The Automation Issue
Editor's letter

We should think of automotive tech as a driving force in our lives as we move forward in the technological age. Technologies with varying levels of intrusion and precarity are springing up constantly, reshaping labor, our relationships, our desires, our social norms and even our being. Decades of accelerated technological development have rendered us grasping for institutions and frameworks for regulating and thinking about these technologies, but the continued advent of automotive technologies keeps making our heads spin.

In this issue, writers took the notion of automation as a jumping off point for looking into how different emerging technologies are restructuring the lives of ASU students. Writers looked at how self-driving cars around campus are changing the student experience, and how AI art generators play a growing role in the ASU art scene. SPM’s satirist uses ChatGPT in a pinch, and another writer explores how vertical farming could reshape the future of agriculture. Two writers team up to explore how ASU’s digital curriculum is leaving some students behind. Our feature story looks at the crushing reality of the student debt crisis at ASU, and one of SPM’s managing editors does a deep dive into the University’s disinformation research. A pair of new student organizations provide spaces for Black women pursuing STEM degrees to share common experiences, and one writer takes some satirical jabs at the tech bro stereotype. Finally, one SPM writer looks at ASU’s chatbot and how students feel about the bot, formally known as Sunny, in a time where it’s finding decreased use.
Report

Mile by mile

With the introduction of Waymo’s new ride-hailing service Waymo One, students, staff and experts give their takes on the future of the rideshare industry in Phoenix

by Abigail Beck
Illustrations by Biplove Baral
It's unseasonably windy as I'm perched on the corner of 3rd Avenue and Fillmore Street. A woman in blue nylon sweat suit is the only other witness to the unmanned white vehicle that whips around the corner. Adorned with my initials — “AB” — on a display mounted to the roof, the car chimes “Hello Abigail” as I swing open the door and step into my autonomous vehicle.

Inside it's clean, almost sterile. It's as if I'm the only person that has ever been in this car, and there's a certain intimacy that comes with that.

But the thrill doesn't last as long as the stares from passersby do. I decide to go to a coffee shop I've never been to 20 minutes east of me. I depart at 3 p.m. on a Thursday, not realizing the autonomous vehicle would have to traverse three different bustling school zones.

Within the first two minutes I'm face-to-face with a group of boys each no older than 14. They spot the Waymo, and then they spot me sitting inside of it. They wave and yell as they inch away from the curb and toward the car, trying to catch a glimpse of the vacant driver's seat.

This kind of reaction continues; I spend the nearly half-hour ride being gawked at. Everyone ogling at the Waymo always turns to catch a glimpse of its companion and cargo: me. I and the Waymo developed a unique connection. If we were going to be a cargo: me. I and the Waymo developed a unique connection. If we were going to be a

Eventually, I just sit back and took in the side of Phoenix I hadn't met yet. I see old homes with porches decorated with rocking chairs and mismatched flower pots. Sun-bleached toys scattered across overgrown lawns.

I get to see the smaller things — all the things I wouldn't have seen if I were the one driving.

I can't figure out how to play music on the way to the coffee shop, so I just sit in silence the whole way there. It was uncomfortable at first. I try to hum to myself, but that was even more awkward, so I just sit. I settle into the sounds of the car and of my environment. There are rarely times when I can do that, when I can just ... be.

At one point we pass another Waymo and I almost wave. It feels like walking past that one friend you only talk to in the one class you two share — a welcome, but fleeting, surprise.

After arriving at the coffee shop, spilling my drink on a clean counter, getting a fresh green tea made by a barista with a blonde mohawk and finally making my swift escape, I order another Waymo to take me back.

On the way home, I sit in the front seat and figure out how to control the music — Mitski was my artist of choice — and I just watch my surroundings pass me by again. It is all I can do for that window of time. It is nice.

**Buckle up**

In November 2022, Waymo One, an app offering ride-hailing service via autonomous vehicles, was introduced to metro Phoenix along with parades of Waymo’s sleek white Jaguars and Chryslers, changing the rideshare model as we know it. At the time, the service sparked discussions among students about the safety, legitimacy and accessibility of self-driven vehicles on and around ASU’s Downtown Phoenix and Tempe campuses.

Waymo One is an app — owned by Alphabet, Inc., the parent company of Google — similar to Uber and Lyft. Where it differs from the two rideshare powerhouses is in allowing customers to order a fully autonomous vehicle to drive them around. For now, it's only available within the boundaries of certain metro Phoenix areas, namely downtown Phoenix, Mesa, Chandler and parts of Tempe.

Chris Bonelli, a product communications manager at Waymo, broke down what a rider can expect from a Waymo ride, emphasizing the importance of a seamless user experience.

Each Waymo has two screens that show the rider exactly what the vehicle is seeing. Moving squares on the screen represent nearby cars and traffic cones, displaying upcoming hazards or obstacles in the road.

“With 29 cameras, a lot of radar and, additionally, lidar, or laser-based sensor input, the vehicle has a 360-degree view of all its surroundings at any given time,” Bonelli said. The purpose of the screens is to “show you as the rider that the vehicle is seeing, addressing and reacting to the environment appropriately.”

Katelynne Newman, a freshman majoring in communication and organizational leadership, hates Waymos. “They drive, like, incredibly odd,” Newman said, adding that she has observed Waymos in Tempe directly affect local traffic in a negative way.

“As soon as you see a Waymo, everyone just starts getting over and then traffic starts building up in one lane because of the f— Waymo bogging everyone down,” Newman said, adding that her experience as a commuter
having to travel to and from school often has become more stressful with Waymos driving around.

I understand where she’s coming from. My Waymo consistently drove exactly the speed limit, and Arizona drivers are not exactly known for carefully following the rules of the road or being as cautious as the Waymo was programmed to be. It seems that Waymos are habitually adapting to the environment as it should be, not the environment as it is, said Newman.

This raises a genuine safety concern for Newman. Sure, the vehicle has the software and hardware that make it objectively safe. But even Bonelli noted that “humans are just intrinsically fallible.”

The autonomous vehicles are “never drunk, drowsy or distracted” Bonelli added. However, the root of Newman’s concerns isn’t that Waymos will run red lights or cut people off, it’s that they are disrupting a city that is already busy and already difficult to navigate by being — dare I say — overly robotic in their mannerisms.

Despite the bolstered safety that comes with not having a driver who can make mistakes, autonomous vehicles are not immune to being in and causing accidents. Between July 2021 and January 2023, there have been 29 crashes involving autonomous vehicles in Arizona.

**Autonomous equals accessible**

With no one commanding the vehicle, staples of traditional rideshare apps like uncomfortable small talk and the additional cost of tipping are long forgotten with Waymos.

Thomas Taylor, a junior studying urban and metropolitan studies, frequently uses Waymos to run errands around Phoenix. Like many out-of-state students, Taylor doesn’t keep a car on campus. With Waymo, he said, the ride-hailing service has provided him with a newfound sense of independence.

“I could easily get somewhere and I don’t have to ask a friend and I don’t need to feel like I’m relying on someone else,” Taylor said. He’s been able to go to the grocery store, travel to the airport and go shopping for clothes with Waymos without feeling self-conscious about not owning a car.

“The car culture in Phoenix is really strong,” Taylor said, describing how he has felt anxious when casually running errands with Uber or Lyft. The awkward feeling of entering an Uber with arms full of groceries is something that dissipates entirely with Waymos, Taylor said.

Although downtown Phoenix has affordable public transport, Taylor feels it isn’t readily accessible to all students. Instead of having to travel to Tempe on the light rail to shop at Trader Joe’s, he’s able to use a Waymo to get to a store closer to downtown Phoenix, saving more time than he would have using a typical ride-hailing service.

Waymos also provide an aspect of privacy that sets them apart from Uber and Lyft. Bonelli described an experience where he was using an Uber and had to take a confidential business call at the same time. For him, the two didn’t mix.

The worry of a stranger overhearing a personal conversation, knowing your home address or seeing you at your sloppiest at 2 a.m. on a Friday just doesn’t matter when it comes to Waymos.

The experience is intended to be the same every single time. The same cars. The same screens.

Both Taylor and Bonelli recognized the significance of Waymo’s product consistency.

“When I hail an Uber, I’m gonna get paired with either a 2022 Lexus or a 2003 Prius and anything in between,” Bonelli said.

**The future of campus transport**

Aviral Shrivastava, a professor at the School of Computing and Augmented Intelligence, described Waymos as “fancy new toys” that will become more normalized as they become more common.

“I think if this technology — and I think it’s not a question of if, I mean when — this technology becomes prevalent and successful, I think the costs of these rides will go dramatically down and that (will) be a real game changer and have a real impact on society,” Shrivastava said.

If autonomous vehicles become more prevalent in areas surrounding college campuses, then they will take up more space in society at large, he said. If they become more readily available and affordable, then people might stray away from owning their own cars.

Despite the increasing popularity of Waymos, the rise of autonomous ride-hailing is still very much in its infancy, Shrivastava said. There is “no good and easy answer” for predicting when and how autonomous vehicles will become a normal part of everyday life, he added.

“I think a lot of people are imagining that it will be decades before autonomous cars become very prevalent,” said Shrivastava. “I look forward to that time.”
Uncanny brushstrokes

AI art bots are reshaping and disrupting the art world

by Keetra Bippus
Illustrations by Andrea Ramirez
Artificial intelligence art generators may not have taken over the human race yet, but they sure have taken over the internet.

Although he doesn’t consider himself an artist, Andrew Maynard, a professor at the School for the Future of Innovation in Society, used an AI art bot to create 56 images. He directed the bot Midjourney to create what most caught his eye and published the creations in September 2022.

Maynard considers his work with the AI bot a collaborative process where he directed the AI to refine images that inspired him. Although AI can create beautiful images, it cannot replicate the experience and creativity of human artists, he said.

"I think there’s a need to rethink the value of human-generated art," Maynard said.

For example, a child creating art is a way the child is reflecting on their life experience. The value of the art isn’t the picture itself, but what it represents from the child, Maynard said. That can’t be replicated by a machine.

In the future, Maynard envisions AI art generators as a tool for those without technical artistic skills to express themselves creatively.

Adriene Jenik, a professor at ASU’s School of Art, has been an artist since she was a child.

“All my experiences of joy have to do with expressing myself either by myself or with other people,” Jenik said. “I really believe strongly in the power of creativity as a life force on Earth.”

AI art could take the place of human artists in the industry, Jenik said. For example, concept art that used to be created by artists can be generated in seconds by machines.

“This is a massive shift for the industry,” she said. “The challenge and the sad part of it is that machine learning has been done by scrapping the internet of all our creativity for decades.”

Parallel views

AI-generated art has no way to come up with original concepts, styles or ideas on its own. Instead, it analyzes a set of images and attempts to produce a new image in the style of the images it analyzed.

AI art generators can even create pieces in similar styles to human artists, learning from images artists have posted online, often without asking artists for permission or crediting and compensating them fairly.

There’s currently no comprehensive legislation regarding AI on a federal level, said Gary Marchant, a professor of law at Sandra Day O’Connor College of Law who teaches a course on AI ethics, law and policy.

“The legal issues are changing so quickly all the time that it’s very hard for traditional regulation to even stay relevant,” Marchant said.

The new legal issue of AI using artwork without artists’ permission hasn’t been resolved yet, he said.

“If you have an AI system that uses data to train the system, what obligation does that company developing that AI system have to the creators of the underlying data?” he asked.

Marchant sees two ways of looking at the issue. On the one hand, AI is simply viewing a line of data — a human could hypothetically view 10 Picasso paintings and create a painting in Picasso’s style. In this view, AI is merely looking at existing art online and using it for its own purposes, which could be seen as fair use in a legal context.

In an alternative view, AI is using — or exploiting — creative data in a way the original artists don’t benefit from. This issue is a hot topic; a group of artists recently sued the creators of the AI used in popular art generators like Lensa for using their work in the AI’s database without permission.

Another legal question brought up by AI art bots is whether the art they generate can be copyrighted, Marchant said. Currently, the consensus is no: a human needs to be involved in the work directly to qualify for copyright.

“As AI systems do more and more of our creative inventions and discoveries, both in the arts and literature but also science, how do we create the right incentives so that they can’t get any intellectual property rights?” Marchant said. “That’s a huge new issue that is challenging our courts and legal system.”

While the legal and ethical issues are new, the concept of AI is not. The idea of AI — a computer mimicking human intelligence — was first introduced in the 1950s at a research conference. But it wasn’t until the last three decades that AI became advanced enough to outperform humans.

Recent innovations in AI have thrown universities into a tizzy, with professors reevaluating the ways they assess students, as easily accessible AI chatbots like ChatGPT make it easier for students to turn in work that isn’t their own.

AI art could be seen as a new tool for creativity, with people able to create with a few buttons and clicks, Jenik said, but the government and society need to decide on the ethical ways to implement them.

However, she fears the “existential threat” of rapidly expanding AI and the subsequent implications for creative jobs and the economy.
“We can’t stop it,” Jenik said. “Now the issue is going to be for artists and creative people to understand how to work within the machines.”

Putting the artist back into the art

Art is always evolving, said Lance Gharavi, a professor at the School of Music, Dance and Theatre. So far, he hasn’t seen any AI-generated images he wouldn’t consider art.

“A lot of people believe that art has to be the product of human labor, that the artist has to put effort and work into the thing, and that effort and work has to display a kind of skill,” Gharavi said. “So we marveled at the skill and labor of the artists. Well, that hasn’t been the way the art world has treated art for a long time.”

Gharavi noted how “readymade” art — mass-produced objects artists remove from their intended purpose, like a urinal, and display as art — have often been considered art without a human artist putting any effort into the creation of the initial artistic object. His positive perspective on AI art contrasts with the broader tempos of the art world.

“The culture is going through a lot of hand-wringing and questioning trying to figure this out, but we’ve been through such issues before — although I think the advent of generative AI is more culturally and socially significant than a lot of previous innovations,” Gharavi said.

He likes to think of AI as a “collaborator for creation.” Working with an AI is collaborating with something completely different from him in nearly every way, he said.

“What kind of visions can it produce that are surprising, that would never come from my mind?” Gharavi said. “That is something that excites me.”

Kevin Baragona is a founder of DeepAI, an AI company that promises to “enhance your creativity,” according to their website. He said he sympathizes with artists who are concerned about their artwork being used in AI databases without their permission.

“This is something high on our minds because the artists do have a good point,” he said. “The way we see it is that AI learns from millions, if not billions of images. And when done right, it learned from it. It’s not stealing it. If you mixed together 10,000 people’s work to produce a new work, that’s not considered stealing.”

Baragona said DeepAI does not currently replicate specific living artists’ styles.

Maria Pliusnova, an engineer at DeepAI, said the company wants to find a way for artists to use AI to save time, rather than see the technology as a competitor.

“There’s a real potential that this technology becomes too powerful to handle, like too hot to touch,” Baragona said. “I like our current state of AI. We might be having more progress than we really need right now.”

Baragona said that there’s no telling where AI technology will be in the future, and he questioned whether technology may be advancing too rapidly.

“It’s probably beyond our current imagination,” he said. “I’m embedded in the field and I’m startled by what I’m seeing. If we really do invent computers better than people at everything, are we going to regret that?”

For Jenik, there’s something that human artists can do better than AI generators — at least for now: “We know how to be human.”

Art that connects with humans and reflects the human experience is something that a computer may not be able to replicate, Jenik said.

“AI art only knows from what’s already been done,” she said. “So if you think of the human imagination as limitless then there’s always things beyond that that can be expressed.”
“We can’t stop it. Now the issue is going to be for artists and creative people to understand how to work within the machines.”

— Adriene Jenik
We’re in the throes of the spring semester here, and if you’re anything like me, you’ve changed your major (twice), gone into a deep depressive episode and have considered running away to Canada and getting a new legal name. I hear Toronto is nice in the spring.

If I’m being honest, this article has not been at the top of my to-do list. When my editors hired me in December, they said I would be writing for something called “The Culture Issue.” You can imagine my surprise after learning that many more issues come after that one. Regardless of whatever this “Automation Issue” business is, my final draft is due at dawn and I have little more than a disjointed grab bag of punchlines.

I’m short on time. The convenience store near me is wiped clean of all Red bulls and Monsters. I guess I’ll have to settle for a Birthday Cake Bash Bang Energy. I have two C’s with five assignments in each gradebook, and I’ve eaten nothing but a turkey sandwich everyday for the last week. I’m too close to my deadline for comfort, so I’m abandoning my principles as not only a writer, but also as an artist — I’m using artificial intelligence to do my work for me.

Unless you’ve been living under a rock for the past five months, you’ve heard about the AI breakthrough ChatGPT. An auto-generative system that’s been released into the hands of the common man, ChatGPT can turn any half-baked thought into a manuscript — or a discussion board post that’s due within the hour. Getting someone else to do your homework used to require beating up a nerd or something. Now, with the touch of a button, anyone can make a robot do the work they’ve been putting off.
And that’s exactly what I’m going to do. With some added flair, of course.

The end of reality: How virtual reality is blurring the lines between what’s real and what’s not

Bolded text was generated by ChatGPT, normal text was written by the satirist.

It’s the end of reality as we know it. The clunky, sweaty nightmare that is virtual reality is blurring the lines between what’s real and what is not… according to ChatGPT.

Virtual reality is a technology that allows users to “immerse” themselves in a computer-generated “environment.” Legally, “immerse” has to have quotation marks surrounding it. So does “environment.” The technical definition for VR technology is “computer binoculars.” By strapping an ophthalmoscope to your thick skull, anyone can experience the claustrophobic comeback of the glorified 3D glasses that are VR headsets.

It can be used for entertainment, education, and training, among other things. “Other things” is a very nice way of saying porn. Too nice. This paragraph is really understating the pornographic usage of the headsets. Seriously, go to any VR game website right now and search “girl simulation.” There will be literally thousands. Actually, don’t do that.

One of the key features of VR is its ability to create highly realistic simulations of real-world environments and experiences. Unfortunately, it can’t provide that yet. If anyone figures out a way to do that, please email metaquest@markstucks.com.

As VR technology advances, it is becoming increasingly difficult to distinguish between what is real and what is not. Some people believe that VR has the potential to change the way we think about and interact with the world, while others—normal people—are concerned that they’ve invested far too much money in technology that won’t be functional until the year 3000.

There are a variety of VR games available, ranging from fantasy games like ethical capitalism to more real-life simulators, like paying your landlord or choosing between insulin and cable.

VR technology has also opened up new possibilities for traditional gaming genres, such as first-person shooters that actually kill people, puzzles where the solution is to kill people, and sports games where people die. VR gaming has seen rapid growth in recent years, driven by “advancements” in VR technology and increased consumer interest. This consumer interest is completely organic and not at all a product of industry-created hype over an underwhelming piece of technology.

Well folks, we’ve come to a crossroads. As a writer, I recognize the threat ChatGPT poses to my very existence. Yet, I’ve used the technology for its intended purpose as a means to an end. And I hate to admit it, but it helped me.

I am neurodivergent, and sometimes I struggle to get my ideas out clearly. Don’t get me wrong, I’m a perfectly capable writer, but my brain doesn’t always put ideas in order quickly and coherently. I found it much easier to get my thoughts out when given a sample essay to work from. I was able to easily formulate my ideas around a few simple paragraphs, and I must admit, it saved me time and stress.

My point is, AI threatens the livelihood of creatives in every field. Or maybe my point is that AI has a real utility, and can assist anyone in writing effectively. Maybe it’s both.

In the coming years, we’re going to have to start asking ourselves tough questions about how we integrate technology into our reality — and if we even want to. Dear readers, if you take anything from this article, let it be this: I will always be funnier than a robot.
As stewards of a university renowned for its ever-expanding online enrollment numbers, ASU’s administrators pride themselves on their — and by extension, the University’s — role in building what they view as the future of higher education in the digital age: a mix of online and in-person learning.

At ASU, technological access is a necessity for successful educational outcomes. In 2020, the University offered over 2,400 iCourses — completely online classes available to in-person students. The University has used Canvas as its learning management system since 2018. The same year, Zoom was licensed University-wide. One year later, Slack was also made available for the entire University.

Together, these three digital platforms allow students to take exams, attend classes and communicate with their professors and peers. But for those who lack reliable access to these integral learning platforms and online course offerings, accessing their coursework can seem like traversing an unbridgeable chasm.

As the University continues to pursue dramatic technological expansion, students who aren’t able to reliably utilize the University’s digital offerings believe it’s only broadening the persistent, yet often overlooked,
“Students who are connected do better. They have resources. So this digital divide perpetuates the inequalities that are already there. It magnifies them.”

— Karen Mossberger
goal is to bridge the digital divide.

“What does the internet mean?” asked Karen Mossberger, the director of ASU’s Center on Technology, Data and Society, which conducts research on digital inequality. “It’s access to information, just like education should be.”

An obscured divide

The term “digital divide” was coined by psychologist Lloyd Morrisett to describe the emerging and rapidly broadening gap in technological access during the sharp rise in computer ownership among the highly educated during the 1990s.

While the digital divide can be observed anywhere technology can, or can’t, be found, relatively little attention has been paid to the digital divide on college campuses, according to U.S. News and World Report. Within this oft-overlooked digital divide, students with disabilities, low-income students and Black, Hispanic, small-town, rural and first-generation students are among the most affected by the gap in access.

“Often, low-income communities become invisible in the larger society,” Mossberger said.

These students tend to struggle more with acquiring the technology necessary for successful online learning, such as laptops and reliable internet, or they experience other issues related to digital access. This in turn results in these college students earning poorer grades and getting lower GPAs, according to a 2018 study.

“Students who are connected do better,” Mossberger said. “They have resources. So this digital divide perpetuates the inequalities that are already there. It magnifies them.”

Andie Jia knows that before heading out to class for the day, it’s routine for many college students to check their bags for a few necessities: perhaps a water bottle, a phone charger and, most importantly, a laptop. But for a long time, the junior studying secondary education couldn’t afford to shell out over $1,000 for a MacBook Pro in addition to the costs of other college expenses. So for roughly three years, he skipped that step of the routine, leaving for class with the laptop sleeve in his bag sitting completely empty.

“Having a laptop is very necessary for college students,” Jia said. “It’s very necessary that they have all the technology.”

As a university committed to maintaining educational accessibility, ASU says it is “tackling the digital divide” through its laptop loan program, which allows students to rent laptops to complete their course work.

But the program has stopped loaning out devices for the spring 2023 semester because it has reached maximum capacity.

Annie Davis, director of communications at ASU Enterprise Technology, said 2,904 laptop devices are currently on loan to students, but that many of students’ computing needs can be fulfilled by visiting on-campus computing sites and libraries.

Outside of class, Jia would cope with his lack of laptop access by frequenting places on campus — like Hayden Library, Noble Library and the Tech Studio in the Creativity Commons building — where he could access a computer with reliable Wi-Fi. But during class, he would have to resort to using his cell phone to complete online class activities, even as he watched his peers scroll on their laptop screens, able to use advanced course software and complete assignments with ease.

Among professors with strict no-cell-phone policies, Jia found that his special circumstances typically warranted no sympathy. One professor explicitly warned him that their
strict classroom ban on cell phones would hold, even if Jia wouldn't be able to participate in class activities in any other way. If Jia violated the rule, his class grade would suffer.

Jia never ended up renting a laptop from the University’s laptop loan program. The program did not immediately respond to requests for comment on why it has reached maximum capacity and what it is doing to address high demand.

“If ASU can’t guarantee that every student enrolled has a laptop, then it’s always going to be a problem,” Jia said.

Bridging the gap

Susannah Sandrin, a clinical associate professor in the School of Mathematical and Natural Sciences, teaches environmental science classes online.

When she’s holding class through a screen, Sandrin is able to teach ASU students on all campuses and even halfway across the world. However, her class requires students to have a personal computer in order to access and complete lab assignments through the subscription learning platform SimBio.

“That particular company, I ask them every year if there are any other options that could make this accessible,” Sandrin said. “Every year we revisit it. We try to figure out if there is something else that’s the same quality that would be more accessible, and until we find that, we’ll stay with it.”

Despite their efforts, her department has not been able to find a software that offers better environmental science labs. “It’s really hard because you want to balance the quality of education with accessibility,” she said.

Because of the tech requirement, Sandrin has had to direct students to computer labs, libraries and other spaces with access to computers to complete their labs.

“We’ve worked with the library system since we started offering this course and started using that software program, so students can go to the ASU libraries and download it to any computer,” she said. “It’s just that they have to leave their dorms.”

Aside from the physical gear necessary for students’ success, Sandrin said online education is only as good as students’ internet access and quality. She gets emails every day from students who live in rural areas about needing a quiz reset because they lost internet connection while taking it.

In assistant professor Stacey Moran’s classes, heavy technology and extensive programs are not a problem with her “low tech, no tech” policy. Contrary to the typical classroom setting, no laptops or phones are seen out unless a student has learning accommodations.

Her class is a film and media studies course on science fiction called Film and Technoscience. It involves thinking about technology and how it affects people — which is ironic, she says, considering her classroom policy.

“I don’t think we yet have the tools to think critically about what (technology) really is, so by getting rid of it, taking it out of the classroom, I think it gives us an opportunity to think about it in a different way,” she said.

Although she has assignments on Canvas, she provides paper handouts and encourages students to write, in class and at home. And even on Canvas, she aims to make her class a more accessible place.

“I’m still working in my classes to make readings accessible — those PDF readers where people who have visual impairments can have the text read to them,” she said. “I’m still trying to put captions on all of my images and stuff like that. In terms of accessibility, it’s
quite time-consuming, and I’m working on making sure that the tools we are using are accessible to all kinds of students.”

**Online accessibility**

During their first semester studying graphic information technology at ASU, Ali Fontaine faced many students’ worst nightmare: having to defend themselves against an allegation of cheating on an online test from the University’s anti-cheating software.

Fontaine, now a senior studying graphic information technology at the University, has Ehlers-Danlos syndrome, a connective tissue disorder. The day-to-day pain caused by the condition can interfere with their ability to focus, learn and retain information. For Fontaine, using a screen reader for the test was a disability accommodation — but the University’s software flagged it as cheating.

“I was just using a plug-in to make my life easier while taking the exam,” they said. “And I had to prove that that’s what I was actually using.”

Because the digital divide is habitually viewed as a lack of physical access to digital infrastructure, such as reliable internet or laptops, online accessibility issues faced by students with disabilities are often missing from the conversation over digital inequality.

Fontaine said that as ASU has shifted to be more tech-oriented, a similar lack of attention and sympathy has been felt by students who are facing accessibility issues with educational technology.
“I’ve had a couple professors upon the initial request for accommodations throw a big fit about how it’s potentially unfair to other students,” Fontaine said. “But really, the accommodations are there to level the playing field for people like me who get really sick, sometimes out of nowhere. We can’t really control when we’re worse or when we’re better.”

As a student in one of ASU’s hybrid classes, Fontaine has noticed multiple accessibility issues. Recordings often lack captions, and transcriptions aren’t synchronized with the videos they accompany. Fontaine said they don’t spend much time hoping anything will change as classes begin to pivot to online learning.

Be it with hybrid courses, tools that increase accessibility to higher education, or a reroute of our academic attention to the physical, ASU, its faculty and its students are at the forefront of the digital education age. What matters now is how the University incorporates those existing across the cavernous digital divide into its technological ambitions.

“This is the future of learning,” Mossberger said. “But we need to have a bridge to the future to help all students have the choice.”
Report

Farms of the future

How one ASU lab is working to create food resiliency in the Southwest through vertical farming

by Keetra Bippus
Photography courtesy of Yujin Park and Jonathan Ries
The word “farm” might conjure up images of vast swaths of land covered by endless rows of crops. A vertical farm might conjure up images of scientists inside laboratories wearing starch-white lab coats, examining soil samples with microscopes. It’s time to remove those images from your mind and plant the seed of imagination: a vertical farm in your kitchen.

Grappling with a longstanding drought, Arizona farmers currently use over 70% of Arizona’s water supply for irrigated agriculture. Drought and water cutbacks have forced some to reduce their planting in recent years. Facing an agricultural crisis, Zhihao Chen, an instructor at the College of Integrative Sciences and Arts and an owner of Homer Farms, a startup that works to convert organic waste into bioenergy and liquid fertilizer for vertical farms, decided to look for a solution.

He found it indoors — through vertical farming, to be exact. By employing a combination of artificial lighting, water mixed with nutrients and stacks of trays holding leafy greens, vertical farming uses up to 90% less water than traditional farming and yields 10 times more crop in the same amount of space used to grow on traditional farms, according to ASU News.

In fall 2022, ASU’s College of Integrative Sciences and Arts began offering a certificate program in indoor farming led by Chen and his colleague Yujin Park, an assistant professor at CISA.

Students in ASU’s Indoor Farming Lab learn about vertical farming and have opportunities to be recruited and trained with applicable knowledge the industry is looking for, Chen said. Some students who have completed the program have later been hired by Homer Farms.

Matthew Easter, a junior studying sustainability, joined the Indoor Farming Lab because he wanted to get career experience and was interested in the science behind vertical farming.

“I come from a family of farmers … it seems that the genes somehow got passed onto me,” Easter said. “I think that indoor farming is a way that we can provide food in a way that is sustainable.”

Vertical farming can allow for fresh produce that isn’t normally able to grow in Arizona to be produced locally. Easter said. “This controlled environment in which we can grow things allows us to have much more fresh options in locations that desperately need them.”

The Indoor Farming Lab mainly grows leafy greens, strawberries and herbs due to the high cost of vertically growing other plants, such as grains. Because the conditions in which the plants grow are meticulously controlled, Park and student researchers can ensure their nutritional value by adding nutrient solution.

For plants with medicinal properties, like marigolds, the Indoor Farming Lab “can manipulate all the environmental factors so that we can increase certain vital chemicals to increase the nutritional value,” Park said.

Farming for the home

Chen and Park are working with the city of Phoenix to help the general public build small-scale vertical farms inside their homes. The two are planning to host workshops to educate residents about vertical farming techniques, targeting those who live in food deserts.

If residents want to sell their crops, Homer Farms will buy the produce and distribute it to its buyers. That way, if small businesses are worried about finding a market for their produce, Homer
Farms can help them get their foot in the market, Chen said. They can also keep the produce for themselves to have fresh food grown right in their home.

Jonathan Ries, a graduate student studying applied biological sciences, envisions vertical farms in people’s homes becoming commonplace in the future. In fact, he already has one in his own home.

His prototype, constructed from PVC pipes, is a bit specialized, but someone could even use buckets bought from Home Depot and start their vertical farm, he said.

“For the average person who just wants some fresh produce and maybe doesn’t like getting their hands dirty, doesn’t want to dig into the ground, (vertical farming) seems like such a good solution for people who want that produce literally in their kitchen,” Ries said.

Personal vertical farms are fairly low maintenance once they get started — Ries only needed water, LED lights and nutrients, which he bought on Amazon. In Arizona, vertical farms can even be placed outdoors, eliminating the need for LED lighting.

In the future, “I think we’re going to be at a point where we have to farm indoors,” Ries said.

Ries sees vertical farming becoming a necessity in the future, on both a large and small scale, due to its water efficiency, faster food production and regional accessibility. In rural communities, he said neighborhoods could have farms nearby or inside them, instead of having to drive miles to the nearest grocery store, due to the small amount of space required for a vertical farm — the ASU Indoor Farming Lab started in two standard shipping containers.

Homer Farms is also in the process of renovating a 10,000 square foot warehouse to vertical farm in Phoenix with the goal of creating a more resilient food system for the city. The farm is predicted to grow a minimum of 500,000 pounds of produce a year. Both the training and the farm are supported by the Phoenix Resilient Food System Initiative, originally adopted in 2021. The vertical farm is expected to start cultivating food in March, Chen said.

The initiative is designed to decrease food insecurity and create a more resilient food system in Phoenix so the city will be less impacted by disruptions to the supply chain, which during the pandemic exacerbated the need to have a strong local food network.

The sustainability benefits of vertical farms don’t end at the saved space and water. The vertical farms at ASU, in partnership with Homer Farms, convert food waste, including waste from football games, into liquid fertilizer for the produce, Chen said.
Farming for the future

In addition to providing more food than traditional farming methods, vertical farming can be a more environmentally conscious way to grow mass amounts of crops to sustain a resilient — and ever-expanding — food system. Vertical farming can be certified organic, said Kathleen Merrigan, executive director of the Swette Center for Sustainable Food Systems and former U.S. deputy secretary of agriculture.

Organic foods avoid synthetic pesticides, reducing farmers’ exposure to air and water pollution, a report Merrigan co-authored found. Organic farming also protects the health of farmworkers, farmers and the environment, according to the report.

“Most of them (farmers) have come to some sort of epiphany in their life,” Merrigan said. “That the way they were producing with intensive use of chemicals makes no sense for the health of their family (and) their farmworkers.”


Energy makes up 50-70% of the cost of goods sold for vertical farms. Renewable energy, like solar panels, can offset the costs, but they also require more square footage than vertical farms typically have. As technology continues to evolve and LED lights become more efficient, vertical farming becomes more desirable, Merrigan said.

According to Chen, while vertical farming is great for leafy greens and herbs, it’s a different story when it comes to cultivating crops like rice and wheat. The energy required to grow grains in a vertical farm doesn’t match up to the market value of the crop, Chen said, leaving those in the field looking for ways to innovate.

Still, Park and Chen hope that the vertical farming program at ASU will help reshape the future of agriculture in Arizona and the Southwest — especially amid ongoing drought.

This initiative comes at a time when some farmers in Arizona are looking for ways to use less water for their crops, according to Chris Udall, executive director of the Agribusiness & Water Council of Arizona.

At the start of 2023, farmers in Pinal County lost all of the remainder of their access to the Colorado River entirely. Arizona has taken the lion’s share of cuts to reduce its water use compared to California, which gets almost half of the lower basin’s water apportionment.

“Farmers are very good about being able to adjust to water conditions,” Udall said. There are farmers who would shift
“I think that there’ll be a lot that look at vertical farming as an option if it’s affordable and they can make a profit. (They’re) businessmen and they are cognizant of costs and inputs. This is a real opportunity.”

— Chris Udall

to producing crops with less water, but there needs to be a demand for them, he said.

“Farmers do what they do for a reason,” Udall said. “A lot of them, if not all of them, look to experiment on everything possible to help them raise a crop.”

Farmers are looking to make a profit, and water is a huge factor in meeting an agricultural bottom line. Some farmers are looking into vertical farming, but energy and startup costs can often be barriers. Vertical farms must make nearly six times more money than conventional farms to break even, according to a report from CoBank, an agribusiness bank.

“I think that there’ll be a lot that look at vertical farming as an option if it’s affordable and they can make a profit,” Udall said. “(They’re) businessmen and they are cognizant of costs and inputs. This is a real opportunity.”

Andy Etchart, an employee and the great-grandchild of the founder of Everkrisp Vegetables Inc., a third-generation family-owned farm in Arizona, said in an email that sustainable farming has always been a part of the company’s identity.

“We are constantly thinking about not compromising the ability of future generations to meet their needs both on a personal and broad scale. We are currently in the third generation of Everkrisp and want that to continue for many more,” Etchart said in an email.

Etchart is concerned with the future of hydrology in the Southwest, including access to water from the Colorado River. That concern has led to the farm implementing more efficient irrigation, such as drip irrigation.

The farm doesn’t see vertical farming in its future, and Etchart said that startup costs are high.

“It appears to us that many producers in this space are working with venture capital and/or private equity groups whose main purpose in these ventures is return on investment. (Return on investment) isn’t at the heart of why we farm and doesn’t seem in the best interest to the people of Arizona,” Etchart said in an email.

While concerned about the future of farming in Arizona, Etchart still has hope: “Farmers (are) crafty and resilient and people need to eat.

“More broadly, we want the people of Arizona to have fresh, local produce for decades to come,” Etchart said in an email. “As that vision seems less and less likely we focus more and more on trying to make it come true.”
Feature

‘If you can’t pay, you can’t stay’

The skyrocketing cost of college has transformed the student experience

by Madeline Nguyen
Illustrations by Biplove Baral
To any passing observer, Alex* may have seemed like just another ASU student slipping out of their dorm to hook up with an online stranger in the dead of night. Except this wasn’t a mere hookup. Alex was going to meet their first client, and they had a knife hidden in their left sock — just in case things went south.

Before then, the high-achieving student thought they had their whole life planned out ahead of them: earn straight As, graduate at the top of their high school class, obtain a degree and someday attain financial stability.

Getting kicked out of their abusive home, living on the street and becoming a sex worker was never part of the plan.

But nevertheless, Alex found themself completely on their own. And despite financial aid representatives’ previous assurances that the University would fully cover their college costs as a low-income student, Alex unexpectedly found a $6,000 bill in semesterly expenses with their name printed on it.

“I don’t have a home,” they said. “I don’t have anyone to go back to. So it was either I lose everything, or I stay at ASU and figure my shit out.”

After being stuck in limbo with the University’s financial aid department for a few months, Alex was desperate. They felt as if they’d exhausted all of the legal means to earn money through their low-paying food service job, and the tuition bill’s final payment date was coming up on them fast.

When Alex’s final financial aid offer from the University wasn’t as large as they anticipated, they quickly learned that paying to keep their academic plan on track was something they’d have to figure out on their own.

Alex met their first client as a sex worker not long after. They used the $800 they earned from an older man that first “brutal” night to pay tuition for the classes they attended the next morning.

“People who say that money doesn’t buy you happiness don’t understand what it’s like to cry over your bills,” they said. “Because it does, it really does. Money buys you the financial support that you need in order to be safe, stable and secure.”

Ignore the price tag

Amid high inflation rates, mass layoffs and fears of an impending recession, the cost of college is still higher than ever before. With a collective $1.75 trillion in student loan debt, the U.S. has the second-highest average student debt in the world behind only the United Kingdom, according to online lending marketplace Lending Tree. Many students still hold the deeply rooted view that a college degree is the golden ticket to the American ideal of comfortable middle-class life.

This view still holds weight: College diplomas can indeed increase chances of economic success, but graduates must be able to reap a return on investment to recoup the skyrocketing costs of their education.

“To what extent is the American dream actually possible?” asked Kevin Correa, a clinical assistant professor in the Mary Lou Fulton Teachers College who specializes in higher education. Correa is a former first-generation and low-income college student.

“To what extent is America fulfilling its promise of a place where people can succeed no matter their background?” Correa said. “Because when we look at the data, statistically, that hasn’t been true. Finances still tend to be the number one predictor of whether or not people get a bachelor’s degree. And the question is: Is that the country that we want?”

While the national battle over the Biden administration’s student loan relief program rages in the courts, some ASU students, like Alex, argue that the eye-watering cost of college is hindering their ability to enjoy their experience at a university that prides itself on its supposed affordability for all students.

“ASU is steadfast in our commitment to our charter principles of offering an exceptional university experience that is accessible to any qualified student,” said ASU spokesperson Veronica Sanchez in an email.

“A critical component to accessibility is the cost of tuition and fees, and there are many successful financial aid and scholarship programs in place that ensure that more students who are first generation and/or from lower income families can attend ASU with little to no financial burden.”

Despite University President Michael Crow’s praise for the school’s “modest tuition, high financial aid” model, ASU’s tuition and fees fall on the higher end of the spectrum among four-year public universities nationwide, according to data from U.S. News and World Report. This academic year, in-state

* This student’s name has been changed due to privacy concerns
The ivory tower

For centuries, colleges were originally meant only for the wealthy. From their founding in the Middle Ages, universities were established to educate the sons of Europe’s wealthiest men for professional careers in fields like law and medicine. As the children of the elite, these students could easily afford to spend a few years out of the workforce to enjoy their college experience. Those who weren’t as privileged learned crafts from their fathers and headed straight into the workforce instead.

Despite the progress made in improving accessibility to higher education, Valeria Reyes, a first-generation college student, said the divide between financially stable and unstable students remains.

“The system is created specifically for one type of student,” the senior studying French and justice studies said. “If you’re not that student, then you’re going to find yourself struggling and having many challenges.”

Like many first-generation students, Reyes spends her time performing a precarious “balancing act” between the heavy course loads of her two majors and the demands of her part-time job at the University. When she can’t juggle all her duties simultaneously, free time, club involvements and outings with friends are always the first to go.

“It can be stressful,” she said. “I have so much work. It’s like having two jobs — I have my part-time job, but also, school is another job on the side.”

While most of Reyes’ paycheck goes to her basic necessities, she sets money aside for her student loans by relegateing herself to strict budgeting habits.

But for Reyes, college didn’t always seem like another task to check off her extensive list. When she first came to ASU as a bright-eyed freshman, the University seemed to be full of promise. Reyes was the first member of her family to attend college, and she was thankful to know various scholarships would cover the bulk of her tuition.

But after only a few months at ASU, Reyes quickly realized that college would be much more expensive than she anticipated. Non-tuition-related expenses from things like books and transportation piled up rapidly — but because her family was unable to save money for her degree, there was nothing to pay the academic bills with.

Without the guidance those with college-educated parents receive while navigating the hidden costs of college, Reyes thumbed through the University’s financial support systems by herself. In the end, Reyes took out her first student loan during her freshman year.

First-generation students are among the most overburdened by student loans — along with Black, Latinx and low-income students — and they’re also more likely to work throughout college.

“First-generation students have tremendous resilience and drive and ambition to do whatever it takes to get a college degree, no matter how many hours of hard work that requires and how many sacrifices they need to make,” Correa said. “They’re willing to do what it takes because they know that that college degree means so much not only to them, but also to their family.”

But the extra social, financial and psychological challenges that first-generation students encounter throughout the college journey also make it more likely that they’ll drop out, even though a degree could contribute to upward economic mobility and achieving the increasingly illusory American Dream.

One in three first-generation students will drop out of college within their first three years, according to a 2019 report from the National Center for Education Statistics.

And even among those who make it to graduation, the hardships don’t stop. The heavier burden of student debt weighs upon many first-generation students is a major barrier to class mobility.

“Prior to coming to college, I didn’t think that money was as big of an issue as it appears to be now,” Reyes said. “But that (loan) is definitely something I worry about, especially now that I’m about to graduate.”

Beyond tuition

Growing up, ASU was never Anne Perry’s dream school.

Phoenix is thousands of miles away from Perry’s native Florida, and the Valley’s dry desert air and dusty terrain were a jarring contrast to the humid summers and marshy swamps that characterized home. But the sophomore studying sports journalism found herself drawn to the quiet beauty of the desert and the limitless professional opportunities she could reap in Phoenix, a premier sports hub and home to one of the best journalism schools in the country.

Perry knew covering out-of-state expenses at the University might be tight on her single mom’s salary, but she was confident that financial aid would be able to make her dream achievable. She promptly reserved on-campus housing on the downtown campus and prepared herself for the cross-country move and “completely different experience” that was to come.
But only one month before she was slated to move into her ASU dorm, Perry’s lack of sufficient financial aid left her with paying for out-of-state tuition, on-campus housing and living expenses — something that would be impossible given her family’s financial situation.

Even as Perry quietly resigned herself to attending a more affordable in-state university, her mother secretly spent time working out a solution to the family’s financial dilemma mere weeks before the fall semester was scheduled to start.

“And then my mom was like, ‘I have this idea. Let me know if you hate it, but if you really want to go (to ASU), then this is the only solution,’” Perry said. “And at that point, I would’ve done anything to go.”

After a month of deliberation, Perry finally landed in Arizona for her freshman year at ASU. But that wasn’t until she canceled her housing reservation at Taylor Place, a dorm on the Downtown Phoenix campus, which allowed her to shave roughly $5,000 off her lengthy list of college-related expenses. Instead of living on campus like many other freshmen in downtown Phoenix, Perry would be living farther from campus with a family friend.

“Sometimes, college is more about the financial than the educational,” Perry said. “People who can pay for these costs — the upper class — can just come, and it’s not much of a concern to them. But especially when you’re lower income, you have to work harder to be able to just go to college.”

Beyond the soaring cost of tuition, students are also expected to shell out enough money to pay for a multitude of other college-related costs. In fact, most students who take out loans do so to pay for non-tuition-related expenses, such as housing, books, food and transportation, according to public policy think tank New America.

At ASU, on-campus housing rates at their most expensive can amount to nearly

“It can be stressful. I have so much work. It’s like having two jobs — I have my part-time job but also, school is another job on the side.”

— Valeria Reyes
$19,800 every school year, and meal plans tack on thousands more. Even if students decide to dodge on-campus housing costs by living in non-ASU housing close to campus, gentrification and rapid development across the Valley have led to a barrage of rent spikes.

In 2021, Phoenix’s rent hikes were among the highest in the nation, according to AZCentral. Since then, rents have continued to skyrocket. Downtown Tempe and downtown Phoenix now rank among the most expensive places to rent in the Valley, and they’re also home to ASU’s two largest campuses.

In addition, high inflation rates have caused the cost of non-tuition-related expenses to soar, but wages haven’t kept pace. While workers have been earning more dollars every hour, their wages have actually declined over the last 17 months when accounting for inflation.

Though various scholarships cover much of her tuition, Perry works two jobs to pay for other college expenses and necessities like food and books. Even with the extra income, she and her mom sometimes find themselves scrambling when bills are due.

“The cost of college is something I expected when I came into it, but I didn’t realize exactly what paying that amount of money would really be like,” she said.

Financial… aid?

Avion Wick’s mom had died over a year ago. But in some sense, she was still alive — at least in the eyes of the U.S. Department of Education.

As the sophomore majoring in mass communication and media studies looked over his federal student aid award letter for the 2022-2023 school year, he found the department had based its calculations on his parents’ 2020 financial information, when his mom was still alive. As a result, the department had used the six-figure income his mom received to determine how much financial aid he’d be awarded.

Except his mom was no longer alive, and his family was no longer making anywhere near that level of money.

But to the Department of Education, the change in Wick’s circumstances did not matter. As a student paying for the University out of pocket, Wick’s financial aid award was much lower than he needed to keep his head above water. And the remaining tuition and fees he now had to pay threatened to drag him under.

“Very quickly, I realized that financially, I’m not going to be able to attend college as long as I wanted to, go as in depth as I wanted to,” he said. “It changes a lot of people’s minds on what they can and can’t do and how much they can do.”

Wick had already been struggling to pay the barrage of costs associated with attending the University as an out-of-state student. He knew his financial situation came with “ups and downs,” so he sacrificed what he could for the price of a degree — even if it meant missing out on many hallmarks of his ideal college experience.

Instead of cheering in the stands at raucous football games and partying through sleepless nights, Wick found himself working a full-time job, packing 22 credits into one semester and living farther from campus to find cheaper housing.

“That allows me to just survive in a crazy expensive area like Phoenix,” he said.

But with the arrival of his financial aid award letter, there now seemed to be more downs than ups. Wick’s financial benefits from his father’s military service had run out, and this academic year’s 4% tuition increase for out-of-state students brought out-of-tuition to nearly $30,000.

Ultimately for Wick, deciding whether to continue a four-year track at ASU came down to the choice between a mountain of debt or a degree.

Looking forward to a “new start” at ASU after spending his last year of high school learning online, Wick’s hopes have slowly slipped away with his decision this semester to withdraw from his original and exclusively on-campus major, journalism, to his current degree track on ASU’s online program, which was more affordable for him.

For the sake of his financial needs, he’s charted out an intensive course load that will allow him to obtain his bachelor’s degree in three years — receiving his diploma by the time he’s 20 years old.

“When I came to ASU, I did not expect to be leaving so fast because of the financial burden that it is to stay for all four years,” he said. “Now, it definitely feels like I am just anyone else taking classes in front of a computer.”

For decades, federally funded financial aid has failed to keep up with the cost of college. Pell Grants — federal financial aid packages meant to provide money for students who demonstrate exceptional financial need — haven’t kept up with the soaring cost of college. From 2000 to 2020, average tuition and fees at public four-year institutions like ASU, which is the most affordable type of college for bachelor’s degrees, doubled, but maximum Pell Grant awards have only increased by 29%, according to data from NerdWallet.

In addition, the intricacies of the financial aid and loan processes can puzzle many students and keep them from attaining financial stability.

“If you can’t pay your tuition, you literally can’t stay,” Correa said. “You literally can’t continue your education. There’s certainly things that ASU does to help with that, but at the end of the day, that is the number one reason why students are unable to complete their degrees: They simply can’t afford it.”
Report

New platform, new paradigm

Why is the Department of Defense funding ASU researchers to study disinformation?

by Alexis Moulton
Illustrations by Biplove Baral
When a video appearing to depict Joe Biden spewing anti-trans hate speech surfaced online in early February, Joshua Garland was alarmed. In the brief clip, which was widely shared on social media, Biden delivers transmisogynistic rhetoric so bigoted and obscene, it isn’t suitable to publish here — and the lip-synced audio sounds just like the president’s actual voice.

“Even my mom was like, what is this?” said Garland, an associate research professor at ASU’s Global Security Initiative. “I was like, Mom, it’s not real. It’s a deepfake.”

Deepfakes are synthetically generated digital media created using artificial intelligence. The technology is most often used to make doctored porn, but fake video and audio of politicians and public figures has also emerged in recent years. Deepfakes are one of several online disinformation techniques Garland researches at the GSI’s Center on Narrative, Disinformation and Strategic Influence.

“In the last couple of years, I’ve really seen disinformation as being one of the greatest existential threats to our democratic society, and really society in general,” Garland said. “And so I wanted to know what I could do as a mathematician or computer scientist to aid in this problem.”

The GSI is ASU’s global security research arm. 70% of the initiative’s funding comes from the U.S. Department of Defense, Homeland Security and Intelligence Community; another 26% comes from “other government” sources, according to GSI’s website. These agencies, which are primarily concerned with national and international security, commission research in AI, cybersecurity and border enforcement technologies.

Garland and the GSI aren’t the only misinformation researchers at ASU who receive defense funding. Hazel Kwon, an associate professor at the Cronkite School of Journalism and Mass Communication, has been researching digital media and society for more than a decade. Kwon’s Media, Information, Data and Society Lab has received support from the Department of Defense for research on the dark social web.

“When I began in the field of digital media, we were all talking about good things, about digital technologies for democracy,” Kwon said. “But after Web 2.0 sort of penetrated society, since then it has been exploited by people who have malicious intent. So now the whole paradigm in our field has really shifted toward talking about the dark side effects of technology.”

In January, Kwon was recruited by ASU’s McCain Institute, a political think tank, to be part of a task force on “Defeating Disinformation Attacks on U.S. Democracy.” The task force has three additional ASU faculty members, including Scott Ruston, director of the GSI center Garland works at.

The disinformation task force is funded by the Knight Foundation and Microsoft. The McCain Institute does not receive Department of Defense funding. Instead, its long list of donors features household names from the technology, energy and finance sectors: Chevron, Walmart, AT&T, SpaceX, JPMorgan Chase, Raytheon and, perhaps most controversially, the Royal Embassy of Saudi Arabia, among others.

Why is the DOD so invested in studying and combating online disinformation? For that matter, why is Microsoft? Why has the field of misinformation studies exploded with government and corporate funding over the past few years? And what does that explosion mean for research agendas at public universities?

“It’s really hard to say if it’s good or bad,” Kwon said. “It’s there, and people are gonna use it, and we’re gonna study it anyway. One thing that’s clear is that the old model, the old theoretical framework — that open communication and this decentralized network for conversation, without having much control mechanisms, is ideal for public discussions — that paradigm seems to get very challenging.”

Anxiety

Before earning a Ph.D. in cinema and media studies from the University of Southern California, Ruston spent 10 years in active duty for the U.S. Navy. In 2017, he was hired by ASU’s GSI to study the rhetoric and narrative of Islamic extremist groups, such as Al Qaeda.

“This was also a time that there was growing attention on how nation-states were manipulating the information environments of other nation-states,” Ruston said. “You’ve probably heard lots of stories about Russian meddling in the 2016 election. So that was on people’s minds.”

The panic surrounding Russian interference in the 2016 presidential election via targeted online disinformation has frequently been dubbed “Russiagate” in popular media. Ruston maintains there is ample evidence the Internet Research Agency, an organization linked to the Russian government, ran fake accounts and astroturfing campaigns on American social media with the goal of “stoking political polarization.”

Journalists, media critics and data scientists have questioned liberal media narratives surrounding the Russiagate scandal for possibly exaggerating the scale of its impact. A January 2023 study from New York University found only 1% of Twitter users accounted
for 70% of total exposure to the Internet Research Agency’s disinformation accounts; the study found “no evidence of a meaningful relationship between exposure to the Russian foreign influence campaign and changes in attitudes, polarization, or voting behavior.”

But even if the Russian influence campaign had no effect on voters’ decisions, the mere existence of an influence campaign prompted a wave of government attention to disinformation on social media. In January 2021, Ruston became the director of the GSI’s brand new Center for Narrative, Disinformation and Strategic Influence, which seeks to “support efforts to safeguard the United States, its allies, and democratic principles against malign influence campaigns,” according to its website.

“To date, the most frequent funder has been the Defense Department,” Ruston said.

Garland joined the center in February 2022. His team is currently developing an algorithm for determining whether a given selection of text, like a news article or social media post, was written by a human or generated by an AI — such as the popular ChatGPT. Believable AI-generated text could pose the same disinformation issues deepfakes do, and at a faster rate and larger scale than human writers are currently capable of.

“Generated text is becoming so similar to human text that there’s going to be this blurry ground where we can no longer differentiate it,” Garland said. “So we have to have a tool that allows you to tell if this was generated by a human or generated by an artificial intelligence.”

The Defense Advanced Research Project Agency, the DOD’s research arm, is funding the project. The ultimate goal is to publish a detection algorithm capable of identifying AI-generated text across a wide array of large language models, not just ChatGPT.

“Currently, ASU is number one in that metric,” Garland said. “For doing text detection, across this DARPA program, which is a very big DARPA program that includes many high-end universities and industry partners, we have the algorithm that’s doing the best currently. Which is pretty cool.”

Is AI-generated disinformation deployed by foreign actors already a large-scale threat? It’s difficult to know, said Garland, who couldn’t point to a specific example. There’s certainly already AI-generated content — and misinformation — on the internet. But Garland thinks that for DARPA, “the concern is in some ways very preventative,” anticipating hypothetical problems up to 20 years down the line.

The U.S. foreign intelligence apparatus is far from new, but in the social media era, its capabilities are evolving. The McCain Institute, for example, operates a web scraper that monitors sites like Facebook and Twitter for mentions of NATO.

In Kwon’s opinion, thinking about disinformation exclusively as a foreign political threat is a potentially problematic framing. In 2020, Americans experienced a more intimate side of the online information crisis in the form of COVID-19 conspiracy theories.

“In the past, when people talked about disinformation, it was really about foreign influencers, foreign intervention,” Kwon said. “Once you define disinformation actors as foreign institutions or operators, it’s really easy to sort of cut the boundary, right? This is the bad guy, and we are the victim. However, these days the domestic operation is so impactful.”

Motivation

Qian Li is a Ph.D. candidate in the Cronkite School who studies social media engagement and online social movements. A student of Kwon’s, Li spent the past two years researching the role of online media in influencing public opinion on the American gun control movement — particularly the role of non-traditional, grassroots sources.

“With the trend of neoliberalism in journalism also comes debate about the liberty of who can be a journalist,” Li said. “Due to the digitization and development of social media, everybody has the freedom to express their feelings or to report the news. That makes the public sphere much more digitized, and also complicated.”

Li and Kwon’s research focused on two oft-misunderstood media actors: activist media — in this case, gun control movement websites — and ephemeral media, a new term in the misinformation studies field.

Ephemeral media is low-quality, typically partisan media which is often uncredentialed and disappears over time. Imagine you click on a news article on Twitter, “and then you close it, and when you open it again, you find Error 404,” Li said. “You can’t see any information, just the link of the webpage. People will think it is because it’s fake news, or it is because of censorship. It gives people more imagination.”

There is evidence to suggest most misinformation on the internet is tied to ephemeral media and accessed via social media. Activist media is also typically disseminated through social media; users can have a hard time telling the difference between the two.

“Activists play an essential role in triggering public attention on social movements, but we should be careful,” Li said. “Their ideas,
their agendas also will be affected by other information actors … We cannot ignore the interplay between activist websites with other kinds of media.”

The misinformation crisis the average American is most familiar with is probably vaccine-related conspiracy theories. Chun Shao, also a student of Kwon’s, is interested in how seemingly separate conspiracies build on each other through social networks.

“Even just from my personal social circle, there are some people who believe those types of conspiracy theories, discouraging them from getting a vaccine,” Shao said. “Or sometimes they don’t believe scientific findings. I think those types of misinformation are very very harmful.”

In 2022, Shao co-authored a study with Kwon which used AI topic-modeling techniques to identify connections between conspiracy theories about Bill Gates, COVID-19 and vaccine microchips. The caveat, of course, is that researching trending topics online “cannot measure whether people believe these conspiracies,” Shao said. “We only know whether they are talking about them.

“Sometimes, retweets may not mean endorsements,” he added with a chuckle.

That’s why differentiating between disinformation and misinformation is important. In an academic context, disinformation refers to false information presented with intent to deceive. Misinformation, on the other hand, is not always intentionally deceptive. Sometimes, inaccurate information just slips through the cracks. In the case of COVID-19, many so-called “misinformation actors” are normal people who legitimately want to spread their beliefs, blind — willingly or otherwise — to the factual inaccuracy of their positions.

“These domestic influencers and operators, their motivation is sometimes not extrinsic. It’s not for getting money,” Kwon said. “A big part of the disinformation industry is to make money, to make profit out of it. But another part of what we now define as disinformation mechanisms have a very intrinsic motivation. They really believe in it. In a way, their motivation is genuine.

“I think that’s where the real challenge comes in as a scholar,” she said. “To what extent should we consider it the free speech of people who have a genuine interest? To what extent should we consider it a part of the disinformation mechanism?”

Fracture

Garland knows a thing or two about the hazy and dangerous limits of free speech. Before coming to ASU, he researched online hate speech and citizen counterspeech efforts. In the process, he developed a somewhat cynical analysis of social media platform design.

“I think that the way the social media algorithms work, in some ways, promotes disinformation. In some ways, it promotes hateful rhetoric,” Garland said. “If they can show you something that’s going to be inflammatory, or highly engaged with, or mess with your emotions, or make you angry, or make you upset or whatever, they want you to see that first so that you keep scrolling.”

The problem, in Garland’s opinion, is a lack of incentives for platforms to change their algorithms. Most just remove posts and suspend or ban users who don’t follow their guidelines, rather than qualitatively adjust their engagement strategies.

“The big tech solution up until now has been to hide it, delete it, censor it, these kinds of things … and that just seems to make the problem a lot worse,” Garland said. “There’s been a lot of research that shows if you censor people, you ban them, you remove them from platforms, they simply move to other platforms where the problem’s way worse.”

The first users to migrate platforms are typically political extremists: neo-Nazis, antisemites and racists of all flavors. These users congregate on low-moderation social forums like 4chan and 8chan, the home of the Qanon conspiracy and the manifestos of several white supremacist mass shooters.

“When they come back from those cesspools,” Garland said, “they are just completely radicalized.”

Since 2020, alternative social media sites like Parler, Gab and Truth Social have spawned from right-wing disdain for what some view as censorship on mainstream platforms, namely Twitter and Facebook. These alternative platforms amplify right-wing influencers while targeting audiences that relate politically to those who’ve been suspended. According to a 2022 report from the Pew Research Center, around 15% of prominent accounts existing on alternative sites had previously been banned from a different platform, often for spreading misinformation.

The majority of people on these alternative platforms — spaces where there is far less exposure to traditional news media than on other platforms — say they are there to stay informed on current events, according to Pew. Prominent accounts on these platforms often peddle COVID-19 vaccine misinformation and transphobic rhetoric, and users are largely satisfied with the experience.

When anyone, from political extremists to everyday conspiracy theorists, can spread misinformation online, the outcome can be deadly. In the case of COVID-19, some anecdotal reports have suggested anti-vaccine rhetoric contributed to hundreds of thousands of preventable deaths. But when misinformation actors are pushed off social platforms, they
often end up in information islands where their distrust of institutional knowledge and other biases are affirmed.

For these users, “censorship” is a badge of honor. Why would they trust public academics, much less the federal government, to study and police misinformation?

**Intertwined**

ASU’s McCain Institute is exactly the kind of organization people with anti-establishment beliefs are predisposed to distrust. When the institute announced its disinformation task force on Twitter, its post was flooded with replies characterizing the initiative as an authoritarian attack on free speech.

The McCain Institute isn’t a DARPA project or a research lab — it’s a nonprofit political think tank. Its funders aren’t U.S. government agencies; they’re mainly corporations and private entities.

Microsoft, one of the McCain disinformation task force’s funders, has recently invested heavily in disinformation analysts and removed Russian state-affiliated media from its app store. Many tech companies, including some McCain Institute donors, have poured resources into disinformation research as their credibility and favorability has floundered since the 2016 Russiagate scandal.

Walmart, one of the McCain Institute’s largest donors, has run ads on over two dozen sites with COVID-19 misinformation. The corporation has also advertised on RT, a Russian state-affiliated news site, effectively financing the exact disinformation apparatus the McCain Institute has criticized on multiple occasions.

In 2014, the McCain Institute received $1 million from the Saudi government, a state notorious for stifling press freedoms and running its own social media disinformation campaigns in the style of Russiagate. And that’s not the Institute’s only global scandal.

In 2019, the State Press broke the news that Kurt Volker, then the McCain Institute’s executive director, resigned from his position following reports that he assisted Donald Trump in pressuring the Ukrainian government to dig up dirt on Joe Biden’s son, Hunter Biden. Less than two weeks later, Trump’s first impeachment inquiry was already underway.

There’s reason enough to be skeptical of the McCain Institute. And if the free speech Twitter trolls looked a little closer, they might realize it’s for a different reason than the one they assume: Across the board, tech companies, universities and intelligence agencies are financially and logistically entangled with the same disinformation actors they publicly disavow.

“I’m of the school of thought that disinformation is a very, very old problem,” Garland said. “It was called propaganda for a long time, right? I think that the most basic term is lying. And lying has been around since forever.”

In parallel with the surge in government and private funding of national security-oriented disinformation research, another side of the field has emerged, sometimes called critical disinformation studies.

Critical scholars have called attention to the U.S. government’s historical manipulation of media narratives — George Bush, for example, infamously lied about Saddam Hussein having weapons of mass destruction to justify the 2003 invasion of Iraq. Others have suggested the trend of disinformation alarmism in legacy media amounts to a moral panic.

Journalist Joseph Bernstein coined the term ‘Big Disinfo’ to describe “an unofficial partnership between Big Tech, corporate me-
For once

by Fatima Gabir

How two budding student organizations are helping Black women in STEM overcome barriers

It's a secret that there are innumerable barriers for Black women who are pursuing a degree in STEM.

"I’m in this lecture that is like 300-400 students. I know I’m going to walk in and be one of five Black students, almost certainly going to be the only Black woman in the room," said Debbie Kariuki, a junior studying psychology.

Kariuki is the vice president of Black Women in STEM at ASU, a new club that aims to provide a safe space for Black women, femme-presenting and nonbinary students pursuing degrees in STEM to find commonalities and community through a space for sharing common experiences. In November 2021, before the club began operating in September 2022, its founders discussed a common ground they shared: navigating the complexities of an ASU STEM program as a Black woman.

Kariuki, Caroline Pete — the club’s president — and the rest of the executive board wanted to provide an organizational space specifically for Black women pursuing STEM degrees. The club modeled its structure after existing ASU organizations like the Black Medical Student Association and the National Society of Black Engineers, Kariuki said.

“We wanted to make sure that Black women were (at) the center because the issue at hand was being Black and a woman,” Kariuki said. “We wanted to make sure (the club) was interdisciplinary in its approach.”

BWSA aims to create networking opportunities with events that get students to connect with other students who look like them, Pete said. BWSA’s first event of the spring semester was a series of discussions about the college experience. BWSA members received a topic and chose if they disagreed, agreed or were neutral before discussing it as a group, she said.

The organization hosted a trivia night in February in partnership with the Black Undergraduate Law Society and the Black Medical Student Association in honor of Black History Month. BWSA also hosts study sessions for members and other students.

“It’s a kind of professional and social development because our peers can network with each other," Kariuki said.

An anticipated partnership with a youth development program in the Valley, ICAN, an organization that provides after-school programs, is also in the works, Pete said. ICAN’s after-school programs are free for low-income families to access.

ICAN reached out to BWSA to speak to students during Black History Month about who they are and to get kids excited about school and STEM. The BWSA team plans to share their experiences as Black women in STEM and perform science experiments to keep students engaged, Kariuki said.

‘A broken system’

Black women in the workplace continue to face exclusion and discrimination in certain careers within STEM fields. A 2021 Pew Research Center study reported uneven progress in increasing gender, racial and ethnic diversity within STEM fields, especially in jobs like computing and engineering. Black workers as a whole remain underrepresented in STEM fields; out of all the STEM jobs included in the Pew study, only 9% are held by Black workers. Additionally, Black and Hispanic women in STEM positions made an average of $9,200 less than white women did in 2019, the Pew study found.

To address the lack of women color in STEM, the Center for Gender Equity in Science and Technology at ASU strives to alleviate the gap by creating research opportunities and critiquing the existing literature while offering STEM education programs targeted toward underrepresented communities, according to a promotional handout from the center. Through community organizations and school districts, the center provides programs that teach digital storytelling, computer programming, designing tech projects, and expanding scientific knowledge.

The center is designed to address a faulty higher education system that needs to be restructured, said Tara Nkrumah, an assistant research professor at CGEST.

“We in no way want to promote the girls’ participation in our programs to focus on fitting into a broken system,” she said.

Nkrumah joined the center in 2019 as part of her postdoctoral research. Her research focuses primarily on promoting equity in teaching and learning not only for girls and women of color but for people of all genders, she said.

The center’s focus at the start of
2023 was the Cyber Warriors camp. Participants in the program in grades 8-12 gain experience in cyber security and IT through interactive games and hands-on activities throughout the camp.

CGEST works nationally and internationally with different organizations to create various programs, Nkrumah said. CompuGirls Hawai’i provides residential camps through the National Science Foundation grants primarily to Hawaiian natives and those who relocated because of military families, Nkrumah said.

**Overcoming barriers**

Pete and Kariuki both recall experiencing isolation in different classes and labs they took.

“Stepping into a school (where) I am constantly looking around like, ‘Wow, I am being coded as a Black woman right now,’ there’s this unsafeness where you’re unsure if the person next to you relates to you,” Kariuki said.

Kariuki described this experience as one where she felt unsafe because she was unsure if the person next to her perceived her in the way she wanted to be perceived. You’re never sure if your peer holds a bias that may come out in your interactions with them, Kariuki said.

Kariuki started working on her Barrett thesis this semester, in which she wants to research the cultural presence of a father in a Black household, focusing on multiracial families. Black mothers are said to be more culturally influential in the household; Kariuki asks why Black fathers are not considered to be the same.

“Noora Aldossary

“Many Black women don’t have the door open for them, so we’re holding their hand and guiding them”
This is a sensitive topic, especially while talking to white professors. Karikiuki looks for a professor with cultural competence to avoid having to confront racial biases and microaggressions while completing her research.

“I think having somebody… to correctly navigate and go through those conversations is cool for me because then I know that I will not become a victim to my own project,” Kariuki said.

Similarly, Pete, a junior studying psychology and neuroscience, said one of the biggest barriers Black women in STEM face is not being taken seriously by their white peers. This barrier can seep out in various instances, like coming up with an idea and not being properly credited for it, a problem Black women have faced in the past and continue today.

For example, many famous Black women in history have made great achievements in STEM that have gone unrecognized. Dr. Dorothy Lavinia Brown, the first Black female surgeon, Dr. Rebecca Lee Crumpler, the first Black woman to earn an M.D. in 1864, and Mary Jackson, NASA’s first Black female engineer, have all been glazed over by the white public.

Internalized feelings of doubt and habitually being discredited by white peers are coupled with the interwoven nature of racism and the patriarchy, Pete said.

Being excluded from group projects can be another common experience for Black women forging into a STEM field. Pete, who recalled feeling excluded from a lab group she was part of last year, said she wasn’t “sure if it was intentional, but it is something that (she) internalized.”

Despite these barriers, Black women have made opportunities for themselves in various STEM positions. Because of how she was brought up, Noora Aldossary, a senior studying biological sciences, tries not to let negative experiences she’s had in STEM spaces plague her. However, she admits imposter syndrome still gets to her.

“Whether (I’m) in the lab or the classroom, I sometimes feel like my peers and faculty do not include me. But like I said before, I don’t let these negative experiences get to me,” she said.

**Cultivating safe spaces**

These experiences are all too common, and Pete said she hopes BWSA can help to open conversations among Black women getting STEM degrees.

“Providing language assures them that their feelings are natural,” she said. “Maybe you feel isolated because few people look like you in said class. But you just have to be like, ‘Wouldn’t I want to see somebody who looks like me do what I want to do?’ So you should be that person.”
There is a historical context of Black women that makes certain spaces uncomfortable to be in, which is why Black women having their own space is essential, Pete said.

Kariuki discussed that because of imposter syndrome, Black women need their own space. BWSA’s main purpose is to remind Black women that they belong in the field and that they worked just as hard as their non-black peers, Kariuki said.

Spaces targeted for Black women are an opportunity to be surrounded by other women that share similar goals. It is a way for Black women to be themselves and feel comfortable in their skin, Aldossary said.

Another new student organization that aims to center Black women’s voices is The PrettySmart Club. The club started at UA, and a chapter began at ASU in August 2022. The PrettySmart Club promotes academic, social and professional development and includes all majors — from STEM to business to pre-law. The club provides resume-writing and leadership-building workshops and hosts mock interviews for roles in STEM fields. Aldossary, the PrettySmart Club’s president, said the club provides role models to younger women.

“It’s really good for us older women on the e-board to communicate with these younger girls and show them the connections they need,” Aldossary said.

“Many Black women don’t have the door open for them, so we’re holding their hand and guiding them.”

PrettySmart Club’s advisor, Edward Ofori, assistant professor at the College of Health Solutions and director of ASU’s Pathomechanics and Neuroimaging Laboratory, said “exposure, advocacy and representation” are some ways to encourage Black women to join STEM.

He added that reaching out to schools — and the young, promising students within them — directly is a proactive way to help motivate more young Black women to pursue opportunities in STEM fields.

Pete, Kariuki and Aldossary share a common ground: their clubs aim to create safe spaces. The highlights of their first meeting put that idea into action — the members of these clubs felt that they could express themselves and speak freely compared to other organizations. Pete called it “a place (where) you did not have to code switch.

“For once, I was on the board. For once, I was included,” Aldossary said. “I feel like I was seen and heard. But there is a bigger picture. It’s not all about me. I feel like the safe space is allowing women to come to us.”
Your patchy beard and mustache indicate that you can’t shave because you’re too busy working on tech’s next greatest innovation. It also adds to your “I-woke-up-like-this” look.

You never stop talking about your current projects or favorite startups. You speak vaguely so no one steals your idea, and you throw in phrases like “invest in blue chip” or “seed funding” to blend in with your peers.

As someone who stares at a screen all day and has an addictive personality, you undoubtedly need something to ease your impulses. Take long drags from your vape, Puff Bar, Juul, e-cig — whatever you call it — while you work. It also increases your coolness factor by, like, 25%.

Your sparkling Tesla key dangling from your finger hints that, despite the bubbling embezzlement charges, you’re loaded. It’s also a low-effort way to do your part in saving the environment despite all the other harmful things you do to the planet, like running your three Canadian crypto mining farms.

If you’re a true tech bro, it’s likely that your unhealthy habits have destroyed your eyesight. Or you were born with it. Either way, wearing glasses is a staple in the tech bro look. If you don’t need glasses, wear some anyway. Blue light or fake clear glasses are viable options or just punch out some actual prescription lenses. Extra points if they’re Ray-Ban.

A t-shirt with your private alma mater’s name or logo on it paired with some jeans and a zip-up puffer vest is the perfect outfit combination. You wear this outfit everywhere: on a date, to the beach, at the company’s potluck. Not only does this give a simple, put-together look, but it also validates your conversation starter: “I majored in computer science at Stanford.”

Tech bro starter pack
Learn how to look and act like a tech bro

by Savannah Dagupion
Illustration by Andrea Ramirez
Report

Meet Sunny

Automated chatbots are the future — an advancement that saves time and administers resources faster than any human. Here’s how ASU is using one to its advantage.

by Leah Mesquita
Illustrations by Andrea Ramirez
College can be an intimidating place, especially for incoming freshmen. We could all use a friend to guide us in the right direction, a friend who is always a text away, ready to offer words of encouragement, plenty of emojis and a set of listening ears. Although this ‘friend’ may seem hard to come by, it’s already waiting to meet you.

Its name is ‘Sunny,’ and it has already connected with thousands of your ASU peers. Sunny is a chatbot responsible for sending automated messages throughout the year, updating you on fun events around campus, upcoming deadlines or sharing links to helpful resources ASU offers to those looking for academic or personal support.

In the past few years, Sunny has been a unique asset in the ASU admissions process, encouraging incoming Sun Devils to complete tedious orientation tasks in an easy, efficient way. But Sunny’s advancements go far beyond acclimating first-year students.

Sunny’s automated notifications became especially vital in the wake of COVID-19. Sunny was responsible for keeping students up-to-date with required daily health check reminders, the importance of wearing a mask on campus and ensuring students practice wellness like wearing masks and using hand sanitizer.

According to a report from Fierce Education, about 5,900 students engaged with Sunny to inquire about their classes and remote alternatives to ASU services in March 2020 — the height of the pandemic.

While Sunny seems to have established itself as a valuable tool for ASU students to use to their advantage, the usefulness of the chatbot has been questioned by some students over the years. Since Sunny was first introduced, many students have used ASU’s subreddit to share one-sided conversations instigated by students looking to provoke the chatbot.

Because Sunny is a chatbot, the line between artificial intelligence and human interaction is often blurred. Students sending everything between harsh swear words and professions of love to Sunny may be surprised when their response reaches the humans responsible for monitoring incoming texts.

Although subscribing to Sunny is completely optional, those who receive the automated messages — especially students who are no longer freshmen — have overall mixed attitudes toward the chatbot.

“They’re good reminders, but I don’t think it’s a super important or useful resource,” said Natalie Schultz, a senior studying business law. Schultz first subscribed to Sunny her freshman year and admits in her time at ASU, she has never been particularly interested in turning to Sunny for information.

“I personally don’t know anyone who has used Sunny,” she said. “Most of my friends are still subscribed to it because the texts are pretty infrequent, but they have the same opinions about it.”

In recent years, adopting new mechanisms of mass communication has become a common practice at many schools. Like ASU, Georgia State University has implemented its own chatbot, Pounce, to help recently accepted students with their enrollment process. Other schools, like Loyola University, rely on chatbot programming to aid advisors by finding students’ GPAs in seconds.

While chatbots seem to now be an essential tool in universities’ efforts to grow student success, Schultz said Sunny isn’t integral to ASU’s campus culture: “I don’t think it’s useless, but I don’t think automated text messages are going to foster a community,” she said. “You’re not communicating with other people at ASU, you’re communicating with an AI.”

The birth of Sunny

“We were very interested in being able to get information to students and, more importantly, have a resource that would help students quickly and on their own timeline,” said Matt Lopez, ASU’s deputy vice president of Academic Enterprise Enrollment. Since summer 2017, Sunny has been a tremendous asset to the admissions process, Lopez said.

“It originally started with us communicating with admitted students, then it expanded to prospective graduate and transfer students,” Lopez said. Sunny had already sent over 3 million messages to students by the beginning of 2020.

“The way of life right now is on a mobile phone,” Lopez said. “Being able to text important information to students in the palm of their hands has been very helpful on the recruitment side of things. We’ve been able to send messages like ‘We’re missing your transcript.’”

After Sunny’s debut in February 2018, an estimated 492 hours of staff time was saved that year thanks to the advanced programming of the chatbot, according to a 2019 presentation by Missy Pizzo, now associate vice president of Financial Aid and Scholarship Services. The ability to answer basic enrollment questions compensates for the excess emails and phone calls that ASU staff would normally deal with. But according to Lopez, Sunny’s help isn’t just for freshmen.

“First-year students are used to speaking with Sunny, so they lean on it, and the need changes as students get a little bit older. They’re not needing a reminder that this is the time of year you start planning for your next semester,” Lopez said. “The type of outreach changes over time, but I still think it’s just as effective.”

AI for the future

ASU uses Amazon Web Services — the platform the University used to create Sunny — extensively, according to Bobby Gray, executive director of products and projects at the University Technology Office. AWS offers the necessary components ASU needs to program Sunny to hold conversations with students, using a feature called ‘Lex.’

“Lex matches the text you type in with the utterances or questions we have,” Gray explained. The chatbot content system is designed to be responsive to a range of questions and answers the user inputs, accounting for slight variations in syntax, he said.

Director of the Provost Office Crystal Gustavson Miller elaborated on how Sunny’s messages make human contact: “When Sunny receives a message, the system is going to try and match it with the best possible response. And if it was unable to find a match at all, it will automatically flag the conversation as
needing to be reviewed by staff members in the enterprise chatbot system."

According to Miller, messages are flagged every day. “Students tend to ask very specific questions about their particular situation,” she said. “Sometimes we might have a response that it could match to, but they add something so specific it might throw the ball off a bit.”

While this may contradict Sunny's ability to save time for staff members in charge of monitoring student responses, Gray said the more questions Sunny receives, the better it will respond.

“Over the years, we’ve grown the production architecture,” he said. “We can put out a ton of text now, but we’ve also been responsive to questions asked of us by students to build that knowledge base and support them.”

Peter Nagy, a lecturer in ASU’s Success by Design program, said chatbots generally have a positive impact on student experience. Nagy first joined the University as a postdoctoral researcher at the Center for Science and the Imagination, where he focused on implementing informal sciences — lifelong learning projects and experiences that are grounded in science, such as visiting a zoo or botanical garden — into school activities.

While Nagy is only relatively familiar with Sunny’s programming, he echoed Gray by noting how chatbots grow the more humans interact with them.

“That’s the beauty of chatbots,” Nagy said. “It uses large language models, and the more questions you ask it, the more it will adjust to the student population.”

Although Nagy views chatbots as an integral part of modern technology, he feels it’s important to recognize the imperfections these helpful tools still carry.

“These chatbots are not some magical entity,” Nagy said. “They’re not going to replace human support, but they can extend it and make it more effective.”
Travel more. Spend less.

Get an extra 10% off flights and hotels with StudentUniverse.

Redeem Now

amazon.com/joinstudent

prime student

Student Universe
Are you looking for a place to live? Come to the Fair!

The bi-annual ASU Student Media Housing Fair, with co-sponsor Aramark, features services that can assist with your transition to off-campus living. Representatives from a wide range of residential communities and businesses on and off campus will be available to answer your questions.
Your education for a healthier world begins here.

Medicine  |  Nursing  |  OT  |  Pharmacy  |  Physician Assistant  |  PT

Priority Consideration for ASU Students. Creighton University's interprofessional learning environment, housing six programs under one roof, offers students hands-on, real-world experience.

For all who want a healthier Arizona—we say, Welcome to Creighton.

creighton.edu/phoenix