Saving lives

through

innovat



# A unique new startup accelerator with Mayo Clinic and ASU is supporting breakthrough innovation in the health care industry

Story by MAKEDA EASTER

The pain of a lingering sore throat is in many cases, not just physical.

On top of feeling unwell, people often have to enter the health care system to get relief. This often looks like: making a request to take time off work, finding an open appointment, sitting in traffic, filling out paperwork, enduring a throat swab, and finally, paying the bill.

Treating common illnesses — strep throat, urinary tract infections, influenza, and now, COVID-19 — could be more accessible and affordable, giving power to the consumer and reducing wasted spending in health care, argues Ken Mayer, founder of health technology company, Safe Health Systems.

Based in Los Angeles, Safe Health Systems is working to disrupt the traditional approach for treating low-complexity illnesses by offering remote diagnostic and digital care services. In 2020, the company formed a venture offering digital provider services, AI-based care and remote and rapid diagnostic testing, with Mayo Clinic through the Mayo Clinic and ASU MedTech Accelerator.

# ion

**Connections between medicine and tech are being reimagined and redesigned to help both patients and medical professionals.**

In the case of someone suffering from strep throat, the Safe platform would allow that person to find care, take a rapid diagnostic test, and receive trusted results, from home.

When Safe Health Systems launched in 2016, its scope was narrowly defined, focused exclusively on the rising sexually transmitted disease epidemic. The company created an app, Safely, that allows users to import STD test results and show their verified status privately on their phones.

Looking to scale the technology, Safe Health Systems turned to the Mayo Clinic and

ASU MedTech Accelerator, an immersive two-week program followed by six to 12 months of continued mentoring, that began in 2019. The program helps early stage medical device and health care technology companies level up through personalized feedback from clinicians and business leaders.

Six companies, including Safe Health Systems, were part of the inaugural cohort. As a participant in the Mayo Clinic and ASU MedTech Accelerator, Mayer was able to spend invaluable time with subject matter experts, including Dr. Steven Lester, the program's founder and medical director, and a Mayo Clinic cardiologist.

Inspiration for the accelerator came to Lester and colleagues at ASU about four years ago, after Lester took on a new role in Mayo Clinic's department of business development. One of the first people Lester connected with was Charlie Lewis, the accelerator's co-founder and vice president of venture development and physical sciences at SkySong Innovations, an ASU spin-off that helps bring university inventions to the marketplace.

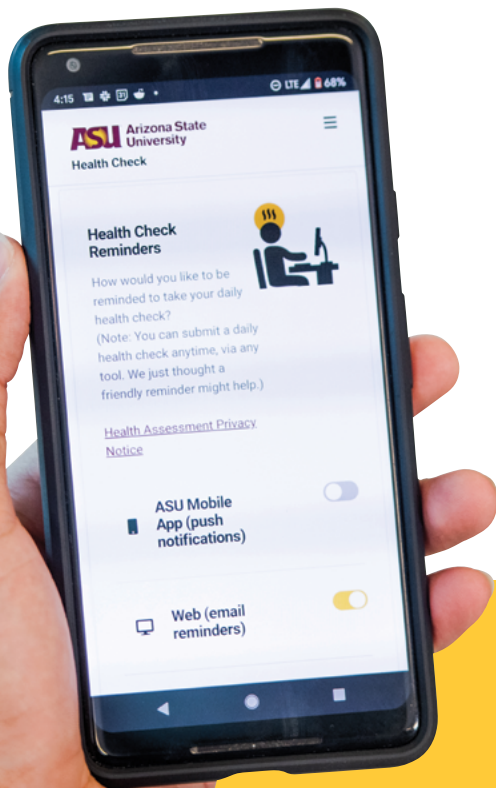
The two began discussing ways to make health care

technology companies visible to the venture capital community, "to potentially fund some of these things, as well as getting in front of potential entrepreneurs that might be able to take these ideas and run with them in the form of launching a new startup," Lewis says.

Lester and Lewis brought in other experts from ASU to help build this unique accelerator that combines access to Mayo Clinic's world-class physicians and ASU's entrepreneurial resources. The program includes individuals such as Ji Mi Choi, vice president, Knowledge Enterprise and founding executive director, the J. Orin Edson Entrepreneurship + Innovation Institute; Michael Harris, senior director of corporate development at Mayo Clinic and accelerator co-managing partner; Rick Hall, senior director of health innovation at ASU's Edson College of Nursing and Health Innovation and accelerator co-managing partner; and Amy Woof, who serves as clinical operations program manager of Mayo Clinic and Arizona State University Alliance for Health Care.

The unique program will "help these companies to advance in the marketplace," says Lewis, who is the program's chief venture development officer.

The program is designed to help innovators navigate notoriously complex governmental medical regulations, while gaining support from established and sometimes reluctant-to-change health institutions.



**Safe Health Systems' digital care and remote diagnostic technology is currently deployed at several universities amid the pandemic, including ASU as the Daily Health Check app.**

### Touch points with Mayo Clinic and ASU experts

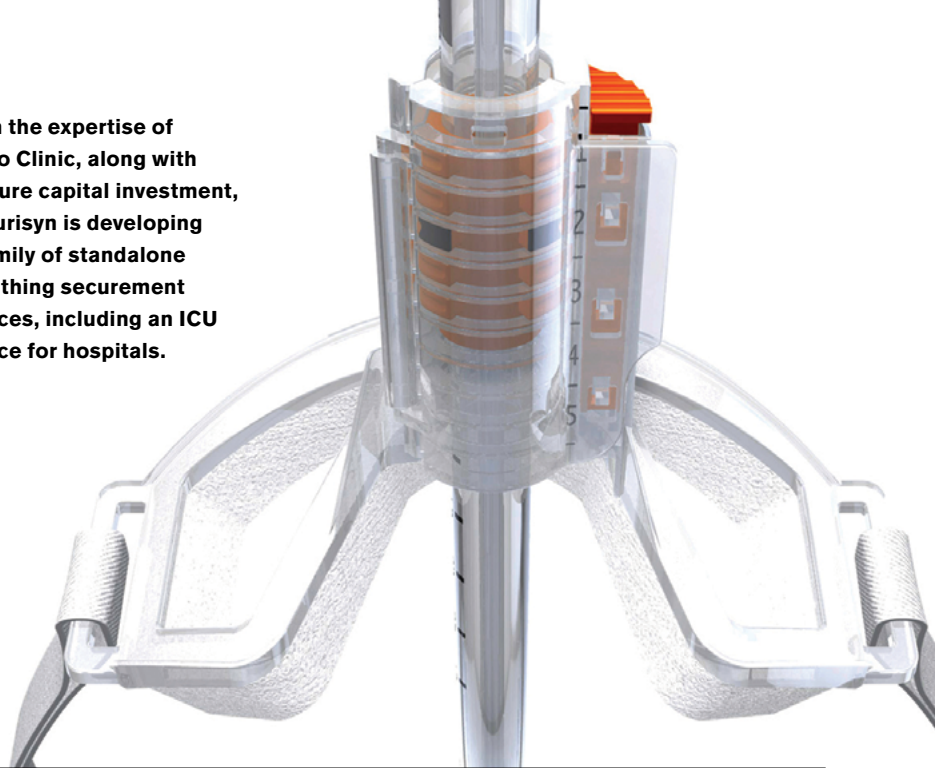
Another startup from the inaugural cohort, Securisyn Medical, used the experience to improve its interlocking breathing tube securement technology.

Securisyn co-founder Dr. Arthur Kanowitz, who spent many years as a medical director for ambulance and fire departments, is dedicated to solving a serious and preventable problem in medicine — tragedies related to unplanned extubations.

Smooth, plastic breathing tubes are typically secured by an adhesive tape that sticks to the patient's face or a device that grips to the tube. But after encountering heat and moisture in the human body, the tubes can become slippery and unexpectedly slide out of an airway, potentially causing pneumonia, brain damage and even death.

In 2019, approximately 121,000 people experienced unplanned extubations, resulting in 33,000 deaths in the U.S. alone. These are also complications “that lead to over \$4 billion a year in unnecessary health care costs to the system,”

**With the expertise of Mayo Clinic, along with venture capital investment, Securisyn is developing a family of standalone breathing securement devices, including an ICU device for hospitals.**



co-founder, CFO and COO, Elyse Blazeovich, says.

Securisyn was still pre-revenue and pre-FDA clearance when it entered the accelerator with its original design — a series of ribs on the smooth, slippery surface of the breathing tube, allowing it to interlock with the securement device, creating a strong barrier against movement.

While participating in the accelerator, Blazeovich estimates the company had more than 100 touch points with emergency

room and critical care physicians, respiratory therapists, and health care administrators, in addition to experts in supply chain issues and innovation, among others. These are connections that continue today, even as the product has evolved into a bolt-on accessory, where securement can be added to any endotracheal tube, regardless of where it's placed or which manufacturer made it.

Participating in the program helped Securisyn evolve from a single invention, a device to better



## Mayo Clinic and ASU Alliance for Health Care

The Mayo Clinic and ASU Alliance for Health Care is the university's most transformative collaboration. Formalized by a signed memorandum of understanding in 2016, the Alliance continues to develop comprehensive improvements in the science of health care delivery and practice, all toward one goal: continually advancing patient care. Together the recognized world leader in patient care, education and

research, and the nation's No. 1 ranked university for innovation are combining expertise from every corner of health care — doctors to bioengineers to business experts — for an adaptive approach to preparing the next generation of health care pioneers and practitioners in our communities.

**Learn more:** [mayo.asu.edu/medtechaccelerator](https://mayo.asu.edu/medtechaccelerator)

secure breathing tubes, to an expanded portfolio of products in various areas of health care.

This spring, Securisyn will begin clinical builds and is planning to move into full production next year. Broadening the scope of its product brings the company closer to its overarching goal — eliminating unplanned extubation and attaining zero preventable deaths.

Mayo Clinic's decision to invest in Safe and Securisyn was motivated by its goal of helping companies transition to the next level, while also improving the health care system. Venture capitalists are typically driven by financial returns, Lester says. "When Mayo Clinic

is investing, they're fundamentally motivated by one thing — is this going to favorably impact the care of our patients and patients worldwide?"

### **Credibility with the industry**

For Gyant, a health care technology company that was also part of the inaugural cohort, the Mayo Clinic and ASU MedTech Accelerator was essential in tackling one of the first hurdles as a startup: getting initial buy-in from the health care industry.

"You also participate in a way that gives you access to that first potential customer ... and that creates a level of institution trust that is really important to break into

the industry," says co-founder and CEO Stefan Behrens.

New to health care, Behrens and co-founder Pascal Zuta used their experience in the video game industry to develop an AI-based platform that works as a connective tissue between patients and their health system. The platform and virtual health care assistant appears on a hospital system's website or app to chat with patients 24/7, guiding them to the proper care.

It keeps track of health histories and records, creating a personalized experience to perform basic tasks in the early stages of the patient journey.

**Because of participation in the Mayo Clinic and ASU MedTech Accelerator, in a single week, the Gyant team was able to figure out what solutions to pursue for success.**





"It reduces the staff hours needed to do mundane things," Behrens says. "There's such a shortage of qualified staff, everyone is burned out and worn thin, so if there's anything we can do to reduce some of that burden and let a computer handle it, that's a win for the health system."

In the first week and a half of the accelerator, the Gyant team met with about 12 Mayo department heads of gastroenterology, radiology, emergency medicine and other disciplines, along with ASU professors in biomedical informatics and engineering. They also spent time with health care workers on the ground, such as nurses and technicians who could provide a different perspective on the product. In a single week, they figured out the type of solutions to pursue that would have normally taken months, Behrens says.

The accelerator was invaluable and forced Gyant to consider "how does [the platform] fit into the patient journey in a major health system and where does it create value for the health system, so that they would be willing to adopt something like this," Behrens says.

### **Solving pressing needs**

Nearly two years after participating in the Mayo Clinic and ASU MedTech Accelerator, Safe Health Systems, Securisynd and Gyant are making a significant impact on patient and health care workers' lives.

Securisynd spent 2020 testing its core breathing tube securement device with several institutions that gave the company validation of the product's usefulness.

Gyant is handling 60,000 patient interactions every day at hospitals. Gyant's COVID-19 Screener and Emergency Response Assistant, which offers educational content on coronavirus and virtual screenings via chatbots, has been used by 25 payer and health system customers and 500,000 patients.

Safe Health's digital care and remote diagnostic technology is currently deployed at several universities amid the pandemic, including ASU as the Daily Health Check app, for daily self-assessment and health status verification. Its vaccine care tool will support distribution and verification in the coming months.

As the Mayo Clinic and ASU MedTech Accelerator prepares for its second cohort in the spring, the team looks forward to working with even more companies that have original solutions to health care's most challenging needs. Addressing these pressing issues is about originality, creativity and thinking of new ways to provide better care to patients, Lester says.

"It's about finding people that want to continue to move forward and embrace the unknown and uncertain, and have that optimistic belief that there are really always solutions, just as long as one searches for opportunities to achieve them," Lester says. ■

### **See how the accelerator works**

Watch a video from the first cohort: [mayo.asu.edu/medtechaccelerator](https://mayo.asu.edu/medtechaccelerator)

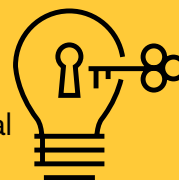
## **By the numbers**

# **#1 in patient care**

Mayo Clinic is the #1 hospital in the U.S., #1 in Arizona, and #1 in more specialties than any other hospital.

## **Intellectual property strength**

Mayo Clinic's intellectual property provides competitive advantages for more than 100 technology startups.



# **8,000+ human research studies**

underway at any given time at Mayo Clinic. ASU is one of the fastest-growing research universities in the country, among those with \$100 million+ in annual research expenditures.

# **\$750M+**

**total funding raised by ASU-linked startups**

SOURCES: MAYO CLINIC, ASU



## How will I feel? Will the COVID-19 vaccines have side effects?

Possibly. Reported side effects of the COVID-19 vaccines may include fever, chills, fatigue, headache, and pain and swelling where you received the injection. But those side effects aren't cause for concern. "That's a great sign. Symptoms show that your body is creating an immune response to COVID," says Heather Ross, a clinical assistant professor in ASU's Edson College of Nursing and Health Innovation and School for the Future of Innovation in Society. She also participated in the Moderna vaccine clinical trial over the summer. "After the first dose, my arm was pretty sore and I had a headache, but not anything serious. After my second dose, about eight hours after the shot I had a fever, I felt super tired and pretty grumpy for about 30 hours. And then I was fine." These symptoms are normal signs that your body is building protection against the virus and are an expected response to a vaccine. "The whole point is to activate your immune system," says Anna Muldoon, who holds a master's degree in public health and is a PhD student.

# Will you get vaccinated?

## Doctors on their personal and professional perspective



**Dr. Frank LoVecchio,**  
medical director  
of clinical and  
community  
translational  
research, College  
of Health Solutions

### **What is your personal view of getting vaccinated?**

#### **Why does it matter?**

Personally, I am very pro-vaccination for COVID and most diseases. I understand that people may want to wait but I do not think that is the best choice for health care providers, older adults, teachers and other high-risk groups. You are getting vaccinated for yourself (to decrease the chances of you getting ill or dying), your family (all evidence suggests you are less likely to carry COVID-19) and mankind (if we are all vaccinated then the disease will be controlled and we can return to our “new” normal. There is less opportunity for COVID-19 mutation).

#### **Have you been vaccinated yet?**

I have. I received both doses. I have been extremely fortunate in my life and I consider the day I received my first dose as one of the top 10 moments of my life. Like most, I felt some side effects, especially after the second dose, for less than one day.

#### **If everyone goes out there and gets vaccinated and we create some kind of immunity, what will the summer be like?**

We will have some degree of herd immunity by the summer but would not reach our goals of about 70% vaccinated until the fourth quarter of 2021. However, herd immunity is not an all-or-none phenomenon. If your circle of contacts is immunized then you will be much safer this summer.



**Dr. David P. Sklar,**  
professor of  
medicine,  
College of Health  
Solutions

### **What is your personal view of getting vaccinated?**

#### **Why does it matter?**

My view about vaccination is that the benefits very much outweigh the risks. I've seen a lot of people with serious COVID in the emergency department. You never know if you will be one of the unlucky people and if you can avoid having to roll the dice by getting vaccinated that seems like the wiser option, so I encourage people to get vaccinated as soon as possible.

#### **Have you been vaccinated yet?**

I have had both doses of the vaccine and had mild symptoms after the second dose ... but it did not stop me from working or doing my normal activities. I was thrilled to be vaccinated and felt much better about working in the emergency department after that as well as feeling that it was less likely I would infect my loved ones, students or other employees.

#### **If everyone gets vaccinated, what will the summer be like?**

I think that the summer could be much safer than what we have lived through over the past year. If we can focus our vaccination on the high-risk populations and the 60% of our population who want to be vaccinated I think we could get pretty close to herd immunity by the summer.



**Dr. Denis Cortese,**  
director of ASU's  
Healthcare Delivery  
and Policy Program  
and emeritus president  
and CEO of Mayo Clinic

### **What is your personal view of getting vaccinated?**

#### **Why does it matter?**

The vaccine is an important tool. It's basically a prevention tool to try to either prevent you from getting the illness at all, or if you do get it, it's to prevent it from being severe. So when you look at COVID, it can cause really severe medical complications. It's not just like a little flu. For many people it can be very mild, but for many people it can be much worse.

#### **Have you been vaccinated yet?**

Yes. Got it at ASU. My wife's had her first one and we're both scheduled for our second dose – I got Moderna and she got Pfizer.

#### **If everyone gets vaccinated, what will the summer be like?**

That's a very difficult one to answer without having a crystal ball. ...The first aspect is how many people will actually take the shot. And that's the requirement to really significantly put a dent in the spread of the disease. If each of us gets vaccinated when our turn comes up, it could be around mid-June when we would have control of this; if not we're looking more into the late fall.

**“ We have a responsibility  
as stewards of this land  
to keep the land clean so  
that the Earth can breathe.”**

– LEON NUVAYESTEWA,  
PIKUSHWUNGWU – YOUNG CORN CLAN



Leon Nuvayestewa and his daughter Valerie  
in First Mesa, Polacca, Arizona.



Nurture  
the Earth

**Caring for  
land and  
water**

Documentary  
on the Hopi  
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**Global  
blueprint**

Mapping  
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**Clockwise from top left: Corn stalks midseason; Valerie Nuvayestewa walking in the winter corn fields; Valerie and her father, Leon Nuvayestewa, in First Mesa, Polacca, Arizona, and Valerie's mother, Evangeline, harvests varieties of squash.**



# A Hopi perspective on land and food

**Photos by** TOMÁS KARMELO AMAYA '13 BA AND VALERIE NUWAYESTEWA

Hopi Senom, meaning “Peaceful People,” “feel great respect, honor and responsibility for the land and water, and we are taught to be able to recognize that the Earth is living, that it’s a living, breathing being,” says Valerie Nuvayestewa, board president for Hopi Tutskwa Permaculture Institute.

The student documentary “Holding on to the Corn” provides an intimate look at this relationship. When they began talking to elders, the filmmakers, Luke Simmons ('20 MA in mass communication), junior Itzia Crespo and Karina Dominguez Casas ('20 BS in sustainability), all students in the School of


Sustainability and the Walter Cronkite School of Journalism and Mass Communication at the time, discovered that Hopi tribal traditions and experiences provide the path for more access to healthy food. And they also learned that there are important lessons and wisdom for all people about how to care for the land and water. ■

**Learn more about Hopi Tutskwa Permaculture Institute, a community nonprofit based in the Village of Kykotsmovi, located in Northern Arizona on the Hopi Reservation at [hopitutskwa.org](http://hopitutskwa.org)**

**Watch the film at [sustainability.asu.edu/media/student-videos/holding-on-to-the-corn](http://sustainability.asu.edu/media/student-videos/holding-on-to-the-corn)**

# Global blueprint





By mapping the biodiversity of our Earth, ASU is helping identify how to stem the dual crises of biodiversity loss and climate change

Story by KRISTIN TOUSSAINT

Photos by GREG ASNER

FOR A

# livable planet

## When Greg Asner

looks out at the world from one of the countless locales he's visited — through his work mapping biodiversity, he's been all over, from the Brazilian Amazon to the Andes Mountains, Borneo to Madagascar, and beyond — he doesn't just see the flora and fauna of a region. His unique way of looking at the world goes beyond the perspective he gets from the seat of a twin-propeller plane that soars over the tree canopy or by scuba diving on a coral reef.

“My brain works on evolutionary time,” says Asner, director of ASU’s Center for Global Discovery and Conservation Science. Even looking out onto the bay outside his window in Hawaii, he sees past its current form to its geological and biological history, to why this place is special.

The big picture is more than the reefs right under the water’s surface, it’s the history of Hawaii’s isolation and formation that helped bring about the thousands of species that live only in those reefs.

“I can kind of see it back in time and why it was unique, and I can do that anywhere on the planet,” he says.

It sounds a bit like magic, and in a way it is. But the real magic comes when Asner combines that worldview with Earth-mapping technology. Through that technology, satellite imaging and geospatial data can reveal ecosystems’ details as they exist today — all the animals and plants that live in a certain place. Combine that with Asner’s historical perspective, and he can explain why it’s so crucial to save that land. The technology reveals what species exist there now, and his evolutionary knowledge tells him why that came to be the only place they can exist.

“That’s how I, and the [Global Safety Net] team, view the planet’s surface,” he says.

The GSN is the culmination of this work. It’s a blueprint for saving areas of Earth essential for biodiversity and climate resilience, and the first estimate of the total amount of land area requiring protection in order to address the

**“The more [healthy and thriving] species that naturally occur in an area, the better that ecosystem is able to absorb shocks, threats and disturbances.”**

— BETH POLIDORO,  
ASSOCIATE PROFESSOR OF  
ENVIRONMENTAL CHEMISTRY,  
ASU CENTER FOR BIODIVERSITY  
OUTCOMES

dual crises of biodiversity loss and climate change.

With the ASU Global Institute of Sustainability and Innovation as a key player, the GSN finally answers a complicated question that accompanies any conservation work: Where, exactly, should we put our efforts to save the most species and mitigate the worst of climate change?

### **Why biodiversity matters**

In the last 50 years, we’ve lost more than two-thirds of the world’s wildlife populations on average, according to a recent World Wildlife Report. A United Nations report, co-authored by Leah Gerber, director of ASU’s Center for Biodiversity Outcomes, found that Earth’s biodiversity is declining at a rate unprecedented in human history. One million animal and plant species are now threatened with extinction.

That biodiversity loss has huge impacts on humans, no matter where we are. It makes

pandemics, like COVID-19, more likely, and the way to prevent diseases from leaping from animals to humans, Gerber wrote in *Issues in Science and Technology*, “will have to lie with protecting and reporting wildlife habitat and conserving biodiversity.”

Biodiversity is linked to our health in other ways, too.

“The more [healthy and thriving] species that naturally occur in an area, the better that ecosystem is able to absorb shocks, threats and disturbances,” says Beth Polidoro, an associate professor of environmental chemistry at ASU, involved in the Center for Biodiversity Outcomes. “We need these healthy ecosystems because they provide ecosystem services for us.”

Healthy forests provide clean air; healthy soil is needed for us to grow food; healthy rivers maintain water quality.

### **The Arizona connection**

And although biodiversity may conjure images of far-off places, it matters in our own backyards. The Sonoran Desert, covering 100,000 square miles across Arizona, California and Mexico, is the most biodiverse desert on the planet, home to more than 2,000 plant species, more than 350 bird species, 60 mammal species, and up to 1,000 species of native bees.

Losing the plants whose roots protect the Colorado River could destabilize a fresh water system that supplies drinking water to 40 million people and nearly 6 million acres of farmland. The



**One Earth says that because of the Global Safety Net, 100 articles have been written, 40 maps have been requested, and the overall narrative is changing that the environmental issues we currently face, though immense, are solvable.**

loss of bees means losing their pollination services for countless other species. Bulldozing wild land as urban sprawl expands can mean losing wildlife forever.

In Arizona alone, the GSN would set aside more than 66,000 square miles, or about 59% of all the state's land, in order to preserve its biodiversity and ecosystems. Crucial areas also extend out west: In Utah, the blueprint would save nearly 59,000 square miles, or 69% of the land; in Nevada, more than 95,000 square miles, or 86% of the state's land; and in California, some 32,000 square miles, half of the state's land. The mountains, deserts and canyons that span these states are unique ecosystems and crucial habitats for thousands of species.

### **Working across departments**

Even though Asner is based in Hawaii, he was inspired to come to ASU and start GDCS, he says, because of how the sustainability mandate through President Michael M. Crow isn't hyperbole — it's real.

"The university is trying to play a role beyond standard academia, forging and influencing communities up to U.N.-level decision-making," he says.

The goal of GDCS is to understand what we have in terms of biodiversity, Asner explains, and work with decision-makers to find solutions to keep those things alive and healthy on the planet.

ASU's sustainability efforts stretch beyond that center. Its work to protect critical biodiversity areas reaches across departments, like

to the School of Mathematical and Statistical Sciences, where Steffen Eikenberry is a postdoctoral fellow. Eikenberry uses math to quantify environmental problems like consumption and land use.

"The climate crisis and biodiversity crisis are twin crises fundamentally driven by consumption throughout the world, primarily the rich world," he says. But how do you quantify that, and how do you find out the most important things to change in order to solve those crises? "If you want to say anything, you have to do the math."

Cross-departmental work for an issue as big as biodiversity is so important because of the unique expertise everyone brings to the table.



## Using the blueprint to protect Indigenous lands

**Angela Amanakwa Kaxuyana, part of the senior leadership of the Brazilian Coordination of Indigenous peoples in the Amazon, and her team are using the Global Safety Net in the real world to help protect her people's land in the Amazon rainforest.**

**With 80% of the global biodiversity managed or owned by Indigenous people, Kaxuyana says that scientists and native communities have long held the same goal of wanting to protect the planet. The GSN has provided campaigners and grassroots organizations the key information they need to take action to stop development projects and promote land conservation.**

### The importance of Indigenous knowledge

More than one-third of the lands identified as biodiversity hot spots in the GSN are communally held by Indigenous peoples, and ASU itself sits on ancestral territories, including the Akimel O'odham (Pima) and Pee Posh (Maricopa) Indian communities. Acknowledging Indigenous peoples is built into ASU's work as an institution, into Asner's work as a scientist, and into ASU's audacious goals to protect biodiversity and mitigate climate change.

"We start with the fundamental premise that there have been caretakers of this land long before we showed up in 1885," says Bryan Brayboy, director of the Center for Indian Education. One objective of ASU as an institution is to "leverage our place," and that means considering and working with tribal nations.

While other institutions and researchers may go onto Indigenous lands and tell Indigenous peoples what they need to do, at ASU, Indigenous peoples are an active part of that effort from the start. That's especially true when it comes to biodiversity work.

Indigenous peoples account for 6% of the global population, yet manage 80% of the world's remaining biodiversity.

One important approach Asner and ASU take to this work, according to Brayboy, is to consider why so much of the pristine lands are being managed by Indigenous peoples, and what that says about their relationship

**"Indigenous peoples account for 6% of the global population, yet manage 80% of the world's remaining biodiversity."**

— BRYAN BRAYBOY, DIRECTOR OF THE ASU CENTER FOR INDIAN EDUCATION

with these lands.

"You don't just need the principles of how people are stewarding and guarding the lands," Brayboy says, "but you actually need the people themselves."

Assistant Professor Haunani Kane will soon live that firsthand when she comes to ASU this summer, where she'll combine her experiences as a native Hawaiian with Western, geospatial technology for the GSN. One example is the way she considers coral, not only as something that grows in the ocean but as something essential to her people.

"We are looking at these organisms, and the places that we study as a part of ourselves. We believe that we are nothing without our land or without our resources, so that's really what drives the work that we do," Kane says. "In terms of climate change, we're studying the impacts and the changes out of necessity. It's something that we are trying to understand because our survival and our way of life will depend upon it."

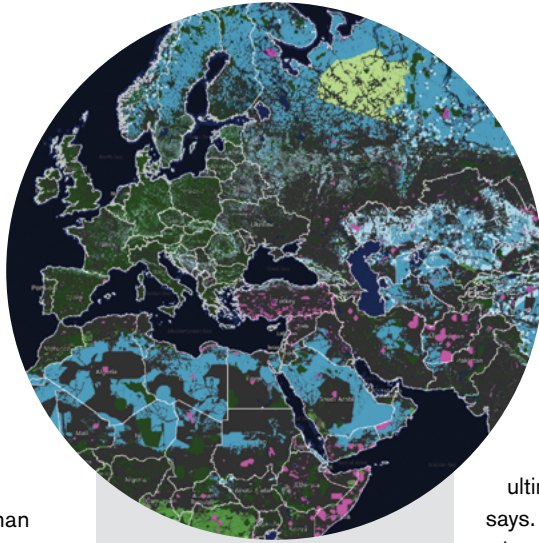
## What's next?

Human activity has pushed us past the point of saving all of nature, but the GSN lays out the path and the map for saving half of Earth's land (50.4%, to be exact). Any lower and we destabilize those ecosystem services, Asner says, like clean water, pollination, self-regulating forests that don't require human intervention to keep trees free of pests, and carbon sinks that naturally keep our world from getting too hot. Any higher, and those essentials for living healthy lives on the planet are nearly impossible to achieve.

It will be a feat.

The GSN is a group effort from ASU, the University of Minnesota, the research organization Resolve, and the nongovernmental organization Globalia. It's funded by the nonprofit One Earth, and other funding has supported Asner's aircraft program that did the foundational biodiversity mapping, including the MacArthur Foundation, the director James Cameron, and media heir William Hearst III. The Leo DiCaprio Foundation has also been a big supporter of Asner's work.

"We only get one planet," DiCaprio said at the 2014 United Nation's Climate Summit. "Protecting our future on this planet depends on the conscious evolution of our species." Though he was speaking generally, that sentiment explains why DiCaprio supports One Earth and its work like the GSN: We only have one Earth, and this is a way to save it.



**The Global Safety Net, a global blueprint for a livable planet, uses a first layer for already protected areas such as national parks and wildlife sanctuaries. Second, are rare species sites that need to be protected immediately. High biodiversity areas are third. Regions with large mammals, continuous intact wilderness and climate stabilization areas complete the mapping. Together, they total 50.4% of the planet.**

## Explore Earth's biodiversity hot spots by video

Get a new perspective on Earth at [globalsafetynet.app](https://globalsafetynet.app)

Want to contribute to help save these biodiversity hot spots? Donate through the ASU Foundation and specify it's for GDCS at [asufoundation.org](https://asufoundation.org)

Those big names help researchers like Asner try out new approaches to biodiversity work, whereas governments tend to be more risk-averse. But governments still need to collaborate and establish action plans to preserve these lands.

"What we're doing is ultimately not the answer," Asner says. "It's the pathway for those who want to answer the question of 'What do we do?'"

The GSN is a toolkit that decision-makers need to carry out, but getting conservation policy passed can be a challenge.

Polidoro has one suggestion: Get scientists involved with writing legislation.

"People that create policies don't always have access to the scientific literature," she says. "Find a governmental liaison, a lobbying organization or policy organization that you can connect with and help them draft legislation. ... You can't work in isolation."

Asner's unique way of looking at the world unfortunately doesn't let him glimpse into the future to see if decision-makers will adopt the GSN. But he's still sure it will have an impact. The data is publicly available through the GSN site, which has an interactive viewer to let users explore findings by country, ecoregion and all 50 U.S. states.

"The most powerful thing about the GSN is it serves to teach everyone on the planet what we've got," Asner says.

And what we need to protect. ■

# ASU research is making an impact in Arizona and across the world

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**TOM LEWIS** Author and Founder of the T.W. Lewis Center for Personal Development at Barrett, The Honors College at Arizona State University

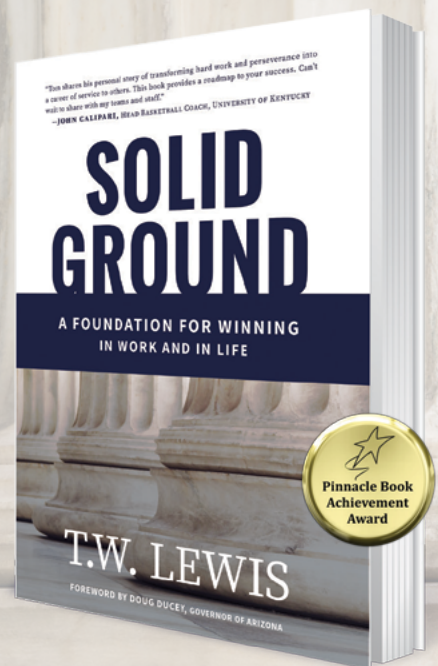
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All proceeds are donated to the T.W. Lewis Foundation to help children, families and students in need.

# Champion the arts

## INTERCONNECTED

Jennyfer Stratman, '97 BFA in sculpture, created bronze and enamel elements for her wall installation, "Hybrid Forms," a convergence of medicine, biology and research. Each amoeba-like form tells a story, exploring the interconnectedness between everything from the subatomic to the galactic. She was among the artists selected by local arts organization Artlink Inc. and Wexford Science & Technology LLC to collaborate on 850 N Fifth Street Phoenix Biomedical Campus. Anchored by ASU research and innovation spaces, the building serves as a hub, mixing scientific discovery, the arts and entrepreneurship.

**Racial justice through the arts**  
A candid conversation.  
54

**Turning the page on social justice**  
Powerful stories about young adults.  
60





# Standing tall on the shoulders of ancestors for racial justice through the arts

Colleen Jennings-Roggensack is a force of nature in the world of the performing arts. She's also a healing force for social change in her work, for the past 30 years, as vice president for cultural affairs and executive director of ASU Gammage. She speaks candidly about her proud heritage and upbringing, a lifelong commitment to racial justice, and her passionate desire to connect communities through the arts.

## In her own words: A candid conversation with Colleen Jennings-Roggensack

**As told to** RAMONA HARPER

**“Broaden your horizons and give back to the community.”**

I grew up to be an adventurer. My father was in the Air Force, and we lived in 13 states, England and Okinawa before I went off to college. As a military brat, I remember not having much money, but my parents figured out how to scrape it together so we could go to the theater. So, I always had a great respect for culture and understood the importance of culture.

Dance made me curious, and I started out as a Martha Graham-trained dancer. I wondered about how people moved differently because they saw the world differently. My passion for dance is great, but then it spread and blossomed to all the art forms.

I understood that the mainstream is the stream that you're standing in, and I think this belief gives you a global view. The term isn't international or foreign — it's global. We say global because we're part of it. We're not separate from it. And I do believe that my worldview is the direct result of my upbringing.

My parents gave me and my two siblings three sacred texts. My mother said, “You will be a great success if you just broaden your horizons.”

## Award-winning arts leader

Arts leader and visionary Colleen Jennings-Roggensack has artistic, fiscal and administrative responsibility for the historic Frank Lloyd Wright-designed ASU Gammage and ASU Kerr, with responsibility for Sun Devil Stadium and Desert Financial Arena for nonathletic activities. She oversees the activation and transformation of Sun Devil Stadium into a year-round hub of cultural activity as ASU 365 Community Union.

Appointed by ASU President Michael M. Crow, she co-leads the Advisory Council on African American Affairs. The council enhances diversity, growth and opportunity for Black undergraduate and graduate students, faculty and staff.

Jennings-Roggensack serves on The Broadway League's Equity, Diversity and Inclusion Committee, Government Relations Committee, the Executive Committee and the board of governors, Labor Committee and co-chairs the Legislative Council and Road Presenters/Intra-Industry Committee, and is Arizona's only Tony voter.

Jennings-Roggensack is a founding and current member of the Creative Capital Board and senior advisor to Women of Color in the Arts, former Association of Performing Arts Professionals board president, and she has served on the National Council on the Arts at the bequest of President Clinton and is a life director of the Fiesta Bowl. She is a consultant to universities and international governments, and is a featured speaker at conferences. In 2020, she has served on multiple panels addressing human rights, justice, diversity, equity and inclusion and the future of Broadway; and she participated in the TheaterMakers Summit on getting Broadway touring productions back on the road.

Jennings-Roggensack is the recipient of numerous awards including the 2020 National Coalition of 100 Black Women Education Legend, 2019 Valley Leadership Woman of the Year, 2019



**Colleen Jennings-Roggensack stands tall on the 2019 Tony Awards red carpet in ASU alum Loren Aragon's couture dress, inspired by his Acoma Pueblo heritage.**

ASU West Pioneer Award, National Society of Arts and Letters Medallion of Merit, Valle del Sol's Mom of the Year, APAP Fan Taylor Award, Black Philanthropy Initiative Honor, The Broadway League's Outstanding Achievement in Presenter Management, and Arizona's Governor's Arts Award. In 2012, The Arizona Republic recognized Jennings-Roggensack for Arizona's 100th Anniversary as one of the individuals who had the greatest impact in the era.

It was my father who said it was important to give back to the community.

And then the third thing, which my father pragmatically said was, “Get a job.”

Those sacred texts challenge you to make the world a better place by committing yourself to something larger than yourself. These were the ideas and the forces that influenced me the most growing up. And it’s in my DNA as my responsibility to pass them on and share them.

When I was very, very young, probably in the third grade, I was on a military base and I was walking to the library. A group of white boys in a convertible drove by and shouted the N-word at me and laughed and shouted. I didn’t know what to do, how to process that, how to bring understanding to that.

And there were other situations. I remember being with a group of classmates and I was probably a little bit older, maybe in junior high, and they were going to have a sleepover. I said, “Great.” And a young girl said, “You can’t come because you’ll get the sheets dirty.”

I think that I internalized it then, but later I found my voice. I could say, “That’s not right.” I could confront it, but it took me a long time.

And when people say you can’t work for “the man” or you can’t do this and that, I said, “No. We can’t change things from the outside. You have to be on the inside to make changes.

“We need people who have

skin in the game.”

ASU President Michael Crow selected Dr. Jeffrey Wilson and me to head up the Advisory Council on African American Affairs as part of a list of 25 actions to collectively support work to enhance diversity, growth and opportunity for Black students, faculty and staff.

And while “allies” is a nice name, we need collaborators and co-conspirators to do this work. We need people who have skin in the game, irrespective of the color of their skin. We know President Crow is committed to this. We know our ASU charter says we want to be judged by whom we include, not whom we exclude, and the success of whom we include. So the executive council and subcommittees are gathering together specifically to work on those 25 actions.

**“I am passionate about art and culture and how it unifies us.”**

My passion is being in a theater and having people together, sitting in a room, breathing together and waiting for the curtain to go up because they’re going on a journey together. And they don’t know what the journey is, but once that curtain goes up, they’re all in it together. That’s my favorite moment in the theater. It’s why I’m so passionate about art and culture. It unifies us.

Passion is my personal motto.

Passion gets you up in the morning. It isn’t money or a job title or position — it’s passion. And if you don’t have passion for what you do — stop doing it. Go and find something that you are passionate about. And I believe I live my life this way.

**“I sit on the board of governors and executive committee of The Broadway League which oversees all theaters on Broadway, as well as hundreds of theaters on the road where Broadway is. And of some 40 members, I was the only person of color for a very long time.”**

The Black Lives Matter movement has made a difference, and now there’s the We See You, White American Theater movement [a national multidisciplinary Black, Indigenous and people of color coalition that published its “BIPOC Demands” to address racism in American theater]. It calls you on the carpet and says, “Where are our African American directors, set designers, costumers, hair designers, diversity in unions?”

There are people who are ready to do this work — Black theater managers, producers, stage managers and press agents — and they’re just standing there ringing the doorbell. So,

The Broadway League went from saying, “Pipeline, pipeline, pipeline” for greater equity in theater, to “Doorbell, doorbell, doorbell.” We have to focus on the doorbell because it’s not the pipeline.

My white colleagues at The Broadway League said, “OK, what do we need to do?” We created the first equity, diversity and inclusion committee; and interviewed a series of people to do our anti-racism training. The Broadway League has been doing many exciting things and is committed to change.

The most horrible thing in the world is to be forgotten. The arts can bring inclusion and connect communities.

ASU Gammage’s many “Cultural Participation” programs continue to have great impact in the community, giving children and adults of all economic circumstances access to community arts programs, international artists and innovative academic tools. For example, one day I said to my staff, “I want to be in the prisons, in the jails. Because that community is going to come out and they can be great contributors to the whole community — or not. I think we have a role here.” And we are now in our 25th anniversary of the “Journey Home” program for incarcerated women returning from prison to mainstream society.

The inmates put on performances that are extraordinary. It always makes me cry. Once, during a Q&A, one of the inmates stood up and said, “We thought

you forgot about us.” And to me, that’s the most horrible thing in the world to be forgotten. So, I knew that we were going to stay committed to this.

Another one of my favorite programs is “Kaleidoscope,” part of our community arts programs for Title I schools that introduces students to musical theater and an intensive curriculum-based program.

We want that kid who is a D student or that kid who couldn’t make it to school for several days in a row because of whatever else is going on at home. We serve them a nice dinner with silver and china, and then they see a show at ASU Gammage. I said, “This is not going to be Styrofoam cups and pizza.” The actors come in and have dinner with them. So, this is a big deal for them to do this.

**“We can solve the pandemic of racism. We are the vaccine for racism because we are the ones who are going to solve this problem.”**

Looking forward, I believe it is important that we have a secretary of culture as part of the U.S. Cabinet. The U.S. is one of the few countries in the world that doesn’t have a minister of culture. I am really pushing for that and truly hope it will happen because it’s very important.

I also believe we need public healing right now. We need public

healing for this administration and for what we’ve just been through. We need public healing for all of the issues that we are dealing with: justice, equity, diversity and inclusion. And artists can do that. We need arts workers declared as second responders.

As we’re talking about COVID-19, we also need to talk about art and culture. We need to talk about how we get people back together. We need to talk about our fears, our concerns, and how we move forward. I truly believe we must be sitting in those spaces, breathing together so we can solve the pandemic of racism.

There’s the vaccine for COVID-19 and then there’s the vaccine for racism. We are the vaccine for racism because we are the ones who are going to solve this problem.

There are many awards in my office, but one award that sits on my desk is very, very important to me. It’s an award for Mother of the Year. So, it’s about work you love, but you must also have people in your life that you love and who are important to you.

And I quote my friend, Brian Moreland, an African American producer, who said, “All of us here are a walking return from someone’s investment in us.”

We are the walking return on investment. We are the walking rich. Somebody invested in us. So we need to have high returns. ■

**See the ASU Gammage schedule and get the latest updates at [asugammage.com](https://www.asugammage.com).**



In an ASU Gammage engagement program, students have dinner with actors from a production and then see the show.



Students give presentations to the cast of "Hamilton" as part of a special event at ASU Gammage.

## The power of theater

Inviting schools across the Valley to present to 'Hamilton' cast and see show

One of Colleen Jennings-Roggensack's proudest moments was bringing "Hamilton" to ASU Gammage for four weeks. "It was fresh off of Broadway and went few places in the West," the vice president for cultural affairs and executive director of ASU Gammage says.

"It wasn't enough that it was just 'Hamilton,' it was that how do we make sure everyone has a chance to be included? So we worked with schools across the Valley, and they studied the time period of Alexander Hamilton, did their own creative work, we had them come here, present their work on the stage to the cast. Imagine that. Many of these students had never been to a Broadway show, let alone the star Austin Scott, who was our Hamilton, went on to Broadway to where he moved into another show. But they also, that afternoon, just a house full of students, got to see 'Hamilton.' Not only was the cast thrilled and excited, but the students were thrilled and excited, and they never forgot it."

**“Through multi-dimensional character-driven stories, barriers break and empathy blossoms.”**

– Jewell Parker Rhodes, award-winning, The New York Times–bestselling author and also Virginia G. Piper endowed chair as well as the founding director of the Virginia G. Piper Center for Creative Writing. She has published 17 books, with five more in the pipeline.

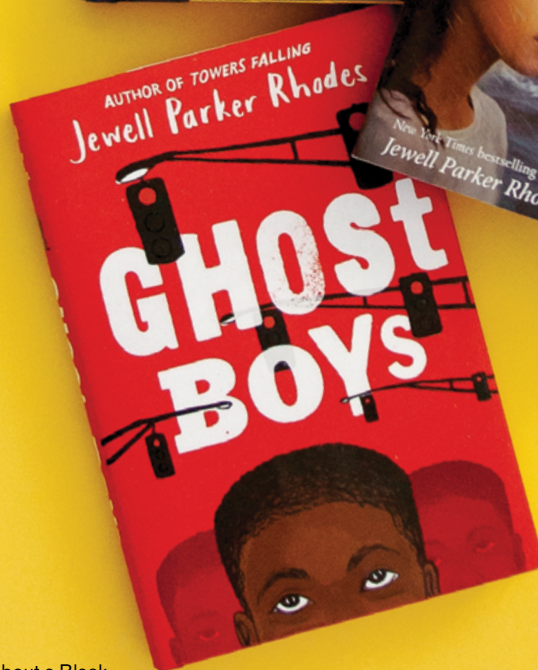


### ‘Black Brother, Black Brother’

This powerful coming-of-age story is about two brothers, one who presents as white, the other as Black, and the complex ways in which they are forced to navigate the world, all while training for a fencing competition. Emotionally gripping, this stunning middle grade novel is a careful examination of the school-to-prison pipeline and follows one boy's fight against racism and his empowering path to finding his voice. It was named a Top 10 Kids' Indie Next Pick by IndieBound and an Amazon Best Book of 2020 and is an NAACP Image Award nominee.

### ‘Ghost Boys’

This heartbreaking and powerful story about a Black boy killed by a police officer, draws connections through history. Rhodes deftly weaves historical and sociopolitical layers into a gripping and poignant story about how children and families face the complexities of today's world, and how one boy grows to understand American Blackness in the aftermath of his own death. An instant New York Times and IndieBound bestseller, it was also a Goodreads Choice Awards finalist.



### ‘Ninth Ward’

This tale of survival in the face of Hurricane Katrina is a heartbreaking and uplifting read. Twelve-year-old Lanesha lives in a tight-knit community in New Orleans' Ninth Ward. She doesn't have a fancy house like her uptown family or lots of friends like the other kids on her street. But what she does have is Mama Ya-Ya, her fiercely loving caretaker, wise in the ways of the world and able to predict the future. So when Mama Ya-Ya's visions show a powerful hurricane Katrina fast approaching, it's up to Lanesha to call upon the hope and strength Mama Ya-Ya has given her to help them both survive the storm. "Ninth Ward" is a Coretta Scott King Honor Book winner, Parent's Choice Foundation Gold Award, Al Roker "Today Show" Book Club selection and Notable Books for a Global Society honoree.



# Play like a Sun Devil

## MOST VALUABLE PLAYER

### Tempe to Boston to World Series wins and home again

When Sun Devil Dustin Pedroia was drafted in the second round by the Boston Red Sox in 2004, it was predicted he could have a solid professional career. It started officially on Aug. 22, 2006, in his first major league appearance. To put it into his own words, his career was a Laser Show. A four-time All-Star and four-time Gold Glove Award winner, Pedroia spent all 14 of his big league seasons with Boston, earning three World Series rings. Pedroia won the 2007 American League Rookie of the Year Award, the '08 AL Most Valuable Player Award and the '13 MLB Players Alumni Association's Heart and Hustle Award and was 2013 American League Defensive Player of the Year. This came after posting three of the best seasons in Sun Devil history, hitting .384 as he started all 185 games of his career and was a two-time national Defensive Player of the Year. He earned first-team All-America honors from everyone and was a three-time All-Pac-10 selection. Pedroia is retiring from baseball and starting a new chapter.

## New venture challenge

For sport-related innovation.

62

## Pitching excellence

Coach Ford leads softball to strong seasons.

63

# innovation

## Innovation

### SDA partners on New Venture Challenge

In collaboration with ASU's Global Sport Institute and J. Orin Edson Entrepreneurship + Innovation Institute

The Sun Devil Athletics Venture Challenge will help establish new and innovative sport concepts that can be launched, piloted and scaled at SDA's various facilities. This program will provide a launchpad for aspiring entrepreneurs while keeping SDA on the forefront of new sport-related innovation. The challenge will culminate with a live pitch competition in April at ASU Demo Day.

"As the world's largest university and national hub for innovation, ASU has creative thinkers and industry pioneers across our five campuses, and we would be doing ourselves a disservice to not tap into that potential," says Vice President for University Athletics Ray Anderson.

The challenge will focus on areas of innovation that are important to athletics'

operation – possibly including venue and facility innovations, immersive technology, consumer engagement and athlete performance.

"This is yet another example of the vast opportunities and benefits of Sun Devil Athletics' resources through our world-class university," says Deputy Athletic Director Jean Boyd. "We're very excited to partner with the Global Sport Institute and Edson E+I, building on the programming we have been providing to ASU scholar-athlete entrepreneurs, and expect this to be yet another exciting collaboration moving forward."

The winner(s) will have the opportunity to implement their product or service at SDA's facilities made possible with promotional resources, mentorship, coaching, and award(s) of up to \$25,000 per year.

Learn more at [globalsport.asu.edu/sport-ei/venture-funding](https://globalsport.asu.edu/sport-ei/venture-funding)



## 2021 Football outlook preview

The 2020 football season – from battling COVID-19 protocols and daily testing to the season hiatus – will go down as one of the craziest seasons in Sun Devil history.

In Coach Herm Edwards' third season, the Sun Devils finished 2-2, with wins at Arizona and Oregon State. With high expectations to compete for a Pac-12 title and book a trip to the Rose Bowl, the Sun Devils look forward to the 2021 season.

"We want to be better than last year. We set high goals for ourselves and compete with each other every day. It's a good thing to help us get better," says running back Chip Trayanum.

[thesundevils.com/sports/football](https://thesundevils.com/sports/football)

Keep up with Sun Devil Athletics news and videos

at [thesundevils.com](https://thesundevils.com)



## Hockey

### Walker eclipses 100

Sun Devil Hockey senior Johnny Walker reached his 100th career point in January, as he helped lead Sun Devil Hockey to a bounce-back 5-3 victory against No. 18 Notre Dame. Freshman Matthew Kopperud also stayed hot in the victory, netting another two power-play goals for his 11th and 12th of the season, and led the country in goals scored.



**“She has elite expectations and recognized the innovative direction that Arizona State is heading. She has great energy.”**

– RAY ANDERSON, VICE PRESIDENT, UNIVERSITY ATHLETICS, SPEAKING ABOUT COACH TRISHA FORD



## Softball

# Pitching strength

From St. Mary's College to Stanford to Fresno State to ASU, coach building on excellence

Trisha Ford took over an illustrious Sun Devil Softball program that lays claim to more than 1,600 wins and four national championships. She had led her Fresno State team to consecutive Mountain West Conference championships in both the 2015 and 2016 seasons en route to being named the 2016 MWC Coach of the Year. While being an extremely successful collegiate coach, Ford also served as an assistant coach for the 2016 Gold Medal USA Softball Junior Women's National Team during the summer of 2016.

In her first three seasons as head coach of the Sun Devils, Ford boasts an impressive 113-50 (.693) record. In her third season at the helm of ASU Softball in 2019, Ford led the Sun Devils to their 15th consecutive NCAA Tournament appearance. The Sun Devils finished the year with a 35-20 record,

which included a 13-11 mark in Pac-12 play. ASU's 35 games in the win column marked the team's 24th straight 30-win season, and culminated in a quarter century of straight winning seasons.

In 2018, she was named the Pac-12 Coach of the Year following a season that saw ASU make its 12th NCAA Women's College World Series appearance.

Pitchers – Ford's bread and butter – excelled in 2020, out-throwing last season's nonconference ERA by a full mark. Widely respected as one of the nation's premier pitching coaches, she guided the Sun Devil staff to a miniscule 2.32 ERA in just her first season in Tempe (2017), a full point lower than the team's 3.66 mark in 2016.

Prior to joining Stanford's coaching staff, Ford spent two seasons as the head coach at her alma mater, Saint Mary's College in Moraga, California, where she is the only female student-athlete in school history to have her number (9) retired.

## Triathlon

### Recognized as Scholar All-American Team

The Sun Devil Triathlon team was awarded the Team Scholar All-American honor by the Collegiate Triathlon Coaches Association and USA Triathlon. Continuing their excellence in competition and in the classroom, Head Coach Cliff English's team earned Scholar All-American Team recognition for the third consecutive year. ASU well-exceeded the minimum criteria, which was a team semester GPA of 3.2 or higher. Not only did each student-athlete surpass that mark on their own, the squad finished with an incredible 3.88 fall semester GPA.

The four-time defending national champions have taken advantage of the unprecedented circumstances to train and focus on their studies. The result was one of the best academic semesters in program history, with five individuals finishing with a fall GPA of 4.0 or higher.

**3.88 GPA**  
for the team in  
the fall semester



**“I thank him for being the only African American in the room fighting those battles we weren’t privy to. Phoenix is a better place because of him.”**

— CODY WILLIAMS, '92 MBA, FORMER PHOENIX CITY COUNCILMEMBER AND JUSTICE OF THE PEACE, SPEAKING OF CALVIN C. GOODE

COMMUNITY ICON

## Celebrating a life of civic engagement

For ASU alumnus Calvin C. Goode, who passed away on Dec. 23, 2020 at the age of 93, bringing hope and support to underserved neighborhoods in Phoenix, promoting educational opportunities for underprivileged youths, and challenging social injustice, formed the cornerstones of his legacy. He was the longest-tenured elected official in the history of the Phoenix City Council and continued to serve the community following his retirement.

Goode, '49 BS in business administration and '72 MA in education, is survived by his sons who are ASU alumni: Vernon, Jerald and Randolph. He is also survived by six grandchildren and two great-grandchildren. His wife, educator and community activist Georgie Mae Goode (Stroud), died in 2015 at age 87.



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and **discover on.**

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This organization receives financial support for offering this auto and home benefits program.

AFF686950-22 CW 2019/10

# What's next

## ASU innovation is key

Next is protecting tens of thousands of newborns from the life-altering effects of infant jaundice. Founded by Arizona State University alumni, biomedical engineering startup NeoLight is bringing energy-efficient phototherapy treatment into homes and developing parts of the world.

**It's just one example of how ASU innovation is fueling our economic future by creating new products, technologies and startups.**



for health care?

The FDA-approved NeoLight, shown here under the baby, treats newborns for jaundice in homes or hospitals.