Christopher Perme ▶
Network Security
Technology Forensics

RAISING THE SECURITY STANDARD WITH ENFORCER

> ⌈ **"As I continued working on the project, utilizing different ways to store items inside of it, I realized that you can literally ship anything inside of the case while having that security footage as well."** ⌋

Inspiration for a Student Innovation Project (SIP) to pursue can come from a hobby, a career goal, or even an educational objective. For Christopher Perme (Network Security & Technology Forensics), his SIP sparked from a personal dilemma: After ordering a custom-built PC worth thousands of dollars, Chris was devastated to see his desktop arrive in Arizona in an absolutely demolished state. Having clearly been dropped at some point enroute, the water-cooled case broke and the liquid within destroyed all components of the PC. Chris realized there was a need for a more secure and protective way to ship expensive electronic devices, which inspired him to develop **Enforcer**, a new shipping solution that ensures security of high-value hardware in transit.

Equipped with a Raspberry Pi 4, a micro 128GB SD card, an O-ring, and an automatic pressure release valve, the **Enforcer** is an impressively designed shipping container. Material within the **Enforcer** is protected from the elements with its airtight seal and thermal resilience. Additionally, opening the **Enforcer** trips a magnetic switch which triggers video surveillance from within the case. This makes the **Enforcer** ideal for transit of precious goods, as the user can view footage from the shipping container and investigate any foul play later with the video footage.

"Originally, the main claim of innovation of the **Enforcer** project was specifically for desktop computers," Chris said. "But as I continued working on the project, utilizing different ways to store items inside of it, I realized that you can literally ship anything inside of the case while having that security footage as well."

Chris has come a long way from his hometown of Garettsville, Ohio to University of Advancing Technology's (UAT) Tempe campus. It proved a fortuitous move, though, as Chris finds the campus to be the perfect backdrop for aspiring innovators.

"For starters, any resource that you could possibly imagine—it's here," Chris explained. "All on-campus technology is updated regularly, whether it's a VR machine, or a 3D printer, or some form of network security software. It's all provided for students to get to experiment with new technology without breaking the bank."
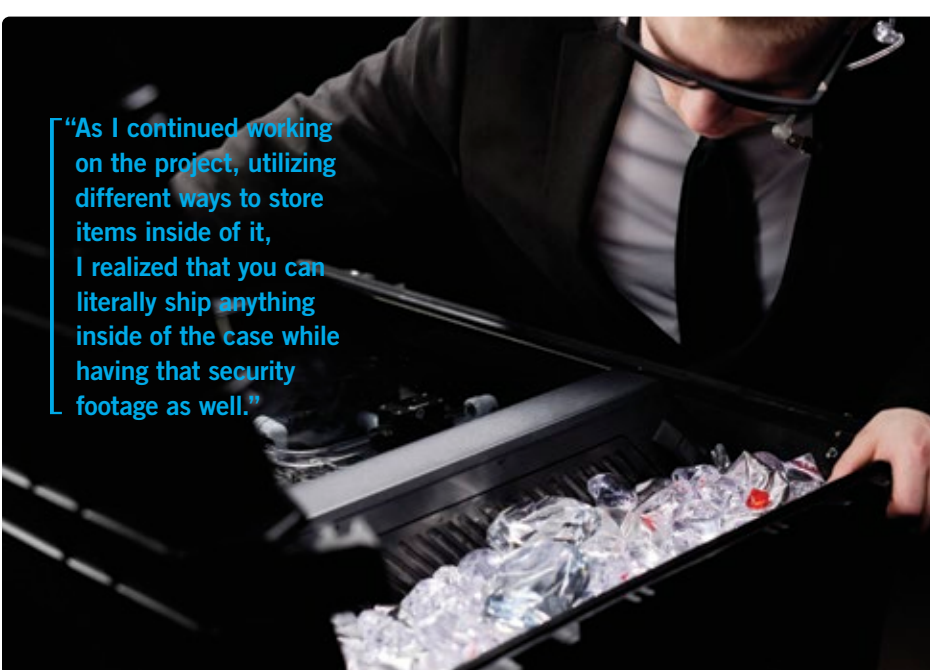
Chris chose to transfer to UAT after an injury ended his football career at Marietta College in Ohio. Wanting to switch his focus from athletics to academics, he applied to UAT on the advice of some family members who are also UAT alumni. Semesters later and now well settled in, the community at UAT has proved invaluable to Chris almost as much as the resources.

"Here at UAT, if you ever need a helping hand, you can walk in the hallway, say, 'Hey, I might need help later with something,' and chances are that they're going to reach out to you before you reach out to them," Chris said. "There's always somebody willing to help whether they're a professor or a student. And that's something that's really hard to come by—especially nowadays."

Chris collaborated with James "Glenn" Truett, a Digital Maker and Fabrication and Robotics and Embedded Systems dual-major at UAT. Glenn contributed to more of the physical elements of **Enforcer**, such as developing schematics and assisting with 3D printing, soldering, and wiring needs for the project. UAT faculty were also helpful, with Chris being particularly grateful to Professor Dapzury Valenzuela, who oversees the SIP-related courses.

In just a few more semesters, Chris will graduate with his degrees, and plans to then return to Ohio. He says he's eager to find an entry-level network security position to get his start at a company where he can use his knowledge and skills to excel. Or, with the demand for network security and technology forensics majors, perhaps land a role he can "grow into" with mentorship and on-the-job learning. He's keeping an open mind to the possibilities but feels confident that the skills he's learned at UAT will help him wherever he goes as long as he embraces opportunities for continuous learning.

"You learn something new with every job you're at, regardless of if you like it or not," he said. **"EVERY EXPERIENCE IS A LEARNING OPPORTUNITY."**

DECIDE YOUR DOOM WITH MACABRE GAMBIT

When Miriam "Pike" Garcia spotted a University of Advancing Technology (UAT) advertisement in the pages of *Game Informer Magazine,* prompting the reader to "Create Your Own Zombie," their educational journey took a decisive turn. Pike had just finished their associate's degree at The University of New Mexico – Valencia Campus, and UAT's Game Art and Animation program seemed like the perfect next step. They soon traveled from their hometown of Los Lunas, New Mexico (which Pike affectionately calls "Looneyville") to their new Tempe home. As Pike nears graduation, it is intriguing to see how much their Student Innovation Project (SIP) was coincidentally foreshadowed by their introduction to UAT. Enter Macabre Gambit.

"I like zombies. I like role-playing games (RPGs). I like drawing—so why not combine all of them?" Pike did just that in the creation of Macabre Gambit, an interactive, physical comic book that plants the reader in a dystopian playground run amok with "ferals"—zombie-like creatures that threaten the existence of the comic's characters.
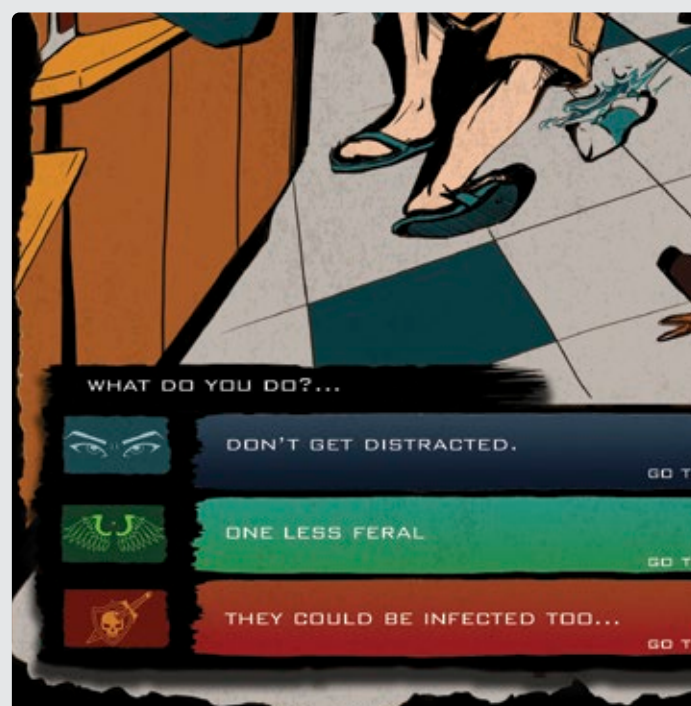
Miriam "Pike" Garcia
Game Art and Animation

I like zombies

I like RPGs

Inspired by Bethesda RPGs like *Fallout* and post-apocalyptic franchises like *Mad Max,* Pike has created something entirely new with Macabre Gambit. In true RPG style, Pike put a lot of thought into how the decision tree would be implemented in the comic, resulting in a three-tier choice system based on emotion. Readers make their next move, *Choose Your Own Adventure-style,* based on one of three motivators: Drive (the character's inner determination), Soothe (building empathy and trust for safety), or Threat (fight or flight response). Readers will then see how their choices impact the story of Macabre Gambit, taking the characters through alternate trajectories and leading to varied endings for the comic.

Pike has always had a fascination with the zombie genre—though they clarify that it's not so much the classic, George A. Romero-esque, grave-crawling, brain-eating zombie prototype that usually comes to mind that draws them in. Rather, Pike is enthralled by the concept of mutating contagion, having even done research into how such a hypothetical virus might spread from human to human or whether the host's sense of self could possibly still exist within the body.

"I've always been drawn to the post-apocalyptic genres," Pike said. "There's just a gritty realness about them. There's varying conflict too—there's person versus person, person versus environment, and even person versus self. The zombie genre can be a reflection of our everyday life in a fictional format, just a little bit exaggerated."

It's not just the brooding possibilities for conflict in this fictional framework that appeal to Pike. "I like the gruesome, too," they countered. "I like seeing zombies' heads explode."

It also helps that Pike's SIP has a built-in audience they could reference for feedback throughout their time at UAT.

"The student body here at UAT is basically an island of misfits," Pike explained. "There are a lot of outcasts—but here, they find their people. They connect with other kids that are like them, that have the same interests, that can play D&D till like 12 o'clock at night. It's just a small school where those meaningful connections can be made."

Enthusiastic feedback came from UAT faculty as well. Pike credits the abilities and the readiness that UAT's Subject Matter Experts (SMEs) offer students as key factors in completing their SIP.

"SMEs make it known that they're there to answer any questions," Pike explained, contrasting the accessibility of UAT faculty from their experience with professors elsewhere. "UAT SMEs get their hands dirty with you, help you out, and give you feedback that you need to push yourself and improve."

Pike credits professors Lynn Understiller, Matthew Marquit, and Jorge Portillo as particularly helpful faculty in completing Macabre Gambit. They not only offered assistance but allowed the space for creative expression necessary for students to take risks and create something new.

Pike plans to continue working on Macabre Gambit after graduating this spring from UAT. After returning to New Mexico, they hope to turn their current internship with SP Entertainment, an Albuquerque-based media company, into full-time work. Beyond that, Pike hopes to leverage the skills they've learned at UAT into a career in the video game industry someday. Taking a cue from the characters in Macabre Gambit, Pike is prepared to navigate whatever comes their way next.

THE ZOMBIE EVOLUTION

EARLY INSPIRATIONS
Zombie-like creatures have their roots in Haitian Voodoo and various cultural myths. Gothic works like Mary Shelley's *Frankenstein* (1818) explored themes of reanimation, bringing the idea into cultural consciousness.

CINEMATIC BEGINNINGS
Classic films like *White Zombie* (1932) and George A. Romero's *Night of the Living Dead* (1968) set zombie genre conventions, such as their mindless movements and status as flesh-eating creatures.

THE RISE OF ZOMBIE HORROR
Romero's *Dawn of the Dead* (1978) blended horror with social commentary, setting up zombies as an apt metaphor. The '80s saw a surge of low-budget, high-gore zombie flicks.

ZOMBIES GO MAINSTREAM
The first *Resident Evil* (1996) video game popularized zombies for a new generation. Movies like *28 Days Later* (2002) reinvigorated the zombie genre with fast-moving infected.

ZOMBIE RENAISSANCE
Shaun of the Dead (2004) brought humor to the zombie film genre, while *The Walking Dead* (2010) brought the drama, soon becoming a cultural phenomenon.

ZOMBIES FOREVER <3
The genre exploded in 2012, as Telltale Games released *The Walking Dead* game series. The following year, *Warm Bodies* (2013) explored zombie romance and *The Last of Us* (2013) redefined what's possible for storytelling in video games.

▶ CHOOSE YOUR OWN ADVENTURE AT UAT
Learn more about UAT's Game Art and Animation degree at **uat.edu/btb/game-art**

WHAT DO YOU DO?...
DON'T GET DISTRACTED
GO TO
ONE LESS FERAL
GO TO
THEY COULD BE INFECTED TOO...
GO TO

ONE LESS FERAL

Balancing Rhythm and Roar with Wumu Melody

▲ Bianca Magaña
Game Art and Animation

From monster tamers like *Temtem* to roguelike rhythm games à la *Crypt of the NecroDancer,* UAT student Bianca Magaña (Game Art and Animation) had no shortage of inspiration sources when it came time to create her own Student Innovation Project (SIP). After further fueling her creative energy with ancient eastern mythology and Chinese pop music, Wumu Melody as a concept was born.

"My main goal was to create something unique artistically," Bianca said. "I had this idea for this project for a really long time now. And I wanted to make sure that I did it justice."

A monster tamer (think classic *Pokémon* games) meets rhythm game elements (similar to the popular *Guitar Hero* franchise) in Wumu Melody, a video game concept that follows characters Liu Yao and Sun Shi as they use musical abilities to capture adorable creatures called Wumu. These mysterious Wumu possess abilities aligned with the elements, deriving their power from wood, earth, water, fire, or metal energies.

Initially, Bianca had plans to develop a fully 2D pixel art style game, before discovering she would need to modify her approach. "I realized that I needed a new art direction, something that was going to stand out in the market," she explained. "And that's kind of how I slowly led myself down this road in order to create a new visual experience that takes some stuff from the old—like pixel art—and some stuff from the new and combines them in this really beautiful way."

The 2D pixel art of Wumu Melody brings in the retro style of past generations' video games, but the classic visuals are refreshed through their placement in a 3D environment. The main character, Liu, looks like she wouldn't be out of place in *Pokémon Red, Blue, or Yellow* (1996) with her mint-colored hair and chibi-like features—but a lighting test made in Laitger shows how Bianca was able to add dynamic environmental effects to add extra depth to the character designs and environments, creating a modern result.

Bianca collaborated with two programmers at UAT, Mitchell Kelly (Advancing Computer Science) and Terrance Gay (Game Programming) to bring her vision to reality. They assisted with dynamic lighting implementation, game design prototype creation, and the movement of Wumu Melody from Construct, a 2D game engine, to the 3D environment enabled through Unreal Engine 5.

UAT's community proved to be the nurturing environment Bianca would need for such an ambitious undertaking. She knew from her first visit that the cozy campus would be a good fit for her. "I liked the small, tight-knit community," Bianca recalled of her initial campus tour. "I liked how everyone was very open to talking. And I've definitely felt that I could walk up and make casual conversation with nearly everybody here—we're a nerd school!" She also credits Professors and subject matter experts (or "SMEs" as they're called at UAT) Lynn Understiller and Jorge Portillo with providing her suggested methodologies, knowledge, and guidance to reach her SIP goals. The space they gave her to learn helped Bianca become more independent through the game development process.

"I feel like I was very unorganized before UAT," Bianca said. "And taking these classes has helped me in that sense. And also, I did not know anything about modeling. I started here with zero 3D modeling knowledge, unwrapping knowledge—so all of that new information really helped and inspired me in order to create this project. I wouldn't have been able to do this if I didn't go to UAT."

After graduating later this year, Bianca plans to continue to develop Wumu Melody in order to take it to market. She is considering various options for funding further development, such as Patreon or other community monetization platforms, to continue the project. Bianca also hopes to find an opportunity to work in established game development, such as for Riot Games, the publisher and developer behind wildly popular franchises including *League of Legends* and *Valorant.*

Wherever life takes her next, she is hopeful for the future and sees how the skills she's learned at UAT will serve her well. She has already realized the extent to which her university experience is reflected in her portfolio. "All of the things that I learned from UAT, it kind of came into Wumu Melody in some way."
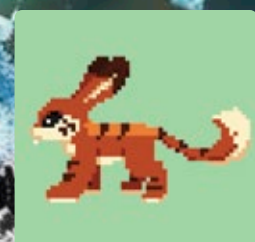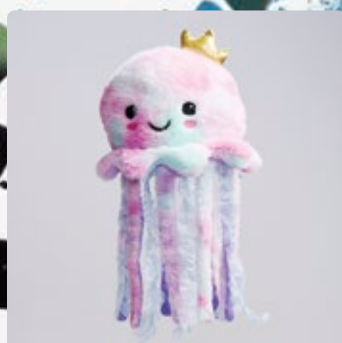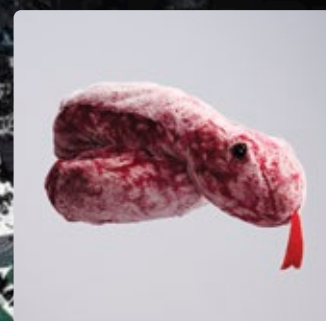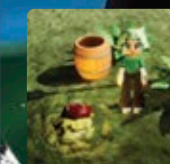
PIXEL ART RENDER OF MAOTU CHARACTER
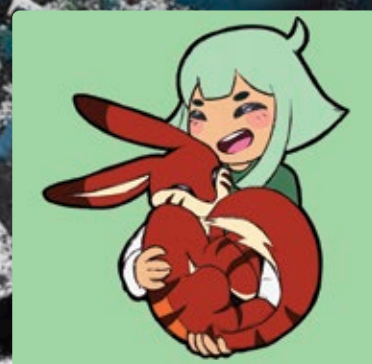
EARLY CHARACTER DESIGN CONCEPTS OF MAOTU AND LIU

THE CONCEPT ART FOR THE BATTLE SEQUENCE SHOWS A BIT OF HOW THE UI AND LIGHTING MAY LOOK.

A SUCCESSFUL LIGHTING TEST WITH LIU

▶ CRAFT NEW GENRES AT UAT
Learn more about UAT's Game Art and Animation degree at uat.edu/btb/game-art

Inspiring Connections for Change

Originally from Ridgecrest, California, Hope Thoms (Game Design) has journeyed far—both geographically and intellectually—to complete her Student Innovation Project (SIP). The inspiration for creating FemInspire, a social media app designed to connect girls and young women with female mentors, can be traced back to a seed of an idea planted in her childhood.

Hope always enjoyed playing sports from a young age and also loved participating in hands-on, scientific endeavors. She has fond memories of attending lab activities designed for middle school students at the nearby naval base, Naval Air Weapons Station China Lake, making bottle rockets, mini parachutes, and even touching a cow's heart during one memorable presentation. However, she felt that her interests made it difficult to connect with other girls and notes that she mostly had male friends growing up as a result.

"It's definitely something that inspired me to create an application like this because mentorship is important," Hope said. "But, so is community."

Hope was also motivated to create FemInspire in memory of her late aunt, who worked in information technology. After surviving a battle with breast cancer, Hope's aunt passed away a year later, due to complications caused by stress. Knowing her aunt dealt with harassment at her workplace and was isolated as a woman in STEM, Hope feels even more determined to prove the importance of and foster female connections in male-dominated spaces. Further, she feels that supporting women in these fields will create better applications, products, and experiences across the field of technology. Particularly, Hope highlights the need for more women working in the video game industry because harassment impacts not just women's tenure in the industry, but the output of women's contributions to games that make it to market.

Hope Thoms ▶
Game Design

"Diversity makes great games," Hope asserted. "I'm making FemInspire because women want that diversity, because women want to hear women's voices. When I play a game, I want to play a female character. There's an imbalance that I want to help resolve, because it shouldn't exist—but it does even now, in 2024. It's still there, it's still a problem. And it's probably going to be a problem for a very long time."

Hope had to learn a number of new skills and programs in order to create her FemInspire prototype. She designed the mobile app's interface using Figma, and took great care with choosing the color scheme and look of the app. She chose blue and purple as the color scheme, wanting to avoid the expected pink of many female-driven applications. And despite not having an art background, Hope pushed herself to design and refine FemInspire's logo until she was satisfied with the result. She even coded a website for FemInspire at an earlier stage, using HTML, CSS, and JavaScript—though this was eventually scrapped when it didn't reach the quality level she was striving to hit.

Hope also consulted with a number of UAT faculty and students in the completion of her SIP. While she feels grateful for the practical lessons gained within the classroom, Hope ultimately feels that the most important lesson she learned in her college experience was the need for resilience.

"I'm a very driven person," Hope explained. "If I need to do something, I will just do my best to accomplish it. I've developed a kind of 'iron it out as I go' philosophy. Every single UAT class I've taken has been fast-paced, and with life and work, it's hard to balance. But at the end, I have to figure it out. Whether the solution is talking to a professor, or conducting some research, every single class here has taught me the need to be a problem solver."

Looking to the future, Hope is invoking her namesake and feeling optimistic about her life and career prospects after graduating later this summer. She plans to stay in the Phoenix area for some time, noting that the city has become an emerging technology hub. But, she acknowledges the potential need to relocate to the east coast, where most of her dream video game publishing and development companies are located. She's also keeping an open mind for the stepping stones that could take her where she wants to land.

"I'm the kind of person who if I don't get to work my dream job immediately, that's okay with me," Hope insisted. "Because I am very persistent and passionate."
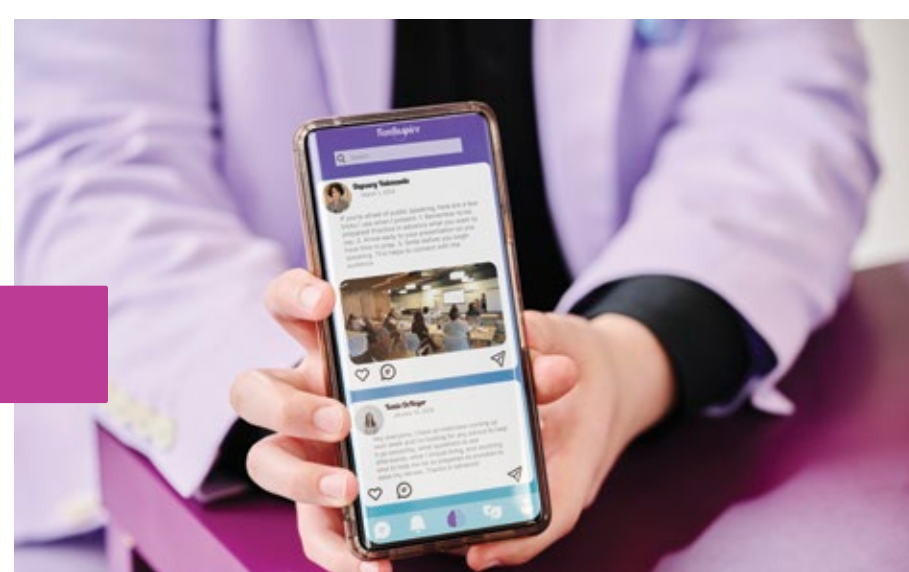
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HOT COURSES GIVE YOU A COOL EDGE

STAY INFORMED WITH CUTTING-EDGE COURSES ON THE LATEST TECHNOLOGICAL ADVANCEMENTS. UAT SPECIAL TOPICS COURSE OFFERINGS VARY EACH SEMESTER, BUT HERE'S A PREVIEW OF SOME OF THE INNOVATIVE CLASSES YOU CAN LOOK FORWARD TO ENROLLING IN SOON!

DBM150: *Introduction to Maker Studio* provides students entry-level knowledge of the most common maker equipment needed to create props and functional prototypes. This course provides a framework for non-Digital Maker and Fabrication majors to learn the tools, techniques, and technologies needed to create their own prototypes in order to bring their ideas to life. Introduction to Maker Studio allows designers from any of UAT's programs the chance to craft physical forms with the swiftness necessary in a rapidly evolving market, so that they can evolve their visions toward real-world applications.

RBT347: *Robot Navigation* tasks students with designing and building software to create an autonomous mobile robotic platform. The design process will implement real-world environment considerations. Student creations will also have a clearly defined level of autonomy which takes into consideration factors such as asynchronous events and sensory input. Performance requirements will be clearly outlined within course objectives, including components such as appropriate architecture selection and other thoughtful design considerations. Related topics, such as data structures used in the implementation of intelligent machines, will also be considered and studied as a part of the course curriculum.

DBM215: *Prototyping Tools and Practices* introduces students to the in-depth art and science of the prototype—and, in turn, explores the key steps of the engineering design process. Students will learn how to properly define and address a problem and will identify the solution whether that is a product, a service, or something else entirely. The course curriculum will lead students through the development cycle of compiling market research, building a prototype, testing, learning, and repeating the cycle again. Case studies examining the humble beginnings and vast evolutions of famous, world-changing products will be reviewed.

DEGREES

ON CAMPUS
Advancing Computer Science
Advertising Art
Artificial Intelligence
Business Technology
Data Science
Digital Maker and Fabrication
Digital Marketing
Digital Video
Game Art and Animation
Game Design
Game Programming
Human Computer Interaction
Network Engineering
Network Security
Robotics and Embedded Systems
Technology Forensics
Technology Studies
Virtual Reality

ONLINE
Advancing Computer Science
Advertising Art
Artificial Intelligence
Business Technology
Data Science
Digital Maker and Fabrication
Digital Marketing
Game Art and Animation
Game Design
Game Programming
Human Computer Interaction
Network Engineering
Network Security
Robotics and Embedded Systems
Technology Forensics
Technology Studies
Virtual Reality

MASTER OF SCIENCE
Cyber Security
Game Production and Management
Software Engineering
Technology Innovation
Technology Leadership

READY SET GO »

The UAT admissions process should begin as early as your sophomore year of high school. This can be a great benefit for you since it allows you to create a relationship with an advisor from the University who can help guide you every step of the way. In addition, applying early gets you access to:

> More scholarship opportunities
> Notification of scholarship eligibility when you apply
> Select your spot in the dorms
> Better class choices
> Campus events
> Student news

WHO'S ADMITTED TO UAT?
UAT welcomes exceptional students who are passionate about learning in every phase of their life. Just as important in the admissions process is your aptitude for technology. For instance, a good student who has been programming and building websites or advanced robots is of more interest to UAT Admissions than someone who has not demonstrated an aptitude for technology, but has top grades and test scores. In other words, we're looking for future technology innovators and patent holders!

SO… WHAT'S NEXT?
Prospective students can apply online at uat.edu/btb/apply. Admissions requirements and the online application can both be found on this page. Soon after your application has been received and reviewed by our Acceptance Committee, you will be notified of your acceptance status. If you need help or advisement with the application process, or if you just have questions, please contact our Admissions Office at 877.828.4335.

FALL 2024 SEMESTER
September 9 - December 22

SPRING 2025 SEMESTER
January 15 - May 4

SUMMER 2025 SEMESTER
May 12 - August 24

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Learn more about UAT student innovation:
uat.edu/btb/sip

BEHIND THE BITS

ISSUE 15

H@xc0rd–REVISITED

▶ **Bradley Chavis**
Advancing Computer Science &
Network Technology graduate, 2021

From the University of Advancing Technology's (UAT) humble beginnings in the 1980s to its present-day status as an innovation hub, many Student Innovation Project (SIP) concepts have been hatched and brought to fruition here. Some SIPs continue to be developed after graduation, exemplifying the spirit of creativity and technological advancement that defines UAT. Other SIPs prove to be the perfect launching pad to propel the student into their future careers—which was certainly the case for Bradley Chavis, 2021 (Advancing Computer Science & Network Technology).

Bradley's SIP, H@xc0rd, was a simple yet powerful Discord bot designed for utilizing common network security tools without requiring any knowledge of Linux.

"With only one command to start it, there's no reason not to love it," Bradley said back in 2021 of the project. "No more struggling to set up a Linux machine or trying to find all the tools compatible with Windows. It's just one command, and you're done."

H@xc0rd's tools ranged from exploitation to reconnaissance, including Hashcat, Hydra, Nmap, Shodan, and many more. Each tool had its own custom-built help section to help users understand what the tool was, how to use it, and how to interpret the results.

H@xc0rd was built using the Node.js runtime library, leveraging many libraries along the way. The different commands were based on modules, enabling them to be loaded dynamically.

Using H@xc0rd on the server it was hosted on was even simpler, as only a Discord account and basic knowledge of the platform would be needed. To use the bot, one simply had to use the specified prefix found in the packaged sub.js file and the command they wanted to run.

To see all available commands, users could simply use the "!commands" function, which listed approximately 15 tools implemented in the project—which Bradley and his project partner, David Austad (Network Security alum), consistently updated.

If a tool wasn't implemented but was desired, users had the freedom to add it themselves. H@xc0rd was built to allow new tools to be implemented in a matter of minutes.

Through H@xc0rd, Bradley brought advanced network security tools to users' fingertips with ease and accessibility. And even more than that, Bradley learned so much in the production of his SIP that he was able to gain a coveted network security job after graduating from UAT in 2021.

Leveraging a security intern position at Netskope that he completed during his time as a college student, Bradley started a full-time position with the company after graduation. After multiple promotions, Bradley is now a Security Analyst II for Netskope and is nearing his four-year mark with the company. His success demonstrates what can be achieved with a UAT education!

The project aimed to be as user-friendly as possible, with install scripts automating the setup process on most Linux systems so that anyone could start using H@xc0rd quickly and efficiently.

h@xc0rd

▶ **UNLOCK YOUR POTENTIAL.**
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