

BEHIND THE BITS

A CLOSE-UP VIEW OF UAT STUDENT INNOVATIONS

ISSUE

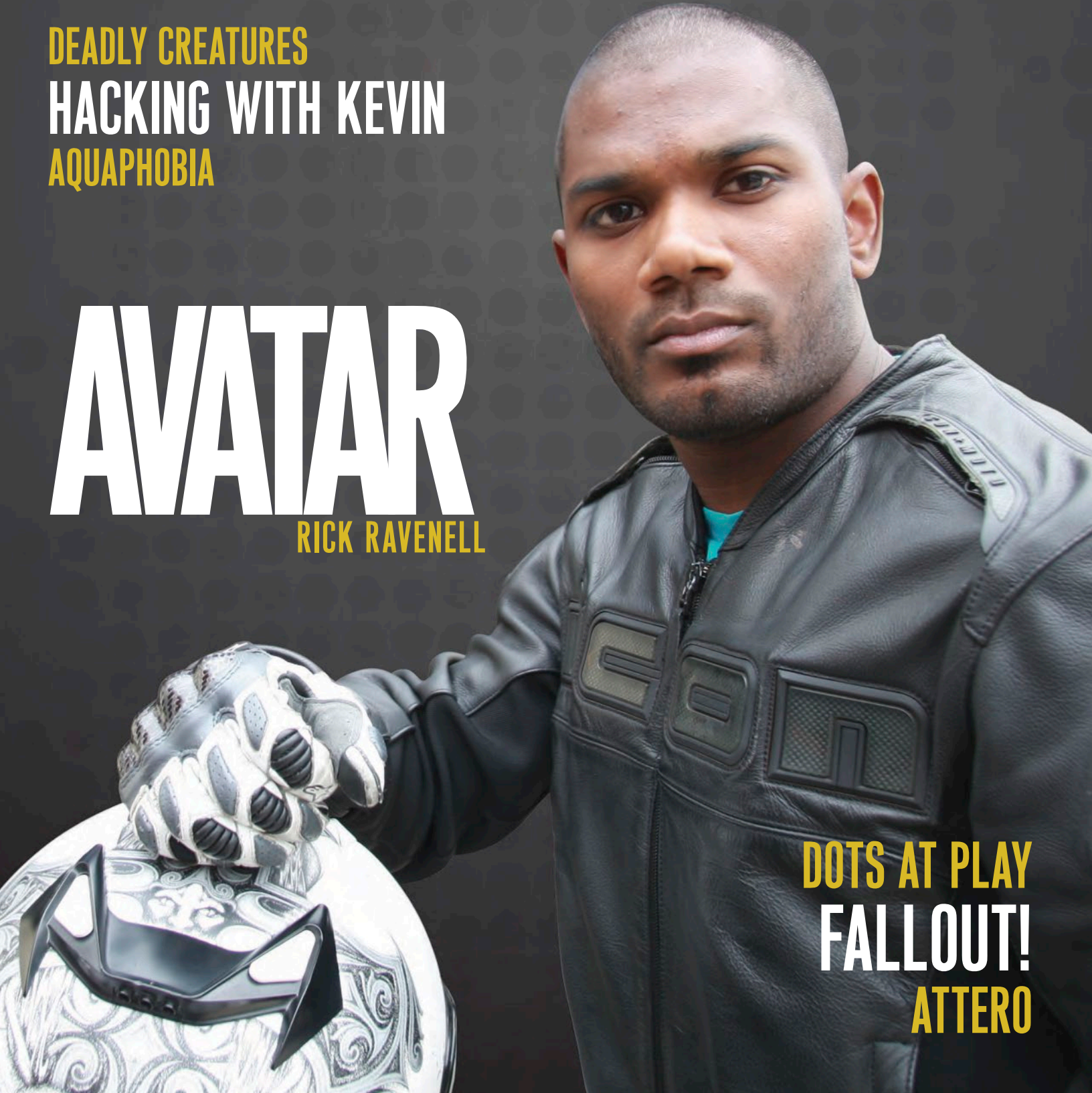


THREE

DEADLY CREATURES
HACKING WITH KEVIN
AQUAPHOBIA

AVATAR

RICK RAVENELL



DOTS AT PLAY
FALLOUT!
ATTERO

* **32**



PUZZLING OUT
A NEW
GAMING PLATFORM

The Microsoft Surface computing platform is making waves, and not just when you touch or set an object on a device powered with surface technology.

KEVIN KADIUM
REAL-LIFE HACK JOB

* **22**



* **16**

AQUAPHOBIA

Aquaphobia: Mutant Brain Sponge Madness is a colorful, fast-paced, 2D side-scrolling action platformer game about Gibby, a Caribbean brain sponge (a real species: Geodia gibberosa), which has been subjected to bizarre experiments by the deranged Dr. Jack Harbor.



RICK RAVENELL
UAT ALUMNI HITS THE BIG SCREEN WITH AVATAR

* **4**



* **52**



STUDENTS DEVELOP GAME FOR DoD

STUDENT WORKS

MICROSOFT ADAPTIVE KEYBOARD
Microsoft has an amazing new keyboard in development that's unlike anything you've seen before.

* **46**



* **12**

ATERO
COMBINING FANTASY-ROLEPLAY GENRE WITH SHOOTER BATTLE ACTION

RETRO RAY-GUNS IN 3D

UAT students get a hands-on approach to learning about technology, business and Hollywood.

* **56**

* **18**

DEADLY CREATURES
A MAJOR TITLE FOR WII. PLUS! WHERE ARE THEY NOW?

* **36**

COWBOY DREAMS
DIGITAL DREAMS DO COME TRUE
UAT Co-Produces a Western Short
Destined for Greatness

* **60**

TOMORROW'S TECH TODAY
STUDENT INNOVATION PROJECTS



* **CONTENTS**

ISSUE THR3E

DOTS AT PLAY * **30**
THE ART OF PROGRAMMING

Art that interacts with and responds to your presence in space, that's the purpose of the algorithmic art project, Dots at Play.



STOC
STUDENTS CREATE DATA VISUALIZER.

* **28**

* **40**

FALLOUT
LATEST BLOCKBUSTER IS A MAJOR MILESTONE IN DIGITAL VIDEO PROGRAMS



AVATAR

Images Courtesy of Twentieth Century Fox Film Corporation and Dune Entertainment LLC. All Rights Reserved.

RICK RAVENELL



EVER HEARD OF?

AVATAR

We have, too. Everyone in the world has either heard of or seen this epic, multi-award winning James Cameron film that broke records for both budget and box office revenue. Few, however, can say they've been a part of making this film, thus making history. One of these esteemed few is Rick Ravenell, one of UAT's own.

When Rick talked with us, he fulfilled our expectations of geek-cool by riding up on his Suzuki Gixxer, leather clad and sporting blue jeans lined with Kevlar. This must be why he was able to deliver when his boss on the *Avatar* project gave him a shot and told him to "make this look cool." When he went to the 3D cinema to review his work with his cohorts, he didn't disappoint. Still, there were usually changes to be made following these shot review sessions. If Rick himself didn't catch it, James Cameron always did. "Jim has an eye like a laser; he picks out the slightest discrepancies," Rick said.

Just how does a UAT alumnus get to the place in his career when he's on a "Jim" name basis with the great James Cameron? Two parts talent, two parts education (UAT style), lots of hard work, and (perhaps most importantly) networking. In fact, it was Rick's UAT roommate—already on the Visual Effects team for *Avatar*—who got him the job. Rick's advice to UAT students currently aspiring towards rewarding careers was to "make sure you make friends, be nice to people and keep track of them. They can all be important future connections in the industry."

Rick graduated from UAT in 2007 with a double major in Animation and Digital Video. Before that, he attended a university in Hawaii where he majored in traditional art. During the year he spent at his first school, Rick completed most of his base requirements and took additional classes in art, drawing, painting and composition. When asked why he made the move to Arizona to attend UAT, Rick said, "I knew art was what I wanted to do, I just wanted to do it with a computer."

With this goal in mind, Rick set out to look for the best animation and digital video schools in the country. When he came across the UAT website, he read through some information and ordered a new student packet. That was all it took. Rick found where he belonged and made his decision. He sent in his application, was accepted, and moved to Arizona without ever having stepped foot on campus. He got to work right away, averaging between 18 and 21 credit hours every semester without a summer break.

"UAT was a self-driven, individualized curriculum that gave me the chance to be proactive about shaping my education,"

Rick said of his alma mater.

After his first semester working with After Effects and Combustion, Rick realized his passion for visual effects. This particular discipline was not represented as a major at the time, so Rick worked with



UAT professors Paul DeNigris and Arnaud Ehgner to shape his curriculum and make it fit what he wanted to do. In the end, it was a combination of Digital Video, Animation and a special topics class Rick created with UAT professors to specifically work in the field of visual effects. "The Digital Video and Animation profs were great in working with me, and then I started the special topics class for visual effects with Arnaud, which helped so much."

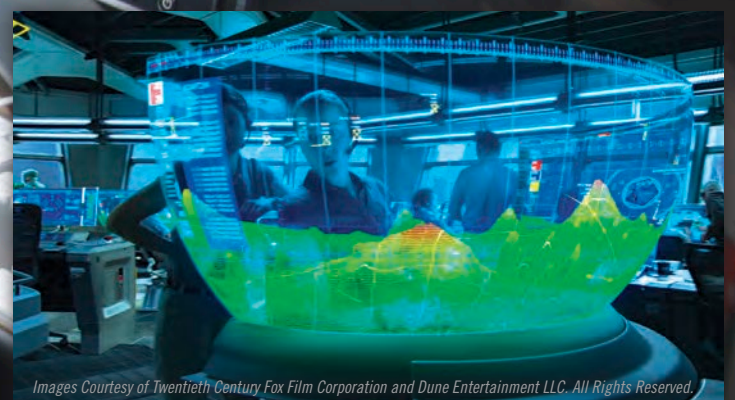
Some of Rick's most memorable and helpful classes at UAT were not, however, within his field of study. "I took a couple classes as a freshman that were amazing. One where I learned how the brain works and how my personality type works best with other personality types. Also, a class called The Psychology of Creativity, where we learned about where creativity comes from and did free-form drawings to explore that."

Rick's traditional art roots never left him. In fact, he considers figure drawing to be an essential skill for any visual effects artist. "It's important to be able to look at a form, recognize it, and reproduce it on paper or on the screen," he said.

This skill paid off when he joined the visual effects team for *Avatar*. Previous to landing the mega-feature gig, Rick worked on the television series *Knight Rider*, a job he also landed through a UAT contact. He had a basic website with a portfolio reel ready to go when the *Avatar* opportunity came up. The day he heard of the opening on the team, he sent in his resume and reel. He got the call only a few hours later and scheduled an interview for the next day.

"They looked at my website, watched my reel, and then with my connection, I was in. Just like that," Rick said.

He was hired to start immediately as a motion graphics artist, one on a team of just five others. "I came in and started pounding out shots. My boss gave me a composite image file of the graphic to be animated and told me, 'make it look cool.' So I did."



Images Courtesy of Twentieth Century Fox Film Corporation and Dune Entertainment LLC. All Rights Reserved.

INNOVATION: BREAKING GROUND

- UAT alumnus, Rick Ravenell, was literally facing a whole new world as he began developing visual effects for the film.
- The stereoscopic filmmaking used in this movie, which reproduces three dimensional space was a major breakthrough in cinematic technology.
- A number of visual effects techniques broke new ground in terms of technology—a new system of lighting, which was necessary because of the vast sets used in the movie and new motion capture animation technologies allowed the filmmakers to transfer 100% of the actors' physical performances to their digital counterparts.



Los Angeles, United States

WHERE ARE **THEY** NOW?

Since finishing the *Avatar* project, Rick has continued working in Los Angeles as a freelance VFX artist. He recently finished creating the visual effects for the first season on *Justified*, a Western themed television series. He created a lot of driving composites for the series, making it look like the actors in the car are moving down a road. He also created many instances of what he called “invisible” effects, where, for example, all of the palm trees are removed from a shot, or the Washington DC skyline is added to the background of an airport scene to make it look like the DC airport.

When Rick’s not working, which isn’t very often, he likes to ride his motorcycle, go to the shooting range, play video games and eat junk food. He describes himself and his coworkers as “just big kids who have money.”

Rick credits his education at UAT for preparing him for the successful career he enjoys today. “It didn’t feel like academia,” Rick said of UAT. “It felt more open and collaborative, just like it is in the industry.”

When asked what his favorite thing about UAT was, Rick said: “The flexible curriculum. Students can work closely with professors and other students to customize a degree that fits what they want to do after graduation.”

UAT STUDENTS' GAME ROCKS GDC AGAIN WITH ATTERO

In what is rapidly becoming a UAT annual tradition, a team of students and professors took a game they had created to this year's Game Developers Conference (GDC). GDC is the world's largest conference for professional video game developers. Industry professionals make presentations on programming, design, audio, production, business and management, and visual arts to more than 17,000 attendees.

Team Dos from UAT, armed with professionally prepared game disk packaging and marketing materials, presented their new game, *Attero*, to the industry professionals in attendance. They got a rousing reception, some solid real-world advice and more than enough encouragement about their project to make the endless hours in development worthwhile. To get the game to the "semi-finished" state that allowed the team to demo it at GDC required eight months of work by a dozen or more students.

Each member of the team got a powerful piece to place in their portfolio to show prospective employers when they graduate and launch their job search. While there was never an intention to take the game to a commercially viable finished level, team members estimated that the process to do so could take two more years of dedicated work.

COMBINING FANTASY-ROLE PLAY GENRE WITH SHOOTER BATTLE ACTION

Attero is a fast-paced, competitive multiplayer game featuring a fearlessly colorful and handcrafted art scheme and created using the Unreal Engine 3 development framework for Xbox 360® and PlayStation® 3. While many Fantasy Role-Playing (FRP) and Massively Multiplayer Online (MMO) titles have included objective-based competitive, multiplayer game modes as part of their feature set, *Attero* is unique in that it makes that aspect of gameplay its sole focus. Player-vs-player battles are uniquely in the forefront of this FRP. *Attero* takes teams made up of fantasy-themed character classes, and puts them in combat scenarios usually reserved for shooter games, while preserving their reliance on each other to fulfill team roles, for a conceptual breakthrough in the gaming world.

SAVE YOURSELF FROM AN APOCALYPTIC FATE

Attero takes place in a fantasy-themed world recently saved from the brink of oblivion. The story begins in the shadows of the trees in the heart of Attero's jungles, as elders of a strange and ancient race of goblins looked in on a scene from spiritual trances, pleased with what they saw. For centuries, the goblins had been hunted and killed for sport by both elves and humans. The only respite from this relentless genocide occurs when the elves and humans are forced to deal with a new enemy they have in common, an enemy that soon begins to wreak havoc on the whole of Attero.

Ten years later, governments have dissolved and kingdoms are reduced to nothing. Humans, elves and goblins seek to carve out an existence amidst the desolation. The members of the newly dubbed race, Riftborne, struggle to come to terms with their new identities. The races will rebuild, but certainly not for a great while. For now, it's every human, elf, goblin or Riftborne for themselves. Who can you trust?

Teams made up of player classes traditionally found in the FRP and MMO genres duke it out in a First Person Shooter (FPS)-style match, using their unique class abilities to work together to achieve victory in various classic FPS multiplayer game modes. A player takes control of one of four fantasy-themed character classes with different abilities, play style, and team role to play. The player then joins a team of other players and takes on other teams in several different game modes.



NOT YOUR USUAL FRP:

Attero is unique in that it makes objective-based competitive, multiplayer game modes its sole focus.

Attero created a conceptual breakthrough in gaming by putting fantasy role-playing characters in combat scenarios usually seen in shooter games.



DIVERSITY IS A BEAUTIFUL THING

ATTERO

Attero team members, listed in the left column, came from no fewer than six different UAT majors, demonstrating a rare ability for a college—the ability to pull together teams from diverse areas of study to produce a quality game. UAT students come from all 50 states and 6 of the 7 continents and they all have one thing in common: they are passionate about technology. Their diversity helps keep school activities interesting and exciting, and their connection to technology makes the learning fun. The *Attero* game team is a perfect example of the diversity of the UAT community—different cultures, different talents, different majors all coming together. Students bring their own experiences and base of knowledge in addition to what they have learned in the courses in their major. A big part of UAT's "Learn. Experience. Innovate." culture is this melding of talents, perceptions and personalities. UAT provides a rich campus life for students and faculty. It's unique technology-infused campus facilities have been designed to enhance collaborative learning. Students, staff and faculty learn, create, live and play together in a team environment.

THE TEAM MEMBERS:

BLAKE BJERKE – Lead 3D Artist
Major: Game Art & Animation

DANIEL LOO – 3D Artist
Major: Game Art & Animation

MELISSA REESE – GUI Artist
Major: Digital Animation

ANDRES MERCEDES – Programmer
Major: Game Programming

UAT ALUMNI

ANDY ARIAS – Lead Concept Artist
Major: Digital Animation

LAYNA SALAZAR – Lead Animator
Major: Game Art and Animation

ANDREW LANGHOLDT – Co-Lead Programmer
Major: Game Programming

BRYAN CLARK – Co-Lead Programmer
Major: Game Programming

FATIR AHMAD – GUI Designer/Programmer
Major: Game Design

STORM KIERNAN – Programmer
Major: Game Programming

WHERE ARE THEY NOW?

J.D. CERINCE – Art Director/Character Artist
3dBob Productions

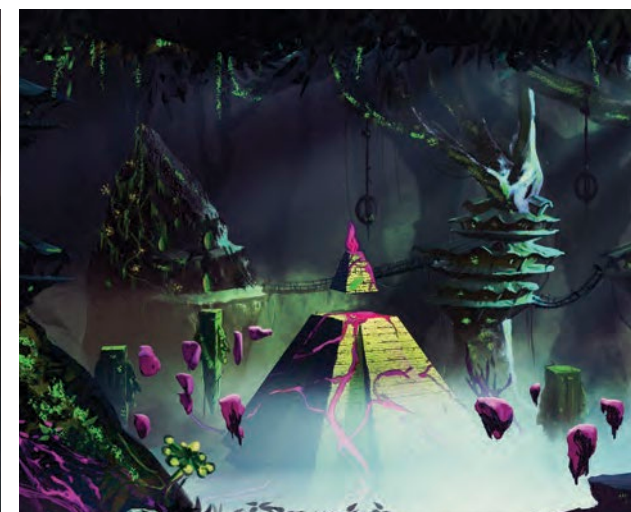
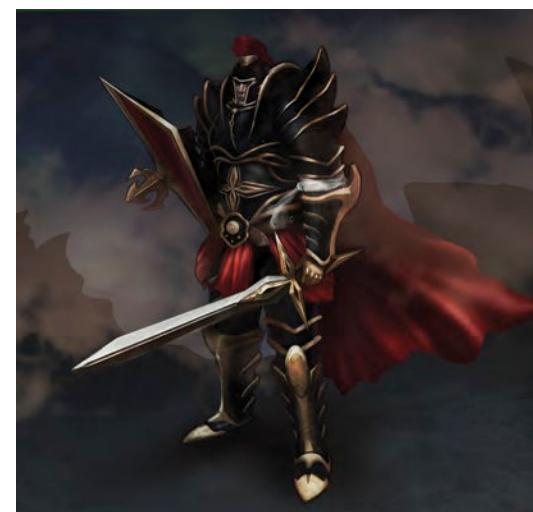
TAYLOR SOUTHERLAND – Project Lead/Lead Designer
Carbine Studios

ANDREW DYKSTERHOUSE – 3D Artist
LifeLine Studios

STEVE TOMEI – Rigger/Animator
HotSeat Media

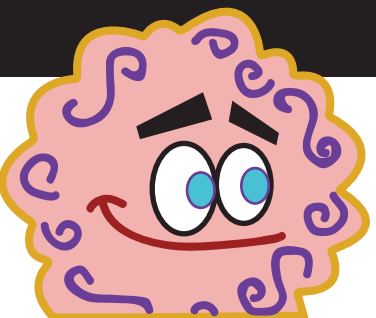
JERRAD ZONNA – Programmer
UPS

NICOLE SILVA – Interactive Designer
Blackbaud Inc.



AQUAPHOBIA

MUTANT BRAIN SPONGE MADNESS



OVERVIEW

This Xbox 360 game was developed for Microsoft's 2009 Dream Build Play Challenge by Team Aquaphobia, comprised of students and professors from UAT in Tempe, Arizona. During the months of May to August 2009, using XNA Game Studio 3.1, the team developed the entire game. The game, competing against nearly 5,000 games by developers from more than 100 countries in the DBP Challenge, was also presented at the 2010 Game Developers Conference in Austin, Texas.

DETAILS

Aquaphobia: Mutant Brain Sponge Madness is a colorful, fast-paced, 2D side-scrolling action platformer game about Gibby, a Caribbean brain sponge (a real species: *Geodia gibberosa*), which has been subjected to bizarre experiments by the deranged Dr. Jack Harbor. Although he isn't aware of it, Gibby lives in a science lab aquarium. As a result of the mad doctor's ministrations, Gibby has awakened from his slumber and discovered he can now move about his environment in quite extraordinary ways. Many exciting discoveries await him—who he is, what he is doing here, and where he is going. You know, the big questions that every mutant brain sponge must answer.

The player controls Gibby through numerous levels and a variety of game modes. The core game mechanics combine an innovative use of biochemistry and materials physics-based gameplay with traditional platforming and action gameplay. As Gibby defeats certain enemies, he may absorb their DNA and acquire new abilities. As the game progresses, these abilities are needed to overcome new challenges. Levels are designed to allow more than one solution, and it is expected that players will discover exciting emergent gameplay possibilities.

READY, SET, DONE:

This UAT team developed a complete game in just 60 days, which is unheard of in terms of game production time tables.

Because of skill sets and efficient team project management methods learned at UAT, the team was able to work quickly to build the game, overcoming challenges along the way. In the end, they were able to meet their deadline for entry into Microsoft's Dream Build Play Challenge.

WHERE ARE THEY NOW?

Ron Conley, who was in charge of art on *Aquaphobia*, graduated from UAT with a Multimedia degree in 2007. Today, he's working at Faro Entertainment.

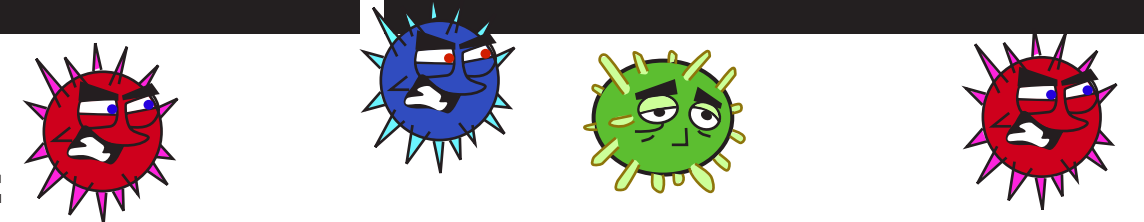
Sean-Ryan Smith, who was a Programmer on *Aquaphobia*, graduated in 2009 with a degree in Game Programming. He is currently continuing his education.

Other UAT alumni who worked on *Aquaphobia*:

- RB MACDONALD – Design
- TIM MICHAUD – Lead Programmer
- JARED MILLER – Programmer

MICHAEL VISCIO, a Game Art and Design major at UAT, was the environmental artist on *Aquaphobia*.

CHALLENGE



Perhaps the biggest challenge to the team was having to develop a complete game in only two months. Plus, the team admits that the group did not fully get on track with their work in the initial weeks of the semester in which they had to complete the game. There was no consensus moving forward until halfway through the allotted time period and this resulted in some too fast, perhaps not so elegant coding, long 'crash' meetings, and a deadline day batch of bugs that that some thought would not be resolved in time. In the end though, the team got through it, conquered the challenges, and ended up with a great full-team performance that included mass, all-day work sessions in the University's computer commons.

Because of the time limitation, the team had to abandon a few concepts they had hoped to implement but ran out of time for, such as scaling, more background detailing and additional puzzle elements. The team felt that they could accomplish their original goals when they got back to work on the game after the DBP Challenge and their GDC presentation.

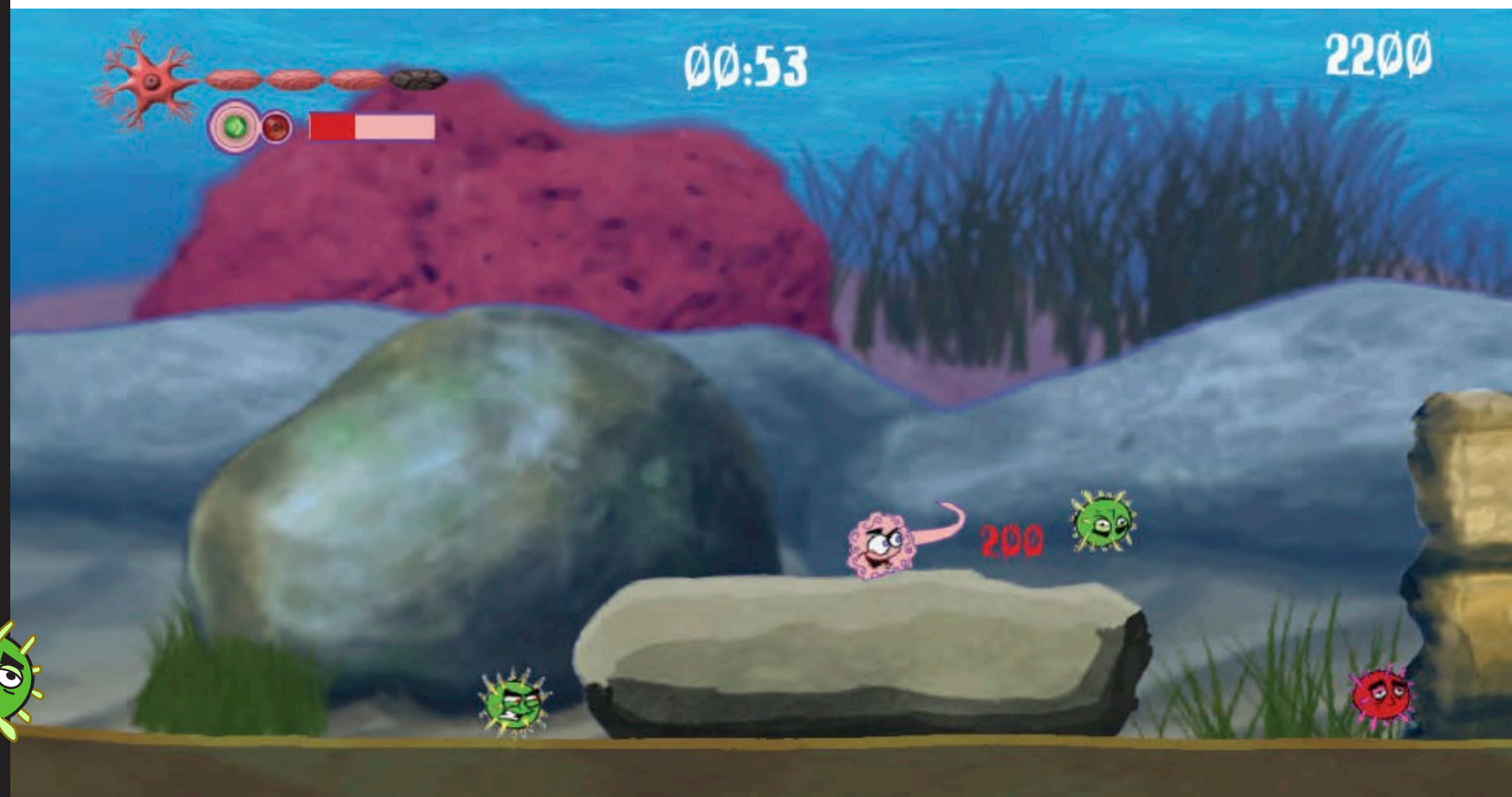
SUCCESSSES

All *Aquaphobia* team members report that it was really gratifying to come together as a cohesive group and essentially create a game in 60 days. Beyond that, submitting it to the DBP Challenge and

presenting it to the GDC are sort of extreme icing on the cake. As the team worked on the game in the UAT commons, random students were recruited to try out the game. The enjoyment that students showed in playing the game—even though it was not a finished product—gave the team the motivation to press on with a difficult challenge. One member said, "There is nothing more gratifying than to see someone use and enjoy something that you have been a part of creating; the enthusiastic feedback was really important to our ability to complete the game."

THE FUTURE

After the DBP Challenge was over and the presentation at GDC was done, all team members took the opportunity to clean up and polish all the little things they had to hurry through development. The fact that they could possibly be doing the work to really finish off the game under an Xbox Live contract adds even further to the excitement they anticipate in the future. Project manager, Professor Jonathan Harbour summed it up this way, "The fact that we have come together and created a game that may eventually be played by rabid gamers around the world is incredibly gratifying to each of us, and it's a great example of the unique and rewarding learning experiences that are available at UAT."



THE BACK STORY:

RESEARCH PROJECT TITLE:
Genetic Manipulation of Sessile Invertebrate Fauna to Create Cognition Enhancing Prefrontal Cortex Neuronal Responsiveness

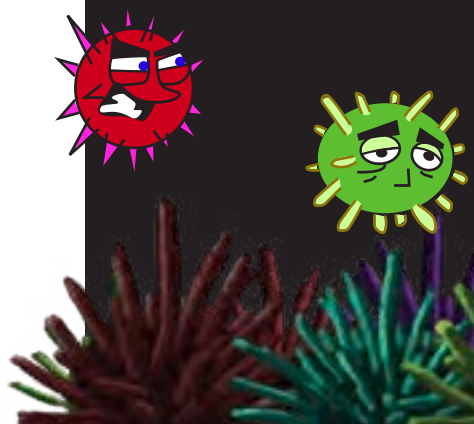
PERIOD OF ANALYSIS:
31 April - 05 August, 2009

LOCATION:
Ren's Reef National Marine Sanctuary (N 33.432222, W -111.931944)

PRINCIPAL INVESTIGATOR:
Dr. Jack Harbor

INSTITUTIONS:
University of Aquatic Technology and Aquaphobia, Inc.

DR. HARBOR'S RESEARCH NOTES:
Ren's Reef National Marine Sanctuary may be a southwestern limit to several species of what are generally considered to be 'tropical' organisms, but it is the presence of *G. gibberosa* that offers the most exciting possibilities for a genuine breakthrough in cognition-enhancing prefrontal cortex neuronal responsiveness. Unfortunately, I may have to resort to unorthodox methods to pursue my theories. My so-called 'colleagues'—jealous and incompetent to a man—have conspired to sabotage my reputation in order to deny further funding.



UAT ALUMNI MASTERMIND A MAJOR TITLE FOR Wii

DEADLY CREATURES

EQUIPPED FOR THE CHALLENGE:

UAT alumni working on *Deadly Creatures* faced a steep challenge, this was the first time Rainbow Studios had created a title for the Wii platform.

All agree it was only their strong base of knowledge and skill gained at UAT that allowed them to be successful in a development environment that was new even to their more experienced colleagues.



Game developer Rainbow Studios is known mainly for motorsport titles like the *MX vs. ATV* games. That's why it comes as a surprise that *Deadly Creatures*, one of the most anticipated Wii games in history is from the Rainbow team.

Dustin Young, a UAT graduate, was Rainbow's lead artist on the project. After graduating in 2004, he went to work for Rainbow and has been there ever since. Young isn't the only UAT graduate at Rainbow. In fact, he is joined by several other alumni on the *Deadly Creatures* team.

At Rainbow Studios, creating a game from conception to completion is a team effort. It all starts with a brainstorm session. Each member of the team is encouraged to submit his or her ideas during this open forum. Ideas can be documented in writing or simply discussed. Whether the idea is a story line, game play elements, objectives or something else, all is welcome. There might be as many as 20 or more good ideas at the end of the brainstorm that the team then has to narrow down to the best five. The final five are then built upon and fleshed out into full concepts, which get pitched to Rainbow's publishing arm, THQ. Often, these game concepts won't be much more than writing on paper at the time of the pitch. Occasionally, the team will request art from the Concept Department in order to show a visual representation to THQ.

The Concept Department at Rainbow is staffed with painters and sketch artists—talent armed with brushes and pencils to be the first to bring to life the vision of a writer or a game designer. They can be called upon to create the exact right angle for something, to make a new texture, build storyboards or just create a panoramic painting of a scene. The concept artists also make use of the Wacom, a digital tablet that allows them to draw and paint directly into Illustrator or Photoshop. During the pitch phase, though, the Concept Department is rarely used.

"Ideas can get shot down quickly, so we don't want to spend a lot of time or get people too excited about an idea we're pitching," said Young, who wore many hats on the *Deadly Creatures* project, from interface design to back-end scripting to functionality planning and programming to animation. "I have to be fluent in a lot of different areas," he said. Young credits his versatility on the job to his varied experiences at UAT, having taken 3D art and animation classes, scripting classes, art and design, and from working on student projects where he learned a bit of everything about the process of making a game. When Young learned about Rainbow Studios while he was at UAT, he immediately started applying for any available positions—from graphic design to IT to programming. Ultimately, he wanted to be a game designer, but he was willing to start anywhere. When he got a job as an artist, he was still in school and had to balance the two—a price he was happy to pay.

Raymond Visner, a game designer for *Deadly Creatures*, was one of Dustin Young's prior classmates who also graduated from UAT in 2004. But, unlike Young, he didn't join Rainbow until 2007.

"There was a good combination of theory and practice that I gained from UAT, which really helped me to prepare for a job like this," Visner said.

Deadly Creatures, the story, is about a scorpion and a tarantula fighting against other insects and reptiles native to the desert. It's an adventure broken into chapters rather than the levels common to most video games. Visner was responsible for creating Chapter 7, save some back-end programming. All of the creature fight scenes in Chapter 7 are the handiwork of Visner, from designing the creatures to placing them in the world, having their reveals come out, engineering the engagements, all the way through to the end of every possible sequence.

UAT ALUMNI MASTERMIND A MAJOR TITLE FOR Wii DEADLY CREATURES



The game was actually conceived in a dream that the lead designer on the team had about being a snake controlled by a Wii-mote and veering up to strike a mouse. When the team got together to brainstorm the game world, they realized that being a snake was rather limited. “You’ve got the waggle and you’ve got the strike. That’s basically it. Snakes are intimidating creatures, too, so we figured that he would be a better boss to fight versus an actual, playable character,” Visner said. The team took cues from their own backyard, so to speak, for the environment, creating a desert game world. But, they also wanted to offer a variety of environments and add in man-made objects, so Visner created a junkyard in Chapter 7 featuring a tipped over truck, a dollhouse, a garden gnome stuck in the weeds and several other unique objects to climb through. “The objects give you a sense of scale, a sense of size. They let you know that, although you’re in the wild, there’s always some mark of a human,” Visner said.

The lead programmer on the team, Trapper McFerron, graduated from UAT in 2001 and joined Rainbow Studios in 2002. “I loved being at UAT. I was there on campus for at least 14 hours every day on the days I didn’t have to work,” McFerron said. “I took what I learned in class and used it to make games. A lot of the teachers I had at UAT would come in before class or after class and sit with me, sometimes for hours, helping me with a game project I was struggling with.” McFerron’s first extracurricular project was to rewrite

the classic, *Pac Man*, using Java. One of the faculty members who helped McFerron with his Pac Man project was also a programmer working for a local Internet company, which was hiring. McFerron applied and was hired, enabling him to get real industry experience while still in school.

Holly Sheppard was an environment artist on the *Deadly Creatures* team who graduated from UAT in 2005. When she first came to UAT, she had a traditional art background and very little computer and technical knowledge. What drew her to UAT was a desire to make digital films. When she worked on a student project to modify the Core game engine, however, she was completely converted over to the world of game design. “When I graduated, I didn’t apply anywhere except game studios, so UAT prepared me for everything. I started from zero,” Sheppard said. She took some different classes and discovered her passion in modeling. She loved making art for game environments. Her role in *Deadly Creatures* was to make everything in the game that wasn’t the characters themselves, from the tangled brambles to the ground to the lighting and texturing of everything.

Sheppard was feeling her way through her first experience designing lighting for a game environment while working on *Deadly Creatures*. She found support and inspiration from her fellow team members, who gave her pointers and direction on how to light everything properly to create the right mood in the game world. “It was so much fun, I loved it,” Sheppard said.

Deadly Creatures is in stores now and receiving positive reviews from the press. The UAT alumni involved in creating the popular game are thrilled to be working for Rainbow Studios and grateful to UAT for preparing them well. They’re looking forward to shipping more new titles in the coming year.

“I loved being at UAT. I was there on campus for at least 14 hours every day on the days I didn’t have to work,” said Trapper McFerron.



WHERE ARE THEY NOW? – TRAPPER MCFERRON

UAT graduate Trapper McFerron is currently a Principal Software Engineer at THQ Digital Studios (formerly Rainbow Studios) in Phoenix. THQ is a leading worldwide developer and publisher of interactive entertainment software. The company develops its products for all popular game systems, personal computers and wireless devices.

Trapper leads the architecture development and implementation of THQ’s next generation game engine and tools. Since graduation, he has worked on *uDraw Game Tablet*, *Dood’s Big Adventure* and *Deadly Creatures* for the Wii platform. He has also contributed to Pixar’s *Cars* for PS2 and Xbox and *MX vs ATV* for PS2.

The team for *Deadly Creatures* was smaller than usual, so each team member had to take on multiple roles. In addition to being the lead programmer, Trapper was responsible for designing the overall animation system, the physics system, the camera system, and the rendering system, much of which was outside of his comfort zone. He was required to piece together everything he learned at UAT as well as fill in with on-the-fly learning via tutorials and trial and error, resulting in many late nights at work. “The camera system was particularly challenging to program because there isn’t another game that I’ve played where you can walk on walls and ceilings and through tiny tunnels to where the camera really has to be smart and adapt to its surroundings,” Trapper said. “In most games that I sampled, you can walk around on the ground and sometimes on walls, but the camera stays upright, so you see the characters upside down. But in *Deadly Creatures*, the camera

is turned upside down too, so you see the character still right side up but the world is upside down. It was a huge challenge to have the camera react smartly and not disorient the player.”

Trapper credits his UAT education for preparing him to succeed in the highly competitive game industry. He pointed out that the “super late hours” of the UAT Computer Lab and teachers who were willing to work late helped him put in the long hours needed to become a game programming pro.

OTHER UAT ALUMNI WHO WORKED ON DEADLY CREATURES AT RAINBOW STUDIOS ARE:

Holly Sheppard – Environment Artist

Dustin Young – Lead Artist

Raymond Visner – Game Designer

KEVIN KADIUM

REAL-LIFE HACK JOB

OVERVIEW

Kevin Kadium, a double major in Network Security and Technology Forensics at UAT, is interning at an interactive marketing agency in North Scottsdale. Most days, he spends his time working with the IT department.

But on a cold morning last November, Kevin was thrown a curveball.

Kevin's boss just wrote a book about interactive marketing and he wanted to give the first copies of it to his clients. That's cool. But, instead of just mailing out a book, he wanted to send it to his clients on Amazon's e-reader, Kindle.

That turned into Kevin's first hack. But there was more. After he finished hacking the Kindle, Kevin's boss changed his mind. Instead, he wanted to send out his book on Barnes & Noble's e-reader, Nook. That turned into Kevin's second hack.

+ DETAILS

Kevin's boss didn't want to just send his clients a Kindle or a Nook, though. He wanted the image they saw on the device to be his book's cover. They'd open up a box and there would be an awesome e-reader—thin and sleek. But when they turned it on, instead of seeing the home screen, they'd see a custom screensaver of his book.

+ HACK THIS: LEGAL OR NOT?

Hacking has a bad connotation to many people, like Kevin's parents' generation. When people thought about hacking years ago, they thought about illegal activities, like breaking into the government's computers. But, most hacking is legal.

In 2008, for example, the Electronic Frontier Foundation asked the U.S. Copyright Office for permission to hack Apple's iPhone. In 2010, it was given permission, freeing up everyone to legally jailbreak their smartphones.

"This is about opening up a device and digging in," says UAT Provost and Dean Dave Bolman. "Especially with hardware, users are allowed to dig in. It's different with software because you probably signed something that says, 'I will not change this.'"

For the most part, hacking today means taking a device and ethically and legally messing around with it, to make it do what you want it to do.

"That is the root of all great technology," says Provost Bolman. "Someone will take an existing device, pull a cable from something else and plug it in, and all of a sudden you solve a problem. It may be ugly and messy to start, but it solves a problem."



HACKING

STEP 1:

Kevin started where any good hacker starts, online. There's no point in modifying a device from scratch, not if other people have done it before. And definitely not if they've done it before and posted the coding for it on a website like Hack a Day.

"I started searching forums and online communities to find out what has already been done out there," says Kevin. "I was on a forum and found that people had written modified versions of Kindle's original firmware."

For the Nook, he found a tutorial on becoming a super-user, which would essentially allow him to change the Nook however he wanted.

STEP 2:

Next, Kevin knew he'd probably give up the warranties if he hacked the devices. He made sure his boss knew what was going on.

"If it's my device, and I don't care about the warranty, and I want it to do something else, why not?" says Kevin. "It's my device."

STEP 3:

For his first hack, Kevin had his boss' book cover on the Kindle within a few minutes.

"I downloaded the hacked firmware," says Kevin. "I dropped it into the Kindle and updated it. From there, you are able to put apps on it or, in our case, our screensaver."

Kevin handled the second hack in his spare time. Within a couple of hours, though, the Nook had transformed from a pretty nice e-reader into an incredible tablet PC with Facebook, Google Earth, Skype, email, games and a bunch of other programs.

"It's a new device, so I just wanted to see what I could do with it in an hour or two," says Kevin.

+ CHALLENGES

When Kevin's boss handed him a Kindle, saying, "Here, hack this," and later the Nook, it kicked into gear skills that Kevin has been developing since he was a kid—hacking a device to make it do something different.

"Hacking is just taking something and making it do something that it wasn't intended to do," says Kevin, who has taken classes like Applied Exploits and Hacking at UAT.

He's recently been doing that with his iPhone, a few times over. He's added custom apps, SMS tones and ringtones. But, he's done a lot more, too, like jailbreaking the operating system to enable FaceTime to run over 3G, instead of Wi-Fi, to make video calls.

Plus, he's installed Metasploit to exploit vulnerabilities in OS.

The downside of hacking something is the manufacturer will usually no longer honor your warranty or provide customer service for the functions you hack into it.

The upside is that you end up with a modified device that no one else has.

Excelling at hacking takes a lot of learning. When someone like Kevin is surrounded by techies, all of them messing around with software and hardware, the solution to a project like the Kindle or Nook hacks is smarter and better than if someone had learned how to do it on their own. Why? Because when a group of people



LOOKING AT THE STOCK MARKET IN A WHOLE NEW WAY

STOC

STOCK TICKER ORBITAL COMPARISON

STOC (Stock Ticker Orbital Comparison) is an interactive data visualization program created by UAT student James Grant and professor Todd Spencer with help from instructor Stephen Cady. The project was programmed in Processing, an open-source language, using the metaphor of a planetary system, which maps parameters of stocks in the S&P 500 to animated visual outputs. STOC had its world premiere at the SIGGRAPH 2009 Information Aesthetics Showcase in New Orleans, LA.

STOC solves a specific problem. Existing methods for displaying large amounts of stock market data do not easily allow comparisons between various stocks as the data is often presented in a fixed tabular format. Some previous solutions to this challenge implement a price-over-time graph, with the option of layering on additional stocks or market indices for comparison. STOC, however, seeks to allow immediate comparison of hundreds or thousands of stocks by mapping various stock-specific parameters to easily observable visual outputs. This visualization is particularly suited for comparisons between items, as one is able to immediately identify a variety of parameters in the group of stocks being compared.

The program uses mapping functions to adjust the raw data within ranges usable for visualization purposes. The data is mapped between inputs and outputs and comparative information is represented by visual outputs such as:

- Volume of trading = Planet orbital distance
- Comparison to S&P 500 = Planet speed
- Percent change from prior close = Planet color
- Market capitalization = Planet size
- P/E ratio = Planet atmosphere width and color
- Moving average = Planet opacity
- Dividend yield = Planet moon size



Check out a demo of STOC at www.uniformchaos.org/stoc.php

James Grant - project lead
 Todd Spencer - faculty mentor
 Richard Armijo - programmer
 Austin Gruenweller - Database

The program also produces an average of all these numbers to define the general performance of the S&P 500. This is represented by the large center circle, or "sun." After discussing how to best display the data, the team determined that the color of the sun would be an average of the change percentage, and the volume is a scaled visualization of the total volume of trading on the S&P. This was done to allow the viewer to tell at a quick glance some basic information about the market's performance and how much trading has occurred.

The entire system runs on the Internet and can be manipulated in several ways. The user is able to zoom in and out of a section to see more detail, or expand and contract each of the relative orbital radii, maintaining their relationship, but allowing the user to give more or less separation to them in order to better compare stocks. It also gives the user the ability to right click on a stock to display its name and press the space bar to get a print out of all the raw data that has been collected. The speed of the system can also be scaled via keyboard and can be paused at any time. An individual stock can be selected and highlighted by typing the company name.

Ideally, this application is something that could allow a person to simply glance at it to gauge the market's condition.

In this way, a person could always have an eye on the stock market without having to stare at line and bar graphs or wade through the endless columns of tiny print in the business section of a newspaper.

James reports that he has already had interest from outside parties in making STOC a commercial product. For future development, James plans on expanding the usability of the application with several additions:

- iPhone and Android apps
- Web-viewable visualization and interaction
- Scan through daily archived closing data points
- Additional data sets visualized with same orbital metaphor

This area of technology is developing so fast that UAT has begun offering Virtual Modeling and Design, an undergraduate program in data visualization.

WHERE ARE THEY NOW?

Today, after graduating, James works for Fabrica, Benetton's communication research center (<http://fabrica.it/about>). Benetton is the global fashion brand and retailer headquartered in Italy. This means that James not only has a very cool career going on, HE LIVES IN ITALY! Plus, his office is in a restored 17th century villa. To sum it up, James can only say, "really awesome!"

Fabrica is based in Treviso, in northern Italy. It is not a school, advertising agency or university. It is an applied creativity laboratory, a talent incubator, a studio of sorts in which young, modern artists come from all over the world to develop innovative projects and explore new directions in myriad avenues of communication, from design, music and film to photography, publishing and the Internet.

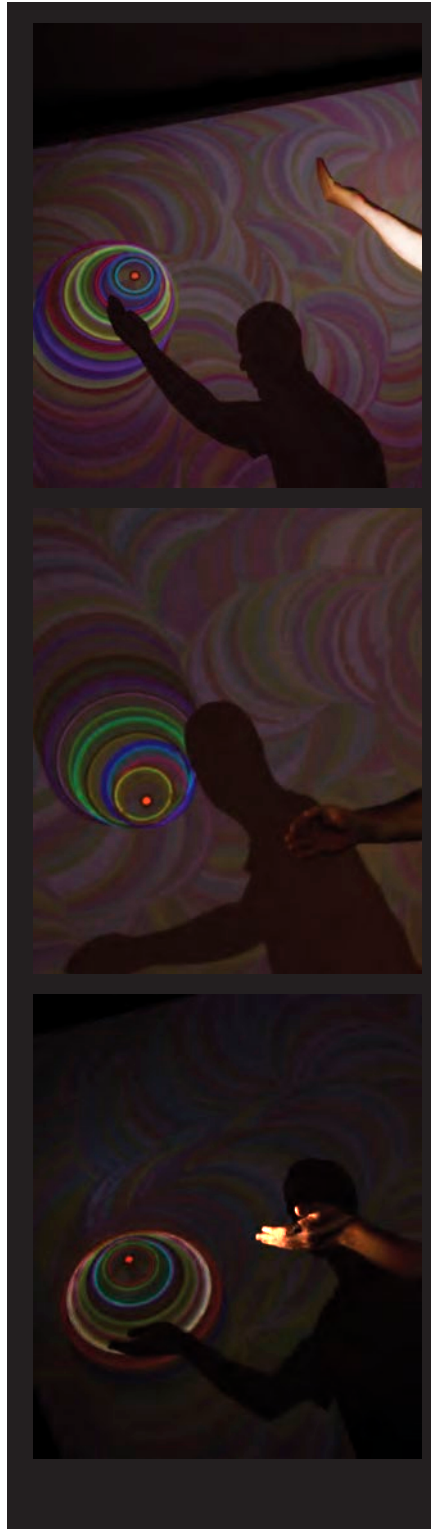
James is a resident in the interactive department where he designs, develops and produces projects. He is currently working on a data visualization project to enter into the World Bank's Apps for Development Competition. He is also working on an installation for the Benetton retail stores' windows. In addition to his work with World Bank and Benetton, James is working on a poster and installation project that will be installed in the Rochester Institute of Technology's Vignelli center and starting a web community to connect young politically active artist with young political thinkers and advocates to produce stronger messages from the youth of the world.

Specifically, James credits classes with his professors Todd Spencer, Vesna Dragojlov, Stephen Cady and Karyn Ricci that covered design, interactive design, algorithmic art and algorithmic programming as being instrumental in his success so far. He says that, "The ability to take experimental classes that ran with small class sizes and were focused on being project-based and finding a topic that was interesting and developing projects about it [couldn't have happened anywhere other than at UAT]."



THE ART OF PROGRAMMING

DOTS AT PLAY



In the futuristic sci-fi movie *Minority Report*, protagonist John Anderton (Tom Cruise) enters a crowded mall atrium. Dozens of advertisements on LED screens scan his movement, identifying him and barking their products at him while he walks. These technologies are similar to what UAT student Michael Dresser utilizes in *Dots at Play*, a visual project that analyzes and displays human movement.

Dresser used the data to have the computer images react to movement and sound volume. Dresser uses tracking software, a computer and webcam to cast a sizable dot and colored rings on a surface. The processing program is an open source software displaying mathematical computations using Max and Jitter for graphical programming and video and matrix data processing. This combination, feeding into a projector, creates the visuals on the person, as well as the gray background behind the images. Future plans include using two computers, one for tracking and another for displaying the images. Dresser comes from an Artificial Life background, a field that includes many abstract concepts and theories not easily represented with numbers.

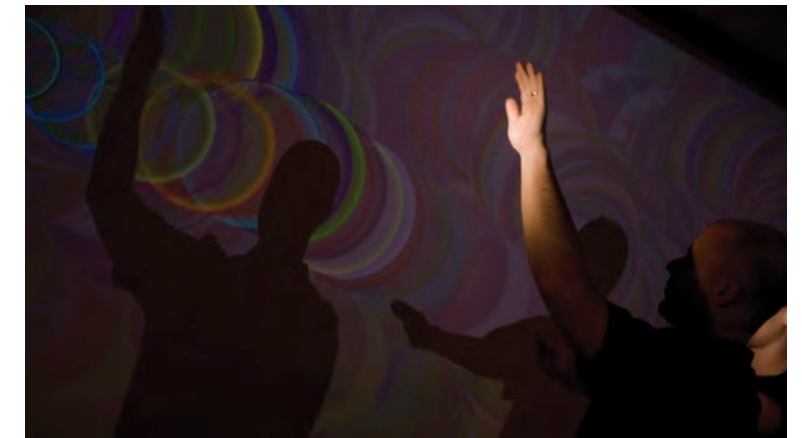
Dresser realized that he was able to grasp these ideas easily through creating visual expressions of them. He gave as an example a representation of Darwin's Theory of Evolution where he created tiny boxes to represent all of the living organisms in space. When these "animals" move in the virtual world, you can see the movement on the screen. Representations of interactions, deaths, extinctions and new mutations of life all get represented on screen visually. Not content with simply knowing the answer or the outcome, Dresser created programs to visually express this and other concepts so that he could see and understand them from beginning to end. These types of projects were what got Dresser more involved in the artistic community at UAT. Student project teams began recruiting him as their programmer, where he had the opportunity to help the artists express what they envisioned.

Dots at Play started as part of an audio analysis program for a class at UAT. With encouragement from Associate Professor Stephen Cady, Dresser used the data to have the computer images react to movement and sound volume. While the display appeared simplistic, the computing power needed was deceptively complex—calculating the tracking point (the person) and the noises.

"This actually took a long time to come up with because it's almost so simplistic, it's difficult to program for because you have too much chaos going on—it isn't obvious to anticipate what's going on. So we tried to boil it down to the simplest concepts we could maintain interest in," said Dresser.

Future plans include using two computers, one for tracking and another for displaying the images, and converting the project to a "processing-only application." Dresser hopes to show the work in lively spaces, taking advantage of its interactive and aesthetic properties.

"I'm looking to get this up in as many places as possible," he said. "You need people to come up and play with it and interact with it to really get the aesthetic response and the interaction response from it."



WHERE ARE THEY NOW?

Michael Dresser graduated from UAT in 2009 with a degree in Artificial Life. Today, he's working for mobile apps maker TMSoft.

PHYSICAL FEEDBACK:

This algorithmic art project works with bodies against a wall or a movie screen, interacting with and responding to the body's presence in space.

When the camera detects the density of a body blocking some of the screen, the dots are programmed to gravitate towards its edge, just two points out from it towards the void. Then, the dots are hooked—they follow your movement by staying on that edge of light and dark.

The processing program is an open-source application displaying mathematical computations using Max and Jitter for graphical programming and video and matrix data processing. This technology is used in the Kinect.

PUZZLING OUT A NEW GAMING PLATFORM

SURFACE

OVERVIEW

The Microsoft Surface computing platform is making waves, and not just when you touch or set an object on a device powered with surface technology. This innovative platform that responds to natural hand gestures and real world objects and has a 360-degree user interface is the next generation of interactive display. No wonder it has already won starring roles on TV dramas such as CSI: Miami and in U.S. political coverage on MSNBC.

Recently, UAT students built their own surface computer that puts this exceptional functionality on display in the UAT Commons. In the technology marketplace, once a particular capability has proven itself in one application, the functionality is quickly adapted and integrated into other applications. This marketplace dynamic is replicated on the UAT campus, where departments collaborate and cross-pollinate far more freely than in traditional academic settings.

An example of this is how the presence of the Microsoft Surface computer sparked the interest of the Spring 2010 Advanced Experimental Gameplay class led by Professor Dave Wessman.

THE CHALLENGE

The objective of the Advanced Experimental Gameplay course is for students to understand the role of innovation and experimentation in developing new types, styles and modes of gameplay. So, the first step was for the students to select the technology platforms they were interested in developing for. As a 17 year industry veteran, Professor Wessman challenged his class to think beyond the current status quo, just as they will have to do as professionals in the ever-evolving gaming industry.

"It was anything goes," says Wessman, "from NeuroSky headsets to Microsoft Surface to the 3D printer. This included changing up gameplay mechanics or target platforms or both. The only constraint was time—we only had 15 weeks to make this happen. In the real world, you're always working under time constraints, so bringing this element into play was very relevant for the students—it's only a good idea if you can bring it to market in time."

Not surprisingly, since they passed the Surface computer every day in the Commons, the students were immediately drawn to the new frontier of surface gaming.

FIRST CONCEPTS

The class split up into two development teams, one of which focused on learning the Surface SDK by developing a version of *Pong* while the other devoted themselves to creating an innovative puzzle game called *Alternate Dimension Maze*. The puzzle concept was simple enough—leverage the surface technology already available at UAT to develop a virtual puzzle game designed to take advantage of the unique properties of the Surface computer. This meant a four player format matching the rectangular surface. The game would require players to place actual physical puzzle pieces on the Surface and the computer would recognize and then re-configure the puzzle accordingly.

It is sound strategy that when embracing a new technology platform, you start with fairly basic game play. Both teams soon learned how wise this approach was. Cutting-edge technology brings with it cutting-edge obstacles to be overcome.



LEFT TO RIGHT:
William Courtney, Brendan Erquiaga,
Professor Dave Wessman, Austin Langston,
Giovanni Gonzales, Kyle Brannon, Andrew Maul



RISING TO THE CHALLENGE:

The UAT student team created a multi-touch computer with an acrylic surface, a camera and a projector – basically, home theater equipment.

They went through planning and writing up schematics, programming test software from open-source scripts then fabricating parts and piecing together the hardware.

The team focused primarily on the hardware aspects to develop a platform on which future students can develop and test advancing software creations for the multi-touch platform.

Without an actual multi-touch interface, it's difficult to develop software that reacts to more than one point of input, so this project fills that need for the Surface hardware at UAT.



TEAM

The core team on Surface was made up of three Game Design majors:

BRENDAN EROQUIAGA – Programmer
ANDREW MAUL – Project Manager/Artist
AUSTIN LANGSTON – Sound/Artist

Other team members included Game Design majors:

KYLE BRANNON – Associate Producer
WILLIAM COURTNEY – Supplemental Programmer

PUZZLING OUT A NEW GAMING PLATFORM

SURFACE

GAMING IN THE ROUND

“One of the biggest challenges the class faced was that everyone was a Game Design major,” Professor Wessman noted. “We had no Game Programming or Game Art & Animation majors in the class, some of the students would have to take on these roles as best they could. Fortunately, UAT’s flexibility in course offerings ensured that some of the students were prepared to do this. We also received a lot of help from Jacob Huen, a programming major who wasn’t enrolled in the class, but agreed to help out.”

“It was definitely a learning experience to work with the Surface,” says Brendan Erquiaga, “a language formation we’d never used before. Even the art and sound were different.”

As if this weren’t challenging enough, initial research by the class soon revealed that Microsoft’s technical documentation was woefully lacking. In many areas, the documentation was simply incomplete or wrong.

“That made it really hard to figure out,” said Andrew Maul, project manager, “especially working within a limited timeframe.”

Welcome to development on the cutting edge, where sometimes trial and error is the only way to really determine what works. The *Alternate Dimension Maze* team persevered sufficiently to develop an alpha model of its game. It made the Puzzle Game work, to the extent it could with existing technology.

“We completed the game, but because of technical limitations with the surface’s process capability, the game flowed at such a low frame rate that it wasn’t fun to play,” says student Austin Langston.

Part of honing your game development skills is understanding when you have maximized the opportunity in front of you. This is what the Advanced Experimental Game Play class experienced with their Surface Puzzle Game. Sometimes, all you can do is learn and move on.

The *Pong* team was experienced more success. As the project progressed, the team decided to add elements of *Breakout!* to the game.

MORE GAMES ON SURFACE CREATED AT UAT

By midterm the class had completed WPB and relegated the Puzzle game to the “noble failure” category. They were ready to reunite the entire class in order to attempt something more ambitious. After much brainstorming the team settled on *StarFist*, a Steve Jackson board game inspired by the classic Cinematronics arcade game, *Star Castle*. The board game was useful for prototyping, and the name *StarFist* appealed simply because it sounded so “heavy metal.” This inspired a new aesthetic theme in which the player’s spacecraft would look like rock band instruments, plus the obligatory heavy metal theme song (provided by a friend of the team). Finally, the team added some gameplay mechanics from *Galaxian* to the core gameplay of *StarFist* to create another unique hybrid.

Even though these games were based on previous games, the fact that they are implemented on the Surface required a complete rethinking of the interface and gameplay mechanics.

Many times with the ever-changing realm of technology, you do have to completely rethink traditional approaches. Ultimately, the UAT educational experience is about ensuring you can always meet that challenge.



WHERE ARE THEY NOW?

JACOB HEUN
Senior Programmer
MeltMedia

STEVE NOBLE
Additional Design/Playtesting
THQ Design Studios

JARED THOMPSON
Additional Design/Playtesting
THQ Design Studios



Learn More at
uat.edu/microsoftgame.com

DIGITAL DREAMS DO COME TRUE COWBOY DREAMS



UAT CO-PRODUCES A WESTERN SHORT DESTINED FOR GREATNESS

Cowboy Dreams started out as an old screenplay lying on the desk of writer Steve Briscoe. His writing and producing partner, Paul DeNigris, loved the script and was waiting for an opportunity to produce the film with Steve, which arrived in 2008. The pair wanted to get some big name actors to star in the film. Their wish was granted when Bill Engvall agreed to be in the movie because he loves all things cowboy and is a friend of Steve's. Engvall attracted another big name actor, Danny Trejo, which ensured the film would take off.

"Audiences want to see a film based on who's in it," said Paul DeNigris, the director of *Cowboy Dreams* and a professor of Digital Video and New Media at UAT. "They want to see faces they recognize."

It's not just audiences either—it's the judges in the film festival circuit. In this digital age, almost anyone can make a movie, so the festivals are flooded with submissions. Judges will pay more attention to the titles with name actors in them. Another benefit of notable actors is attracting the best crew. In the case of *Cowboy Dreams*, the crew was made up of mostly UAT students and alumni. "We had alumni that go back to my first days of teaching at UAT in 2003 who came to work with me on the film," DeNigris said. In addition to alumni, DeNigris recruited 10 current UAT students to work on the film.

DeNigris has been making films in Phoenix for 11 years. He was named the Arizona Filmmaker of the Year at the 2007 Phoenix Film Festival Awards. For the past six years, DeNigris has been directing films at UAT, creating projects that give past students an inside connection to a paid work opportunity and incoming students an opportunity for exposure. He sees these films as an extension of what he does in the classroom, as real experience on a set in production with actors where students learn the most about making films. It also gives them an opportunity to decide if it's what they really want to do. "Getting students involved in an outside project like *Cowboy Dreams* is really the incubator for the real world. Are they going to be able to be focused and energized for hour 10 and 11 of a shoot? It's sink or swim," said DeNigris. Some of his current students got the acid test as production assistants for *Cowboy Dreams*, which had a shoot in the desert heat that lasted 14 hours.

Adam Benson, the audio engineer on *Cowboy Dreams*, graduated from UAT a few years ago and is now running his own audio and visual effects studio with clients all over the world. His studio, Sleep Deprived Productions, is now so busy that he plans to move the business out to Los Angeles and grow it. DeNigris has employed Adam on all of his film projects over the past few years, which has helped with the success of his career. Adam is just one of



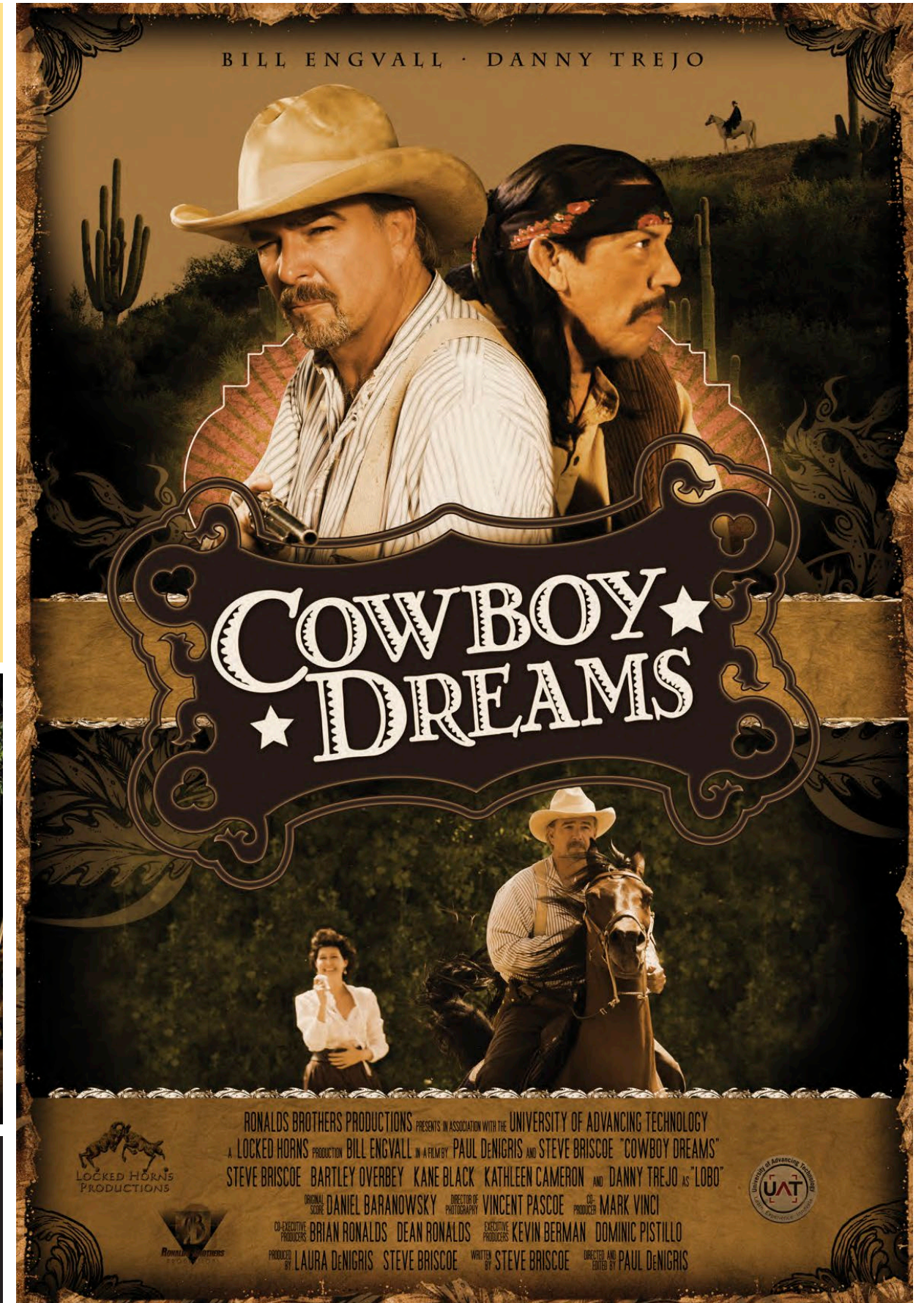
Working with the Pros:

Because UAT Digital Video Professors Paul DiNigris and Steve Briscoe are working professionals in the Phoenix film community, they can provide hands-on experience in film production for the students at UAT in Digital Media, Game Art and Animation and Digital Video.

This opportunity that students get to work on actual productions, side-by-side with industry professionals, is one of the distinguishing features about UAT. "At UAT, we blend the cerebral, aesthetic classroom learning with the hands-on, practical movie-making experience," Professor DeNigris said.



UAT receives an "In Association with..." credit on the official movie poster. Look closely and you'll see that UAT founder, Dominic Pistillo was Executive Producer of the film. How real is the Digital Video educational experience at UAT? You not only may get a chance to work on a real film—**your film gets a real poster!**



DIGITAL DREAMS DO COME TRUE COWBOY DREAMS

Cowboy Dreams Project Team:

PROFESSOR PAUL DENIGRIS
UAT Professor/Director-Producer

STEVE BRISCOE
UAT Adjunct Professor/Writer-Producer

DOMINIC PISTILLO
Founder of UAT/Executive Producer

WEBB PICKERSGILL
UAT Adjunct Professor/Gaffer/Steadicam

STEVE FAILLA
UAT Student/Storyboard Artist
Major: Digital Animation

NICK WASSENBERG
UAT Student/Title Designer
Major: Digital Video

TODD ANDERSON
UAT Alumnus/Key Grip

Where are they now?

RYAN LUIBRAND
UAT Alumnus/Assistant Editor
Editor at Resolutions Media, Phoenix, AZ

CLINT COMER
UAT Alumnus/Documentary Camera
Take Out Productions, Phoenix, AZ

JENNY POND
UAT Alumna/Script Supervisor
Warner Bros.

ADAM BENSON
UAT Alumnus/Audio Engineer
VFX Artist
Show-N-Tell, Los Angeles, CA

KEEGAN EAD
UAT Alumnus/Grip/2nd Asst. Camera
Bank of America, Phoenix, AZ

many success stories DeNigris tells his students about. Two others are Jenny Pond and Keegan Ead, both on the crew of *Cowboy Dreams*, who made a feature length documentary called *Poison Wind*, which played in dozens of film festivals all over the world. "Because of them, UAT films have played in Germany and England and all over the world," DeNigris said.

As for *Cowboy Dreams*, it was the 2009 Phoenix Film Festival Official Selection, the 2009 Dances With Films Official Selection, the 2009 L.A. Shorts Fest Official Selection and the 2009 HollyShorts Film Festival Official Selection. In addition, the film made it to the Quarterfinals in the 12th Annual Fade In Awards.



[HTTP://UAT.EDU/
COWBOYDREAMS](http://uat.edu/cowboydreams)



FALLOUT

LATEST UAT BLOCKBUSTER IS A **MAJOR** MILESTONE IN DIGITAL VIDEO PROGRAMS

After more than 12 months of dedicated work and creativity, a crew of UAT students, led by Professor Paul DeNigris, premiered the futuristic action-thriller, *Fallout*. It's 50 years from now and there has been some sort of apocalyptic battle on American soil. The city of Phoenix still exists, but it's obviously been through tremendous trauma, barely populated, with the smoldering ruins of skyscrapers and shopping malls around every corner. It's a scene of devastation. A team of five soldiers, The Wild Cards, who work for the Department of Homeland Security Southwest Sector Command, are tracking down terrorists with a suitcase nuclear device. The nuke detonates, and there is only one survivor. This sets off an investigation that relies on a high-tech forensic helmet that can extract memories—in a most painful way—from those forced to wear it. Full of twists, turns and double-crosses, the film ends leaving viewers with the mystery of who is really responsible for the damage.

Professor DeNigris describes how the movie came together. "A lot of my students and I love *Stargate SG-1*, so we wanted a lot of military action, ray guns, space—you name it—so we somewhat based it on that. It's basically about an elite unit of anti-terrorist groups that are betrayed by one of their own and seemingly vaporized by a nuclear suitcase bomb, and the investigation that follows after."

DV PROGRAM FIRSTS:

- Fallout is UAT's first film to consist entirely of "green screen," computer-generated images and virtual backgrounds.
- More than 300 digital video effects are packed into the 17-minute film.
- The project brought together student animators, modelers, texture artists, composers and editors with other students learning camera work, lighting, writing, acting and make-up to create all the elements by leveraging everyone's skill set to their maximum capacity in the area they are most passionate about.

FALLOUT IS UAT'S **FIRST** FILM TO CONSIST ENTIRELY OF "GREEN SCREEN," COMPUTER-GENERATED IMAGES & VIRTUAL BACKGROUNDS

The UAT crew, most of whom are enrolled in DeNigris' Digital Video Production Studio classes, consists of a core group which has been with the project since its inception and others who have spent time on the project. DeNigris says, "I think there are about 31 students working on it right now. We have some current students, some auditing students, and one graduated student working on it with me. They're all absolutely dedicated. But, don't get the impression that it has been hundreds of hours of drudgery. We get to play dress-up in tactical uniforms and run around and shoot Airsoft guns. This movie definitely reflects the UAT culture—it includes many references to games, TV shows and movies. While it is enjoyable for all, if you go to UAT or are interested in it, you're going to 'get' this movie."

One of the benefits of being at UAT to work on this type of project is that students get to work with the same equipment that the pros use in the film industry. Here's a partial list of the cutting-edge gear that enabled the team to create a highly credible film:

ON THE **INITIAL** PRODUCTION SIDE:

- Camera tracking was done using yellow tracking markers on the green screen and then tracking the movements of those markers using software (Maya and After Effects, specifically), allowing cameras to move and still have elements added later to match perfectly.
- Green screen stage with motion capture system (for character animation driven by live performer) allows cameras to move and still have elements added later to match perfectly.

- High Def Camcorders with all the lenses and support equipment to capture beautiful images
- Dollies, tripods and crane arms for sweeping camera moves
- Lighting: Arri Fresnels, same as you would see on a Hollywood set
- Great digital audio equipment and microphones
- Portable digital audio recorders that output to 6D memory cards, which means there's no more "tape" in audio recording
- The helmet worn by the character "Hopper" was modeled in 3DS Max and then "printed" in plastic using UAT's rapid-prototyping printer. The parts were then painted and assembled into a complete prop that is totally unique to the film.

FOR **POST-PRODUCTION**:

- Avid Film Production Studio
- 10 top-of-the-line HP workstations set up with Avid Media Composer—the industry standard for digital video editing. All 10 of last year's 10 Oscar-nominated Best Films were edited on an Avid product.
- Full Adobe Creative Suite 4 (now upgrading to CS5)—running applications like Premiere Pro, After Effects, Bridge and Photoshop
- Autodesk 3DS MAX and Maya

Many of these applications are the same ones recently used in the production of *Avatar*. Speaking of which, look for the article in this issue on the UAT grad who worked on visual effects for that film. A good number of other UAT alumni are also working right now in post-production and other positions for TV and movies in Los Angeles.



TEAM FALLOUT

Ryan Andrews – Supervisor of Particles & Dynamics
Major: Digital Animation

John Chafuen – Sound Mixer
Major: Game Design

Jason Dye – Assistant Composer
Major: Game Design

Christopher Erickson – Dir. of Photography/Editor
Major: Digital Animation

Mitchell Faherty – Costumes & Props
Major: Digital Video

Stephen Failla – 2D Designer
Major: Digital Animation

Shawn Geary – Composer
Major: Digital Video

Chad Hryhorysak – Producer
Major: Game Programming

Thitiwut "TJ" Jaroensuthiyotin – Composer
Major: Virtual Modeling & Design

Kyle Jenkins – 3D Modeling & Texturing
Major: Virtual Modeling & Design

Austin Jensen – 3D Modeling
Major: Game Art & Animation

Jessica Jones – 3D Modeling
Major: Virtual Modeling & Design

Mark Lee – 3D Modeling
Major: Virtual Modeling & Design

Alexander Stephens – 3D Modeling
Major: Game Design

Monica Thies – Composer
Major: Network Security

James Toth – Digital Matte Painter
Major: Digital Animation

Nick Wassenberg – 2D Design
Major: Game Art & Animation

Shon Major – Composer
Paul DeNigris

WHERE ARE THEY NOW?

Matt McElroy – Producer
VFX Artist with MK Production in Los Angeles

Joel Terry – Assistant Editor
Working on MFA in Film Production at Chapman University in Orange, CA

Valeriy Benidze – 3D Modeling & Texture
2Wire

Matthew Buresh – Editing & Sound
Studio One Media

J.D. Cerince – 3D Modeling Supervisor
3dBob Productions

Matthew DeJesus – Digital Matte Painter
Kohana Japanese Restaurant – Web Design

Justin Gagen – Art Dept. Supervisor
Blade Editorial

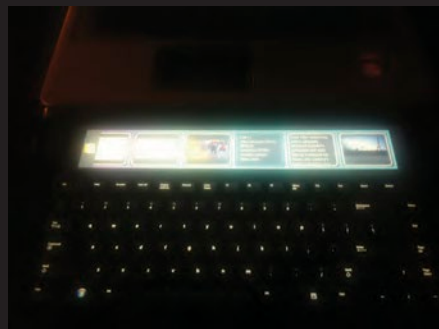
Kalki Kahira – Visual Effects Supervisor
IntraEdge

See Ooi Lim – Lead Concept Artist
Factory 38

Andrew Pfeiffer – 3D Modeling
Factory 38

Luke Walsh – 3D Modeling
United States Military

MICROSOFT'S ADAPATIVE KEYBOARD STUDENT WORKS



OVERVIEW

Microsoft has an amazing new keyboard in prototype that's unlike anything you've seen before.

It's a dynamic keyboard that sits on top of an LCD screen. It's flashy. It's splashy. And, a team of students from UAT got an early crack at making it flashier and splashier.

Nic Breidinger, Ryan Cabral, Zak Robinson and Doug Shannon took part in the 2010 Student Innovation Contest at the 23rd Annual User Interface Software & Technology (UIST) symposium in New York City. Their challenge was to make Microsoft's adaptive keyboard prototype better.

The keyboard is impressive, if not on par with seriously pricey high-tech keyboards like the Optimus Maximus, which has video displays on all its keys. Microsoft's keyboard has countless functions. Plus, it has a touch-screen strip so you can interact with programs on the monitor.

The teams were challenged with adding more functionality to the keyboard.

"We developed a visual, multi-item clipboard that is displayed on the keyboard's touch-panel screen," explains Breidinger. "Every time something is copied on the computer, it is saved to the keyboard. A preview of the item is displayed as a selectable item on the touch panel."

HISTORY

From October 3 to October 6, the Association for Computing Machinery (ACM) had its 23rd annual UIST symposium.

The 2010 Student Innovation Contest at UIST challenged teams of students to develop new uses for Microsoft's adaptive keyboard.

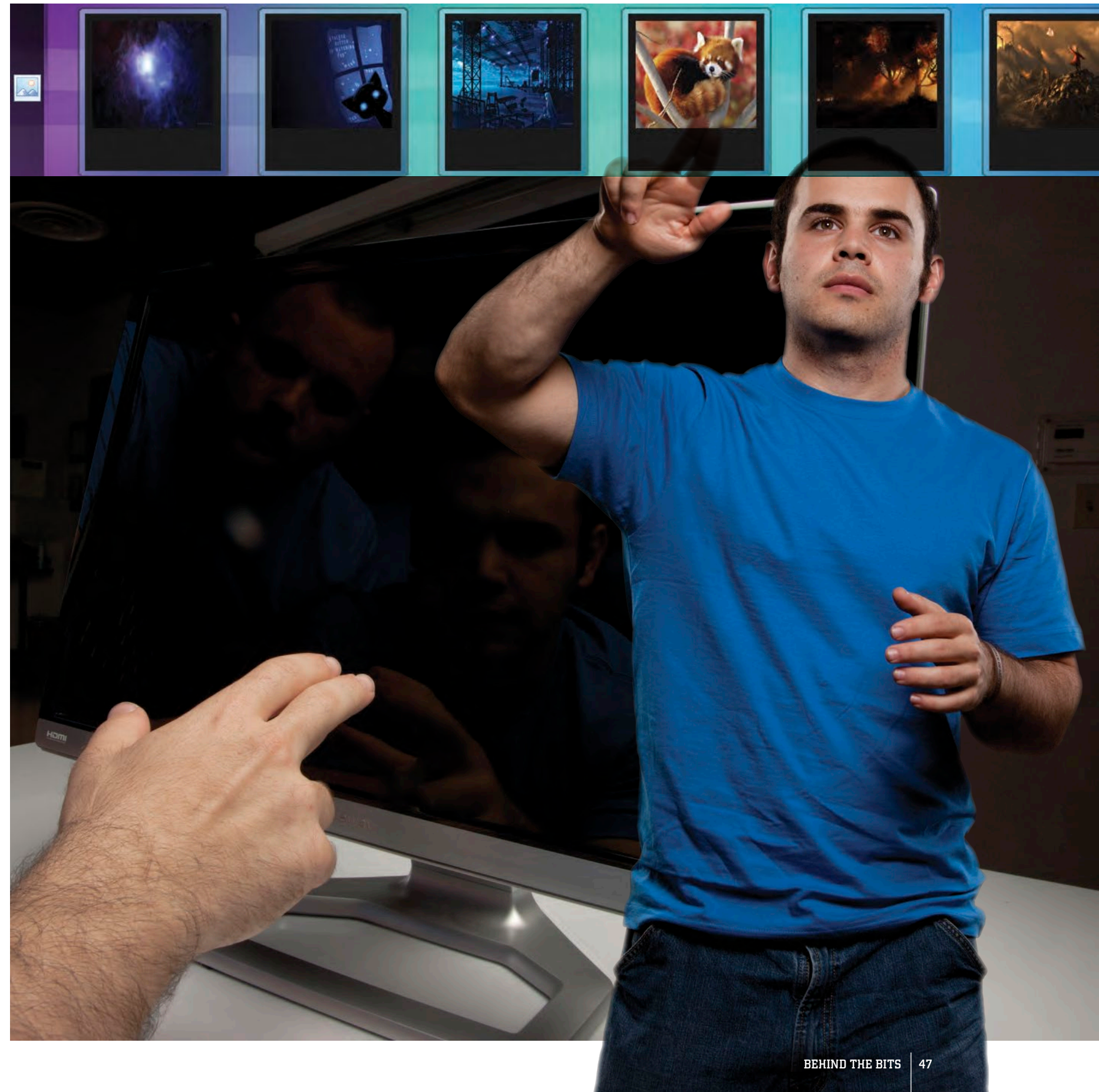
The goal of the keyboard is to cut down on the time it takes to perform certain functions. For example, instead of using a mouse to click from screen to screen to find a frequently used PowerPoint presentation, an image of that presentation can be saved on the touch-screen. Tap on the image and the presentation pops up on the monitor. The fun part is that each key then changes to display the PowerPoint function associated with it. For instance, some of the keys will show images of bar charts or pie charts. Tap the key to get the type of chart you want into your presentation.

Or, touch a photo of a friend on the touch-screen strip and a Microsoft Outlook email addressed to that friend opens up on the monitor. Then, touch that friend's photo to start a video call.

The keys can also instantly switch from displaying the English alphabet, for example, to French, Russian or other languages.

The teams taking part in the Student Innovation Contest were tasked with making the keyboard better, not prettier.

As Microsoft program manager Hakon Strande said in a YouTube video explaining the contest: "What we hope you experiment with is the ability to dynamically change the input device content, based on user context, within a set of application tasks, not simply change your keyboard to a new set of static icons."



MICROSOFT'S ADAPATIVE KEYBOARD

STUDENT WORKS

DETAILS

Each member of the UAT team took on a specific task. Breidinger, a Robotics & Embedded Systems and Artificial Life Programming double major, was project lead and handled the hardware programming. Cabral, a recent grad who majored in Game Art and Animation, handled the overall design. Robinson, also a recent grad but in Virtual Modeling & Design, was in charge of presenting the team's project at UIST. And Shannon, an Advancing Computer Science major, was in charge of software programming.

The team's enhancement was to create a virtual clipboard they called Clippings. When a file is copied, a reference to it is stored on the keyboard's touch-screen, which allows the user to easily recall the data. If it's an image, a thumbnail is saved; for documents, an identifiable portion of it is saved. The most recent and heavily used Clippings go to the front of the touch-screen queue.

The team used Microsoft Visual Studio 2010 and a development kit for the adaptive keyboard that Microsoft provided. For hardware communication, they programmed in C++. And, for the user interface, they used C# in conjunction with Microsoft Silverlight.

CHALLENGES

Before the event, more than 100 teams from around the world signed up for the UIST's Student Innovation Contest. But, Microsoft had only 40 keyboards. ACM whittled down the number of teams. Each selected team was sent a keyboard.

The guys from UAT made the cut. They had only 28 days to develop a new use for the adaptive keyboard.

"We had an extremely short timeframe to learn how the keyboard works, develop a prototype and work out as many bugs as possible," says Breidinger. "And the development kit was barebones. We had to dissect it and figure out how everything worked by trial and error."

SUCCESSSES

As it turned out, the UAT team didn't win. But, they took comfort in knowing the first-place winners in the "Best Implementation" had a similar idea to their entry.

That winning team, from the University of Regina in Canada, had two innovations for the adaptive keyboard: a visual clipboard and an application launcher.

Their visual clipboard was designed to save files onto the touch-screen strip or on a specific key. Touch that key and your saved file pops up. Their second innovation was an application launcher, where a person can open up a program such as Word by pressing one key or tapping the image on the touch-screen.

"We received a good amount of praise for our project," says Breidinger. "It was a simple concept with a wide range of possible uses."



MICROSOFT'S ADAPATIVE KEYBOARD STUDENT WORKS

ADAPTIVE KEYBOARD TEAM

NIC BREIDINGER – Project Lead and C++ Programmer
 RYAN CABRAL – Design
 ZAK ROBINSON – Presentation
 DOUG SHANNON – C# Programmer

THE FUTURE

The guys from UAT aren't likely to do anything more with Microsoft's adaptive keyboard. But, the experience was worthwhile. They interacted with industry pros at UIST. And, they learned a lot about human-computer interaction (HCI) and working in a team.

"Working in a group with both programmers and artists was a good experience for us," says Breidinger. "We had to learn how to interact and explain our ideas to each other."

PARTICIPANTS

Two of the four members on the UIST 2010 Student Innovation team are still attending UAT but two others have graduated.

WHERE ARE THEY NOW?

It's been several months since UAT's team competed in the UIST 2010 Student Innovation Contest in New York City.

Nic Breidinger

Nic, the project lead and C++ programmer on Microsoft's adaptive keyboard is working toward graduating in April 2011. He's a double major in Robotics and Embedded Systems and Artificial Life Programming.

He's thinking about going for his master's degree. But, until he makes a decision, he's busy working on a few projects for his portfolio and for paying customers.

Ryan Cabral

Ryan was in charge of design on Microsoft's adaptive keyboard.

He's a recent UAT grad in Game Art and Animation. He plans to either go for a master's degree or find a job. One thing is for sure, though, he plans to sharpen his skills no matter what's next for him.

Zak Robinson

Zak handled the presentation and some backend programming on the adaptive keyboard. He's a recent grad who was a Virtual Modeling and Design major. He's working on a few projects for his portfolio and is looking for work.

Doug Shannon

Doug handled C# programming on the adaptive keyboard. He's in his last semester at UAT and is majoring in Advancing Computer Science. He'll finish out his time at UAT in his home state of Ohio, where he has a few job opportunities.



UAT DEVELOPS GAMES FOR

DoD

COMMISSIONED BY THE DoD:

Shelley Keating, UAT Network Security/ Network Technology Professor, worked to help the University obtain its Center of Academic Excellence in Information Assurance Education designation from the National Security Agency.

This designation assured the Department of Defense (DoD) that UAT was a highly capable and reliable technology security partner.

As Professor Keating recalls, "When they heard we were really good at games, they said: 'we can use you to do some really cool stuff'. That's how the whole development agreement came about."



WHEN GAMING IS MORE THAN JUST PLAY:

In creating both *Social Minor* and *Cyber Hero* for the U.S. Department of Defense (DoD), Professors Shelley Keating and Dave Wessman definitely had a hands-off approach in mind. "From the start, we assumed the role of high level managers," says Keating, "allowing the students to really take charge of these projects and use their own skills and abilities to move them forward."

For UAT students, this meant an exceptionally rich internship experience. "Most companies hire interns to do grunt work," says Wessman. "They are supposed to learn just by being in the environment, even if all they are doing is stapling. Well, our students get to learn by doing, and that's a much better bet."

In the case of *Cyber Hero*, UAT students are not that far removed in age from the target audience. Their own perspective proved to be invaluable in relating back to how they thought and felt in junior high school and what games appealed to them then.

"It was a great educational opportunity to help young people understand that defense in the future means securing our networks," says student Christopher Salat.

In the case of *Social Minor*, the students researched actual information security breakdowns caused by social media in order to design the game as realistically as possible. In one incident they turned up, the wife of a high ranking British Intelligence officer had posted photos from a barbecue on Facebook, in which numerous agents were shown, subsequently blowing their covers.

"IT WAS GREAT GETTING DOWN TO THE NUTS AND BOLTS OF REAL WORLD EXPERIENCE," notes student Kayla Harris.

Understanding the key role students are playing in these projects, the DoD allowed them to take full credit for their contribution to the projects on their resumes. As Wessman observes, "when these students graduate and go job hunting, potential employers will be looking closely at their portfolios and these make very compelling pieces."

SOCIAL MINOR: GET SMART ABOUT WHAT YOU POST.

BACKGROUND

The explosion in social media has produced numerous new ways for people to connect and share information about themselves, their businesses and their lives. At the same time, all these new channels of information sharing pose a serious threat to national security by providing so many ways for sensitive information to be unwittingly leaked into unfriendly hands. So, people need to get smarter about what they post.

THE GAMING DYNAMIC

Nobody likes to be scolded into submission. To succeed in engaging government employees and their families, *Social Minor* had to be designed as a positive experience that users could grow into. Also, people love their Facebook, Twitter and other social media. The game had to show them how to use these safely without threatening their ability to enjoy social media.

To achieve this, a two-player buddy system was devised in which players edit one another's social media to identify areas of risk and make their buddies more aware of information assurance issues.



UAT DEVELOPS GAMES FOR

DoD

TEAM DoD:

STEPHEN FAILLA

Major: Digital Animation

STEVE GANNON

Major: Game Programming

LEVI GERMAN

Major: Multimedia

SHAWN GEARY

Major: Digital Video

KAYLA HARRIS

Major: Enterprise Software Development

CHANTEL NICHOLS

Major: Game Programming

ISIAH SMITH

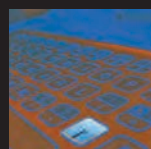
Major: Network Security

TROY TULLEY

Major: Game Design

BRITTANY WILKERSON

Major: Network Security



SOCIAL MINER

To motivate players to advance in their information assurance awareness, *Social Minor* is divided into three levels based on the player's ability. As you will no doubt recognize, each is based on an actual social media application people are already using:

- > Level one: Face Space
- > Level two: Quacker
- > Level three: Linked Up

With each level, the difficulty in indentifying problematic information increases so that users have to become more and more sensitized to vulnerable information and how it is being shared in order to advance.

CYBER HERO: RECRUITING GEEKS TO GOVERNMENT.

BACKGROUND

A major emerging need has been identified for network security and information assurance specialists in the public sector, including the military and all segments of the federal government. At the same time, DoD research has found that the decision to enter into government service is typically made before students reach high school. A gaming solution presented the ideal tool for reaching out to junior high school students interested in the field of technology. Future initiatives will be aimed at even younger students.

THE GAMING DYNAMIC

Every kid, or kid at heart, wants to be a hero. That's the essence of every role play game. It lets the player envision themselves as that hero, defender or savior who is making the ultimate difference. *Cyber Hero* is designed to capture the imagination of the next geek generation and steer them towards a real-world challenge, which is securing the information systems of the U.S. government.

WHERE ARE THEY NOW?

MATTHEW DUMOUCHEL - *GoDaddy.com*

ANDREW DYKSTERHOUSE - *LifeLine Studios*

AUBREY ELTING - *Avnet*

ANDREW PFEIFFER - *Factory 38*

JORDON SARGENT - *National Security Corporation*

DAVID GOLDSMITH - *NETtime Solutions*

ZACHARY WATSON - *THQ Digital Studios*



STUDENT PROJECT MOVIE MAGIC

RETRO RAY GUNS IN 3D



PARTICIPANTS

UAT students get a hands-on approach to learning about technology, business and Hollywood.

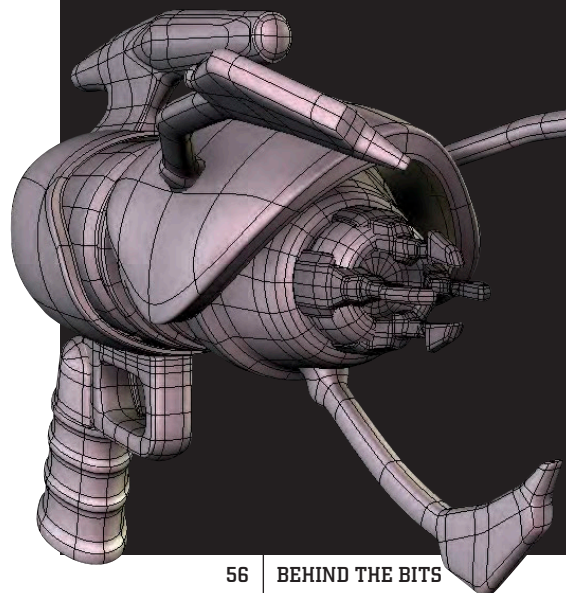
FLIGHT of the MELVIN
3D TEAM

BLAKE BJERKE
3D Modeling

NIC BREIDINGER
Electronics

MATTHEW DEJESUS
Design

MONICA THIES
Project Manager, VFX



OVERVIEW

The Flight of the Melvin is a fantastical movie, the type that benefits from over-the-top props like a ray gun.

That's just what a team of students at UAT got a chance to create, with the help of Professor Paul DeNigris. He's a filmmaker with a long track record of well-respected short films. He's even worked with A-listers like comedian Bill Engvall and actor Danny Trejo (the go-to guy whenever Hollywood directors need a tough-looking Mexican).

UAT students have worked with DeNigris to make props for a long time. But that has gotten a lot easier since UAT got its first Dimension uPrint Personal 3D Printer a few semesters ago.

3D printers essentially squirt out goo, layer by layer, until it forms a solid 3D replica of an image you have the machine copy. For DeNigris' students, that goo has been turning into 3D movie props.

HISTORY

First up for the 3D printer was DeNigris' short movie, *Fallout*. His students made a 3D memory-extraction helmet for that movie.

"We were spending so much time on the digital backgrounds and the environments to give the actors something tactile, something that looked like it really came out of this imaginary future we were creating," says DeNigris. "We realized that there was this really cool opportunity to use the 3D printer to make something truly unique."

But one movie, one 3D prop wasn't enough for DeNigris. And, besides, new UAT students are always walking through his door looking for unique opportunities to use and play with technology.

"Having successfully created something iconic and cool for *Fallout*, we thought we'd do it again for a new film, *Flight of the Melvin*," says professor DeNigris. "It's definitely got fantastical elements to it. It's about a 14-year-old space geek in the late 1960s who escapes doing his chores by building a jetpack and flying away."

The 3D prop for a 1960s-style futuristic movie? A ray gun, of course.

"It's not a phaser, it's not a blaster, it's a ray gun," says DeNigris. "We decided to pay homage to cheesy sci-fi movies. Our aliens have bumps on their heads, pointy ears and they're wearing silver jumpsuits."

DETAILS

Although there was plenty of work involved in creating 3D props for *Flight of the Melvin*, and lots of hours put into it, the 3D printer makes doing that type of work incredibly easier than if students had to make handmade props.

With 3D software like Autodesk 3ds Max and Autodesk Maya, pretty much anyone at UAT can print out 3D images. Printers like the Dimension uPrint make it easy. They essentially spit out material—usually paper, but 3D printers can print in other materials, too, like glass. The printers squirt out liquid layer by layer until it creates a solid 3D image.

While UAT students created a 3D ray gun for a fictional kid in a jetpack, professor DeNigris' projects have real-world implications. A lot of companies are using 3D printers now to cut down on the cost and time it takes to create prototypes.

In fact, 3D printers are also known as rapid prototypers. They are fairly inexpensive. And they're small enough to easily fit into an office.

STUDENT PROJECT MOVIE MAGIC

RETRO RAY GUNS IN 3D



Where some companies in the past had to make prototypes out of wood or plastic or paper by hand, sometimes with a team of employees working for days or weeks, now one person can throw a design into a 3D printer. They can test the prototype, fix it and try doing it again, inexpensively.

These printers are also being used in design studios and by movie directors.

CHALLENGES

The first major step in creating the 3D ray gun was the concept, which was handled by Matthew DeJesus, a recent grad who majored in Game Art and Animation. He took his inspiration for the ray gun from the 1960s and from movies like *The Day the Earth Stood Still*.

"I incorporated those elements into the ray gun and the alien spaceship," says DeJesus. "I tried to capture that style using old technology from the 1960s."

Blake Bjerke, who's majoring in Game Art and Animation, took DeJesus' concept one step further. He used 3ds software to create the ray gun on the 3D printer.

"I took Matt's concept and modeled individual pieces for each part," says Bjerke. "The modeling took about 4 to 6 hours. The whole printing process took about a week."

The final step in making the 3D ray gun was Nic Breidinger's. He was first approached about getting involved in "Melvin" by project manager Monica Thies.

"I took the ray gun and basically hollowed it out," says Breidinger. "I wired it up, put batteries in it and stuck a trigger on it."

The ray gun shoots a blue light.

SUCCESSSES

The 3D printer projects point out one of the best things about UAT. Everyone from the programming side to the animation side gets to work together on really cool projects. In a way, it's just like working for the Hollywood studios, where everyone on a movie set works together to create something great.

"One of the greatest things for my students and me is that we get to exercise our imaginations and create these really wild things," says professor DeNigris. "Something like a 3D printer is part of our arsenal like a camera or one of our lights. It's part of what we have here that makes the Digital Video degree something really unique."

THE FUTURE

UAT's 3D printer isn't getting dusty. Just the opposite—it has been getting a workout from professor DeNigris and new students.

In fact, DeNigris, who is planning to start shooting a drama about the Iraq War in early 2011, recently made an incredibly detailed, amazing replica of a gun used in the sci-fi classic, *Blade Runner*.

WHERE ARE THEY NOW?

BLAKE BJERKE

Blake, who worked on modeling and CG animation on "Melvin," is graduating in 2011 with a degree in Game Art and Animation, with a focus on 3D gaming. He's hoping to become an environmental artist.

NIC BREIDINGER

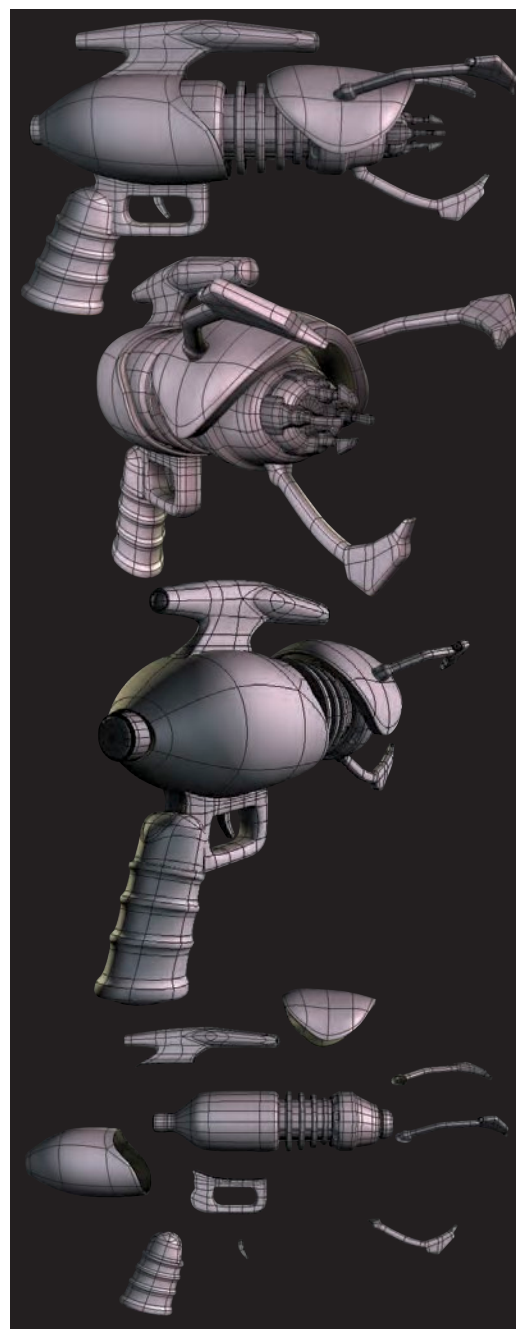
Nic is a double major in Robotics and Embedded Systems and Artificial Life Programming. He's planning to graduate in April 2011. He may go for a master's degree. Until he decides, Nic is working on projects for his portfolio.

MATTHEW DEJESUS

Matt handled the concept art and matte painting on the "Melvin" ray gun. He graduated in 2010 with a degree in Game Art and Animation. He's freelancing for several companies as a graphic designer and a Web developer.

MONICA THIES

Monica is finishing up her final semester as a Network Security major. But, she's not done with UAT just yet. She's hoping to finish a second degree in Virtual Modeling and Design. After that, she'll either head home to Seattle or to L.A. in search of a VFX job.



TOMORROW'S TECH TODAY

At UAT, students get **intense** hands-on **experience** crafting next-generation technology that will **revolutionize** business, communications, entertainment, forensics, **gaming**, the Internet, robotics, social media and **national security** for generations to come.

Get a glimpse of that **future** with these **Student Innovation Projects** in development at UAT right now.

INNOVATING THE FUTURE

BREAKING NEWS ON UAT STUDENT PROJECTS IN TECHNOLOGY FORENSICS THAT ARE INNOVATING TECHNOLOGY.

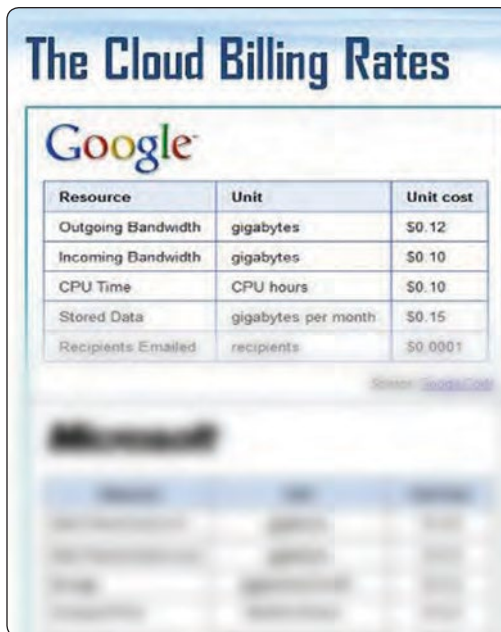
Technology Forensics

INNOVATING THE FUTURE

BREAKING NEWS ON UAT STUDENT PROJECTS IN WEB AND SOCIAL MEDIA TECHNOLOGIES THAT ARE INNOVATING TECHNOLOGY.

Web and Social Media Technologies

The Cloud Billing Rates



Resource	Unit	Unit cost
Outgoing Bandwidth	gigabytes	\$0.12
Incoming Bandwidth	gigabytes	\$0.10
CPU Time	CPU hours	\$0.10
Stored Data	gigabytes per month	\$0.15
Recipients Emailed	recipients	\$0.0001

CLOUD COMPUTING IN Digital Forensics

Ask an expert about jobs of the future and they'll definitely bring up Cloud Computing, which allows government agencies and corporations to store and access vast amounts of data from locations and servers scattered around the globe.

That's why Cloud Computing got the attention of **Thor Ollila**, a Technology Forensics major at UAT.

Technology Forensics prepares students to work as digital forensics specialists in partnership with government security agencies, law enforcement agencies and global corporations to uncover and protect against digital crimes.

The Project

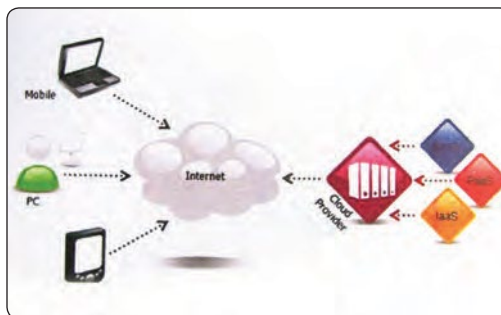
Thor's Student Innovation Project is Cloud Computing in Digital Forensics. It's designed to see if digital forensics investigators can save money and improve efficiency by having a forensics lab function in the Cloud, instead of building a brick-and-mortar lab.

Thor is going about studying costs of buying and operating a technology forensics lab versus having it handled in the Cloud, then comparing the costs and quality of service of Cloud providers like Amazon, Microsoft, Terremark, BlueLock and Hosting.com.

Thor is already tackling this project, including working on a virtualized Cloud server. So far, Thor is finding that Cloud Computing can be functional for digital forensics specialists, saving time and increasing efficiency, but not for large-scale projects.

The Next Phase of Student Innovation

Thor is actively working at UAT on this Cloud Computing in Digital Forensics project, including conducting research and proposing to develop a virtual software system to simulate a Cloud Computing system for Technology Forensics.



VISUAL Mad-Libs

It's more important than ever for students to get hands-on experience creating next-generation technology when companies like Google are hiring thousands of employees, but only the most talented people in a wide variety of tech fields.

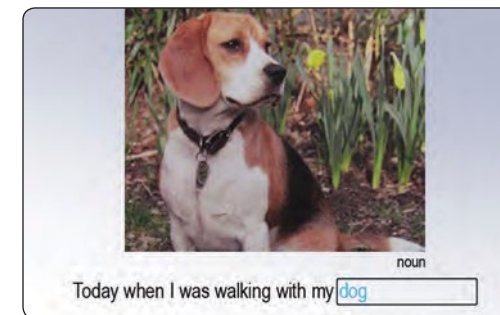
That's just what **Brandon Jacobs** is getting: intense, hands-on experience as he works on Visual Mad-Libs, his Student Innovation Project at UAT.

Brandon is a Web and Social Media Technologies major, which prepares students for careers where they design technology and systems for humans to communicate with computers through any means, including text, graphics, sound and touch.

The Project

Brandon's project is designed to allow people to easily find photos and other images on their computers. It's similar to Google's Image Search, where people type in logical descriptions to find images online.

Brandon's system utilizes the same idea. But, with mad-libs, people type in whatever words pop into their head, often something funny, to see what they find. He is designing a user interface that searches for images and then displays them.



The Next Phase of Student Innovation

Brandon's Visual Mad-Libs has several next steps. Among these is developing his Visual Mad-Libs to run in a browser and to create a user interface that is visually appealing and easy to use. He also plans to create a function that allows users of his Visual Mad-Libs to save and share those images.

INNOVATING THE FUTURE

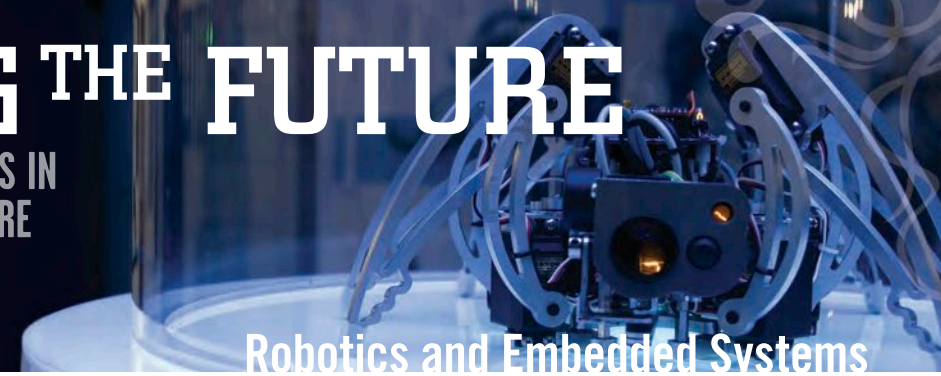
BREAKING NEWS ON UAT STUDENT PROJECTS IN NETWORK SECURITY THAT ARE INNOVATING TECHNOLOGY.



Network Security

INNOVATING THE FUTURE

BREAKING NEWS ON UAT STUDENT PROJECTS IN ROBOTICS AND EMBEDDED SYSTEMS THAT ARE INNOVATING TECHNOLOGY.



Robotics and Embedded Systems



NETWORK SECURITY Free Online Training

The world is a dangerous place, and these days that includes digital crimes that can bring international corporations and governmental agencies to their knees.

With countless amounts of data saved onto computer systems and the Cloud and Intranet systems, **Michael McCullough** is setting out to secure that data. He's majoring in Network Security at UAT, where governmental agencies and Fortune 500 companies regularly recruit students to secure their systems.

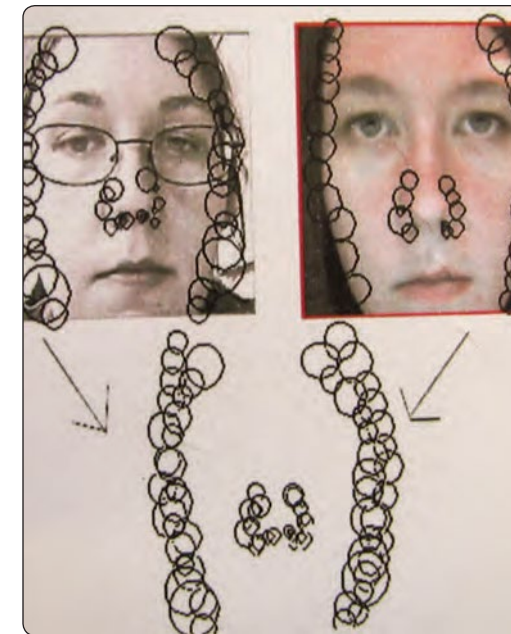
Michael is working on a Student Innovation Project that's designed to help smaller companies that cannot afford expensive security systems and the teams of security personnel needed to run them.

The Project

Michael plans to create an open-source system where site visitors can share information on securing systems, including training on using these systems and advice on best practices and security products to buy. This open-source site will provide timely, continually updated information about network security, for free.

The Next Phase of Student Innovation

Michael's next step for his UAT Student Innovation Project is to conduct interviews with companies that would benefit from having free network security training and advice online. He plans to learn first-hand from companies about the types of network security they need, in order to design the most useful and most effective open-source system.



FACE RECOGNITION Door Greeter

It sometimes takes complex computer systems and mathematical algorithms to develop the most commonsense products.

In the case of a face recognition door greeter that **Brittany Wilkerson** is developing, it could save vast amounts of money for companies and homeowners. It will provide peace of mind, and it can save lives.

Brittany is majoring in Robotics and Embedded Systems at UAT, where she's working on a Student Innovation Project that uses face-detection technology that's accessible to most companies and homeowners.

The Project

Brittany's Student Innovation Project is a Face Recognition Door Greeter, which uses face-detection and object-recognition technology to identify a person at your front door as someone you know or as a stranger.

The system is further designed to greet that person with one of a variety of automated greetings, sometimes humorous greetings for people you know. A general greeting would be used for strangers.

The system offers security for companies, government agencies and homeowners. It's a fun product, but an important one that's designed with easily accessible and affordable hardware.

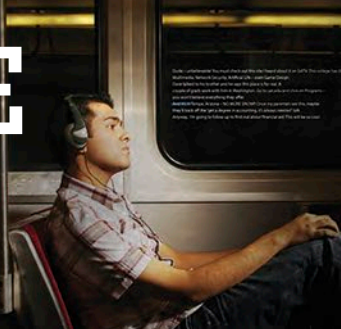


The Next Phase of Student Innovation

As Brittany works on her Student Innovation Project at UAT, she plans to develop it into a more sophisticated door greeter, including randomized greetings, and possibly functions that will allow it to be incorporated into highly sophisticated property security systems.

INNOVATING THE FUTURE

BREAKING NEWS ON UAT STUDENT PROJECTS IN DIGITAL VIDEO THAT ARE INNOVATING TECHNOLOGY.



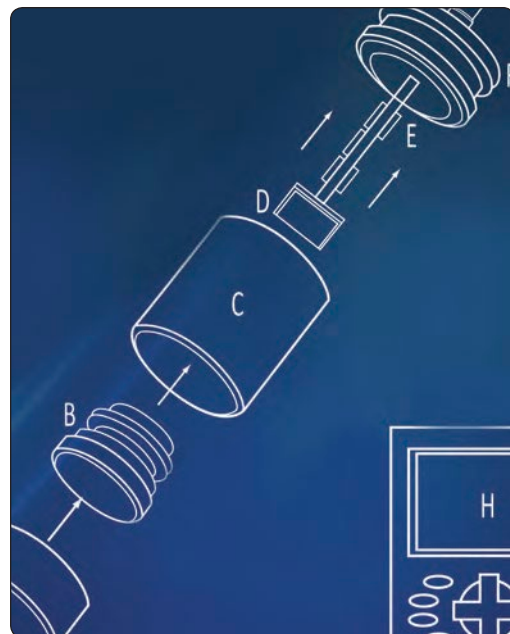
Digital Video

INNOVATING THE FUTURE

BREAKING NEWS ON UAT STUDENT PROJECTS IN NETWORK SECURITY THAT ARE INNOVATING TECHNOLOGY.



Network Security



MOUNTABLE HD INFRARED Night-Vision Camera

When filmmakers, TV show creators, video content producers and mobile device creators produce content that's entertaining, informative and groundbreaking in its use of technology, they do it as part of a team.

Teams with members from a variety of backgrounds are critical to creating content for the Internet, newer platforms like tablet PCs and smartphones, and in the future an explosion of devices that can only be imagined.

That is how Digital Video majors **Nick Wassenberg** and **Mitchell Faherty** are approaching their Student Innovation Project at UAT as a team.

The Project

Nick and Mitchell have been working on a next-generation night-vision camera. The concept is to push night-vision technology to its next level, while making the camera more useable for filmmakers and everyday users.

Their Mountable High Definition Infrared Night-Vision Helmet Camera will be the first HD helmet cam with infrared night-vision technology.

Their vision for the camera is to mount it onto helmets to film HD scenes in the dark from the perspective of an athlete in action, who will have a portable LCD screen to watch the action as it's being filmed.

The Next Phase of Student Innovation

Nick and Mitchell envision their HD helmet camera being the first step toward creating an online community of filmmakers. Their next step will be to design a website where users of their high-tech night-vision camera can post videos and comment on the site's forum.



BIOMETRIC PROTECTED USB Flash Drive

Sometimes the most important data is the easiest to lose. Just think about all the information you have stored on flash drives—the small thumb-sized storage devices that get plugged into a computer's USB port.

Students save countless amounts of data on flash drives, while families save photos and documents, and executives from corporations around the world store important, and sometimes critical data on these devices for easy transport.

Flash drives are small, so they're convenient. But that small size also means it's easy to lose a flash drive, and all the data that is stored on it. That is what **Daryle Walters** has in mind as he develops a flash drive for his Student Innovation Project at UAT.

Daryle's biometric flash drive utilizes next-generation technology to ensure the highest level of protection.

The Project

Daryle, a Network Security major at UAT, is developing a highly secure USB flash drive that ratchets up the security on a vulnerable device. His Biometric Protected USB Flash Drive includes a small fingerprint reader.

The only people who can access the data on the flash drive are those whose fingerprints it recognizes.

The Next Phase of Student Innovation

Daryle is continuing to develop his Biometric Protected USB Flash Drive, with next steps including adding more security features to it.



INNOVATING THE FUTURE

BREAKING NEWS ON UAT STUDENT PROJECTS IN ADVANCING COMPUTER SCIENCE THAT ARE INNOVATING TECHNOLOGY.

Advancing Computer Science

INNOVATING THE FUTURE

BREAKING NEWS ON UAT STUDENT PROJECTS IN NETWORK SECURITY THAT ARE INNOVATING TECHNOLOGY.

Network Security



GIFT CARD Heaven

Millions of people around the world toss gift cards into the trash. These gift cards, drained of their financial value, will eventually end up in landfills where they could remain for thousands of years.

The potential for toxins to pollute the earth from these gift cards is overwhelming. But **Andrew Arnold** and **Melissa Reese**, students at UAT, are working on a Student Innovation Project that will mitigate this danger.

They are giving people an incentive to recycle gift cards, rather than throw them away.

Andrew is majoring in Advancing Computer Science, which prepares students to create software programs for systems that run on a multitude of electronic devices. Melissa is majoring in Virtual Modeling and Design, which focuses on animation technology that's used by companies in virtually every business sector.

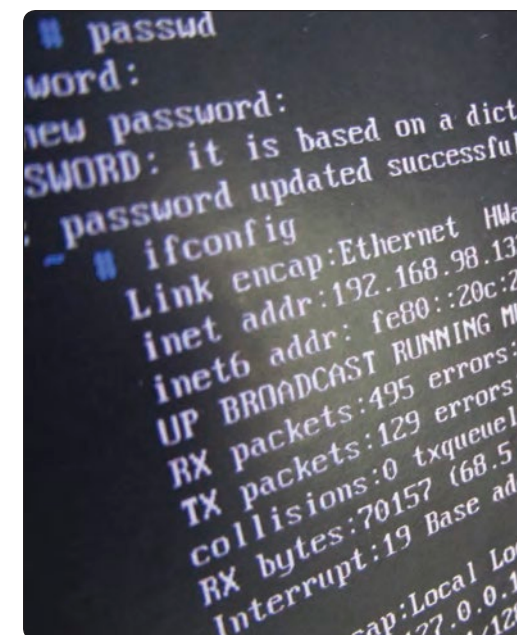
The Project

Andrew and Melissa are working in partnership with Earthworks, an organization that can strip gift cards of their magnetic material for easier recycling. People will be encouraged to recycle their gift cards by participating in an online system, where they can redeem their valueless cards for products given away by advertisers.

The Next Phase of Student Innovation

Andrew and Melissa envision automating this gift card recycling system. That will minimize the time and expense of hiring people to handle the redemption of gift cards and mailing out the item or product they receive in exchange for the card.

```
if ($?) {
    $count = 0
    $users = @mysql_query("SELECT uid FROM raffishartier die('error: mysql',
    $num_rows = mysql_num_rows($users)
    $id = rand(0, $num_rows)
    $winner = @mysql_query("SELECT * FROM raffishartier WHERE uid = '$id'")
    $winner = @mysql_fetch_array($winner)
    $winnerEmail = $winner['email']
    $to = $winnerEmail
    $subject = "You've Won!"
    $message = "You have won this week's giveaway prize on GiftcardHeaven.com.
    another winner. To claim your prize,
    reply to this email with your mailing address. We will send a random
    product to your address."
}
```



DYNAMIC Network Setup

When it comes to working across multiple operating systems, there are many challenges, maybe none more so than the time-consuming process of synchronizing multiple OSs for system and data updates.

Daniel Chun, a Network Security major at UAT, is working on a Student Innovation Project that will automate the installation and configuration of various operating systems and services in a network.

Without automation, this can be a tedious task. For example, anyone new to Linux would have a very difficult, if not impossible, challenge to install Gentoo, let alone trying to configure the network infrastructure.

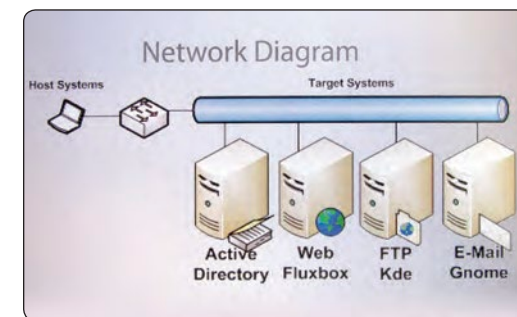
The Project

To install the operating system utilizing Daniel's application, the user initially needs to boot the target system using any Linux Live CD and start the SSH daemon so a connection can be established.

Once the connection is established, the file system will be built and the Linux Kernel uploaded to the system. The application is designed with multithreading support, which allows the program to simultaneously target each system with its unique configuration.

The Next Phase of Student Innovation

As development continues, Daniel will expand on his application by creating a tool to remotely manage multiple Linux systems. Other potential uses of the application are to synchronize updates and firewall rules.



INNOVATING THE FUTURE

BREAKING NEWS ON UAT STUDENT PROJECTS IN GAME DESIGN THAT ARE INNOVATING TECHNOLOGY.



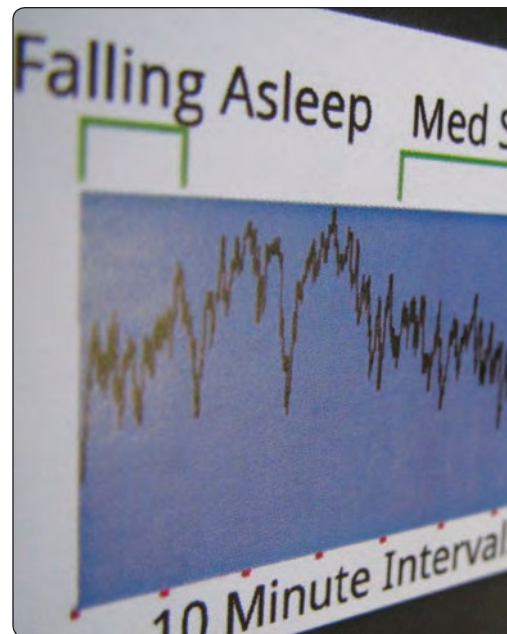
Game Design

INNOVATING THE FUTURE

BREAKING NEWS ON UAT STUDENT PROJECTS IN ENTERPRISE SOFTWARE DEVELOPMENT THAT ARE INNOVATING TECHNOLOGY.



Enterprise Software Development



SLEEP Sense

Is there anything more jarring than suddenly waking up to the shocking screech of an alarm clock? With blaring alarms, people often wake up tired and irritated, which affects their whole day. It doesn't need to be this way.

Brendan Erquiaga, who is majoring in Game Design at the UAT, is working on a Student Innovation Project that will gently wake people up by monitoring their sleep patterns. The alarm won't go off when a person is deeply sleeping. Instead, it will wake them when they are coming out of the deep-sleep phase.

The Project

Brendan is creating Sleep Sense, an application that gives people control over their daily schedules. The alarm system consists of a master list of unique, customizable alarms, either temporary, cyclic or by appointment.

Central to this application is sleep tracking, which is used to help adjust the user's waking alarm. The alarm adjustment smoothly transitions a user from light sleep phases into full consciousness.

The sleep tracking function consists of two data collection techniques, which are combined for alarm adjustment: accelerometer tracking for cheap, effective and noninvasive monitoring, and a sleep diary for unobtrusive data validation.

The Next Phase of Student Innovation

Brendan plans to eventually include in his Sleep Sense application a number of additional useful features, such as online sleeping profiles, destination aware alarms and calendar-synchronizing appointments.



SIGHT AND SOUND Learning: Korean

The U.S. Defense Language Institute classifies Korean as a Category IV language, which means it takes the average English-speaker three times the study time to develop a limited working level of proficiency, compared to Romance languages such as Spanish and Italian.

Other category IV languages include Arabic, Japanese and Chinese.

Kayla Harris, an Enterprise Software Development major at UAT, is working on a Student Innovation Project that will make Korean dramatically easier to learn than with typical teaching tools.

The Project

Kayla's goal is to develop an application that could make learning Korean easy, fun and inexpensive. She wants the application to incorporate the senses of both sight and sound, so that memory, pronunciation, recognition of writing and understanding of meanings will be optimized.

She is developing lesson plans with both visuals and audio components. She even includes games that allow students to test their skills while reinforcing learning.



The Next Phase of Student Innovation

Kayla plans to improve the user interface of her application to make it easier to use and learning more effective and efficient. She would like to adapt the application to the teaching of other languages as well.

INNOVATING THE FUTURE

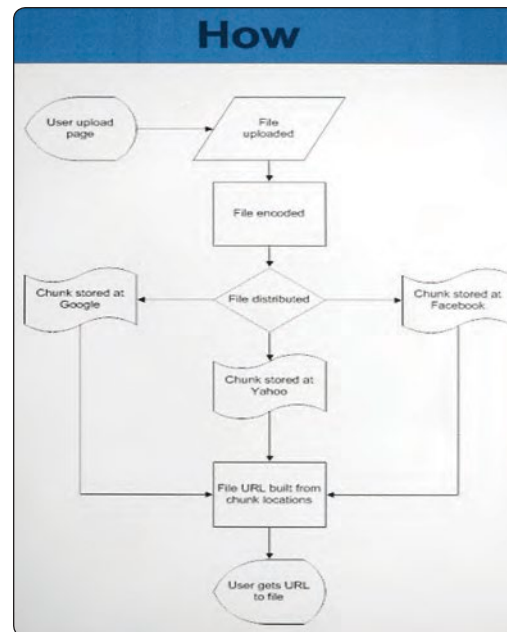
BREAKING NEWS ON UAT STUDENT PROJECTS IN GAME PROGRAMMING THAT ARE INNOVATING TECHNOLOGY.

Game Programming

INNOVATING THE FUTURE

BREAKING NEWS ON UAT STUDENT PROJECTS IN ROBOTICS AND EMBEDDED SYSTEMS THAT ARE INNOVATING TECHNOLOGY.

Robotics and Embedded Systems



WEB SERVICES AS Distributed File Hosts

A Distributed File System (DFS) is a system of putting files into logical locations, even if those locations don't match where the files actually reside. It allows for smoother storage expansion and load balancing.

Bryan Clark, a Game Programming major at the UAT, is utilizing this complex technology for his Student Innovation Project where users can upload files to hosting services and then later retrieve those files.

The Project

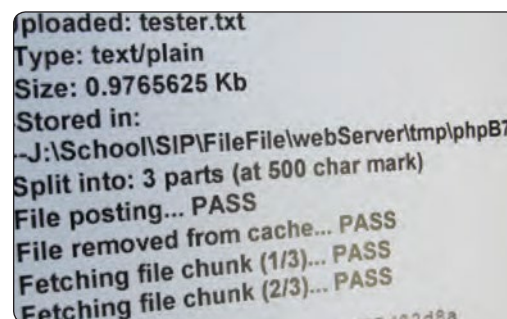
Bryan's project is the development of a system that allows a user to upload a file to a hosting service, with the ability to retrieve the file at any time without a charge.

Here's how it works. The file hosting software takes an uploaded file and encodes it into plain text. The encoded file is then broken into chunks and distributed across the Internet. Portions of the uploaded file may be stored at Google, Facebook and Yahoo, for example.

Bryan's program then assembles a location identifying URL for all the pieces of the uploaded file, so it can eventually be retrieved as a complete file.

The Next Phase of Student Innovation

Expanding the storage resources is Bryan's first goal for future development of his Web Services as Distributed File Hosts project. After that, he plans to collect performance statistics, polish the user interface and build a user-friendly API. At that point, he'll have his program ready for public release.



FIRE Protect

When it comes to the most important technological tools and devices, there are damaging elements like water, ice and fire that cause irreparable harm, but that users often cannot easily protect their devices from.

Heat and fire are particularly threatening because in some industries, heat and fire are critical to getting the job done, such as in manufacturing and mining.

Manuel Barberena, a Robotics and Embedded Software major at UAT, is working on a Student Innovation Project that's designed specifically to protect computers, smartphones and other digital devices from heat and fire.

The Project

Manuel is setting out to develop a next-generation product that can protect services, property and lives from fire and extreme heat. His goal is to develop a lightweight product that can withstand and dissipate heat up to 2500° F—that's enough to protect your hand from the flame of a blowtorch.



The Next Phase of Student Innovation

Manuel's cutting-edge material is an exciting advance that will allow people, corporations and the government to protect important information in hot environments. But, before he completes this project, Manuel intends to improve upon his design and the materials themselves, and he will conduct research studies to find more uses for the product.

INNOVATING THE FUTURE

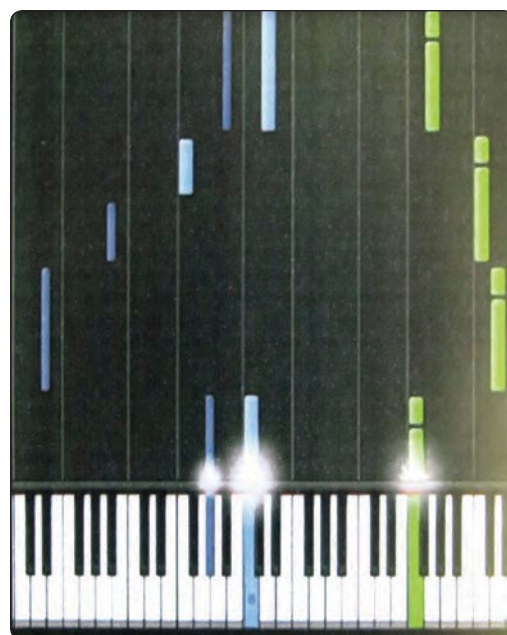
BREAKING NEWS ON UAT STUDENT PROJECTS
IN GAME PROGRAMMING THAT ARE
INNOVATING TECHNOLOGY.

Game Programming

INNOVATING THE FUTURE

BREAKING NEWS ON UAT STUDENT PROJECTS
IN ADVANCING COMPUTER SCIENCE THAT ARE
INNOVATING TECHNOLOGY.

Advancing Computer Science



LINDENMAYER Compression Program

The Lindenmayer System is a parallel rewriting system, first used by Hungarian theoretical biologist and botanist Aristid Lindenmayer, that can be used to model the form and structure of a variety of organisms and generate duplicating fractals.

William Miller, a Game Programming major at the UAT, is working on a Student Innovation Project that breaks music down into a Lindenmayer system to procedurally generate the original piece of music.

The Project

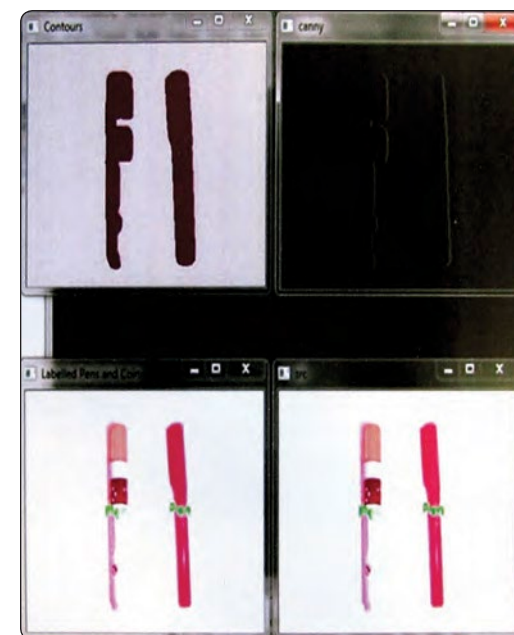
William's code uses Lindenmayer Systems to form a set of rules so that an entire song can be generated from just a few notes.

William is using the MIDI (Musical Instrument Digital Interface) electronic protocol in his project. Unlike analog devices, MIDI sends event messages about the various musical components, such as volume and pitch, which made it easy for his code to manipulate the music.



The Next Phase of Student Innovation

William is confident that this code can be improved and made to function much better as a form of compression. He also thinks that his code could be applied to Artificial Intelligence. By using the pattern recognition of a musician's input, code could be generated that would predict the musician's next move, so that the Artificial Intelligence could assemble the remainder of the musical piece.



INSTANT OBJECT Recognition and Storage

Edwin Powell Hubble, the American astronomer who profoundly changed our understanding of the universe by demonstrating the existence of galaxies other than our own, and after whom the Hubble Space Telescope is named, once said:

"Equipped with his five senses, man explores the universe around him and calls the adventure Science."

That quote has inspired **Max Markowitz**, an Advancing Computer Science major at UAT. He is working on a Student Innovation Project where images will be recognized, based on a visual reference library of stored images.

The Project

Max was struck by the fact that today's technological quest to create Artificial Intelligence systems seemed to focus on the brain, not the eyes. Even though mankind has always used its eyes to discover and recognize objects around us.



Max's system recognizes similar, even complex shapes. But he has not yet implemented the library of object images where the system will compare and identify an unknown object.

The Next Phase of Student Innovation

Eventually, Max hopes to have a storage environment where the program can select one or more databases and utilize stored object data to recognize an object through a camera lens.

Max's plans for the project's full build-out include implementing the database of images, making the database modular and developing the complete documentation for the system.



info

2625 W. Baseline Rd. > Tempe, AZ 85283

Phone 877.UAT.GEEK > Fax 602.383.8222

877.828.4335

www.uat.edu