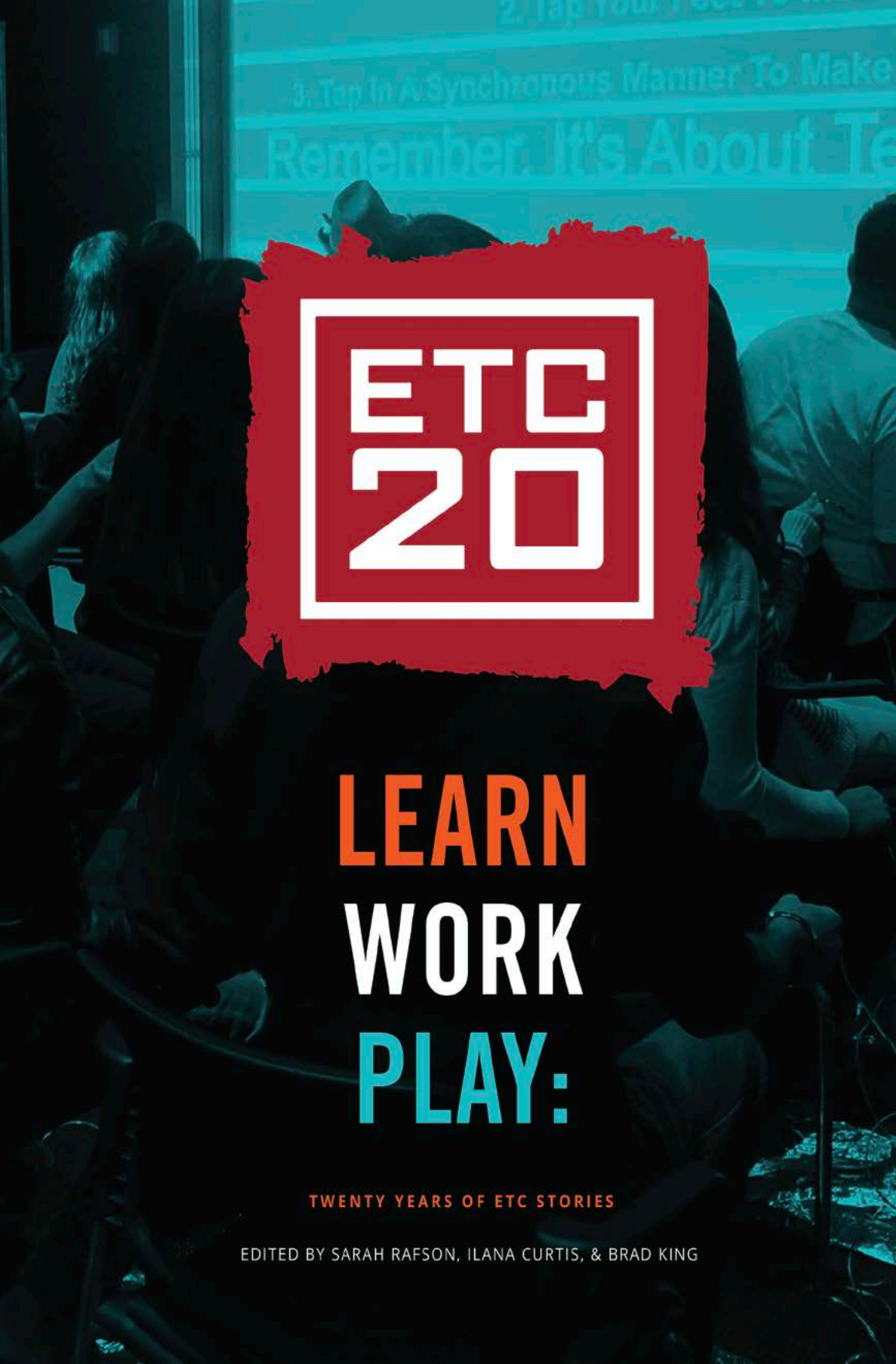

LEARN WORK PLAY:

TWENTY YEARS OF ETC STORIES

EDITED BY SARAH RAFSON, ILANA CURTIS, & BRAD KING

Learn Work Play

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Twenty Years of ETC Stories

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Carnegie Mellon University: ETC Press
Pittsburgh, PA

ISBN: 978-0-359-98411-4 (Print)
ISBN: 978-1-79474-753-1 (Digital)

Cover design by Heidi Bartlett

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BRENDA BAKKER HARGER

I was working on an interactive theater project with live theater and an improv component through Human Resources that was proving to be effective and successful. Around the same time, Don Marinelli, Mike Christel, Alex Hauptmann and Scott Stevens were working on Synthetic Interview.[1] I ran into Don, who I knew from the drama department. I hadn't seen him in the years since I graduated, but I told him that we should see if interactive theater might work with that project as well. We brought that idea to the provost, who gave us a seed money—that was how CMU works at the time. So, we started to explore ways that we might work together on that project. And it was Raj Reddy's idea to capitalize on CMU's strengths of CS and the Arts that began the exploration for the ETC, a year before Randy was hired.

That collaboration would eventually lead to another serendipitous interaction. One day I was editing a video project I'd been working on and Don wandered in. He started talking about this new thing called the Entertainment Technology Center (ETC). Randy Pausch had already been teaching a wildly popular class called Building Virtual

1. Synthetic Interview technology is essentially a system for parsing queries and returning pre-recorded video responses. This technology allows an individual to have a conversation with a character or persona as if that person were present in real-time. The Synthetic Interview Studio is housed at the ETC.

Worlds (BVW) on the main campus. The two of them had the idea to take the principles of that class and start a graduate program with BVW at the center of the experience. That would then lead students into larger, semester-long projects that would unleashed the same type of creativity.

"That's sounds really cool," I said.

What got me really excited was that Don and Randy wanted to offer improvisational acting as part of the ETC's core curriculum. They'd made that decision after talking with Ed Catmull, who was the head of Pixar at the time. He told them that improv would be his first choice as a class if they wanted to establish a curriculum for interdisciplinary work.

That excited me. This was going to be an interdisciplinary program that took improv seriously as a part of the core curriculum. I believe in improv. Improv addresses a wide range of issues and having those abilities under your belt can give you a set of tools to tackle a wide range of problems that emerge in collaboration—especially when it is interdisciplinary. There is so much that you can explore metaphorically by understanding the world of theater and improv and art.

I started teaching in the second semester. In my first class I told my eight students that while I knew what I was doing with improv, I had no idea how it related to what they were doing. I just promised them that we were going to figure it out together.

As you can imagine, some students were—and are—nervous. What I've learned throughout the years is to let each student figure out how

they wanted to participate. The other thing I've learned is that more often than not each of the students will eventually give it a try.

That first year I had one student who was just terrified. He sat in the corner. Every so often he would muster up the courage to contribute something, but you could tell it was killing him. I felt badly about that for most of the semester. At the end of the class, I talked to him about his discomfort and complimented him on persevering.

"This is the best class I've ever taken," he said."

I was shocked but that taught me another valuable lesson. I learned not to judge the process, but instead allow the process to reveal itself to each student, which is very improvisatory.

Improv really allows you to focus on solving problems without worrying so much about the outcome. You allow yourself to be surprised. You allow yourself to enjoy the collaboration happening in real time with other players. That was a new way of looking at problem solving for most of our ETC students. Even if they had improv before, anytime you improvise with a new group it's a new experience.

Improvisational Acting is just one component of the initial ETC experience, but our creative boot camp is the foundation for how the ETC really works. And what makes the class—and the boot camp—work is how all four of those initial classes intertwine.

Fundamentals of Entertainment Technology is an introduction to everything related to entertainment computing: games, theme parks, critical analysis, aesthetics. This is a survey of the landscape of all the

work our students may go on to do and all of the places where the various fields are expanding.

But they also get very practical skills, such as how to pitch a project or how to build a portfolio. This is really a course that teaches you everything you need to know to survive in this field. Of course, the information in the course changes constantly. The types of jobs our students found twenty years ago have morphed. Companies such as Google and Amazon are dabbling not only in games, but also immersive experiences.

Visual Story is a semester-long class that is taught at the same time as Building Virtual Worlds. Here students work in teams to write, produce, shoot and edit several visual story assignments. This class teaches essential skills for becoming a creative technological storyteller – how to think visually and aurally, as well as aspects of mise-en-scene, classical continuity-style coverage, transmedia, and temporal and spatial montage theory.

Building Virtual Worlds brings all of the skills they are learning together in one place, wrapped around a layer of technology. They are working in small groups. They are working with a tight schedule. They are making fast decisions. And they are trying to make the most out of what resources they have available.

While our core creative boot camp hasn't changed much, we've definitely seen a change in the students. We're larger and more diverse, especially with our international population. And the students who end up at the ETC tend to be good at more than one discipline.

All of those changes are good. We've always had talented students, but

the fields are so expansive these days that our students tend to be more curious about disciplines than becoming a master craftsman in just one area, which means they place a value on skills that other people have.

I think our creative boot camp and our students' natural curiosity have always set ETC students apart from other people in the industry. They learned to put a high value on other disciplines because they know they need each other. They learned how to create together in real time. And that sets them apart in terms of being more adept at going into leadership positions. When you have empathy for and value of disciplines other than your own, it extends to the person. People feel valued and needed in a very real way.

As I look back at the last twenty years—and think about the future—I hope as our students continue out in the world, these ideas we try to install here become much more engrained in the entertainment technology industries.

TIM ECK ('02)

Tim Eck *is the assistant director of Show Systems in the Engineering and Safety organization at Universal Creative in Orlando, Florida. In his current role, Tim leads the technical development and vision of animated figures, show systems, and unique show technology & projects for Universal Parks and Resorts worldwide.*

Tim has extensive experience in the entertainment industry, working on both the vendor and client sides of the table in various roles that have spanned museums, Broadway shows, Las Vegas spectaculars, and the largest theme parks in the world.

Tim was previously with The Walt Disney Company, responsible for leading interdisciplinary engineering teams to bring dimensional characters to life. In this capacity, he led the development of many animated figures, walk-around characters, electric actuation technology, and patented interactive character technology platforms that perform at many of Disney's theme parks and cruise ships world-wide.

Tim has been described as "a creative trapped in an engineer's body," as he strives to unite the seemingly impossible creative vision with rigorous engineering and unconventional illusionary solutions. Tim earned a Bachelor of Science in Mechanical Engineering (BSME) degree from

the Milwaukee School of Engineering and a Master of Entertainment Technology (MET) degree from Carnegie Mellon University.

I was one of those strange kids who knew exactly what I wanted to do with my life—I wanted to make theme park attractions and animatronic figures. I desired to create the tangible magic that I had experienced at the theatre, magic show, theme park, or location-based entertainment restaurants.

I caught the bug for this fairly early on and then pursued it through my education. I started by attempting to build my own Chuck E. Cheese figures in elementary school. I thought I had a good creative sensibility for things, but I knew I was stronger in the technical disciplines. I loved the combination.

I thought about pursuing a technical theater degree, but I really wanted to design and build electrical and mechanical equipment used to entertain audiences and pursue a deep understanding of engineering theory and practice. I decided to pursue mechanical engineering as an undergrad. When looking at graduate programs, I hoped to combine my engineering background with theatrical or creative technology in something like a graduate-level drama program. While looking to expand my horizons, finding Carnegie Mellon University's Entertainment Technology Center (ETC) program was that epiphany for me! I've learned that I'm not an engineer's engineer. I'm a creative trapped in an engineer's body, and the ETC seemed like the perfect place for people who are really artistic but who have a slant toward the technical—or vice versa.

I was in one of the inaugural classes and perhaps the first class made up of folks from outside CMU. This was the truly groundbreaking and entrepreneurial era of Don Marinelli and Randy Pausch. They were a match made in heaven, a wonderful interdisciplinary marriage of the right brain and the left brain hemispheres. I don't think this program could have happened anywhere else other than Carnegie Mellon.

There had not been anything like the ETC in academia, in that it was in a graduate program at a university but also felt somewhat like a start-up. Back then, even the facilities resembled a start-up from the moment you came in the door. At that time, we were set up in the top floor—what we called the "penthouse"—of Doherty Hall on Carnegie Mellon's main campus. We all tried to decorate it. To give you a taste of the texture, it was purple and green everywhere with purple crushed velvet curtains on everything for whatever reason.

One of the novel aspects at the time—which is now a part of the ETC's DNA—was how they let students **pitch projects**. Their attitude was "as long as it's a project that fits within this program, it's cool with us." That was very exciting for me and matched my purview of what a progressive graduate program could be.

One early project I remember pitching was called the Interactive Animatronics Initiative (IAI). The idea was to make animatronic and robotic characters more conversationally interactive by combining customized animatronic control software, with CMUSphinx speech recognition and Synthetic Interview technologies pioneered by the Human-Computer Interaction Institute (HCII) at Carnegie Mellon. The other cofounder of that project was Todd Camill, a fellow

graduate student in the Robotics Institute, who was also a collaborator at the ETC. Also co-leading the project was Ron Weaver, a fellow ETC graduate student who had a computer science background and also a background in theatrical performance and dance. The combination of passion and talent is what made the project and ETC unique.

When we initially pitched the idea, Don and Randy said, "Okay, we're going to green light this and see what you guys come up with." After about seven weeks, there was a tipping point when we put all this stuff together and demonstrated the possibilities. Combining all of the technologies together in an early "gold-spike" test proved that we had essentially invented a new kind of interactive medium.

To explore this new endeavor, the team created this new character, "Horatio 'Doc' Beardsley." Probably the most charming version of Doc was our first prototype, which was a combination of an animatronic head with a rough mechanical face yet had soft, emotive eyes. He was a sort of mad scientist—a bolder, elderly character. He was zany and wanted to talk about his life and his poor inventions. One of his prized inventions was the "foon," a fork with tiny spoons at the end of each tine! Doc obliviously told guests about his foon, completely unaware of the advent of the spork—stuff like that.

Along with the character of Doc, we were creating new technology—and not sure if the technology would always work. We camouflaged the technical shortcomings in Doc's character; we used the character's eccentricities to justify the technology's flaws, precisely in situations when the technology didn't work perfectly. When the speech recognition or our story engine didn't work, there would be

Doc's non-sequiturs. He would say something completely off the wall like, "Growing up I had a herd of goats." You'd be like, "What?!" It would elicit a laugh because Doc's this old guy going off on a tangent, nothing to do with what people were talking about, but it also seemed to be part of his character. You can't do that with just any character. People were entertained and accepted him, willfully suspending their need for totally rational discourse with his character.

This collaborative and creative environment was so refreshing after coming out of engineering school. It was amazing to work with very diverse—in both talent and background—motivated, and bright collaborators. This was what I'd been craving but didn't know it.

At the ETC, it wasn't just about getting the right answers (like a proper engineering program)—it was about the critique. The constructive critique is exactly how solutions are evaluated in every creative or artistic medium. This was eye-opening to me and gave me insight to the creative sensibilities I already possessed, but couldn't previously express. The whole ETC experience was life changing because it gave me a more worldly view. Getting out of my comfort zone—and literally moving away from home—allowed me to become more open-minded and think in diverse ways.

* * *

Since the ETC, I have worked exclusively in the entertainment industry. First, I worked at Universal Orlando as a sustaining engineer on the upkeep and maintenance side. It was not exactly my cup of tea, but I learned a lot. Then, I went to a company in New York that allowed me to design and collaborate on automated scenery for Broadway shows. That was a whirlwind experience where I honed my

design chops even further. After that, I joined Disney in Florida, and was there for twelve years. And as of October of 2018, I am with Universal Creative in Orlando Florida.

While at Disney, there was a key project that the ETC prepared me for like nothing else. The project was about making (historically mute) walk-around characters come to life in new ways: to animate their facial features so they could perform in live shows. After figuring out synchronized movement and sound for a modular, wearable system, the next obvious step was to make characters actually interactive.

That's where all of this ETC background and training coalesced. It involved creating technology, play-testing, voice talent, and bringing all these different disciplines together to make an interactive experience that had never been done before. We took everything we knew about animatronics, wearable costumes, and classic characters to make something that was more than just a cool spectacle, but a truly groundbreaking project from an interactive-entertainment perspective.

The project's code name was "Magic Words with Mickey" and was eventually presented as a standard theme park "Character Meet-and-Greet" but with a twist: guests would encounter an entirely (conversationally) interactive Mickey character, manifesting in a complete, albeit brief, experience. Within this short ninety-second story arch, there is a seamless beginning, middle, and end. Once orchestrated, polished, and finally opened, it really surprised me how emotional it can make guests. We would get happy tears. We'd get laughter. We would get families who want to stay longer. More often

than not, guests—and children in particular—are star-struck, so it is up to the character to guide the guest through the experience.

As with everything in this business, building all of this was a collaborative effort. I was leading the technical side, but was working closely with the creative side. To make the characters really interact was an evolutionary step, and we all jumped into it. Each step of the process felt groundbreaking. Taking our idea and productizing it into an operational attraction was yet another jump—making something practical, something that could work for guests sixteen hours a day—was yet another challenge.

Working on the IAI project at the ETC and then years later on this character meet-and-greet shifted my understanding of what it takes to make an interactive character effective. I used to think that an interaction with a fanciful character would be more of an interview, a Q&A of sorts, but that was not the case with the meet-and-greets at Disney. In this case, it was more about fostering an experience and creating a special moment, not an interrogation. Crafting an experience or moment that is very intimate and near and dear to guests' hearts is something that needed to be honed very carefully. I believe our team pulled it off.

There are a lot of buzzwords in my field now like "design thinking" and "design empathy." But these were all practiced at Carnegie Mellon and the ETC before they were buzzwords. We would constantly brainstorm and ideate, and there were a lot of ideas discussed then that were way ahead of their time. Interactive characters, blending interactive mediums, interactive storytelling, giving guests a sense of

agency: those topics are still being discussed and "discovered" by the themed entertainment and experiential industry to this day.

The ETC also provided the preparation for doing interdisciplinary work and embodying what I now think of as "creative empathy." As a technologist, working with other creative disciplines helped me develop creative empathy for what it takes to accomplish any entertainment endeavor, whether it be stage shows, museums, theme parks, or interaction design. When kindred spirits get together—and have empathy for each other's skills that they bring to the table—that's when amazing things happen.

The ETC changed me, and it changes people. That, in turn, influences so many people's careers, entertainment products, and entire industries. This is true even if we are behind the scenes. A mentor of mine at Disney, David Hynds, helped me conceptualize this. He coined this term "performance by proxy" when describing how his show control programming for a popular nighttime spectacular wasn't about how he was directly performing in front of a live audience like a performing artist would, but rather his contributions by means of software configuration and choreographing show timing was a performance by proxy. He therefore performed and entertained myriad guests through his work. I love the idea of "performing by proxy." ETC alumni may not be household names, but they're entertaining thousands or millions of players, guests, customers, audience members through their work. It's an astounding impact by proxy.

SHAWN PATTON ('03)

Shawn Patton *is a principal game designer at Schell Games. With fifteen years of experience in the game industry, he is responsible for leading the design of projects from start to finish: condensing ideas into usable plans and actionable tasks while creating a consistently engaging and fun experience for the player.*

Patton has worked on a wide variety of projects, including games for VR/AR, PC, mobile, web, and console as well as theme park attractions. His most recent roles include: Design Director for I Expect You To Die, a virtual reality escape-the-room game, Project Director on the Vive title Water Bears VR, and Design Director on an interactive theme park attraction. Previously Patton worked for Walt Disney Imagineering at the VR Studio, where he developed the character creator and mini-games for Disney's Toontown Online.

The games Patton has developed have received multiple awards, including three Proto Awards for Best Overall Experience, Best Interaction Design, and Best Gameplay, a Vision Inspire award, and a Thea award. He received a degree in Computer Science from Rutgers University before entering the ETC.

Patton lives in Pittsburgh with his wife and daughter and enjoys creating board games, eccentric websites, and a sense of whimsy.

My father is a computer scientist and my mother is a fine artist. I like to say that I've been genetically engineered to make video games. My interest goes all the way back to third grade, when one of my teachers taught us the programming language Logo, and I've been designing games ever since.

I distinctly remember going out to visit the ETC as a prospective student in 2000, when it was still on the fourth floor of Doherty Hall at Carnegie Mellon. As I walked up the final staircase, I remember thinking, "What is this crazy place?" It was awesome. There were purple curtains everywhere, artwork from various projects hung on the walls, cables running between rooms, and a gigantic plastic barrel in the computer room where all the cables came out of. That really stuck with me.

I soon learned that this unique decor was in service of the ETC's focus on interdisciplinary teamwork, which is still key to my career today. The original plan was to have workstations that could be set up anywhere. All of the desktops were in one room, and they had really long keyboard, mouse, and video cables running everywhere to every room. In practice, it was really annoying to have to unhook and hook up cables to set up a workstation, but the ambitions and values behind the room really resonated with me. It showed the importance of being able to work very closely with people from different disciplines on your team. It was key to not be confined to a cube or a

random office. Now, of course, technology has advanced, everything's in the cloud or on a laptop and you don't have to deal with the clunky 2000s-era networking like that.

In my second year, Ray Mazza, Amy Kalson, and I pitched "Project Awesome" to the professors. The basic premise was that when you walk into a room, your theme song should play. While the project was tentatively approved, it was made clear to us that we needed to do more work on the high-level premise. We understood that and thought, "How can we make this more relevant to the current state of the ETC?"

At the time, the ETC was in the midst of moving from Doherty Hall to the Pittsburgh Technology Center, where it is today. Students and even teams were going to be split across both campuses. We didn't want the ETC as a body to feel this schism because of the distance, so we tasked ourselves with the challenge of making the two spaces feel linked, even though they weren't physically linked anymore.

In 2002 we created "Awesome Kiosks" built out of older computers using discarded filing cabinets we found and dressed up as much as possible. The way it worked was when you walked up to either of the ETC campuses, you'd tap something called an "iButton" on a reader. When you tagged it, the kiosk would play your theme song and you'd see any messages that were left for you from other ETC students. They would display on screen so you could get caught up quickly. We also had live video feeds running all the time showing both locations.

Then we began to layer games on top of this. We organized events; for holidays we would have events where you could earn extra uBucks, the currency of the whole system. You could spend uBucks on

themed backgrounds (basically, it was like microtransactions before there were microtransactions). It was all an elaborate system—a personal digital assistant that played music and gave you messages—so that the two spaces would feel more connected. In 2002, we were way ahead of our time.

The ETC is a creative environment where you can take risks. You can learn from mistakes among other awesome people and talented professors. It just made sense. If you fail, it's alright; you're not going to get fired.

I was a part of Jesse Schell's first game design class after working with him at Walt Disney Imagineering the previous summer as an intern after my first year of the ETC. It was his first time teaching the class, and it was an excellent experience. A year later, when Jesse started up Schell Games, I was one of the people that he called, and I've been working there ever since.

At Schell Games we have been able to save money from client work to develop our own original intellectual property. Each year we do a week-long event, "Jam Week," where we put together pitches, very much the same thing as what we did at the ETC with Project Awesome. People who've been formulating ideas have time to flesh them out more, maybe having gathered other employees who are also interested in the same idea. Some people use it for self-development, and either do solo projects or just smaller projects to learn a new skill, but many people go through a pitching process and then use Jam Week itself to put together a prototype or a proof of concept of a game idea. A lot of our internal IP projects have come from Jam Week.

The whole Jam Week process is a larger version of what we do at the ETC, where you'd pitch a project to the professors, and then get to work on it. You'd have to figure out all the interesting challenges and problems along the way and come up with solutions to them. It's just like that, only on a bigger scale here at Schell Games.

The main strength of the ETC is being able to work in teams and communicate effectively with people of different disciplines than your own, something we did in the Building Virtual Worlds class, working on Project Awesome, and collaborating on basically every project we worked on. Fields like interactive media and game development hinge on teams working well together, communicating, and bringing all their skills to bear on a project.

Designers need to be able to speak to engineers. Engineers need to be able to speak to designers and artists, and artists to audio people, and audio people to designers and producers. You get the picture. Everyone needs to be able to communicate with everyone and understand their needs, and how they can work best together.

That was emphasized throughout the ETC curriculum. In Building Virtual Worlds, students put together a team with an artist, a designer, an engineer, and a sound designer, and they have to make something in one or two weeks. That is the skill, the magic, that the ETC is so good at teaching. It is useful in whatever company you work on in interactive media; whether it's video games, museum exhibits, or Disney Imagineering. In my mind, that is the most useful skill.

It is my firm belief that ETC students internalize that way of working, and then carry it with them as they go out and spread throughout the interactive game development and media community. As a result, that

approach makes the teams that they work on better, more efficient, and more creative. The network of ETC graduates is vast at this point. I think we've all been taught the importance of the team dynamic, communication, inclusion, and the clarity of the ideas, from brainstorming and ideation, through the process of culling to implementation, polish, and post-production. That's why ETC students seem to be in high demand.

NEIL DRUCKMANN ('05)

Neil Druckmann *is the vice president of Naughty Dog. He is the director and writer of The Last of Us Part II. His previous titles include: The Last of Us, Uncharted: Drake's Fortune, Uncharted 2: Among Thiefs, and Uncharted 4: A Thief's End.*

I studied computer science at Florida State University. All I really knew was that I wanted to work in games. When I came to the ETC, I first felt how small and intimate it was. I remember getting there and helping out Steve Audia, the IT/technical person there, putting computers together in little cubicles for the students. It already felt that there was a friendship there between professors, faculty, and students. The next thing I realized was the interesting paths all the students took to get there, how talented everyone was, how passionate they were about creating really interesting things and making them work. That was the start of the best schooling experience I've had in my life.

In the first year, **Building Virtual Worlds** was the class that made the biggest impact on me. It's a class where we're put into groups of four

or five people of different disciplines. You spend a week or two working on a virtual reality project, then you present in front of the whole class and get really harsh criticism and notes about the project you made before the group is broken up. After that, you're put within a different, similar multidisciplinary group, but with all different students.

Even though so much of the class involves technology and art, the class is really about learning to collaborate. It was coupled with the time when we also took an **improv acting class**, which was really about trusting other people, understanding them. You really learned how to communicate.

So many people that are interested in computer science are introverts and aren't used to this kind of collaboration; they're used to working alone at home. I was one of those people. Something about the combination of those two classes brought me out of my shell and taught me what it's like to collaborate with other people, let go of ideas, and incorporate others into the creative process.

The other thing that has stuck with me about the Building Virtual Worlds class is that with every group you were in, you would fill out anonymous questionnaires at the end. You would list, for each member, three positive qualities that they had and three negative qualities that they had. Then you turn it in to the professor. At the end of the semester, you get to see what everybody said about you. What are your positive qualities? What are your negative qualities? You'd see certain trends.

For me, I realized that everyone says, "I hold on to ideas too tightly, and I could be really tough when things get stressful." I realized I had these aspects of my personality to work on, and I've made it a priority

to work on those more negative qualities that showed up. It was cool because it didn't come from the professor. It came from my fellow students. Something about that made me take it more to heart.

Of all the projects I worked on during the first year, the project that had the most impact on me was *Night of the Living Dead*. It was inspired by the late George Romero, who was the director of *Night of the Living Dead* film. He lived in Pittsburgh, and was friends with Ralph Vituccio, one of our professors. The two of them set up a project where students would make a *Night of the Living Dead* game. We would come up with the concept and pitch it to Romero, the director of the original movie. He would pick a pitch, and then, for a semester, you would work on a prototype.

I remember putting my all into the pitch for why I should be on this project. I did all this artwork, and luckily, I ended up on the project. The way the project initially worked was we broke into three groups. Each one had to come up with a pitch to George. I came up with this concept about a father-like figure with a daughter who traveled across the country in a post-apocalyptic world. It didn't use any of the characters from *Night of the Living Dead*.

We pitched it to George along with two other pitches from other groups. My pitch didn't get selected. It was humbling, in a way, that the thing you worked really hard on wasn't right for this project. That was a lesson that has stayed with me for the rest of my career: you don't always get your way when you collaborate with others.

For the pitch that was accepted, I did my best to support it. I did some programming and some particle effects work on that project. In the end, our "eyes were bigger than our stomachs"; we had a much bigger

idea than what we had time for, so we were only able to create a very limited prototype. For our presentation, we ended up going with just a video, which felt like a failure compared to our ambitions. We didn't scope appropriately to the resources and schedule that we had set.

For years, I dreamt about working at Naughty Dog. Sony PlayStation owns several studios, and Naughty Dog has been one of their most prestigious. They do very narrative-driven games. After my first year at the ETC, I was able to secure an internship at Naughty Dog. As my internship ended, Naughty Dog offered me a full-time job, so I stayed here and used my job as my project for the ETC. I only went into the classrooms on campus at Carnegie Mellon for one year. My second year was at work.

The idea I had for that father-daughter story that wasn't picked stuck with me. When I came to Naughty Dog, I worked on it as a comic book, and pitched it to comic book publishers, but it didn't get it picked up, so I faced another failure.

As I slowly rose through the ranks within Naughty Dog from programmer to designer to lead designer, I found myself in an opportunity on a project that needed a concept. I was like, "I have this story that I've been working on. Let's start with that."

That slowly became *The Last of Us*, which is now an award-winning franchise for Sony and our studio. It blossomed from a series of failures, starting as an ETC project. Over the years it shifted and morphed into its own thing, becoming a shared vision—a collaboration—at Naughty Dog.

But the core of what drew me to the idea always stayed the same. At

the time, I was thinking about having kids. The core of *The Last of Us* is: how far will a parent go to protect their child? I actually had a baby during the production of that game. I thought a lot about sacrifices my parents made, sacrifices I would make for my kids, and then thinking about the insane lengths a parent would go for their child where it could, to someone on the outside, appear like they're making morally dubious choices to protect their child.

I started thinking, "How do we make a player feel that way towards an artificial character? Is there a way we could get them to feel the way a parent feels and then, over the course of the game, have to make greater and greater sacrifices so they really understand what it is a parent does?"

In the apocalyptic world of *The Last of Us*, you start as this character, Joel, who's a smuggler. You're tasked with smuggling a fourteen-year-old girl, Ellie. At first, the characters don't like each other. Over the course of a twenty-hour game, they go from not liking each other, to somewhat liking each other, to respecting each other, to loving each other, to making the ultimate sacrifices for each other.

For this to work, the artificial intelligence of Ellie has to be impeccable. If you ever stop thinking of her as a person, the game falls apart. The animation has to carry the performance of the actor so the audience buys into all these emotional turns. The gameplay has to immerse you in the world so you buy into playing these characters and their predicaments. All these aspects have to come together to ultimately convey the core message, leaving people with philosophical questions about moral decisions these characters have made against their own morality.

I came to Naughty Dog with a pretty broad set of skills, which I wouldn't have had if I had not gone to the ETC. Even though I started in the company as a programmer, I had already worked on writing, art, and elusive skills like collaborating with other people and pitching ideas.

When I started at Naughty Dog, I knew my place. I was a tools programmer initially, but I also knew I wanted to shift to the creative side of things, so I jumped at any opportunity I had to pitch ideas and get design work under my belt. By the time I finished my second game at Naughty Dog, I switched over to design and writing.

I was a designer and cowriter on *Uncharted 1*. I learned so much from **Jesse Schell**'s game-design class as far as how you listen to players, how you listen to coworkers, and how you refine game design ideas. I've gone from pitching small concepts to pitching bigger and bigger ideas; I pitched a whole game with *The Last of Us*, and was creative director on it. Now I'm the director of the sequel to that game, as well as the vice president of the studio.

I also credit the ETC with some of my leadership style. I learned to talk to people in different disciplines and articulate problems or ideas. As a director and one of the leaders of the studio, you can step back and say, "What is it that we're trying to make? What philosophical statement are we trying to tell here?" "How do I use art? How do I use game design? How do we use technology? How do we use music?" All of these questions come together into a really focused message that the player is going to walk away with. I think that kind of focus and vision has made us successful in the past few years.

I remember during the ETC, so much of what we worked on was,

"How do you empower people to contribute to a project, to a vision, without micromanaging?" I learned that whether someone was leading me or whether I was leading someone else, you got to play both roles at the ETC, so you get a full picture of teamwork.

Throughout my career, I've kept that in the back of my mind as I've worked with more and more people, working on how to better communicate with people, how to manage people, how to deal with conflict. There's quite a bit of conflict management within the ETC because we're all ambitious. You're constantly working on various projects, having to deal with other people and their egos. How do you turn down someone's idea without demoralizing them?

At the ETC, **Randy Pausch** was an amazing professor but would give very harsh feedback. Throughout that experience you learn to develop thick skin. Sometimes your ideas don't work, and you need to hear that in a public setting. That was great training before going into the workplace. We learned to not take that stuff personally.

When thinking about the meaning of our work, there are different aspects. One is that we're creating entertainment that makes you look at life a little differently, maybe change your mind about certain philosophical ideas. Right now, we're working on a game about this conversation about the cycle of violence, empathy, and perspective.

I've had someone tell me a story that has stuck with me. I was in a PlayStation convention promoting our newest game. A fan came up to me and said they played *The Last of Us*, which is a pretty bleak game. They said they were in a period of their life where they were extremely depressed. And somehow the game helped them get through

this tough period. It was an escape from the pain, but also somehow gave them strength to get through these personal obstacles.

I was blown away. You work on this thing and you don't think of it on that level. Our job is to tell a compelling story. How do we have authentic, honest characters? How do we create gameplay that is intriguing, that pulls you into a world, and immerses you?

Then sometimes you realize that when all these things really come together, it goes beyond entertainment. When you make art that's that meaningful, it can affect lives in ways we can't anticipate. While that aspect of game making isn't our focus, it is fascinating and inspiring that our stories impact people to such a degree.

KYLE GABLER ('05)

Kyle Gabler *makes independent video games, music, and other projects, mostly listed at kylegabler.com.*

It was a different time when I first started at the ETC! If we turn on our modems and log back into 2003, Gmail didn't exist, no one was using social media, Britney Spears was the greatest artist of our generation, we still burned files to CD-ROMs, and smartphones were over four years away for most people. The ETC building at 700 Technology Drive still smelled brand new. It was modern and clean and steel and glass, and we were the first class of students to get to use it—and we explored every inch of that building!

There were twenty-five of us in our class. Most of us were new to Pittsburgh, and most of us were twenty-two years old, with no families, no local friends, and no real responsibilities. Since no one had smartphones or social networks, all we really had was our work

and each other. I don't think I've ever been able to be so singularly focused since.

We had nowhere else to go and nothing else to do, so we spent all day and often late every night together in that building. It was like living on the USS *Enterprise* from *Star Trek: The Next Generation*—a bunch of people with different skill sets, all super qualified and great at their different jobs, engineers and command officers and artists, all packed together on a ship, exploring the galaxy together. For example, there was a vending machine on the second floor that dispensed hamburgers. We were very poor, so we'd calculate which burger yielded the most ounces per dollar spent. It was a great time!

For our last semester, a small group of us pitched an independent project called The Experimental Gameplay Project (EGP). The goal was to make fifty games in one semester, or about one game per student, every week. Each game would be based around a weekly theme like "gravity," or "evolution," or "a game your mom would play." I'm grateful that the ETC faculty—and especially Jesse Schell—took a chance on us and let us run this project. It launched us on a trajectory that we're still on today, fifteen years later.

The idea behind the project was that if you can make something fast—in only a week, for example—without caring too much about it (failures were totally okay and even welcomed), then you'd be more likely to stumble on unexpected and surprising new discoveries. There are lots of game jams with similar philosophies these days—like Train Jam and Global Game Jam—if you ever want to try out something similar.

We released all of our prototypes for free on a little website we set up.

A lot of the prototypes were pretty crappy, but a few of them became popular online. My most popular prototype from this project was called *Tower of Goo*—a short game where you build towers out of living, squirming balls of goo. The theme that week was "springs." The original prototype is still available for free online. 1

After the ETC, I worked for one year at EA making prototypes for research & development, another direct result of the EGP at the ETC. It was a fortunate and really fun job, but all I could think about was making my own little game studio.

After one year, I quit with one other friend from EA. We expanded *Tower of Goo* into a commercial game called *World of Goo.* The ETC connections continue indefinitely after graduation. Towards the end of development, Drew Davidson was kind enough to playtest the entire game to completion on video and offer feedback along the way. Finally released in October 2008, *World of Goo* went on to win a bunch of awards, including several "Game of the Year" awards, and is still the highest-rated game of all time on iOS, according to Metacritic, even in 2019. Maybe more importantly, *World of Goo* was among the first wave when "indie games" and digital distribution started to go mainstream. It helped other young game developers notice that making a game with no money and just one or two people was entirely feasible. It would be nice to believe that we were especially clever and could see that wave coming in advance, but it's only in hindsight that we realize how lucky we got with the timing.

Fifteen years after graduation, I still work with two of my ETC classmates every single day. Around 2009, I got together with Allan Blomquist and Kyle Gray, all three of us from the same ETC Class of

2005. They quit their jobs, and we formed an indie game company called Tomorrow Corporation. The entire company is still just the three of us—two Kyles and one Allan.

So far, we've made three games together, and we're currently working on a fourth. *Little Inferno* is the world's first existential crisis simulator. (Something's burning.) *Human Resource Machine* is a program in which little office workers solve puzzles. It is a hilarious romp up the corporate ladder that prepares young minds for a future in which human labor is no longer required. A follow-up to *Human Resource Machine*, but with more humans, *7 Billion Humans* automates swarms of office workers to solve puzzles inside your very own parallel computer made of people. And our latest game, currently in progress, is *Welcome to the Information Superhighway*, a road trip adventure to the end of the internet, with the fabulous and broken friends you meet along the way.

One thing that's been in all of our games is the feeling of participating in a big world that doesn't really care about you, and that will definitely outlive you. I don't have a delusion of changing the world, so we just try to have fun and include a little satire along the way. We include themes and references about stuff like surveillance, the euphemism treadmill, getting older, quotes from drag queens, the importance of Oxford commas, or whatever is exciting to us at the time. Randy Pausch had some rules in his Building Virtual Worlds class:"No guns, and no nudity." Not because they were controversial, but for a more critical reason—they just weren't inspired or interesting. He later added: "No inside jokes, and never start off with long exposition—because nobody cares."

1 You can try out all of our prototypes from the Experimental Gameplay Project here, if you're feeling brave: https://experimentalgameplay.com/egp1games/towerofgoo.exe

I love these rules, and we've continued using them today. We've also added a few more. For example, we will never make a game with a jump button. Jumping has been pretty adequately covered in thousands of other games. No one ever said, "Man, wouldn't it be cool if only there were a game where you could jump!" Randy's rules remind us to always explore something new.

We don't have an office, and we all live in different states (one of us in California, one in New York, and one in Ohio), but we group-call every day and have an ongoing group-chat, which makes it easy to collaborate. Thanks to the ETC, we knew we would work well together, since we had all worked together in various combinations in Building Virtual Worlds. I also worked with both of them separately, with Kyle on the EGP, and with Allan when we were both interns at EA.

Our little team of three ETC alumni have now known each other for over sixteen years, and at this point, we feel like three old men sitting on our front porch with a wild highway out front that we barely understand. We no longer have the luxury of being twenty-two years old with no responsibilities in a brand-new building in Pittsburgh—now we have adult stuff like wives and husbands and kids and high blood pressure. The world is changing with or without us, and we're just happy to watch where it goes. We hope we can continue making strange new projects and that people in this strange new world continue to enjoy them!

The ETC is like a brand-new computer. A new computer is one of my favorite things in the world, because it represents unlimited possibility. You can use it to build anything. You can use it to make art or music or write the next series of young-adult vampire novels, or download a free compiler and write any program you can think up, like a new artificially intelligent musical instrument, or a mini-universe of evolving digital lifeforms, or a social network where you can communicate only in emoji. The ETC was like that, too. It won't automatically grant you internships or opportunities or good ideas, but if you put in the work and coffee and late nights, it will support you and mix you up with dozens of other inspiring and excited students and faculty, all with different skill sets, and multiply whatever you put in.

* * *

I kept a text file of quotes and quips I learned from ETC faculty and other mentors during my time there. Here are some of my favorites that I still think about:

"You have to learn when to shoot your baby in the crib." -Randy Pausch [Translation: Don't fall in love with every precious little thing you make. Judge your work honestly and if you're making something that's just not working, don't be sentimental, just kill it and move on.]

"If you make something cool enough, nobody cares if you didn't follow the rules."—Randy Pausch

"Do it now, apologize later."—Jesse Schell and Randy Pausch

"It's not about the art. It's about the craft. However, you must always

maintain the illusion that it's all about the art."—J. Wolff, music composer for *Seinfeld* and *Will & Grace*, who I interned with at EA, on the importance of the business behind art. Also noted, "I make music, but mostly I make royalties."

"Remove yourself from the competition."—J. Wolff [Translation: If everyone is doing X, you might want to think about doing Y, and don't waste energy competing in the same pool as everyone else. Easier to stand out when you're not part of the competition.]

"Imagination is a high-resolution decompressor of information."—Source unknown. [Translation: More pixels, more definition, more detail, doesn't make better stories. Audience's imagination will render stuff better than you can.]

"Ask for stuff, and you'll often get it!"—Randy Pausch, Jesse Schell, and pretty much all the faculty at the ETC

SABRINA (HASKELL) CULYBA ('05)

Sabrina Culyba is an independent designer specializing in creating transformational and innovative, interactive experiences. She has worked on a wide range of entertainment & technology projects including video games, board games, theme park rides, animatronics, and toys.

She is the author of The Transformational Framework: A Process Tool for Transformational Games (ETC Press, 2018). Sabrina graduated from the ETC in 2005 and lives in Pittsburgh, Pennsylvania.

I started as an undergraduate in computer science at Carnegie Mellon University in 1999—the same year the ETC began. As an undergrad, I intersected with the program mostly through the Building Virtual Worlds course. I made it a point to attend the course's semester-end show every year, leading up to my senior year when I took the course myself. As graduation approached, I found myself looking for a way to use my CS degree without going into finance or defense. These were both industries that recruited heavily from CMU, but held little interest for me. I wanted to use my skills to create positive, meaningful

experiences for people. That potential is what drew me to the ETC. From observing and participating in the Building Virtual Worlds course, I had the sense that the ETC was a special place where I could work on unusual things. And I did have a chance to work on several interesting and varied ETC projects. One that stands out in particular was Quasi.

Before my time at the ETC there was a project called the Interactive Animatronics Initiative, or IAI. A number of students worked on that project, including Tim Eck and Ron Weaver, two ETC alumni I got to know later. The IAI project spanned multiple teams over four semesters and they created several interactive animatronic shows with an original character named Doc Beardsley. Doc was stylized as an elderly, hard-of-hearing, grouchy inventor with a hamster sidekick named Slippy. The team did all sorts of interesting things, including integrating Doc into synthetic interview technology that was being developed at CMU.

By the time I entered the ETC program, it had been a few years since IAI, and Doc Beardsley was not really operational anymore. But one of my classmates, Peter Stepniewicz, wanted to pitch a student project where we would make another ETC animatronic character—a sort of next-generation IAI project. Actually, we even eventually named our project the IBI, short for "Interbots Initiative," as a play on the idea of building off the prior work of IAI and Doc Beardsley.

Peter, Salim Zayat, Josh Taylor, and myself pitched the project to the ETC faculty, and it was approved. I didn't know it at the time, but that project was going to set a course for many important things in my life in the years to follow.

Our goal for this first IBI project was to build an original character from scratch, all the way from character concept to fully-functional animatronic. We planned to build not only the animatronic character but also all custom software and a new interactive show of sorts that would allow guests to interact with the character. We had come to the ETC to practice the craft of leveraging technology to create unique experiences and this project provided lots of room to flex those skills, both technical and creative.

It was a really ambitious project that brought together a wide, diverse set of skills. Along with Peter Stepniewicz and myself, the core team for the original IBI project consisted of Eugenia Leu, Salim Zayat, and Jichen Zhu. Peter was taking on most of the hardware. Salim was the character animator. Eugenia, Jichen, and I worked on the control software. We also brought in Andy Hosmer from the Art Institute of Pittsburgh, who did special effects work (and ended up eventually coming to the ETC himself).

We spent the first third of the semester doing character design and thinking about what the interaction would be like. ETC Faculty member Brenda Harger worked with our team a lot to help us through that process. I recall we initially had three very different character concepts, each with different physical designs and different personalities. One was literally a robot character who was a sort of Pinocchio, with a "wants to be a real boy" motivation. Then there was an alien that had crash landed at the ETC. He was supposed to have a sort of grouchy, I-wanna-get-off-this planet personality. Finally, there was a very organic, stretchy, fuzzy, glowing character that was more of an emotive creature than a humanoid.

We settled on the robot concept for the physical look, but softened the Pinocchio angle so that the he wasn't completely dissatisfied with being a robot but rather had an insatiable curiosity and fascination with humans. This slight shift let him enjoy being a robot, indulging in robot puns and reveling in an ongoing campaign to get laser eyes. All of that was intentionally very playful, and it gave great context to setup any interactions with guests. I think some of that sensibility of what personality to go with definitely came from discussions with Brenda and reflecting on how to make the experience approachable. We wanted to provide the best palette for interactions where someone could just walk up and instantly get it: "Oh, a robot who is really curious about humans." It's very easy for anyone to play off of that. We also wanted him to be able to be expressive so many of his physical features were designed to support very emotive animations and also included the ability to change the color of his eyes and antennae for emotional cueing.

That first semester we built an animatronic character who, at the time, was just from the waist up. It was housed in a large kiosk that lived in the ETC hallway on the fifth floor for a little while. The core interaction, which was all autonomous, was for a guest to use a touchscreen and voice to interact with the character. Oh, and it had a large, custom-built Skittles and M&M candy dispenser so you could also ask the robot to give you some candy. (The candy was of course a thinly-veiled bribe to get students to interact with the character.) We named him Quasi—a name suggested by fellow ETC student Dave Culyba.

By the end of the semester, we had built a fully functional robot and a complete interactive experience. And behind the scenes we had done a

lot of cool technical work. We had a pipeline that took a character digitally designed in MAYA and SolidWorks, and used those 3-D models to actually fabricate the physical pieces. We had a tool that would export animations on the CG character to animations we could play on the physical character. We also built a custom content authoring tool to author the character's autonomous behavior easily with a simple drag-and-drop interface. Honestly, we accomplished more than I think even we really expected in a single semester. At the same time, the work was a part of an ongoing legacy of ETC projects, and we were definitely empowered by that legacy.

That wasn't the end of Quasi. He actually became a platform for Building Virtual Worlds the following semester which resulted in a lot of interesting new content being created for him. Then he was "recruited" to be the mascot for the World's Fair for Kids, and this spawned a follow-up project to make a new version of Quasi with a full body and the ability to be live-puppeteered by a remote operator who would be out of sight. I wasn't an official team member on this second IBI project—I was working on a Japanese-language learning game project that semester—but I stayed involved.

This second version of Quasi had some autonomous features but mostly he was puppeteered, so we made quite a few changes. We had a thirty-foot umbilical cord stretching from the robot to this new giant, purple kiosk for the puppeteer. At the kiosk, there was a fold-out computer where the puppeteer had a video feed from a pin-hole camera in Quasi's nose. A microphone at Quasi's feet allowed the operator to hear what was spoken by guests. And we built new custom software called the Guided Performance Interface to allow the

puppeteer to easily control Quasi while simultaneously having a conversation with guests.

One of the team members, TJ Jackson, became the primary puppeteer and voice of Quasi that semester, but in the end everybody who worked on that project got a chance to be the puppeteer. And it turned out it was very easy for anyone to take on the role of Quasi and engage with complete strangers—and have a lot of fun with it. I'm not generally someone who likes to get up on stage and talk to people, but there's some magic that happens when you create a layer between you, as the performer, and the guests, even if the guests know full-well that the character is being controlled. I recall one time when we took Quasi to the SIGGRAPH conference, there was no place to put the puppeteer out of sight in our tiny booth. Still, even with the puppeteer sitting five feet away, guests continued to talk to Quasi as though he was a separate person. They were really pulled in by the character. The same thing happens for the puppeteer, I think. You get comfortable interacting with people as Quasi. People are so willing to speak to Quasi, because we designed the character to be very approachable.

In a sense, this reflected a through-line we had developed as a team in relation to designing experiences. We had a mantra about "technical transparency." We didn't want people to see the technology—we wanted them to see the character. So even though right there is a microphone, a puppeteer, and a touchscreen, we really wanted to have the guests walk away thinking about the character, about Quasi, not about how they interacted with all that tech. Making this happen drew on skills we developed in ETC classes like Improv and Building Virtual Worlds.

I have really fond memories of the Quasi project and the people I worked with on it. Part of the secret sauce of the ETC is the people it brings together. The magic is that you are surrounded by people who are excited to create something cool together. Over your two years, through working on ambitious projects, you have the potential to build strong, life-long relationships with other amazing, creative people. Though everyone at the ETC may come from different, diverse backgrounds, they unite around passion for the work. I've even found this true when I've met ETC alumni who I did not know as a student. After the first IBI project, I had the chance to get to know Tim and Ron, from the IAI team, during a summer internship in Orlando. It was lovely to find that ETC ethos connection spanned beyond my own classmates, and it's something I've experienced over and over again when I meet ETC alumni.

One of the other things I really appreciated about being at the ETC was simply the freedom to explore an idea. I was lucky enough to have a chance to pitch three of the four projects that I ended up working on so I got to actually sit in the driver's seat of concepting those projects, and that was a great experience that taught me a lot. At the ETC, students are often trying something for the first time—maybe without any professional or personal experience—but the program gives them space to try those new things, to fail, and to learn. It really embraces a design approach that keeps things open and flexible, but also feasible and concrete. That environment, I feel, empowers people.

In some ways I feel like I never quite left the ETC. Both of my first jobs after grad school were directly connected to the people I met there. I worked for Jesse Schell's company, Schell Games, for thirteen years after graduating, side-by-side with many fellow ETC alumni,

including my sister, Melanie Harke, who graduated a few years after me. At Schell Games, I found a strong continuation of ETC culture—interesting creative work and a mix of wonderful, passionate people.

At the same time I started at Schell Games, a small group of us from the Interbots Initiative projects—myself, Seema Patel, Dave Culyba, Andy Hosmer, and Jim Valenti—started a spin-off company called Interbots. We built a third version of Quasi, which is at the Carnegie Science Center here in Pittsburgh. We also built Quasi's little sister, Moxi, who went to the Singapore Science Center. We worked on toys and other related tech as a startup for a number of years and, though Interbots as a company no longer exists, those friendships remain.

During my time at Schell Games, I ended up continuing the work I had become interested in the last year at the ETC—transformational games. These are games that aim to have some kind of educational component or behavior change effect beyond entertainment. I eventually wrote a book called *The Transformational Framework*, published by the ETC Press, based on the process that we developed at Schell to help development teams approach these kinds of game design problems.

But undoubtedly the biggest impact the ETC has made on my life has been Dave Culyba—he named Quasi, was a fellow IBI team member, and fellow Interbots co-founder. He is now ETC faculty and, as it happens, we got married in 2012.

I could never have known how big of a role the ETC and particularly the Quasi project would have on the personal and professional trajectory of my life. My family, my closest friendships, and my

professional accomplishments all have roots in my time there. It's been lovely to be here in Pittsburgh and continue to see the work of new ETC classes. What an amazing twenty years for us all!

ASI BURAK ('06)

***Asi Burak** is a veteran of the video game and tech industries. In 2011, Burak was named one of the "Digital 25: Leaders in Emerging Entertainment" by the Producers Guild of America and Variety magazine for his work on games for impact.*

He is currently SVP Business Development at Tilting Point and the Chairman of the influential organization Games for Change (G4C).

Burak has served as an Executive Advisor to organizations like EON Productions (producer of the James Bond films), The Tribeca Film Festival, Newsweek, and McCann Erickson, helping to guide the strategic use of video games to further brand engagement. Prior to serving as G4C's President from 2010 to 2015, Asi co-founded and led Impact Games, the creators of PeaceMaker and Play the News, which was acquired by Hybrid Learning Systems in 2010.

He is often interviewed by the media and has been invited to speak at conferences and institutions including TED Talks, Harvard Kennedy School, the Clinton Global Initiative, Sundance, the Skoll World Forum, CES, South by Southwest, GDC, and the US Army War College. Burak is a faculty member at the School of Visual Arts MFA

program in Design for Social Innovation and holds a Master of Entertainment Technology from Carnegie Mellon University.

My entry into the ETC is pretty unique because I found out about it by accident. I am from Israel, and I knew I wanted to come study in the US, specifically at the MIT Media Lab. I didn't look at much else, but I had seen Carnegie Mellon in many places—publications, conferences—and then the ETC came up in my research. The program immediately stood out to me because it is practical, commercially connected, and very focused on entertainment.

I was working as an executive in mobile at the time. My boss in Israel was supportive of me visiting Pittsburgh during a business trip to the US. At the time it was four or five years after the start of the ETC and I could tell that the faculty were really excited that someone with industry leadership experience was interested in going back to school for a Masters degree. On this visit, they gave me a robust tour and introduced me to **Shanna Tellerman** and **Neil Druckmann**. Neil is a fellow Israeli and Shanna is Jewish, but they were also rock stars. So meeting these two very ambitious and relatable students was meaningful. I met them and left thinking, "this sounds amazing."

In reality, I was on average eight to ten years older than everyone else, so I was jokingly called by Don Marinelli "the first executive student." For me, the ETC was a life-changer. It opened my eyes to the US, to video games, to entertainment on the big stage, and to my own decision to focus my career on making video games and impact; it all happened there and in a very supportive environment.

The main project that I worked on during my studies there was *Peacemaker*, which became a poster child of the ETC at the time. We pitched it in my first semester and expanded it in the following semesters. I actually had the idea for a video game about peace in the Middle East before moving to Pittsburgh, but I wanted to walk in with an open mind and take the time to adjust to the program. Although pitches rarely gained faculty approval, students were given the opportunity to pitch their unsponsored projects for university support and that is exactly what I did. My colleague Ross Popoff and I developed the game and concept and pitched it to a room of ten faculty, but we were told to come back in a month with a more developed concept. We started recruiting more students and we received some great support from second-year students Shanna and Brian Schrank.

The following months, we dedicated every spare moment to working on *PeaceMaker*. After that second pitch we got the go-ahead from the faculty. I remember the computer science professor Josh Yelon reminding us that, "We are always here to help. But you'll need to do the heavy lifting. To be honest, I don't envy you."

PeaceMaker is a game about the Israel-Palestinian conflict where players are exposed to the journey toward peace. It's a field strategy game where you can play one of the leaders, the Israeli or the Palestinian. These are two different games in a sense with different balances, goals and challenges because it's an asymmetrical situation. This was the innovation of the game–that users can play both sides and "win" or "lose" either. We also used real footage from the news, which was unique. The game was also available in three languages: Arabic, Hebrew, and English. Progress for *PeaceMaker* was slow at

the start, but then something happened and we started to receive a ton of international press, community support, and people coming from all over to speak to us. The *New York Times* ran a headline story in their arts section, "Saving the World, One Video Game at a Time." *PeaceMaker* was the front page and that's when we could begin to take these positive reviews and see that games or experiences that are about impact and social issues were going to be well received. I remember the co-founder of the ETC, **Don Marinelli,** running down to my office the day of that headline shouting, "Some people would give their right arm to get this kind of coverage!"

For *PeaceMaker*, it was very beneficial that students at the ETC are from all different backgrounds. Specifically, because we dealt with peace in the Middle East from the start, we had to understand the different perspectives at play in the game. I am an Israeli, I served as a Captain in the Israel Army, and to make me the only voice in the project when we wanted to show the other side as well didn't feel right. There was the concern that it would be too Israeli-biased. The fact that I teamed up with Americans and students from other nationalities helped a lot. We also got connected with Professor Laurie Eisenberg in the History Department at CMU who specializes in the conflict. We sat in on her classes and ended up using her students to test prototypes of the game. We put them at the front in a lot of the conversations. In general, I think it's a great thing for the ETC, the diversity, the idea that people come from different backgrounds. It's very similar to the entertainment and gaming industry.

We started *PeaceMaker* in 2004, and by 2007 my partner, Eric Brown, and I were ready to release *PeaceMaker* as a commercial product. For a group of students, it was a pretty sophisticated piece of work. The

simulation was fairly believable, and although you can't necessarily compare it to *Civilization*,[1] it achieved the goal of introducing players to some difficult, interesting, and important concepts on conflict and peace. Our last semester at the ETC was focused on developing the blueprint for "tech transfer" and spin-offs: to show future students that it's not crazy to do something at this level and take it outside of school. We offered a blueprint for everything you need to take care of to successfully spin-off: legal, tech transfer, hiring, office space, etc. After graduating we started a company, ImpactGames, and looked for a space in Pittsburgh. That was one of the first spin-offs of the ETC. The office was a storefront right on Carson Street, and I remember we had people coming in asking, "What are you selling?"

It was very hard to get into the market with limited marketing resources at that time. Many people told us, "Look, it's an educational product," but we were stubborn, and we equated it to documentaries, arguing that it was necessary for the public. We made about $350,000 in revenue from *PeaceMaker*. In our office space we also built a platform called Play the News, which got some traction. The idea was that we could create a prediction game around the news. In the end we sold the company, and I moved to New York and accepted an offer to lead and run the Games for Change organization.

I ran Games for Change for five years and now continue my involvement as the organization's chair. My career thus far, and a lot of what I continue to do, is about promoting games as mainstream

1. Civilization is a series of turn-based strategy video games, first released in 1991.

media that push the boundaries for people who use them or think about them. For me, it's always about getting games to a place where we're not used to seeing them. At Games for Change, we worked with the White House and with the US Department of Education. We got the first grant ever from the National Endowment for the Humanities, so basically it was like saying "Yes, this can be an art form."

I feel lucky to do what my professors at the ETC did for me now at Games for Change or at the School of Visual Arts, where I teach. I have the privilege to help others, grow the community, develop events and create programs around the industry of games with impact. Next year we're launching the Games for Change accelerator. We're excited to incubate, highlight, and grow projects of this type.

All in all, I feel that the potential of video games is still undervalued and largely dismissed. It's a medium that is super popular, financially successful, but there is a gap between the realities of the industry and the potential of the video game industry to affect change or change opinions. I saw that gap in 2004 as an opportunity to create something and I feel that we did make a dent in this industry with *PeaceMaker*. My work pursuing that mission continued at Games for Change. I've been lucky to be involved in some pioneering moves. They're small in our niche, but at the end of the day, they actually speak to a very dominant medium in today's culture.

Games can really be so impactful. I received an alumni award from the ETC, and I think it was because **Drew Davidson** and his faculty really appreciated how the ETC was so influential to what I did after and what I do today. Being at the ETC opened so many doors. Even

the people that mentored me or the people that I met through events at the ETC have all been so instrumental in my journey. Having the ability and confidence to reach out to industry leaders, like Bing Gordon (co-founders of EA and Zynga Games) is so special. As an ETC student, people at that level are willing to meet you, talk to you, and give you feedback.

What is unique about the ETC is that it is programmatic and focused on creation. You collaborate on real-world projects that can have a significant impact.

SHANNA TELLERMAN ('06)

Shanna Tellerman *is the founder and CEO of Modsy. Before founding Modsy, Shanna was a partner on the investing team at Google Ventures. From the start, her career has focused on the intersection between design and technology, especially in the realm of 3-D technology platforms. Prior to her work at Google, Shanna was the founder and CEO of Sim Ops Studios (Wild Pockets), a spin-off from Carnegie Mellon University that focused on democratizing 3-D game development. Sim Ops was acquired by Autodesk in 2010, and Shanna worked there as a product line manager responsible for launching the cloud platform and Autodesk 360 application.*

In 2009, Shanna was named one of Business Week's best young entrepreneurs, in 2012 she was featured in the book "Creating Innovators" by Harvard education expert Tony Wagner, and in 2014 she was named one of Silicon Valley Business Journal's Women of Influence. Shanna received both her Master of Entertainment Technology (MET) and a BFA from Carnegie Mellon University.

When I was a student at the ETC in 2004, I began working on a project then called "Hazmat Hotzone," which applied gaming

technology to train emergency responders. The ETC had connected with a lieutenant in the New York Fire Department, and, together, they had come up with the concept and partnered on the project.

It was only a few years after 9/11, and the FDNY was still dealing with the ramifications of the tragedy. We were tasked with helping to create training simulations that would allow first responders to experience situations beyond fire and prepare for everything from handling hazardous materials and biohazards to terrorist attacks.

In just one semester, we made incredible progress. It was clear that the fire departments would really benefit from the product coming to life. Networked game simulations were a great way to train emerging firefighters to deal with a variety of potential scenarios. I spent the next two semesters focused on just this project, which was a bit unusual at the ETC, but it had taken on a life of its own by that point.

Over the course of a year and a half, we would make several trips to New York City along with the prototype, testing it with real firefighters. The fire department was a great advocate. They would help us by giving feedback, setting aside the time, and bringing in groups of trainees.

Jesse Schell was the advisor on the project, and he made a really big difference in my life. Not only was he helpful in giving feedback during the course of the project, but when I realized that it was hard for me to imagine just putting this project on a shelf, graduating, and going off to get a job, he was the one who encouraged me to consider bringing a grant into the university. When that wasn't necessarily

coming to fruition quickly enough, he encouraged me to think about spinning it off and forming a company.

It's hard to believe that this might not have happened at all. After my first year, I got an amazing summer internship in California, working on *The Sims* at EA. I was working on interesting things with amazing coworkers and getting paid as well. At the time, the ETC let you spend your second year working for credit, so I could have easily extended this position for my second year. Still, something inside of me was nagging as I thought about staying on at EA. I knew this was really my last year to be a student and to work on new projects and ideas, not as an employee and not in a workplace. One day I woke up, and decided, "I'm going to go back to Pittsburgh." I really wanted to spend that last year at the ETC. I'm so glad I did because it completely changed the course of my life.

I ended up forming my first company, Sim Ops Studios, out of the Hazmat project. The ETC really prepared me for entrepreneurship in a way that I would have never guessed while I was sitting in those seats as a student. It was a crash course in how to build product, how to do user testing, how to work with people with different backgrounds, how to give feedback, and ultimately how to do a really quick sprint so that you can learn to fail faster and faster. All of those things are probably the most important tenets of actually building a business.

After graduating, the next few years brought a lot of changes and a lot of learning for me and my new company. We tried developing the vision of the training product, only to realize after spending about a year building a product, iterating, and getting the product ready to ship that budgets for fire departments were pretty tight and on very

strict annual cycles. It was clear to us pretty quickly that this was not going to be a giant business opportunity, nor was it necessarily going to support the business for very long. We were going to run out of cash very quickly.

Soon, however, I realized the 3-D technology we had been building for training simulations—which was really about making it very easy to assemble things and create 3-D environments—was potentially interesting if we were to call it an open 3-D world builder, not necessarily just for training.

That change was very interesting to investors at the time, because online virtual worlds like *Second Life* were just beginning to take off. We were able to raise some additional capital, basically bringing that vision to reality at a point when a lot of developers were switching from large boxed software to online experiences. Soon we moved everything into an online-hosted environment. We started using Amazon's Web Services, before cloud storage became the standard.

Eventually, Autodesk came to us. They are the leaders of 3-D tools, and they, too, were transitioning to the cloud. They had to rebuild their tools and business models in support of this new 3-D, cloud-based workflow. We had basically built out some of the earliest cloud-based 3-D workflow tools as we developed our products at Sim Ops. They were immediately interested in our team and experience and ended up acquiring the company in late 2009.

My path to the ETC and entrepreneurship in general was not a direct one. Growing up, my passion was focused on art, drawing, and specifically oil painting. But I also really loved math and science, and I was a good student. It felt like there was nowhere in the world to go if

you liked both of those things. I decided to attend Carnegie Mellon and pursue my BFA with the hope that I may be able to find a way to combine math and science with art. At that time I had no idea what I wanted to do professionally or if something would even exist that combined these disparate passions.

After starting my BFA, I was continuously in search. Each discipline on its own never felt compelling, and I tried multiple artificial ways of combining them together without success. That's when I discovered the course **Building Virtual Worlds**, taught by **Randy Pausch**. I was immediately drawn into this course, and it totally changed my life. I had found the answer to my search in graphics and 3D. That's how I ended up at ETC.

The ETC—and specifically the realm of 3-D graphics—unlocked my passion for solving new challenges and working in interdisciplinary teams. The sum of all parts was something greater than any of us, individually, could do alone. I realized I was not the best computer scientist or 3-D artist on the team, but that I had a passion for pulling it all together and bringing the team's collective vision to life.

That was a light bulb moment for me.

When I reflect back, my journey finally makes sense, and it has all come together in my current company Modsy. From my BFA to my internship on *The Sims* to my first 3-D startup, Modsy now combines all my experiences. My very first lesson the ETC teaches is to "Start with the problem first." In the case of Modsy, we started with a real-world problem and worked backwards into the best solution combining 3-D graphics, technology and services. At Modsy I've had the amazing opportunity to put it all together to build a team, lead a

team, continuously iterate, continuously learn, fail a lot, grow a lot and always move forward to build our vision. You really can't be afraid of failure if you want to build something new and grow as a person. You need to go for it and recognize that the worst case scenario is that you will learn a tremendous amount and come out on the other side with a new perspective. It harkens back to one of the core things that Randy Pausch tried to instill in all of us, which was understanding that failure is part of your path. From failure comes growth.

SHAO ZHANG ('06)

Shao Zhang *is a technical director at Dreamworks Animation Glendale. He was born in Wuhan China and moved to Australia when he was six. At age twelve he moved to the US and received a BA in Electrical Engineering and Computer Science from Pennsylvania State University and a masters from the ETC at Carnegie Mellon University.*

He currently lives with his wife and two children in Burbank, California. By trade he specializes in visual effects supervision and animation production. As hobbies he enjoys landscape photography, vintage technology, and working on machine shop projects.

I came to the ETC in 2004 mainly because I had a few friends at Carnegie Mellon. At the time, I was going through a period where I wasn't doing work I was really interested in. My undergraduate degree was in electrical engineering, but for about a year after I graduated, I was doing random work that wasn't related to what my degree had trained me for. Luckily, a couple of friends told me about the ETC. It was a happy coincidence.

When I visited the ETC for orientation, I could feel that the program would give me a bit more freedom—studying things like visual effects, dramatic storytelling, and things like that—than I had while studying engineering. I always knew that I could do cut-and-dry engineering work, or something more interactive, and I started taking the interactive work more seriously when I realized that many traditional engineering jobs were drying up.

You might watch a lot of movies and play a lot of games, but never seriously consider those fields as potential careers until you're exposed to people in those industries. For me, the ETC was a great conduit for getting that exposure. The ETC provides lots of opportunities to talk to alumni and other companies they partner with, and that was especially helpful for me back in 2004 when we didn't have social media, YouTube, and Internet culture to introduce us to those highly disciplined fields. It all happened organically once I arrived.

After fifteen years, a lot of my memories are starting to get a little hazy, but several of the projects I worked on at the ETC stand out in my mind. One of the more fun ones was the Katamari project I did for BVW. I don't know if anyone knows *Katamari Damacy* anymore; it's a Japanese game where you control a ball that rolls around picking up junk. The ball picks up objects in the world that stick to it like a snowball effect, starting with things like trash on the ground and eventually very large objects like cars and buildings. It keeps growing until you get to the point where it becomes ridiculous.

For the Katamari project, we wanted to have a unique input device, and we thought it would be great to use a big trackball. We took an off-the-shelf trackball and remade all the electrical parts, but scaled

them up twenty or thirty times, so instead of one tiny trackball, we had a bowling ball. It was a very intuitive control, to be able to control your virtual ball with a trackball. It was fun to create a new input device for an already-existing experience and see if that would work or not. But again, I don't even know if people know what trackballs are anymore.

Right after graduating from the ETC, I got a job at Pandemic Studios, which was a game developer. Pandemic was later acquired by Electronic Arts, so as a result I unexpectedly became an Electronic Arts employee. Unfortunately, in 2009, Electronic Arts decided to close our studio, so then I transitioned to DreamWorks in 2010. I've been at DreamWorks ever since.

Today, I'm a technical director, but I'm also doing visual effects work for the marketing department at DreamWorks. I do a lot of what we call "custom animation," which is basically animation that the studio creates but that doesn't end up in the movies. For example, we may do a commercial or promotional spot where our animated characters might appear. Sometimes it becomes visual effect-heavy, because even though we're an animation studio and we just do animation for the features, we get partner requests where they want to see our animated characters in a physical location. You might have to put Rocky and Bullwinkle in the middle of the Rocky Mountains, or in the interior of McDonald's or Denny's. It runs the gamut of what our promotional partners want to do with our characters.

Being able to do all of the various tasks that are required for live-action compositing is something I learned at the ETC, and that definitely helps a lot in what I do at DreamWorks. They didn't hire

me to do what I do now—I just grew into it. It's technically not part of my original job description. But because I was available and I knew how this stuff works, I got the practice on the job. As I got better at it, I became the go-to person.

Some parts of my job these days are glamorous, and some are not as glamorous. A lot of it is production of visual content, of footage, for promoting the movies. At a high level it's building up the advertising and marketing for movies, which drives ticket sales, keeps revenue flowing in, and ultimately keeps the studio alive.

Other things, like taking Rocky and Bullwinkle into the Rockies, are a lot more fun, because you end up out in the middle of nowhere shooting frames for the mountains. That's one of the weird things that Hollywood does. I could be working on a movie set in the middle of the desert, so I'll have to put a whole crew out in the desert. A lot of people don't realize that we have to do a lot of that at an animation studio, but we do. Maybe because we do it internally for the most part, or because a few studios may farm that to another agency or vendor. But since we do all of that work internally, I get to go to the mountains, or cruise ships, or McDonald's to film.

I'm always eager to explore new things and expand, since that was what I wanted to do at the ETC back in 2006. I've found that everything works in cycles. I could be back doing this if I ever decided to do something else. Who knows? It's definitely fun; which is a really great thing. I don't know if you'd be able to do this out of school, right away, but it definitely helped to be able to do it while in school.

ALLISON STYER ('06)

Allison *went to the ETC right out of her undergrad at CMU. After graduating from the ETC, she moved to the Bay Area and has lived there ever since. She has been a software designer for Pixar, where she helped develop the next generation of animation tools and is now at Apple.*

During her time at Apple, she has worked on various productivity tools, mostly focused on Apple Books. Most recently she is working in the Health space. She and her husband Eric have one child, Max.

My undergraduate degree was in Human Computer Interaction (HCI) and Biology from Carnegie Mellon University. While an undergrad, I took the ETC's Building Virtual Worlds (BVW) class, which opened me up to the program. I really enjoyed the class and got a taste of the ETC community, so I ended up applying with one of my best friends, Shanna Tellerman (see p. XX). I entered the ETC immediately after my undergrad, and I quickly realized this would be one of the best experiences of my time at CMU. Everyone in the program was working so hard to build something creative. I found this common goal really inspiring. Ultimately, it taught me how much a group of people can accomplish if they work together.

Once at the ETC I learned that students came from all backgrounds, not just technology (like me) but also journalism, theater, studio arts—this really surprised me and I think it's one of the greatest things about the ETC. There are many different people, with different backgrounds and experiences working on a team towards a common goal. The ETC is very interdisciplinary and really good at promoting this through the projects and students they involve.

I remember the improvisation class with Brenda Harger that all first-year students are required to take and how nervous I was every week before the class started. By the middle of the class, however, I always loved it. Looking back now, it truly taught me so much. Like many of the classes at the ETC, the improv class gave me skills and a sense of confidence that I continue to apply in my everyday life. It taught me to be a better communicator and to be more flexible. Being at the ETC did not feel like school or a job—the work I was collaborating on felt like exactly the type of projects I wanted to spend my time on.

One of the most memorable and impactful projects I worked on was an animation project under Brenda with Give Kids the World, a nonprofit resort for children with life-threatening illnesses and their families. I worked on a large team, a diverse set of folks that included writers, animators, and engineers. Our team created an animated film and viewing experience for children visiting the park and resort. Together we developed characters and scenes and wrote the storyline. We rendered the frames and developed ways to move the experience from the screen to the theater. Although the animated film was no more than ten minutes, we designed a whole multi-sensory viewing experience with bubbles and moving elements within the theatre to engage with children. We also included puppets and more tangible

elements. When we presented the project in Florida, you could immediately tell the reaction and response from the kids was very curious and positive. Seeing how they engaged with the animation and physical experiences was really memorable.

Originally, I thought about going into museum design and creating educational experiences for those settings, but my experience with Give Kids the World led me to get more involved with animation and enter the software design side of that process. In the two positions I've had since the ETC, alumni have helped me connect with these companies. Right after the ETC, I went to work as an Interaction Designer at Pixar Studios and helped develop the software used to animate the movie characters.

Presto, the internal animation software that I worked on, directly powered and improved the quality of the animations. I stayed there for seven years and it was exactly what I wanted to be doing. I was more behind the scenes, but out of personal interest I did get more directly involved with the film *Brave.*

With Pixar, and Apple—both as manager for Apple Books and my current role as design manager for Health Special Projects—I feel fortunate to be involved with companies so devoted to outputting the best possible product. With Apple Books, the goal is to increase accessibility to literature and reading. With the health apps I'm working on now, we're making it easier for Apple users to access important information and live healthier lives.

The practical skills I learned at the ETC stay with me today. The ETC taught me how to manage all aspects of big projects and work under tight deadlines. I have directly transferred these skills into my work

today. The ETC really helped me to explore and develop my passion for merging art and technology. I think pursuing work at this intersection is a wonderful way to give back to society. Where these two worlds meet, you can be a part of really impactful and change-making experiences that have the opportunity to make the world a better place.

MICHAEL AGUSTIN ('07)

Michael Agustin *is the CEO and co-founder of Curie, a camera-based AI assistant. He has always been drawn to democratization and accessibility. He started his career developing games published by Activision to the Xbox, PlayStation, and GameCube. Michael was an engineer on macOS, within Apple's Platform Experience group.*

After Apple, Michael founded GameSalad, which made computer science accessible to the masses. GameSalad empowers three million creators and ten thousand schools to publish to the App Store and aid in STEAM education. Michael has invested and advised for two successfully exited startups, taught design and engineering at Carnegie Mellon University and The University of Texas at Austin, and mentored hundreds of entrepreneurs at TechStars, MaGIC (Southeast Asia's largest accelerator), and Disney Accelerator.

Before coming to the ETC, I was already working in the game industry. It was an engineering-dominant culture that wasn't prone to addressing more global issues in optimal ways, especially when it came to crunch time. One of the first projects I completed, however, was

creating a tool that allowed designers to make AI for various characters without having to know how to code. After developing the tool, I think eight out of the nine game designers had started using it.

That inspired me to develop better tools for the gaming industry. I wanted to give designers a way to express themselves without having to know how to code. I was also interested in potentially reducing the stress of crunch time in the industry. (Actually, it was kind of funny that the crunch-time stress culture from the gaming industry—things like sleeping under our desks on a weekend—was also part of some ETC classes. But our motivation was not profit driven in the same way, so it did feel quite different.)

What attracted me to ETC was CMU's involvement in developing the programming tool Alice. **Randy Pausch** created Alice out of the computer science's natural language project with the aim of enabling everyday people to code in a more intuitive language and environment. At the same time, I was interested in exploring opportunities other than traditional game design programs. I had already had professional-level experience working on games, so unlike those focused on building and improving their portfolios, I was more interested in solving design workflow problems in the game industry. The ETC's program seemed like a good fit because I wasn't looking for training on the technical side of things—I already had that experience—I wanted to explore more as a designer and artist. I wanted to interact with folks.

I was in Randy Pausch's last **Building Virtual World**s classes. It was great because we got to hear a lot of his stories and, eventually, we would even hear his last lecture in person. One of the things I

appreciated in this class was the presentation culture—something I also encountered while working for Apple. An example of this was the project that made it into a **Building Virtual Worlds exhibition** in Carnegie Mellon's McConomy Auditorium, where we exhibited our projects for a wide audience.

A team consisting of Bryan Cash, Daniel Bryner, Brian Hagan, Michelle Pun, and me built a mythology based on the culmination of lots of different ideas. The name of the project was "The Tale of the Lunar Moth," and it told a story through something that looked like Javanese or Thai shadow puppets.

We crafted an origin story for how the lunar moth came to be. The moth would fight different challenging characters in order to serve the good graces of a lunar goddess. During the three—or four—act structure, he would have to solve problems, fighting different antagonists. Every character was based on a different element. There was a rock bear, a liquid octopus, and a fire-breathing snake, along with a live actor portraying the moon.

I was the digital artist on the team. I created all the different characters based on techniques I learned from making style interfaces and icons. There was definitely a lot of different effects that we were inspired by, including parallax scrolling games and anime. We were able to employ low-tech ways of representing each character, which is where the shadow puppets came in.

The characters were controlled as if they were felt pieces attached to a stick, each of which represented different body parts of different creatures. We were effectively modernizing a very ancient tradition using computer vision and projectors. We would use the characters

and move the characters around in different ways. We got them to flip. We employed the animation principle of "Squash and Stretch" with one of the characters, the octopus. You would actually change the shape of the quad of the character, so it would look like you were being squished and expanding.

We used all sorts of very traditional 2-D-style game effects and animation styles from Warner Brothers and Disney to pull together a very cohesive story or mythology around the lunar moth. Apparently, it was so good that it fooled a lot of people who assumed we were referencing an actual ancient mythological story. It was all originally written based on the "hero's journey" from Joseph Cambell's *The Power of Myth*, something we were learning about in another class at the time.

It was fun, how it all came together. Presenting it publicly was something quite different from working in the gaming industry where a lot of what you produce is shipped off in boxes. At the ETC, we were using skills related to improv and theater to present our work directly to an audience.

While I was at the ETC, I was passionate about making accessible resources for game developers that have as low a barrier of entry for creators as possible. The company that I later founded, GameSalad—a platform that allows anyone to develop sophisticated games through a visual programming interface—evolved out of projects that I began at the ETC. One of the projects that I originally pitched was about creating entire games with just a pen, called Tactile Game Design. This was a decade before the Apple Pencil. I felt that this would be a fairly natural way to express games since we had just finished a lot of

projects that favored paper prototyping. The time difference for paper prototyping in which you experience something made enough of a difference that it changed the experience of any given project. That necessitated a new type of tool to be able to respond to that representation of work.

Ultimately, that project didn't go through. We ended up building industry-grade toolset for the open-source development software, Panda 3D. In the process, I built a custom tool that enabled Panda developers to use Maya as a level editor, essentially improving the Panda tool chain.

The other project from that time which informed GameSalad was to adapt the idea of "sketching"—a user experience concept developed by Bill Buxton—along with aspects of improvisation to prototype a game. I worked on this with another ETC student, Joshua Seaver, who did the original experience design of the application and tested it by working with students and educators. We found that improv can be very useful for character-driven games, where a lot of dialogue presented naturally would require also require human-level movement, timing, and intelligence.[1]

Effectively, we were trying to make Panda 3D like a real-time strategy game in terms of its decision making and responsiveness. Almost like

1. Read more in "Game Sketching," a paper by Michael Agustin, Gina Chuang, Albith Delgado, Anthony Ortega, Josh Seaver, and John W. Buchanan, presented at the 2007 ACM Conference in Perth, Australia. Available online: https://dl.acm.org/citation.cfm?id=1306829

a more complex, networked version of the Lunar Moth shadow puppets, the technology would allow users to be like individual puppeteers using improv puppeteering to make everything on the screen interactive. They would even be able to provide dialogue and sound effects using their own voice. We presented that in front of Electronic Arts in Redwood Shores to show how they could potentially use this type of tool for their character-driven games.

Since this point, a lot of what I have been doing in the game industry is about creating tools to make game development easier. In the early days of pitching GameSalad, even investors would ask, "Why would anyone want to make a video game?" You realize that the people who are making decisions about this have never made a game, don't come from the game industry, or didn't grow up with games.

Still, when GameSalad got started, a few key game designers, like Doug Church, Will Wright, and Warren Specter, were coming up with more standardized design languages to enable game development for non-technical users. I've taken the confluence of a lot of these different perspectives and, after building some tools to enable people to make games through iMovie for YouTube, our company got the attention of investors to live the startup journey.

With this we developed what is now GameSalad. It also serves as an education tool for teaching programming concepts, game design, and digital media to users. Eventually, we would have three million developers using our software to reach one hundred million players. It's used in ten thousand schools across the US. We helped launch more apps than I can count for just about every platform, and we also helped emerging markets build apps for all different types of folks.

The global reach has been pretty astonishing. There was a guy in Indonesia who used GameSalad to create a sixty-person game office, one of the most funded game companies in Southeast Asia. Another anecdote I am particularly proud of was the story of nine-year-old Kuwaiti boy who used our tools to build bus route and scheduling apps for people in his community.

It is really amazing to think that something that you made in the garage in Round Rock with a team of your friends from the ETC has had such a global impact.

Some of the lessons I personally got from the ETC are about learning to be empathetic, working outside your comfort zone, and seeing the perspectives of others. You would use any of these skills when managing a difficult boss, pitching to investors, selling to a client, or even marketing your game to the masses. For me, this has helped me to take risks and try to build new things. It is the versatility to go out and start a new company, including my latest venture, Curie, which is focused on re-orienting AI assistants to be more attuned to physical objects and their surrounding environment. But for others who went through the ETC, it has helped them work their way up in large companies. It's teaching us to be comfortable with discomfort, to be adaptive, and to deal with change.

JOSHUA JEFFERY ('09)

Joshua Jeffery *serves as a Senior Experience Design Producer at Google, designing and producing client-facing spaces and interactive technologies for a global portfolio. In his 4 years in this role, he has opened 3 spaces and championed a variety of unique approaches to show-based client briefing experiences.*

Prior to Google, Joshua originated the role of Director of Digital Engagement at The Andy Warhol Museum, where he built the institution's presence in web, mobile app, social media, and in-gallery interactive experiences, and also presented frequently at cultural sector conferences and publications. Joshua holds a Master of Entertainment Technology from Carnegie Mellon University as well as a BFA in Scenic Design, and has various design credits at regional theatres across the US.

Josh is an avid outdoor enthusiast. He is a licensed paragliding pilot, and also serves on various grant committees across the arts and cultural sector.

I like to think that my path to the ETC and a career in themed

entertainment began when I was quite young—perhaps it started during family vacations to theme parks when I was seven. I have always been fascinated by immersive environments that use technology—places that are the result of numerous disciplines coming together—and I particularly love complicated executions that look simple to guests. The closest analog to this in my small hometown in the late '90s and early 2000s were community theatre productions, at which I volunteered throughout my teen years. After high school, I parlayed this experience into my undergraduate career, earning a BFA in Theatrical Design and Production (Scenic Design) in 2007, along with numerous years designing for regional theatres across the US. Theatrical production and education are great preparation for the ETC curriculum and projects, all of which are inherently multidisciplinary and bound by physical deliverables on a definitive timeline.

My passion for these projects followed me to Carnegie Mellon. After a great first year at the ETC, I was having trouble finding an exciting, location-based, technology-infused project for my **third semester,** so I pitched the Get in Line project with a group of fellow students. It was a loose idea when we pitched it. The premise of the project was to create interactive, group-based experiences to people waiting in lines, like those typically found at entertainment experiences like theme parks.

During the first semester, we thought a lot about the gateway to interactivity as phones—something that everybody carries with them. We iterated around a primary input of keypad presses; tones that we would decipher and translate into a result on a large, shared screen guests would watch while waiting in line—essentially turning a

personal, nine-digit keypad into a gaming device. It's important to remember that in early 2008, most phones were "dumb" phones, with the iPhone fresh on the market, and no developer app store yet invented.

After a semester of research, design, and iteration, the project culminated in an experience we implemented on the queue of guests waiting for the **Building Virtual Worlds exhibition**, which at the time was happening in McConomy Auditorium on CMU's main campus. We had approximately one hundred folks playing the game over the course of an hour and received tremendously positive feedback. It was enough for us to re-pitch to the faculty for a second semester.

In the succeeding months, we scaled the approach from a one-time queue for a show to CMU's Spring Carnival, which occurred over numerous days and across the queues of different rides and events around the fairgrounds and campus—a test designed to loosely mimic a theme park-style environment. Aside from scale, the biggest addition in the second semester was a back-end system to allow guests to track their score and progress throughout the carnival, essentially creating a real-world massive-multiplayer online game.

The first and second semester implementations of the project—the Spring Carnival in particular—were great opportunities to get real, raw feedback from guests. We could get honest data without the pressure of a paying client or brand who were demanding perfect execution. Additionally, the real-world deadlines with live guests were akin to the aforementioned curtain rising on a theatrical production: the immovable timeline served as the perfect forcing function to

exercise leadership and improvisational problem solving—something had to work for these guests!

Ten years later, I can draw direct lines from the lessons I learned on ETC projects to my current role as a Senior Design Experience Producer at Google, where I design thematic, physical architecture that is tightly coordinated with technological show elements. Chief among these lessons were a variety of perspectives about being a producer, shared to me from my faculty advisor **Shirley Saldamarco**. These include thinking strategically about the inherent skills that every individual on a team brings to the project—and how the project's structure should adapt to reflect each team member's strengths and weaknesses. She also challenged me to think about how to adjust course and lean into evolving realities as a project develops—in other words, how to fly the plane while rebuilding it.

Another skill I directly apply in my day-to-day at Google is thinking about experience design through the lens of guest empathy and the inherent need to "walk a mile in the guest's shoes." Without this, it is all too easy to be blinded by a team's good ideas and not objectively critique its efficacy. The **Building Virtual Worlds "naive user"** round helps illustrate this point perfectly: guests will always arrive at your digital or physical experience with a set of expectations and realities that you can never plan for.

Perhaps most importantly, the full ETC curriculum prepared me well for a career in entertainment technology in the 21st century: one that is inherently multidisciplinary, that requires on-the-spot problem solving, and always puts the guest at the center of the design process. The improvisational acting course with **Brenda Harger** gave me the

tools to work collaboratively across disciplines and solve tough problems with unconventional thinking. **Visual Story** with **Ralph Vitucio** furthered my skills in communicating complex ideas to diverse teams, across language boundaries. The various semester-long projects sharpened my skills in conversing with software engineers, architects, and engineers.

The work I'm doing is proof that while you can be an expert in a given domain, working across disciplines often results in making something that's better than the sum of its parts. The most gratifying skill I learned at the ETC, however, is the ability to transform people's emotions. As designers and producers in entertainment technology, the fact that we can intercept guests, put smiles on their faces, and change how they feel is frankly a superpower.

CHRISTINE M. BARNES ('11)

Christine M. Barnes *has been sharing the magic of storytelling all of her life. She has enthusiastically expressed this love through her work in theatre and theme parks, enabling others to experience characters, stories, and worlds only dreamed of through their imaginations.*

Christine holds a Bachelor of Arts degree from the Pennsylvania State University and a Masters of Entertainment Technology from Carnegie Mellon University, where she was also honored with the Tornado Award.

Christine has worked on over 150 shows including her Broadway favorite, Hal Holbrook's Mark Twain Tonight!!. Beyond the bright lights of the stage, she was properties supervisor at Rutgers University, where she taught talented students the finer points of props and set decorating for the stage.

Her passions lead her to Walt Disney Imagineering as a set decorator, delivering high-quality immersive experiences to guests. Today she is an art director–props at Universal Creative, where she is excited to continue telling stories of iconic characters and worlds.

Outside of work, Christine is not only a lifetime Girl Scout and a

member of the Brotherhood of Magicians, she is also an active member of the Themed Entertainment Association (TEA).

I am of the era of Randy Pausch's book, *The Last Lecture*. My mother had given it to me, and while reading I realized that Professor Pausch and I had very parallel lives—we both strived for childhood dreams that we had once set aside. I flew to Pittsburgh in the middle of a snowstorm and met with Rebecca Lombardi and Don Marinelli. I immediately knew, and so did Don, I was meant to be there and go through the next phase of my life with them. I applied, and thankfully Don was true to his word and accepted me into the program. I left my theatre life of more than 20 years and started a new journey.

For ten years I was the prop supervisor at Rutgers University's Theatre department. I always looked for ways my students could expand their experiences within the entertainment fields. I knew about the ETC graduate program and would encourage them to consider it after their undergraduate career. I didn't think about it as an option for myself until one of my good friends said to me, "You should look at the program." I didn't think at thirty-five I would go back to school, but the more I thought about it, I realized it was my next act.

I came to the ETC with the idea that I would produce video games or even work for animation studios. During our studio visits, I quickly realized that was not the environment I wanted to be in. I felt wary about my place and perhaps I made the wrong decision leaving the

theatre, the faculty stepped in, and after visiting Thinkwell Group[1] the next day. I immediately thought, "These are my people!"

I was exhilarated by everything at Thinkwell Group—the people, the processes, the environment; I felt excited again. I realized I could actually do the same thing I'd been doing for the last twenty years in a different way. My father was a magician. I had been performing with him since I could sit still and continued in theatre as I grew up. This visit with Thinkwell Group made me realize I could apply the knowledge of storytelling through props to museums and interactive experiences. My last semester at the ETC, I worked as a set decorating intern with Walt Disney Imagineering. It opened my world up and linked my past of theatre to my future in theme parks.

Of all my memorable courses, projects, and experiences at the ETC, my favorite project was The Yume Project in 2010. Our team—Michael Honeck, Yan Lin, David Teot, Andy Ping Li, and myself—worked with Kokoro Robotics from Tokyo, Japan, who developed a humanoid actroid robot that was not getting the intended response from audiences. Children were really intrigued by her, but they were hesitant to approach her. Kokoro Robotics asked the team to look at what it takes to bring the actriod to life allowing her to be more approachable. We were also tasked with creating a more intuitive user interface, allowing animators to quickly develop performances for her.

1. Thinkwell is a global design and production agency creating custom, content-driven experiences in the physical world.

Each of my teammates had additional relevant interests and talents to support the project. Our producer turned out to be a puppeteer and knew character development. Our programmer took on the task of making the robot more favorable to animate. Our sound specialist gave her a new voice and we all got together to create the story. My role was focused on costume, wigs, makeup, and working on developing her skin and overall look.

Together, we developed a persona and narrative for our actroid robot. We named her Yume, the Japanese word for "dream." She was a young woman who was so intrigued by humans who can dream. We gave her a fun outfit so that when she moved, it looked like her whole body moved. She had fun makeup and beautiful black hair with red streaks in it. Her new look allowed us to hide the areas that were originally off-putting and accentuated the areas that made her unique in the robotics field.

As part of our proof of concept, we presented her at the Carnegie Science Center in Pittsburgh. When people walked in they immediately were drawn in and intrigued by her. She wanted to know what dreams were like and would ask visitors "What do you wish for? What are your hopes and dreams?" She'd ask them to sign her dream journal and share their dreams with her.

It was really interesting to watch how people interacted with Yume. They either loved her and or were put off by her, mainly due to her appearance. I remember asking visitors, "Are you put off by the robot?" Often they said, "No, we just don't like how she's dressed." We thought that was really wonderful because the original challenge

was guests were put off by the idea of a very real-looking human robot.

The five of us on the Yume Project were individuals you would never think to pair together, but we made something pretty incredible as a team. We presented our project at TEDx UniPittsburgh in 2010 as well as published a paper entitled *The Yume Project: Artists and Androids* and presented it at the National Robotics Conference in The Netherlands. *National Geographic* was also intrigued by our work and wrote an article called *Us. And them,* by Chris Carroll appearing in the August 2011 issue, which featured our team. All of this showed us that as a team, we were more than the sum of our parts. At the end of the day, we were successful not only because we accomplished what the client needed and wanted, but for our ability to come together as a solid unit.

I learned how to work with people who don't always share your vision from the Yume Project. I learned how to be open and to say "Yes, and." Those two words are part of my everyday life now. The ETC teaches you to be open to new possibilities and ideas from everyone around you. To look at people and ideas from a different perspective, you may just find the hidden gem you were not expecting.

I also learned to push myself outside of my comfort zone by meeting people who expanded my possibilities. I realized that everybody has stories to tell and if you ask them, they'll tell you. It is important to be open to their experiences in order to learn something to make yourself a better contributor.

Every professor I had at the ETC did something that enhanced my life in a different way and assisted me to become a better person. Whether

it be teaching me a new program (with a lot of patience) or giving me an encouraging word when I felt lost. Even after I graduated, every single one of them has become someone important in my life.

I try to go back to the ETC every year to offer my service, advice, and mentorship to current students. I do anything I can to help out because I believe the alumni network is very important in supporting this amazing program. I've personally felt the importance of this network, too. It was an ETC alumni who assisted me in getting my first internship, which lead to my current career; I will always be grateful to him.

I'm currently a Production Art Director–Props in theme parks. I'm learning different processes and still taking my ETC experience and implementing it into my current position. The ETC gave me the confidence to know that I am doing the right thing with my life. Stepping into the world of themed entertainment and being able to work in a theme park, I've seen firsthand that my work truly does offer an opportunity for people to experience things that they would only dream about.

I have had the privilege of being part of teams who have created the most incredible experiences for guests. During one project, I had the honor of bringing a friend to visit the park who fought cancer specifically so she could visit it. She learned she had a battle in front of her the same day the company announced the project to the public. She told the doctors there was no way she was going to let it beat her because she had dreams to fulfill!

I learned her story at a time when I was drained; I had been doing long hours just trying to finish the project and get it to where we

wanted it to be, to be amazing for everyone. Hearing her story gave me the drive to complete the project. I was so honored to be able to surprise her and bring her to the dream she fought so hard to get to. It is the most humbling experience to be a part of something so incredible. A chance for people to live their childhood dreams and experience things they never thought they could. To watch the impact it has on their lives and knowing that without the ETC, this would not have been possible for me.

JAN STEC RUSSO ('11)

Jan Stec Russo *is a lead game designer at Toys For Bob, where he has designed and implemented gameplay mechanics that have brought to life characters from the* Skylanders *franchise, and more recently* Spyro the Dragon*, in the* Spyro Reignited Trilogy. *Jan moved to the US from Panama a decade ago, planning to use his electrical engineering background to build theme park rides, but fell in love with game design along the way.*

For the last six years he has focused on character gameplay design and player systems, obsessing over every detail down to the frame. In his free time, Jan likes to roam the Bay Area, trying to find the perfect pork bun or a new scenic hiking trail; most of the time he finds the pork buns first.

I realize now that the reason why I got into entertainment is to make people happy. While I'm now designing high-budget games, the work that I did at the ETC wasn't very game-design heavy. It was a lot of experimental hardware design. When I first started, I leaned towards location-based entertainment, since my background is in electrical engineering. Through Jesse Schell's **game design class** and an internship at Schell Games in Pittsburgh, I discovered that I really

liked game design. I was like, "You can actually do this for a living? This is what I want to do." I haven't looked back since.

Though I mostly work on software these days, I think a lot of the coolest things I worked on the ETC were crazy hardware experiments. For our last project for **Building Virtual Worlds** in 2009, we made a virtual reality jousting game we called "Joust." My good friend Dan is a huge fan of all things medieval. He really wanted to do a medieval jousting game, but he wanted it to be very physical, so we actually built physical lances and physical shields that we would track in virtual reality.

We wanted people to really feel it when you got hit. We attached a heavy-duty bass speaker to the shield so the sound would shake the shield. Every time you got hit, it would send a pretty beefy sound wave to that bass speaker. The shield felt heavy. You felt the hits. It took some pretty crafty engineering to figure out how to maximize that feeling.

One of my favorite moments that showed me the game's potential was when we were testing it with guests.[1] The thing we had built for guests to sit on looked like a wooden horse. While one guest was playing the game, he actually fell off of the horse. Maybe he wasn't quite expecting the impact, but he actually fell off. It was so impactful to see that we had created that kind of physical response from a video game. One of the most valuable things about the ETC is that students

1. Using the word "guest"—as opposed to "player"—is important in the Building Virtual Worlds class.

are encouraged to take crazy risks like that because bold success stories, as well as spectacular failures, are both celebrated.

Part of the fun of taking crazy risks is doing it with like-minded souls who share your same passion. Teamwork is at the core of the ETC, after all. It's very common for people getting started in the game industry to want to work on the hottest video game properties. But what I learned from both ETC and professional projects is that there's nothing better than working with a team of good, talented people. One of my favorite parts about the jousting project is something that has really resonated from ETC, which is that I will always prefer to work with a cool, friendly team than to work on a super sexy project.

That message was reinforced in other classes, too. **Brenda's improv acting class**, which was easily one of my favorite classes of the ETC, helped us learn to communicate with other people and work as a team. The goal of Brenda's class was not to make you a professional improv actor or get you a job at SNL. The goal was really to learn how to be a team player and how to think in the moment. If I'm in a meeting, for example, and someone asks me a really difficult question, her class taught me how to think on my feet instead of freezing.

One of the funniest exercises that we did in Improv Acting was we were supposed to tell a joke with a really bad set up in front of your classmates, with the microphone on. The purpose of the exercise was to make them laugh at the bad joke. The idea was for you to realize that the humor is not in the content, it's all about the delivery. If you're in a meeting, you can pitch the best idea in the world, but if you don't feel excited about it, if people can't get that passion from you, then it's completely dead in the water. That's one thing that has

really stuck with me from that class and directly impacted my work at Disney, Schell, and Toys For Bob.

For the game *Skylanders Imaginators*, I came up with the idea of having a selfie mode. The idea was for you to pause the game and be able to take a picture of your character, doing something funny, to share with their friends. I really believed this was important because the game was all about creating unique characters, so what better way to show them off? It was technically hard to pull off for a lot of reasons. I knew that going in. I knew I had to make sure that I got people excited about this, and to do that I needed to show something working that would get them excited since it would require a lot of engineering support that would not be easy to get.

Essentially, I put on a smoke-and-mirrors show to my team, using a prototype that could fool anyone into thinking that it was actually taking pictures within the game world (it wasn't really). I made sure to show it while all the office was watching. I planned the presentation carefully, rehearsing what was I going to say. I knew if people didn't see me excited, there would be no chance this would ever get made.

In the end, the presentation was good enough to convince the studio leadership. I got them to agree that we should budget resources to pull this off, because the game would improve as a result. I'm obviously biased, but I think it did make the game a whole lot better. Without that initial excitement, it would never have been possible.

When you're playing games and you see the level of detail that goes into a game mechanic— especially as a designer attuned to spotting those things—it makes you happy to see something that probably took a lot of work. You can tell that something was made by someone

who was really excited about what they were doing because they dug so deep into it. It's neat because it feels like you're connecting with the other designer, on a professional level.

I always had an inclination for entertainment, even during engineering school. I grew up in Panama and saw the prospect of working in the American entertainment industry as a bit of a pipe dream. In 2019, ten years after I started this journey, it has been mind-blowing to see literally millions of fans reacting to my work on the development of the *Spyro Reignited Trilogy*. Working a pretty aggressive project schedule, it was easy to see all the game's warts from the inside out. Then, all of a sudden, the game was announced, the trailer was released. We were at the office staying late working on the game when we saw that there were people on YouTube reacting to it. We saw the millions and millions of hits these YouTube videos got in a very short amount of time—it's crazy to think about the impact we can have through one game. These videos show people crying with joy, reacting to this game that we had been working on. Many of the players are remembering their childhood with the original *Spyro*. Maybe they had some personal problems and *Spyro* was a distraction. Or maybe they have happier memories, and *Spyro* was the game they played with their parents, or perhaps it was the first video game they played.

What's clear is the ability of games to bring people together. One of the baristas at a coffee shop I go to almost every morning always chats with me about video games. One day, he saw me wearing a *Spyro* shirt and he lost his marbles. He screamed, "Oh my god, you're working on *Spyro*. Holy cow, that's incredible!" He grew up in the Bay Area, and I was raised in a totally different part of the world, and yet here we were

bonding over a game we both have strong feelings about. It's really powerful.

It's almost magical that with technology now, you can have that almost immediate reaction and connection to players—a bit like watching that player fall off the horse in our jousting simulator years ago in the ETC. I wish we could reach out to the YouTubers posting reactions to our games and tell them that after seeing those reactions they post on YouTube and their passion for the work we do, motivation around our office went through the roof. Not that we weren't motivated before, but you could feel the positive energy around the office. It was incredible, and I hope they know that we were watching, and that it meant a lot to us.

I hope that I can keep doing this for as long as I'm able to. Some people make people happy because they're good at making drinks, or painting, making coffee, or curing illnesses. Entertainment is my calling—that's what I'm good at. I hope to continue to be able to do that for as long as I can.

ASHLYN SPARROW ('12)

Ashlyn Sparrow *is the Assistant Director of the Weston Game Lab at the University of Chicago's Media Arts, Data and Design Center. She is an experienced game designer whose trajectory in games has been the road less traveled. That in itself has allowed her to think about interactions, designs, and frameworks in a way that's a little more playful. Ashlyn has worked on serious board, card, and Digital game projects along with large-scale public health interventions.*

She works closely with faculty, students, and researchers to lead in the development of serious games, interactive learning experiences, and digital media art with youth and for youth. Ashlyn has a BS in Information Sciences and Technology from the Pennsylvania State University and completed her Master of Entertainment Technology at Carnegie Mellon University in 2012.

I grew up an hour and a half north of Pittsburgh in a town called Farrell, Pennsylvania. Ever since I was a kid, I always wanted to study video games. I have long believed they are a great medium to try new ways of expressing visual art, sound, and interactions. It's different from movies or other stories.

When I was looking at undergrad programs in 2005, I visited Carnegie Mellon and did a tour at the ETC. The program seemed to match my feelings about games. I was so excited by it and thought, "Oh my gosh—can this really be my undergraduate degree?!" Reality hit when I was told, "Nope, this is a master's program."

I was upset, but it also meant that before I even graduated high school, I had decided I would be going to the ETC at some point for graduate school. All I had to do was survive four years of college somewhere else before I could get there. After I graduated from college in 2010, I applied to only one grad school, and that was the ETC. Fortunately, I was accepted. (I'd like to think my portfolio of undergrad projects was pretty strong.)

When I started at the ETC, I began in a smaller cohort off-campus. It was the first year of a partnership program between Carnegie Mellon and the University of Madeira, so my first semester of the program was spent in Funchal on a Portuguese island called Madeira.

In Funchal, we were introduced to entertainment technology principles while also doing trips around the city and going on excursions. This was run by a global ETC faculty member named **Michelle Macau**. Her philosophy—which still resonates with me to this day—was that you can't create experiences for other people unless you go out into the world and gain a broad range of experiences.

Michelle's background was in theater and performance, and this shaped how she thought about trying new things in order to design for people. For me, it meant becoming more comfortable with uncertainty and taking risks.

Being in Funchal meant taking a lot of walks exploring the city's history and interesting architecture. I remember in particular exploring the island's incredible aqueduct system that ran from the northern part to the southern part of the island. Water would trickle down from one end of the island to the other, providing water for all the residents. Seeing all of this was fantastic and beautiful, and it is something I would never have experienced had I not gone to the ETC and accepted this kind of new adventure.

When I finally came to CMU's Pittsburgh campus in the spring, my cohort expanded from the six of us who began in Portugal to twenty or thirty people. In the **Building Virtual Worlds** and **Introduction to Visual Story** courses, we worked on projects in teams, and I quickly found that this was going to be about much more than simply training to develop the types of video games that I grew up playing.

In fact, not everyone in the program was even interested in games. I was surrounded by people with backgrounds in complementary disciplines with so many different interests and skill sets. There were those primarily interested in animation, movies, and 3-D design, others focused on location-based entertainment, and others interested in game design. There were artists of all kinds—2-D artists, 3-D artists, sound designers, actors, and improv artists. I ended up working on a lot more location-based entertainment than I anticipated and also working with live actors and videographers. Just interacting with all these different people opened up my mind to what is possible with games.

Building Virtual Worlds, taught by **Chris Klug**, was my introduction to rapid prototyping, and it really taught me to think about the

people you're inviting to your virtual world. We would think about the players as "guests" in the world that we were crafting. Klug told the story of how Walt Disney constructed Disney World, how he would get on his knees and look at it from the height of a child to see the park from the perspective of those he was building it for. This idea informed our structure and language as builders. We weren't talking about games like traditional gamers or even most game designers—we are talking about games from an experience-design perspective. My team and I created experiences where you walked a person home and helped to overcome their fear of thunder, explored the terrifying journey of a baby turtle finding its way to the ocean just moments after birth, and took on the role of four elements of sun, earth, wind and water, to nurture the little sapling until it bears fruit.

Professionally, the ETC set me up really well. I had all the skills necessary to work in the video game industry. Once I graduated, though, I was more conflicted. I was getting a lot of interviews with large mainstream game companies, which was supposed to be what I always wanted. At the same time, I now also realized that the industry as a whole was not what I wanted it to be. As a black woman, I had become used to being the only black person and perhaps the only woman in a course. At the same time, the thought of going into a predominantly male industry kind of frightened me, as did some of the horror stories about sexism and misogyny.

The ETC helped me uncover what I really wanted to do, which was to work on educational games in a more experimental space. I'm a child of the '90s, so I played all kinds of terrible "edu-tainment" games like *Math Blaster* (which is a pretty awful game without our nostalgia glasses on). What the ETC helped me better recognize was that when

we play more traditional video games, there's a lot of learning happening. The learning that happens when we play games can be quite complex, and it made me question why educational games have to look so different from the regular games that we play.

So, after graduating, I took a leap of faith. Dr. Sergi Bermúdez i Badia, one of my professors from Portugal, sent me a job description for a job involving educational games at the University of Chicago. The game lab at the university was just coming together with a partnership between Dr. Patrick Jagoda, a faculty member in both English and Cinema Media Studies whose research focuses on video games, and Dr. Melissa Gilliam, who was an OB/GYN in the medical center. A game lab started by humanities professor and a medical doctor was a partnership that could have seemed very strange, but the ETC's interdisciplinary approach had prepared me for this. In hindsight, it makes perfect sense. Dr. Gillam was interested in developing educational games for students on the south and west sides of Chicago concerning sexually reproductive health and STEM education generally. And Dr. Jagoda was interested in exploring and experimenting with game forms, play, and transmedia storytelling practices.

I was a bit surprised when I got the job, considering I did not yet have experience with educational games, but I've now been at the university for six years. For the first five years, I was at the Game Changer Chicago Design Lab where I started off as a game designer. After two years, I became the lab director.

ETC had prepared me well for management. Working with researchers, public health professionals, and other game designers, I

was effectively doing a lot of "translational" work. This was something I had gotten used to at the ETC, working with groups of people who I didn't understand at all initially, like the videographers who would talk to me about aperture and lenses, which I was clueless about at that point. In Chicago, it was researchers talking about needing "a randomized control trial."

Thanks to my time at the ETC, I was ready to be okay with uncertainty. It taught me all about that improvisational mantra of "yes, and..." So, when I got to Chicago I said, "OK, yes, and let me go to Wikipedia to figure out what a randomized control trial is. Let's make it happen." If I didn't take the ETC's **improv class** sitting next to a videographer in my cohort, I would have no ability to talk to the videographer who is coming in and recording and documenting the work that we're doing in Chicago to then show the university administrators the importance of this interdisciplinary work that we're doing. Sometimes you just need a little bit of distance for these things to fall into place and to work.

In terms of creating games for social impact, I really think it's important to utilize this medium in a way that provides people agency, creates a safe space for failure, and puts these different strategies in practice. We should think of them as tools to add to existing pedagogical methods. Instead of constantly relying on books, videos, or lectures to educate people, we can actually create game-like experiences that are more like sandboxes. You give people sand, buckets, spades, and say, "Build me a house."

Maybe student A's house looks like a little log cabin, but maybe student B's house looks like a castle. Both of those things satisfy that

goal. Games are usually built to do that, where you can play around in these things. You have an objective, but how you solve that problem is really up to each person individually.

Lately at the Weston Game Lab at the University of Chicago we have been working on integrating Alternate Reality games—effectively collaborative scavenger hunts with narratives laid over top—into the freshman orientation as a means of preparing students for what they might encounter at the university for the first time. In our version of alternate reality games, we are using transmedia storytelling, sometimes using live actors, social media, digital game components on the web, or clues laid in local coffee shops. It really is all dependent on the narrative that we want to craft. The ETC and its curriculum really informed my practice and how I actually teach the students I work with in the lab. We talk about games as broader experiences. I teach my students to think about the guests they are inviting into their worlds.

Part of my ambition is to get students in Chicago who are interested in careers in game development to think differently about games. I try to teach my students that not every game has to be about shooting people or stealing cars. I'm not against those types of games—I play them all the time—but it seems that we have really figured out how to incite anger and rage in games, but it's harder to evoke a sense of wonder, love, confusion, and all these other emotions that we have as people. We can change the mindset of game developers. We can be more thoughtful about the stories that we're telling and the game mechanics that we're pairing with the stories. We need to think of something new, and the way to do that is to follow Michelle Macau's advice and "experience something different."

I want to help other people think differently about games, and I think the ETC and the curriculum that was created has informed my practice and how I actually teach the students I work with. I would do everything over again, even those late nights, those 2:00 AMs of thinking, "Oh my gosh, my world is not working, and I have to present it to the class tomorrow." I would never change it for the world.

ANTHONY PALMA ('12)

Anthony Palma *is the founder and CEO of Jump Gaming, Inc. Before Jump became a game subscription service, the company was Kermdinger Studios, an indie game development studio that worked on a game called Stunt Runner, which now (finally) lives on Jump. Anthony was also the founder and director of the Core Labs Game Accelerator at GSVlabs starting in 2015, where he mentored over fifty different indie game development studios to help them understand the business side of game development.*

Originally from West Virginia, Anthony attended West Virginia University for degrees in Computer Science and Computer Engineering before heading to Carnegie Mellon University for a master's degree in Entertainment Technology. After a brief stint at Walt Disney Imagineering as an intern, he decided indie games were his passion, which led him through a winding games industry path that eventually ended at Jump. His other passions include his wife, his dog Todd, a good IPA, and Pittsburgh pro sports teams.

I'm originally from West Virginia, about an hour outside of Pittsburgh. I went to West Virginia University for my undergrad in

computer science and computer engineering. While I was there, I tried to figure out what to do with my career, like most college students.

I knew that I was enjoying engineering, and particularly computer science, but hadn't figured out what direction I wanted to go yet. As soon as I found out about the ETC, I was immediately blown away by their offerings. Not only was it the best program in the country from one of the top schools in the country, but it was in my backyard. I had been a life-long gamer, but I never imagined that gaming would be a career path for me.

When I first started at the ETC, I was convinced that I was going to be the dumbest kid in the class. The sheer amount of intelligence in the room when I walked in made me feel like I didn't belong. I was just a local kid from West Virginia. I was twenty-two when I entered the program, and some of my classmates were thirty-eight. They had decades of industry experience beyond my little bits of college experience, and it was overwhelming. But at the same time, it was very exciting. Everybody at the ETC was incredibly friendly. The staff was amazing and so supportive. The building is a lot of fun. My initial impressions were that I was going to have to work really hard if I wanted to make an impact there.

I have a couple of favorite projects that I undertook at the ETC. One that sticks out in my mind is an iPad application I worked on for Give Kids the World in Kissimmee, Florida. Give Kids the World is a resort for Make a Wish children and other children going through challenges who want to go to Disney World. They can stay at this resort while they're visiting the Orlando parks. It's almost a mini-

Disney World in itself. It's very accessible for all of the different types of folks that are visiting.

The iPad application we created for them tied into a physical space, and you could interact with the space using the iPad. The space itself was a tall, vertical, cylindrical tower. You could turn around 360° in it. There were lights and speakers inside the tower, but largely it was pretty empty. It just had paintings on the walls, the lights, and some sounds. With the iPad though, users could essentially see through a window into another world. We used the gyroscope in the iPad so that when you moved it around, the view that you were seeing moved with you. In the virtual world, you would be able to see fairies and other characters. Depending on where you tapped on the screen or which direction you were facing, you would be able to hear and see it in the space. It was like interacting with an invisible world you could only see through your iPad. The project technically was pretty complex, but it was a very rewarding experience to be able to go down there and watch children interacting with the app. That was also my first experience interacting with external users, particularly with clients that had certain needs.

That was the coolest project that I worked on while I was at the ETC. Every once in a while, I'll see Give Kids the World pop up in the news and it warms my heart to know that I worked on something that's still potentially alive there today. It was an incredibly enriching experience. I had always wanted to work on games and always thought about consumers at home. It's easy to not think about people with different types of needs. Being able to impact their lives—even in some tiny, positive way—is very fulfilling. It's also neat to know that it's a

physical installation. It's not just an iPad app that's going to go out of date.

While I was living in LA for my internship with Disney Imagineering, I didn't have any local friends other than my roommate and a couple of people that I worked with, so, largely, my evenings were open. A couple of my friends from the ETC and I started working on an iPhone game in those evenings. We came up with a simple idea in one of our game design classes the semester before my internship, and we decided we wanted to finish it and actually launch it in the App Store. That process of taking an idea from concept to reality and beyond was the most rewarding thing that I had ever worked on up to that point.

As much as I enjoyed my summer internship with Disney Imagineering in LA, I knew that I wanted to spin out my own game studio when I graduated. I started working with Jesse Schell at the ETC when I returned from my internship. He was a mentor of mine, teaching me how to get off the ground with a start-up. It ended up defining my career path. I don't ever really see myself working for a large company again unless a very unique opportunity comes up. I think the entrepreneurial spirit flows through me quite deeply at this point.

When I was starting to plan my first company, I was lucky enough to pull in three talented classmates from the ETC. It was two artists and a designer that I was good friends with during our program, and they were also pretty excited about pursuing an indie game start-up. I did all the research that I possibly could, because I do not come from a business background. I'd never taken a business class, so founding a

company was a trial by fire for me. Working with Jesse Schell was very helpful in understanding what I needed to do to succeed.

In the spring semester of 2012 (our final year at the ETC) myself and those three classmates—Russell Mester, Ethan Gagorik, and Ross Treyz—actually did spin out a company. We founded an LLC and started working on our first game, *Stunt Runner.* The ETC was gracious enough to give us space inside their building to be able to pursue that. It actually
counted as our last semester of coursework, because we were pursuing a co-op with a company—it just happened to be our own start-up.

It was a very cool and unique thing that they had only done once or twice; students usually go on co-ops with other companies to get real-world experience. This was a way that we could have the same experience, but through building our own company. That was incredibly impactful because it gave us a five or six month head start—we didn't need to find office space or buy other supplies. We could just work inside the school environment we were used to with the teammates that we knew closely. It was a massive advantage for us to be able to stay in direct contact with fellow entrepreneurs that we met through the ETC as well. It was a great start for us as a very young company trying to do something new.

After graduating, we got into a start-up accelerator program in the Bay Area that summer, so we all moved out to California. The company was initially called Kermdinger Studios. It was a terrible name. Ironically, it's actually the same company entity that we currently utilize to run our indie game platform, Jump. We just

changed the legal name in 2015 when we pivoted to work on this new platform.

Our biggest achievement as a game studio was that we actually finished and launched the game that we had worked on for a couple of years. Interestingly enough, we launched it on Jump, on the platform that we ended up building as a company moving forward. It was a great experience in building out the game and taking it to launch, even if it didn't get played by very many people in the end.

We also got invited to a couple of trade shows to show off the game to the public. All of those were amazing experiences. Unfortunately, it was around the time when the indie game market really started blowing up in terms of the number of games that were being released, mainly because Steam Greenlight came to market and because game development tools like Unity became free and very accessible.

Steam is the main game store, like iTunes, where everybody buys their games for PC. Before they released Steam Greenlight, you had to submit your game to be approved. If you were approved, you were guaranteed something like 50,000-unit sales because it was such a big deal to be on Steam.

Steam Greenlight was a process for the community to vote on games that could come to the platform. It essentially just opened up the floodgates and Steam became a much more difficult place to find your footing as a game from a small team. It was very difficult for us to find any audience, let alone our target audience.

The reason that Jump was born was that we saw the challenges firsthand of being indie developers in that early to mid-twenty-teens

world. We wanted to fix it for other developers. That's where the idea for Jump came from, which is the platform that we've built today.

Jump is a subscription service for indie games on Windows, Mac, and Linux. We use proprietary on-demand technology that allows us to deliver games to users in seconds. They run as if they were installed, meaning they run smoothly with no latency or quality issues.

Refining the business model gamers and game developers are used to has been challenging. While Steam is largely a storefront—you have to buy games individually there—Jump is a subscription service. You can subscribe for five dollars a month and get unlimited access to our library of 120 games.

Gamers are trying to figure out what business models they like today, so we're currently looking at adding some new features and ways to access our platform, including a completely free access tier, which will be coming sometime in 2020. In general, Jump is a great way to discover new indie games and to be able to play games on-demand across multiple devices, which was our goal from the outset.

The ETC has absolutely been impactful throughout my career thus far. Two of the biggest things I got out of my time there that I would have never expected were presentation and improvisation skills. We had to take an improv class at the ETC. Then, every semester, we had to present to the entire group about four or five times.

Our professors didn't care so much about what we were presenting—they cared about our stage presence, or how we presented. Today, as the CEO of a company, I'm either on stage or in boardrooms pitching to investors perpetually, and I know that those

skills matter almost more than the product itself when you're an early-stage company.

The ETC also prepared me for leadership. We worked in small, interdisciplinary teams every semester on big projects that simulated a real-world project. Because of that, since I had led a team or two at the ETC, I was able to dive into running my own company quite easily. I had a decent grasp of some management tactics I wanted to try and was able to adapt them as I grew as a leader. The ETC was a really great training ground for the intangibles, which helped me become a better entrepreneur.

It has also been amazing to see my work making an impact in people's lives. For the two games I built, I think the impact was just to make people smile, even if it was just the few hundred that ever saw our games. It was a great sense of accomplishment for me to be able to see people enjoying something that I made, no matter how small it was. With Jump, and moving forward in my career, I hope to continue to make a lasting impact on both gamers and game developers by creating memorable experiences that they genuinely enjoy.

REBECCA GRABMAN ('12)

Rebecca Grabman *is the manager of MAKESHOP at Children's Museum of Pittsburgh. She gets paid to play, make, teach and learn with and from the visitors and staff. It's basically the best job ever. In the past she has worked as a costume shop manager, digital media lab assistant, freelance graphic designer, teacher's assistant, motion graphics artist and, on one memorable occasion, as Fabio's hair stand-in.*

She is passionate about creating tools and experiences that encourage communication, conversation and collaboration for educational and entertainment purposes, using combinations of physical and digital interfaces to create meaningful and immersive environments. Rebecca holds a Bachelor of Arts from Bennington College and a Master of Entertainment Technology from Carnegie Mellon. She also got a high school diploma from an alternative public school in Alaska, but nobody's ever heard of that place.

During my first semester at the ETC, when I participated in **Building Virtual Worlds**, the camaraderie was so strong. That class and the ETC in general—was a whole lifestyle. My classmates and I were in

the building all the time, having Nerf fights at 3 am and things like that.

My introduction to the client-facing projects that we do in the **second semester** was the Star Tower project for Give Kids the World. We had been working in teams already, but having a longer timeline to do something big was important. [1]

We had eight people on our team: Anthony Palma, Cassandra Ichniowski, Dani Belko, Hyemi Do, Katherine Rubenstein, Matt Stewart, Tom Corbett, and myself. I'm pretty sure we were the largest team that semester, and it was a whirlwind. We were working with ITEC, a construction and entertainment company, and Give Kids the World. Give Kids the World Village is an organization in Florida that provides free vacations for kids with chronic or life-threatening conditions, particularly when they're visiting the theme parks in the area through programs like Make A Wish Foundation. It's a place where families can stay that is welcoming and fully accessible. It's also a fun resort type of experience if the children are not well enough to, let's say, go to Disney or Universal.

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1. The Starscape team developed an interactive experience for the "Star Tower." Families visiting Give Kids the World are invited to stay at the resort free of charge, and part of their trip includes a visit to the Star Fairy. The child will personalize a small gold star, then come back the next day to find their star on the ceiling of the Castle of Miracles. The project further develops the mythology of the Star Fairy and provides families with a meaningful and close-up connection with an object that is physically out of reach.

Part of the experience is that each child gets a star that will essentially stay in the Village forever. A previous ETC project had completed an interactive kiosk where kids put their autographed star, and an on-screen fairy "takes it" to put it in the "sky." The Village was running out of ceiling space to hold all of these stars and decided to build a tower dedicated to them, in order continue the tradition.

In terms of what we worked on for the project, there were certain things that were already determined: the location, the design of the tower, the timeline. A lot of the work that we did was to create a way for kids to be able to see their stars, even if the stars are thirty feet in the air. Our team worked a lot with camera control and integrated lighting. There was a database created for the volunteers to record where each star was placed, and an AR app for an iPad that allows visitors to explore the magical world "hidden" inside the tower. After exploring the world, the Star Fairy appears on screen, guiding them to look at where in the tower their star is hung.

There were a lot of different pieces and parts that our team had to figure out, both how to make the experience work, and how to work together. The project included two trips to Florida, including working out of a trailer for two weeks, coordinating between all of the different people involved, and working on a very tight timeline for this amazing nonprofit. It was an amazing first project experience, but a very intensive one. I was also a TA for the spring **BVW** class at the time, too, and so was Dani Belko, who was also on the team. That all kept me pretty busy. It really set the tone for the rest of my time at the ETC.

We were constantly busy and stressed out, but we did do a good job of

making a point of having weekly team dinners. We actually kept that up the whole semester. A fond memory that I have of that project, in terms of maintaining our team's sanity, was that each time somebody got me to laugh so hard that I snorted, they got a point. On Wednesday afternoons we would go to The Milkshake Factory's half-price happy hour, and I would buy the person with the most points a milkshake.

I went to an alternative public high school that was very seminar-based and focused on conversation and sharing ideas. I also went to a liberal arts college. When I got to the ETC, something that struck me was the varying approaches to communication and collaboration between people with different cultural and academic backgrounds, and levels of work experience.

In second semester I also audited an **improv class** just to take a break and have an excuse to do something silly. For me, improv felt like almost a necessity. I loved watching people realize that they were truly funny or could act on the spot to answer a question or solve a problem. Improv broke down a lot of barriers in meeting people and feeling comfortable with each other. It wasn't a totally new or different experience for me, but the class required face-to-face engagement from students. For many, it was uncomfortable or very new, and it was really fascinating to watch how everybody grew and adapted.

When I was at the ETC, my cohort was particularly interested in the game industry. I was thinking, "I don't want to go into this. That's so broad! What are the physical elements of this? I don't really know." It

was sometime at the end of the first year, I remember getting into an elevator with Drew Davidson and he said, "I have a job for you."

Since I was a TA, I figured the job he had in mind was something like moving computers. I was like, "OK, cool, whatever you want me to do. What can I help with?" He said, "No, no, no, I have a job for you." He said that the Children's Museum of Pittsburgh was planning to open a makerspace, and they were looking for interns for the summer. He knew that was my thing, making physical stuff.

I was terrified of children, though. I said, "I don't know anything about kids. I've never worked with kids. They're small and they're scary, and I don't understand them, but I guess I'll apply for this and see what happens."

I did apply and they hired me for the summer, along with Pei Hong Tan and Felix Park. That summer, the three of us designed experiences in a couple of months and were thinking about tools and materials and kids, working with researchers and reflecting and thinking about designing different museum experiences for visitors of all ages and abilities.

Eventually, I came back as a part-time employee, and soon became a full-time Teaching Artist (alongside Christian Tsu-Raun) and eventually the manager of the Children's Museum makerspace. Eight years later, I oversee the makerspace and the lead the programs that are taking place there; I also get to travel around the country to speak and teach. In April of 2019, we opened the MuseumLab building, with another makerspace, and now I get to work with the team there as well. Falling into my current job was great. I still love it and that was certainly a way the ETC has changed my life.

I have a background in both art and technology, so it was really wonderful at the ETC to be exposed to so many different incredibly talented and knowledgeable people, who were really experts in their fields, whether it be art, technology, or something else. The ETC was certainly instrumental in making me more aware of what was going on in the industry, what was "cool," and getting to pursue opportunities, like at the Children's Museum of Pittsburgh, both during school and after.

I think the ETC helped me reflect on what I value in experiences and the different types of ways people experience the world. The projects I was involved in creating at the ETC were not related to the museum industry, but dealt with similar issues like creating an environment, looking at the different places people visit and the experiences they have there. This exposure and reflection really influenced how I work today.

One thing that's been a really lovely and fun part of working in Pittsburgh—remaining in Pittsburgh is never something I thought would happen—is still being connected to the ETC, getting to work with current students in a client role, and helping them through the creative process as an alumna. Hopefully that makes it easier for them because I understand the challenges they are going through in their projects.

Pretty much every ETC student I've met through my work at the museum is lovely, serious, and creative. For the most part, they have selected to work on a museum project because they're interested in location-based entertainment (LBE). Anisha Deshmane (p.XX), from the class below me at the ETC, is someone who I never worked with

directly, but I was the client contact for the project she worked on at the museum, which included creating programming interfaces for young children, and she's now a good friend. She used that project to get experience with LBE, and she has since worked on projects for other museums and theme parks.

I'm passionate about empowering people of all ages, but especially young people, to change the way that they think about things and interact with the world. One of the best ways to empower someone is by creating something, whether digitally or physically, using tools and their hands. It's important for people to feel like they have the ability to make something and make a change, whether it's something that makes them happy or makes the world better—whatever change that is, that's a big part of being in a creative community like the ETC. I want people to be inspired to take these ideas about design and interaction and use tech as a tool to tell a story and create joy.

ANISHA DESHMANE ('13)

As an assistant producer at Walt Disney Imagineering, ***Anisha Deshmane*** *guides the development of interactive experiences, most recently on the Star Wars: Datapad mobile experience for Star Wars: Galaxy's Edge. Her passion lies at the intersection of tangible, interactive, technology-driven experiences that cater to a wide audience.*

Prior to her role at WDI, Anisha worked as a game designer at Schell Games on projects at children's museums, zoos, and in theme parks, on platforms ranging from mobile to virtual reality. She earned her Bachelor of Science in Art and Design in Architecture from the Massachusetts Institute of Technology, with a minor in Comparative Media Studies in 2011, and a Master of Entertainment Technology from Carnegie Mellon University in 2013.

I wasn't always interested in game development, or even theme park design. My original career of choice was architecture because it sat between engineering and art, two subjects I knew I loved and couldn't choose between. Interactive location-based entertainment wasn't even on my radar, so the fact that I wound up here is a bit of a winding story.

I remember my time at MIT as an undergrad primarily as long nights in the architecture studio, creating models and drawings of buildings and spaces. But at such an engineering-focused school, I was constantly surrounded by a flurry of new technologies and innovations, which were a fabulous distraction that influenced a lot of my design process. Just as I couldn't originally choose between art and engineering, I found myself compelled to explore a number of topics ranging from film and animation to computer graphics programming, and by the time I graduated, I had cultivated a foundation in design principles that spanned a wide variety of computational and media applications.

When looking for graduate programs, I searched for curriculums that focused on creative skills alongside developing technologies. The ETC stood out because it offered a path to cultivate a hybrid role, similar to how architecture blended my original interests. I entered the program wanting to continue blending design and technology in the world of animation through computer-generated landscapes and procedural modeling.

I'm often asked if the transition to the ETC was challenging—most students had a hard time transitioning to the long hours, but I was familiar with late nights from the project-based curriculum of architecture education. What actually puzzled me when I arrived was the wide variety of students' backgrounds. I expected software engineers and artists, but was surprised by psychologists, accountants, and business majors. I wondered how all of these specialties were going to fit together.

One of the first things we were told at the ETC was that if we wanted

to be a game designer, or we wanted to do animation, then we needed to start doing it. I feel like that mentality, and that explicit permission, enabled a lot of incoming students to explore new disciplines and apply what they know to new projects. Everyone had a direction for growth.

I originally wanted to focus my time at the ETC on animation projects, but the ETC faculty had another plan for me. Instead of a short film project available that semester, I'd been assigned to the first of many MAKESHOP projects that ETC students have created for the Children's Museum of Pittsburgh. Ours was assigned the goal of teaching computer programming to five-year-olds.

It was an unusual task particularly because the intended audience was very young. MAKESHOP is a very tangible space, where children and families can explore "real stuff"—how things actually work and are created with real tools to do the job. The space facilitates small projects using things like drills, hand tools, sewing machines, and circuits. Their philosophy for teaching children in such a hands-on way inspired our team to infuse computational thinking into physical objects.

I quickly realized this approach required a multi-disciplinary team and began to understand the importance of the ETC's diverse skill sets. While I brought experience with simplified programming systems like Scratch, and could build physical components, our project utilized our teammate's skills in mechanical engineering, technical art, computer science, and visual artists in order to fulfill the project's goals. The team infused MAKESHOP's hands-on philosophy into a tangible programming system of wooden puzzle

blocks that created characters with attributes the children could modify, and a tech-enabled table that could sense the pieces and project a digital version of the characters onto a surface in the space.

MAKESHOP forced me to think about the concept of "programming" differently from how I learned it in class. I had always learned programming in an abstracted way that focused on frameworks and audience, and less on the technical comprehension of a topic. At the Children's Museum of Pittsburgh, we were designing for different levels of engagement with the topic, allowing visitors to graduate from "I can sort blocks," to "these blocks fit together in a logical way," to "if I change this one block, another other thing changes." We saw visitors who were older than our target demographic coming in to play because these literal and abstract building blocks resonated with them. That progression of comprehension is something that could only have come from a blend of tangible and digital interactions.

While I hadn't noticed it at the time, the MAKESHOP project utilized every single one of the skills I'd developed prior to the ETC, but in a new way I could never have anticipated. I'm thankful for the faculty at the ETC who recognized that and encouraged me to explore those topics through a lens I hadn't previously considered, and for my teammates who I learned so much from. The project made the blending of physical and digital interactions much more practical and exposed me to the possibilities of using those skills for museums, which eventually extended to theme parks.

After graduation, I joined Schell Games as a game designer. I was hungry to put the experience I'd gained from the ETC into action in

the real world, and I couldn't wait to uncover new perspectives to augment my design toolkit. While I found something new and unique in each of my projects, the most eye-opening was S.E.C.R.E.T. at the Children's Museum of Houston.

S.E.C.R.E.T. is a museum-wide secret agent experience at the Children's Museum of Houston that adds a layer of storytelling to the existing museum landscape. Agents are equipped for each mission with a radio-frequency identification (RFID) wristband, paper case-file booklet, and a physical gadget—a tool specific to each mission's story—ranging from red-filter glasses and decoder cards to a scope or UV light.

Agents use their case file to complete puzzles, search for clues, and complete objectives around the museum to help save the day. These range from simple items hidden in plain sight to large-scale digital and physical interfaces installed to blend into the museum landscape.

Our team developed physical and digital interfaces that leveraged the museum in unique ways, linked together in a compelling story. While the project started out feeling similar to MAKESHOP—combining design, technology, and physical interfaces—I quickly realized that the stakes were much different.

Where the MAKESHOP project only had to be robust enough to withstand wear by young children, the Children's Museum of Houston was relying on S.E.C.R.E.T. as a ticketed activity that would drive revenue, so it had to be reliable and generate value for their guests. We had to think about the project from the perspective of the operating team, not just from the perspective of the guest. Our

designs incorporated load-balancing systems and flexibility to account for any instances of failure on any one of our physical interfaces.

While the project was similar to our MAKESHOP project, the jump in scale from designing a single table to a museum-wide connected activity gave me a fresh perspective on my designs and helped inform my future projects.

Through nearly five years at Schell Games, I had developed experiences on a wide variety of platforms and explored topics from wildlife conservation to space travel. When I accepted a position at Walt Disney Imagineering as a creative producer for interactive projects, the transition was both exciting and terrifying. I wasn't sure if my toolkit was robust enough, but I was eager for the challenge of learning as much as I could as quickly as possible.

My first project ended up being part of the most technologically advanced and largest single-themed land expansion at a Disney park to date: *Star Wars:* Galaxy's Edge. As a fully immersive land, we were embarking on a brand-new concept—creating a place where guests could step into the world of *Star Wars* and live out their own *Star Wars* story. No pressure, right?

Luckily, I found myself surrounded by another team with a vast diversity of skillsets—from live entertainment and show writers to creative designers and software engineers. While it all seemed overwhelmingly complex at first, I have been amazed by the shared dedication to building a high level of immersion from each discipline's unique vantage point—a mindset I learned at the ETC that was pivotal in developing and operationalizing the technology that would enable the land's ambitious creative goals.

At *Star Wars:* Galaxy's Edge, guests needed tools to explore a remote outpost, discover compelling stories that turn the land into a real place, and form their own identity while there. The *Star Wars:* Datapad game in the Play Disney Parks mobile app turns guests' phones into a tool from the *Star Wars* universe that allows them to explore the village of Black Spire Outpost. Guests use their Datapads to hack into ships and droids, scan crates to discover what's inside them, translate the Aurebesh language into English, and intercept transmissions to read up on anything from encrypted Resistance movements to the latest gossip from the Cantina. Guests can use those tools to complete jobs for locals, and even get paid by Hondo Ohnaka for piloting the *Millennium Falcon* on a smuggling run. The things guests choose to do in the land, and whether those actions help the Resistance or First Order, begin to form a guest's reputation that affects their overall experience.

As we developed the Datapad gameplay, a lot of the same design principles cropped up again and again that I recognized from previous projects. The Datapad needed to cater to a wide audience of different ages, comprehension levels, and Star Wars fandom. It needed to enable incredibly physical moments, which were powered by the innovative technological infrastructure built into the land. It also needed to deliver operational robustness and flexibility, as well as be a value driver for the parks. I brought my understanding of designing interactions between digital interfaces and physical locations, but this time I had to adapt these tools to the scale of a village.

As a former architecture student, I found the land itself a breathtaking work of immersive design and admired the details around every corner. I am still overwhelmed by the opportunity to

blend my original passion with new technologies that tie our guests' experience to the world around them, not just by interacting with the buildings and set pieces, but creating connections to the characters that live there, and stories of the land. The Datapad allows our guests to become part of the story, rather than seeing someone else live it. The technology is what turns the land itself into a platform for telling compelling stories that can grow and change over time. I hope that other designers use this as inspiration for the future.

From a single table at MAKESHOP, to multiple digital and tangible interfaces in S.E.C.R.E.T., to a land-wide mobile experience at *Star Wars:* Galaxy's Edge, I've been growing as much as my projects have been growing. Each project has been augmenting my toolkit with new ways to leverage technology and blend skills together to create unique, impactful experiences—no matter the scale. I've been learning from teams who bring unique perspectives to the table, tackling new challenges each project presents, and absorbing new skills to add to my hybrid toolkit. The pattern I notice, underlying all of this, is that the excitement and capacity to grow with each new opportunity is a foundation I learned at the ETC that pays off over and over again.

CHUCK TSUNG-HAN LEE ('16)

***Chuck Tsung**-Han Lee is an entrepreneur and a VR/AR evangelist. He worked for Microsoft XBOX and the pioneer VR content company, Wevr. He was also the project lead for the narrative VR film Imago and the MR game Garden.*

In July 2016, Chuck co-founded Construct Studio, a San Francisco-based VR/AR game studio and creative production agency. He is currently the head of Construct Studio.

I moved to the US five years ago from Taiwan to attend the ETC. My undergraduate degree was in computer science. During my last year of my undergrad, I wasn't sure what I wanted to do after I graduated, because I hadn't ever written any code, and coding isn't really my thing.

One of my professors in Taiwan was actually a graduate of Carnegie Mellon. He told me, "There's a really interesting program at CMU called the ETC," and encouraged me to apply for it, so I looked into

the program. I thought, "Wow," the program is all about game development, game design, and animation. I applied.

My two years in the ETC were life-changing because I hadn't known what I wanted to do in my career until I joined the ETC. In the first semester, I started the **Building Virtual Worlds** course. I learned a lot there, like how to prototype games and experiences. That was the first time I tried virtual reality. The year I joined the ETC, there were too many programmers, so in BVW I was assigned as an artist because of my knowledge of Photoshop. That was how I learned to use Maya, Illustrator, and Premier, and I ended up falling in love with those apps.

I credit the ETC with making me a better producer, because I now have a computer science background as well as the background of an artist. I also like to talk to people and listen to people, to learn more about what they want and what they need, and to make friends. I would say that managing and leading people is one of my greatest strengths. That has really helped me a lot in the role I am in now.

My experience with virtual reality changed me a lot. I started thinking, "Oh, this is where my passion is." I think virtual reality is going to change the world.

After BVW, in my second semester at the ETC, I worked with Joel Ogden, Amy Stewart, and a bunch of other ETC-ers on a project called Project Hypnos. With this project, we tried to use virtual reality as a medium to tell a story. Our advisors, Ralph Vituccio and Brenda Harger, were really helpful.

We wanted to tell a story from the perspective of a disabled person. As

a result, we learned that virtual reality can become a really powerful tool for empathy. You can put yourself into someone else's shoes and experience that person's story and perspective.

At the outset of our work on Project Hypnos, we didn't know anything about telling a story with virtual reality. During BVW, we used virtual reality to quickly prototype games and experiences, but with this project, we had to explore different ways to shoot a film.

Luckily, one of my teammates was a film director with experience in traditional filmmaking. So, we started doing virtual reality like a traditional film first, but we quickly realized that it didn't work at all. It was a third-person point of view, and it just didn't feel right.

We were also trying to create the experience from the perspective of a little girl, which meant that everyone else in the scene had to be very big. And eventually, because we were using Samsung Gear VR as the medium, we only had three degrees of freedom, which meant that the user wasn't able to walk around—just move their head around. They can't use their hands or anything. And if the player can't move around and can't interact with the experience, what can they be?

Joel Ogden—my partner at the time—his father is a therapist for people with locked-in syndrome. Patients with locked-in syndrome understand what is happening in the world around them, but they aren't able to move around at all. That's where we got inspired, and started to think, "Why don't we tell the story from the perspective of a patient with locked-in syndrome?"

In the story, called *Model*, you are a patient with locked-in syndrome, and your uncle and all of your friends don't believe that you are

actually there anymore. But your mom and your sister do still believe that you are aware. Your uncle basically talks shit about you in front of you, saying things like, "See, he's just a vegetable!" It's really heartbreaking as a viewer, because you feel like he is talking about you.

We combined live-action and 3-D content, and also ballet, because JD's wife is a ballet choreographer. We used ballet to suggest that you, as the patient, are dancing in your mind; you are still alive and powerful in your brain. You really want to tell everyone around you that you're fine, but you can't.

With that narrative virtual reality experience, called Imago, we got accepted into SIGGRAPH 2016, the top 3-D-rendering conference in the world.

Imago wasn't the only project of mine that got into SIGGRAPH. In that same year, my second year in the ETC, I also worked on a game called *Garden Mixed Reality*. It uses Google Project Tango to create interactive, 3-D games where you basically use your hands to build your own garden in a 3-D world.

Our advisor Carl Rosendahl was the one who inspired us to use Project Tango, which has the ability to walk around in space and to quickly generate the 3-D environment by its special camera. We were basically just trying to figure out what we could do with Project Tango, using our hands, feet, body, or any other object to create the same shape in the 3-D world. Eventually, we realized that a garden made the most sense. In the game, you need to walk around the space, use your hands to create 3-D blocks, and then find a clue in the game and achieve some goals.

I also got a lot of great work experience during my time at the ETC. I was supposed to spend my last semester in Pittsburgh, but because I'm from Taiwan, I hated the weather in Pittsburgh. So I decided to get a co-op at the ETC's Silicon Valley campus, and I ended up working for Tony Parisi, a friend of Carl's, at his company, Wevr. At the time, Wevr was trying to become the Netflix of virtual reality—to collect all kinds of VR content and put it on a platform people could subscribe to. That co-op allowed me to build connections with a lot of different people in the Bay Area and Los Angeles.

I'm currently the CEO and co-founder of Construct Studio. I started the company with other ETC-ers in 2016, right after I graduated. The ETC-ers are Joel Ogden (who graduated in 2015), Amy Stewart and Larry Yu-Cheng Chang (who both graduated in 2016). Nigel Randall and Brentt Kasmiskie also joined us in the beginning phase of Construct Studio. It's basically a ETC-er start-up.

Starting Construct Studio seemed like a natural choice after I graduated from the ETC. First, I had worked with Joel and Amy on Project Hypnos, and we found that we worked well together. Also, there weren't a lot of companies that I really wanted to join. The five of us ended up taking a road trip from Pittsburgh to Silicon Valley when we decided to start our company. Another reason why I wanted to start a company was because of Carl Rosendahl's Entrepreneurship class. Carl had been an entrepreneur before becoming a professor at the ETC, and I learned a lot from him.

Today, Construct Studio is a VR/AR game development studio based in the San Francisco Bay area. We created one of the first interactive VR storytelling experiences, called *The Price of Freedom.*

The Price of Freedom is based on the real events of the CIA's mind control program. We used real documents from the CIA to create a VR experience. In the game, you are a main character in a movie. You figure out who you are and where you are through your actions.

After we released *The Price of Freedom*, we were lucky enough to get featured at the Sundance Film Festival in 2017. Also, we got nominated as best narrative VR and narrative achievement award at Unity Vision Summit 2017.

After that, we started talking to a lot of developers and artists and realized that many artists don't know how to write code, but they want to get involved in VR/AR development because VR/AR is an amazing media to create stories and immersive experiences.

After those conversations, we pivoted a little bit and start making a tool called VERA. VERA is a template system for creating interactive 3-D content without writing code, so anyone can create this content, even without a background in computer science. Professional developers and artists have been the first to use VERA because they know the software, and we've been able to accelerate their production by at least eighty percent.

One of our most recent projects is a new game called "Home a Drone." It's a drone-fighting VR game that blends tower defense and first-person shooter. We're still in the beginning stages with this project, but starting in March 2020, we will release the game for early access on Steam, start marketing it, and try to sell as many copies as we can.

Everything I learned at the ETC has been so impactful in my career.

At Construct Studio, because we are all ETC graduates, we bring the same habits to the company and to the work we do every day. Also, it was at the ETC that I discovered my passion for virtual reality. I still believe that VR is changing the world, even if it's happening more slowly than I expected.

SARAH TAN ('17)

Sarah Tan *is a gameplay engineer on Rec Room, one of the most popular (and free!) social VR games available on the market. It is also available on PC (non-VR), and iOS devices. Since joining the VR industry in January 2015, her passion for all things VR has only grown.*

She holds a Bachelor of Computing from the National University of Singapore, and a Master of Entertainment Technology from Carnegie Mellon University, where she was the Head TA for the famous Building Virtual Worlds class, pioneered by Randy Pausch of "The Last Lecture." Her goal in life is to change the world for the better, and games, along with other interactive experiences, are her tool of choice.

The most memorable project I did at the ETC was called *Give Me Your Gun*. It was an attempt to bring a game designer's sensibility of player agency and interactivity into the world of live theatre—think of it as a digitally crowd-sourced theater or Twitch meets the Stage.

It was a semester-long project I worked on with five other teammates, Hill Lo, Ivy Wang, Nikhil Kashyap, Fuyen Hsiao, and Zhetao Wang. Dave Culyba and Brenda Harger were our advisors. Our goal was not

to foster a particular view; we wanted a safe place for people to voice their opinions in a respectful manner, and to understand the motivationsof people with opposing viewpoints.

It was a super cool project, in that it was a live game with improv actors as the characters, which we debuted in New York at the Games for Change Festival in 2016. It was a game about two female friends. One of them supports gun control; one of them doesn't. The audience members interacted with the story via a website we created where they could enter prompts and questions for the actors.

The game had story beats which the audience could hit. Each time somebody in the audience hit one based on a question they asked, we would show on the big screen that "This person unlocked a key story point." There was a significant delay between the audience asking a question and the actors acting it out, so this functioned as a visible progression and reward for the audience, and they knew what they asked had an impact on the game.

As for the process of making this game, it was a semester-long project. We worked on a team with our advisors and our client, Games for Change, a nonprofit organization. We didn't have the idea right at the start. We were brainstorming and prototyping a bunch of stuff. I think we only got this idea about a third of the way through the semester. The idea changed a lot. We knew we wanted to do something that was live because our client said that they didn't want too heavy a focus on technological devices, and they wanted something that a large audience could play. We also did a lot of research into how games can change people's minds and educate.

Because of the nature of this game, we had a bunch of rehearsals with

the actors, which was pretty different from most of the other projects at the ETC. One of our project advisors, Brenda Harger, is the improv teacher, so she gave us a lot of really good feedback. We started off prototyping the game with simple games usually played during improv.

There was one thing about *Give Me Your Gun* in particular that I found pretty funny. After the game ended, a number of people in the audience asked, "How did the actors know what we were asking?" The actors were actually reading off their own phones on the table in front of them while they were on stage. At first, we wondered if we should do
that or if it would be too obvious and immersion breaking. Then we realized, "You know what? Phones are so commonplace nowadays, if we just put one on the table, nobody's going to think twice about it." So that's exactly what we did.

It was really amazing, watching this whole thing come together. After the whole experience was done, so many members of the audience came up to us and said things like, "That was a really powerful experience," and "It changed my perspective on gun control in America." One person even said, "Oh, man, I wish this was on Broadway." That was super cool. Unfortunately, we didn't continue developing the game after the festival.

After *Give Me Your Gun*, I knew I wanted to work on things in the games industry that would positively impact other people. I wanted something that would fit with my values.

I'm now working as a Gameplay Engineer at Rec Room Inc., a game studio based in Seattle, on a game of the same name. *Rec Room* is a

virtual social club where you create and play games with friends from all around the world. It's fun, free, and works on everything from phones to virtual reality headsets. Even though it looks cartoony, the way that the company and the game are run really aligns with my morals.

We strive to make *Rec Room* a fun and welcoming environment for people from all walks of life. Trust and safety are very important to us, and we've invested a lot of effort and time into our moderation systems, especially for VR, where harassment feels very real. We know what we're doing is effective when people at other VR companies, like Oculus, check in with us when they try to implement their own moderation systems.

We also take the protection of kids very seriously. About a year after the company was founded, we noticed that a lot of parents were allowing their young children to play *Rec Room*. In every single multiplayer online game, there will always be a number of trolls and bad actors. While this number may be small in *Rec Room*, just one encounter is bad enough. There are some things that nobody should experience, and that's especially true for kids. As a parent, you definitely don't want your child to hear somebody saying sexually explicit stuff, or accidentally reveal personal information like where they live.

We went through the difficult process of getting *Rec Room* COPPA (Children's Online Privacy Protection Act) compliant, and we are now legally available for kids under thirteen. That took a ton of work; we had to rewrite a lot of things and it's a constant effort to ensure our new features are compliant. Honestly though, it was worth it.

Today *Rec Room* is one of the largest social VR games, and we're growing quickly on non-VR platforms as well. The game is fully cross platform, so you can play on your iPhone with another friend who's on a PlayStation VR headset, which leads to a lot of fun dynamics. I'm also proud to say that *Rec Room* has positively impacted many people's lives. We've received countless messages from players saying, "I suffer from anxiety, but this game helped me come out of shell." Or we hear from parents who have kids with disabilities and are so grateful that we have a junior mode, so they can let their kids experience things they might otherwise get bullied for in real life.

It's crazy how many comments like that we get. It has kept the passion and the fire burning in me, because I know I'm impacting people. It' s the best job I could ever ask for!

IAN MCCULLOUGH ('01) AND EMILY KOVALIK ('20)

Emily Kovalik *is a producer with over ten years of entertainment project-leadership experience. From working hands on in a theme park setting to producing entertainment experiences for audiences around the world, her expertise brings innovative ideas to life.*

Ian McCullough*'s two-decade career has spanned a range of organizations and functional disciplines—from content development to supply chain & operations to software management to marketing—but always anchored to passions for education and creativity. Ian has worked for globally recognized brands like LeapFrog, Turnitin, Electronic Arts, Pearson, and Quora as well as a series of early stage startups and his own entrepreneurial initiatives.*

Emily Kovalik: How did you end up at the ETC?

Ian McCollough: My story was pretty straightforward. I happened to be one of a handful of people at the right place at the right time.

I did my undergraduate work at Carnegie Mellon, where I got my BFA in drama. In 1997, at the beginning of my sophomore year, I studied critical writing with Don Marinelli. Don had his eye out for drama students who had inclinations towards engineering and technology.

He was already working with Scott Stevens and Mike Cristel and Alex Hauptmann with Grand Illusion Studios. The original institution, called the Entertainment Technology Center, was Don and Mike Cristel and Scott Stevens and Alex Hauptmann working on synthetic interviews, primarily. From that, they spun out Grand Illusion Studios. I believe I was their first video editor.

Don pulled me into that. He introduced me to Randy Pausch, who was trying to kickstart a course in building virtual worlds. I was part of the first BVW class in the spring of 1998.

Don was doing Dramatic Structures of Interactive Games as a course through HCI. I took that, as well. That was the point when they started recruiting a class. That would have been in the spring of 1999. They decided that they were going to do a Master of Entertainment Technology program.

Don and Randy would eventually co-found the new Entertainment Technology Center. Don was handing out applications or the program to all of the Dramatic Structures of Interactive Games students.

He looked at me and said, "The deadline is so and so. Make sure to turn your application in on time." I said, "Yes, Don." He said, "I make

no guarantees about acceptance, but you're applying." I replied, "Got it."

Emily: It makes sense that we were paired together for this interview! I also did my undergraduate in Theater, I have a BA in Drama from Ithaca College. After that, I worked at Disney for five years.

I started off working in attractions working at Star Tours: The Adventures Continue and Toy Story Mania! I was on the opening team for, Enchanted Tales with Belle, which was part of the "New" Fantasyland Expansion. That experience was when I first realized, "Oh, there's this whole creative thing!" and I caught the Imagineering bug.

After Fantasyland, I worked for Guest Relations. This was at the time when the parks were rolling out the new MagicBands. It was exciting for me to participate in such a large rollout of technology to guests. It wasn't always easy, but even when there were issues it was a learning experience for me on how to best communicate that to our guests.

Ian: Whatever troubleshooting and problem-solving you did with the rollout of MagicBand, my family's flawless vacation experiences at Disney over the past few years have benefited from your actions.

Emily: Good! That job was the first time I thought I could fit into a producer-type role. It was my early exposure to having difficult conversations and finding different ways to frame responses.

Shortly after that, I left Walt Disney World in Florida and I began working at Walt Disney Imagineering in Glendale as a Production Coordinator for Creative Entertainment. I learned so much in that

role, but at the same time I realized I wanted so much more. It had been my dream to work for Imagineering and once I was there, I was looking for what was next.

On top of that, my husband and I were not crazy about LA. In talking with people I worked with I learned about the ETC, which seemed like a great fit.

Ian: Similar to you, my experience in LA ended up proving that I wasn't a fit. LA is a good place for some people, but it wasn't the ideal place for me. I did my summer internship in LA as we were inventing the whole summer internship concept at the ETC. Don and Randy knew that that was something that they wanted to be part of the program.

Me and Rebecca Crivella (now Rebecca Schärli) both did our internship at Z.com which was an IdeaLab-funded startup. Of the 150-person team, in the summer of 2000, half of them were ex-Imagineers. There was definitely a strong Disney connection there.

I overlapped my final year of undergraduate work with my first year of graduate work, where we were basically making it up as we went along. Luckily, then I had the second year of my ETC work to redirect and figure out, iterate, adapt, and adjust my life plan.

The hilarious thing is that that wound up leading me back to LA. I got a job offer from KPMG Consulting in Media and Entertainment consulting. I found going back to LA oddly ironic, not in a funny way, necessarily.

I was going to start that job on September 17th, 2001. Suffice to say,

with the world changing on September 11th, that wound up in my offer getting rescinded. But I turned back to the ETC and the growing professional network.

I called up Don and Randy and said, "I'm in a bit of a challenge here. Do you have any connections or ideas of people I should call?"

They introduced me to the Institute for Creative Technologies, a program within the University of Southern California, where a few ETC students had been interning that prior summer. I worked for USC in their ICT on a three- or four-month project management contract. Then I let that contract end without extending further, because LA still wasn't working for me.

After that, I got to do my warehouse theater, and to do the starving-artist merit-badge thing after all.

Emily: You have to check that off your bucket list. I'm getting clearer about the beginnings of the ETC. I've heard it described as the Wild West. In the early days, did you have the same semester structure we have now, or was it a little bit more flexible?

Ian: There was a big whiteboard that had a loose plan of what it might be. You have to remember, that the lovely facility on the river was not where we were based at that point, not even close.

There were eight of us in the first class in the first year, and we had one person leave and one join the second semester. There was a little bit of time lapse, but we had all taken Building Virtual Worlds.

That was pretty much it. We did some design stuff. There were electives, but the program was very project driven.

We took opportunities that presented themselves and had the liberty to say, "We're the first class. We're the pioneers, the pilots." We had this idea of core pillars of interdisciplinary collaboration and learning by doing. If an approach to education was compatible with those pillars, then we said "Yeah, sure, sounds great, let's do it."

Emily: That's really cool. You say a lot of the core pillars are still in place, but it seems to be a little bit more structured now. It's not that we're less flexible, but there's more of a sense of "This is what you do and when you do it."

Ian: Yes. Now, I want to come back to you. We talked about your time at WDI. You arrived in Glendale, and you hear about the ETC. Why did you apply? What made you say, "Investing more money into my education is clearly the right step for me, and here's how this will put me into a better place"?

Emily: I applied to the ETC because I had a creative background, and I felt like I was very far away from making any creative decisions. Now, I've even changed my mind compared to what I thought I would do when I was applying. At the time, I thought I really wanted to find myself in a more creative role.

I knew that I was bringing a lot to the table, but I was missing something! So much had changed from the time that I had last been in school. There was also the big life decision of trying to leave LA and not really knowing what the next step was going to be.

Ian: I would imagine that you looked at a map and thought, "Pittsburgh's close enough to Ithaca and Rochester."

Emily: Yes, exactly! My husband is from the Detroit area. We conveniently landed in Pittsburgh. I knew of the ETC and I was hoping to shake up my career a bit. That is for sure what I have done!

Ian: What do you hope happens for you after you graduate? No pressure...

Emily: I see myself in a production role. I like being on the management side of things, but I also like being involved in different creative projects.

Something that I enjoyed about working at Disney was the breadth of projects that would come our way, from a parade to an installation or an attraction. Something that I've learned about at the ETC was there's just so many different types of experiences that I could be a part of helping to come alive.

Something that I didn't like about my past work experience is that although you're making lots of people happy, it's very expensive to go there. I would be interested to see how I can take my education and create for people who otherwise wouldn't have those experiences.

Ian: I totally get that, because I think one of the things that has defined my career has been a certain sense of mission. Different people do different things.

I have a theory that there are three types of ETC students. First and foremost, there are the people who are bold visionaries. They come to the ETC with a mission, an agenda. They have a thing that they must do. These are the people who have a strong entrepreneurial streak.

The second type are the passionate programmers. The passionate

programmers are the ones who could be writing databases for financial firms or insurance companies and making loads of money at it, but they want to do something that sparks joy.

Then the third type—which I consider myself the archetype, and, perhaps resonates with you as well—is the lost sheep. They know that they want to do something meaningful, but they don't know what it is.

Emily: Yeah. I love that.

Ian: That's sort of the pattern that I've seen throughout. Across my years at Carnegie Mellon, I took several more business classes than the typical drama student would. Taking those classes has made a huge difference. Now I work as a marketer, in education technology. Creativity and education have been the constant points of my career.

It was Don Marinelli who taught our theater management class. He made the point that,"Some of you are going to be looking at regional theater and 'nonprofit theater,' which is all well and good, except I want to make a very clarifying point for you. There is no such thing as a nonprofit business. Businesses that do not make a profit go out of business.

What people conventionally call nonprofit is not for profit. The business does not exist to make a profit, and we call the profits surpluses that have to be reinvested into the mission of the organization. That's where it comes into the whole do-gooder streak, and I'm like, "How do I balance that for myself?"

Something that was part of the deliberate early design of the ETC is

we all committed early on to at least being receptive, if not actively engaged, alumni. That's something that we tried to insert into the culture early on. Frankly, part of what you presumably chose to invest in in the program was the alumni network.

When it comes to networking, we try to give explicit permission to all the students and say, "Look, we're all here. We've all been through this dinner. We know you want to talk about internship opportunities and job opportunities. Please feel free to do so. Don't be shy. We know. We did the exact same thing."

I originally wound up at EA by way of an ETC connection. I spent a year working on The Sims 3, wound up getting laid off in the midst of the Great Recession. The position wasn't a great fit for me in the first place, but I was also one of the last people to be hired and therefore one of the first people out.

Maybe calling the original ETC the Wild West is slightly misleading. That implies that we had lots of wide-open space, when really, we were in effectively a narrow junction closet on the first floor of Wean Hall. We were in the 100-level corridor. It was just this narrow hallway that was more or less right across from where Ray and Andy's office was.

The piece there was really connected with me was the opportunity to build something from scratch that cuts from whole cloth.

After I was laid off from Electronic Arts in early 2009, I effectively had to build a business, another consulting practice for myself, out of nothing, and I would like to think that my experience in the early ETC braced me for that.

You roll up your sleeves, get it done it. I think that attitude is really important.

Emily: That's definitely something that's still prevalent at the ETC today. We just had that conversation in our project room, that you just need to make a decision and make it happen. We went and grabbed some cardboard and started prototyping.

Ian: Excellent. Glad to hear it.

Emily: Why does the work that you do matter? I find this to be the hardest question.

Ian: It's little bit easier for me to answer because I'm able to look back and play the grizzled veteran.

It's very tempting with questions like this to be able to look at the global vision.

Looking at these questions for myself, and having, at this point, twenty years of career to think about what I've done, why I've done it, and what the impact has been. The backbone of my career, as I view it, is actually LeapFrog—the educational toy company. After I moved to the San Francisco Bay Area in the summer of 2002, I had been applying to LeapFrog. I identified that as a place that I wanted to be very early.

LeapFrog was a blend of educational mission, storytelling, and theater and technology. That was really where I consider the foundation center of my career, and where entertainment technology took me.

Part of the process that I had to go through was a certain level of

disillusion. Disillusionment is often taken as a negative thing, something that is intrinsically bad. I have learned that disillusionment can be painful, but also healthy when you cast off certain illusions and look at tradeoffs you have to make.

Why does the work I do matter? I now work in marketing for Turnitin in educational technology. I can rhapsodize at length. I mean it in terms of helping to develop solutions that help teachers teach more efficiently, and help students have a more effective experience and become better writers.

All of that is very real, but you start shifting from the global scale, galactic-scale dents in the universe vocabulary, much more to the individual scale. You realize that if you can have a positive impact on one person, that makes it all worth it.

At LeapFrog, I moved from product development and making interactive books and really reshaping how education and toys played out, into supply chain and operations where I was like, "Yeah, this is all skews and money, and this is what the actual machinery is." That de-romanticized a lot for me. I still need my warm fuzzies to get out of bed in the morning. Having warm fuzzies is part of the compensation package.

What I was able to reconcile myself to is that maybe I'm not curing cancer. Maybe making dents in the universe isn't what this is all about. Maybe this is me crafting an experience at some level, where there's at least one kid out there that learned that the letter A makes a sound "a" because of a toy that I had an impact on.

That's good enough for me. For all of the work that I've done

through using technology to entertain, create moments of joy, and educate so people can teach and learn, so people can teach more effectively and learn more effectively, it's finding the importance in the sum total of small moments.

Emily: I think I will try to carry some of that with me, moving forward. It is very difficult for me to answer the "what do you want to do after you graduate" question. The way you think of it is very insightful.

I obviously want to do work that "matters" but it is difficult to understand what that means. I think I want to be involved in projects that expose people to new experiences and technology who otherwise wouldn't be able to see it. That is, I think, my big dream for my career post-ETC.

Ian: My closing comment on this one is the only way to meaningfully change the world is small ways and adding up those small ways. That's it.

There's a difference that's fundamental that students need to learn, between doing something dramatic that draws attention and doing something that lasts.

GLOSSARY

Building Virtual Worlds: Pioneered by ETC co-founder Randy Pausch, Building Virtual Worlds (BVW) challenges students to work quickly, creatively and collaboratively. Part of the immersion semester, BVW gives small teams of students two weeks to create a virtual world, with new groups and goals for each round. It all culminates in a public festival to hundreds of spectators – and an incredible sense of accomplishment. In fact, many BVW ideas go on to become full-time research projects, student spin-offs and commercial successes.

BVW Exhibition (aka BVW Show, Fall Festival): The ETC Festival is an event hosted at the Carnegie Mellon University's Entertainment Technology Center (ETC) where the games and interactive experiences, created by the student teams throughout the ETC, are showcased in a carnival-like atmosphere.

Fundamentals of the ETC: This class prepares students for the full two-year program at ETC with a focus on learning about leadership, teamwork, innovation and positive social impact. Throughout the semester, ETC faculty and industry professionals provide historical context for entertainment technology. Students have the opportunity to begin shaping their professional networks, gain a sense of the field, and establish a fundamental understanding of how experiences engage and inform.

Improvisational Acting: This class is the ETC's "special sauce." It's

the secret ingredient that adds zing to our program and gives you an edge. Taught concurrently with Building Virtual Worlds, Improvisational Acting fosters team building, exercises spontaneity, sharpens focus and increases listening skills. Students learn to solve problems on the fly, build from nothing, stretch their imaginations and overcome inhibitions when communicating publicly and working with others.

Pitch a Project: Some of our most exciting projects begin as student pitches. The student-pitch process was designed to give students the opportunity to explore an original idea that is of particular interest to them and fits into the scope of practical research being done at the ETC. A typical student pitch team typically consists of 3-5 students, and they must be able to convey their innovation, creativity and passion for the subject area.

Pittsburgh Technology Center: The CMU PTC building is off main campus down by the Monongahela River. The ETC has been the largest department in the building since we moved down in 2003. This enabled us to provide project teams with their own spaces to do their work. It is part of the Pittsburgh Technology Center complex which was originally a collaboration of the Urban Redevelopment Authority of Pittsburgh, the Regional Industrial Development Corporation, Carnegie Mellon University, University of Pittsburgh, and several other regional and State partners. The site is now home to nine high-tech buildings.

"The Last Lecture": On September 18, 2007, Carnegie Mellon professor and alumnus Randy Pausch delivered a one-of-a-kind last lecture that made the world stop and pay attention.It became an

internet sensation viewed by millions, an international media story, and a best-selling book that has been published in more than 35 languages.

Themed Entertainment Track: Students come to the ETC aspiring to careers in the creative industries (games, animation, theme parks, museums, mixed reality, mobile, robotics, interactive performances, crossmedia, etc.). The ETC offers projects and elective courses to support these interests, one of the most popular is in Themed Entertainment, focusing on designing and producing engaging places and experiences.

Schell Games: Schell Games is the largest full-service education and entertainment game development company in the United States. Since 2002, we've worked to create interactive experiences on every platform to enrich the lives of players of all ages. Projects in our award-winning portfolio range from mobile, desktop, and virtual reality games to interactive installations and theme park attractions... and everything in between.

Spring Carnival (CMU): Spring Carnival is three days of rides, robots, races, music and comedy, engineering feats at Booth and reunions with friends old and new. For more than 100 years, generations of Tartans have enjoyed this event for students and alumni.

Visual Storytelling: Visual Story is a semester-long class that is taught at the same time as Building Virtual Worlds. Here students work in teams to write, produce, shoot and edit several visual story assignments. This class teaches essential skills for becoming a creative technological storyteller – how to think visually and aurally, as well as

aspects of mise-en-scene, classical continuity-style coverage, transmedia, and temporal and spatial montage theory.

West Coast Trip: The week before the spring semester starts, the ETC first year students participate in our annual West Coast Trip (WCT). During this networking trip, the students visit potential employers in the entertainment technology industry as well as meet ETC alumni in the Los Angeles and San Francisco areas. The WCT also includes a day at Disneyland, not only for enjoyment, but also to look at the park with the new perspective they have gained about making interactive experiences during the Fall semester.

ABOUT THE EDITORS

Sarah Rafson

Sarah Rafson is an editor, curator, and researcher, the founder of Point Line Projects, an editorial and curatorial agency for architecture and design. She was the 2017-18 Ann Kalla Visiting Professor at the Carnegie Mellon University School of Architecture, where she continues to teach and curate the year-end exhibition and publication, *EX-CHANGE*. A graduate of the University of Toronto and Columbia University's Critical, Curatorial, and Conceptual Practices program, she has worked on books with Kenneth Frampton, Bernard Tschumi, and Barry Bergdoll, and collaborated on exhibitions at MoMA, Centre Pompidou, Center for Architecture in New York, and the Parsons School of Design.

While at Columbia, Sarah won the Buell Center Oral History Prize for her thesis on the Chicago feminist architecture collective, CARYATIDS. She currently sits on the board of ArchiteXX and writes on a range of issues in architecture and design.

Ilana Curtis

Ilana Curtis holds a BA in Architectural Studies from the University of Pittsburgh. While at the University of Pittsburgh she received several fellowships to support her independent research on affordable

housing and urban planning, which resulted in several publication projects. Since 2016, Ilana has been involved with all aspects of Point Line Projects including managing the traveling exhibition, *Now What?! Advocacy, Activism, and Alliances in American Architecture since 1968*, editing the publication *En Pointe*, and developing publication projects. She currently leads marketing and editorial operations at Point Line Projects. Her expertise includes writing, editing, architectural research, branding, graphic design, and strategic planning. Outside of Point Line Projects, Ilana can be found working on freelance writing, graphic design projects, or on her weekly newsletter about Pittsburgh's farmers markets.

Brad King

Brad King is the Editorial Director of Carnegie Mellon University's ETC Press and University Libraries, where he works on the CMU Publishing initiative.

He earned his Masters in Journalism from the University of California at Berkeley's Graduate School of Journalism in 2000, and a graduate certificate in Human-Computer Interaction from IUPUI in 2013. Before moving into academia, he worked as a reporter, editor, multimedia storyteller, and senior producer for *Wired magazine*, *Wired.com*, and *MIT's Technology Review*.

He's the co-author of *Dungeons & Dreamers: a story of how computer games became a global culture* (ETC Press, 2014), which explored the roots of storytelling and community that drove the development of the Web, and *Frankenstein's Legacy: Four Conversations about*

Artificial Intelligence, Machine Learning, and the Modern World (ETC Press, 2017).

King has served on the advisory board for South by Southwest Interactive for more than a decade and was the final co-emcee and judge for the SXSW Pitch competition in its first seven years. Previously, he served as the vice president of the Indiana Writers Center board and an advisory board member for F+W's StoryWorld Conference.

POINT LINE PROJECTS

Point Line Projects (PLP) is a Pittsburgh-based editorial and curatorial agency devoted to promoting thoughtful, critical, and engaged discourse through books and exhibitions about art, architecture, and design. PLP collaborates with a wide range of clients—individuals, firms, institutions—to elevate their projects through specialized industry knowledge and experience. Find out more at pointlineprojects.com.

ABOUT THE ETC PRESS

The ETC Press was founded in 2005 under the direction of Dr. Drew Davidson, the Director of Carnegie Mellon University's Entertainment Technology Center (ETC), as an open access, digital-first publishing house.

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The ETC Press publishes three types of work:peer-reviewed work (research-based books, textbooks, academic journals, conference proceedings), general audience work (trade nonfiction, singles, Well Played singles), and research and white papers

The common tie for all of these is a focus on issues related to entertainment technologies as they are applied across a variety of fields.

Our authors come from a range of backgrounds. Some are traditional academics. Some are practitioners. And some work in between. What ties them all together is their ability to write about the impact of emerging technologies and its significance in society.

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This is definitely an experiment in the notion of publishing, and we invite people to participate. We are exploring what it means to "publish" across multiple media and multiple versions. We believe this is the future of publication, bridging virtual and physical media with fluid versions of publications as well as enabling the creative blurring of what constitutes reading and writing.