ETC Augmented Reality Salon
Event Report

Produced by
Entertainment Technology Center @ USC

Report by Philip Lelyveld

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USC School of Cinematic Arts
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Introduction

The Entertainment Technology Center at USC hosted an Augmented Reality Salon on the afternoon of November 11, 2016 at the USC School of Cinematic Arts. Eightly-nine people with hands-on involvement in AR from 56 different organizations participated.

ETC executive director/chief executive officer, Ken Williams, opened the event to welcome attendees, followed by Philip Lelyveld, ETC's VR/AR Initiative program lead, who described the salon's purpose and schedule. According to Lelyveld, until PokemonGo burst onto the scene last summer, AR was developing quietly in the shadow of VR. With our spike of awareness around the success of PokemonGo, we are rapidly redefining and evolving our ideas of what an AR experience can be. "We're here to explore the possibilities of AR as a foundation for new types of storytelling, new types of human interaction, new approaches to revenue generation and business models, new combinations of technologies, new social, legal, and ethical challenges," said Lelyveld.

The afternoon schedule started with six 10-minute presentations, each followed by five minutes of Q&A. Three of the presentations focused on the Business of AR and three on the Art and Technology of AR. These presentations set the stage for the most valuable part of the afternoon: discussion groups. Everyone in attendance was assigned to one of four classrooms where moderators led a 90-minute discussion. Each group was curated to include business people, technologists, and creatives. Some were experts in AR and others were new to it. Some represented major media companies and others were from start-ups. The goals were to share ideas and build community among peers.

That evening, participants were sent an email to elicit what in the presentation they thought was important, interesting, hadn't thought of before, and disagreed with.

This report summarizes the entire event and the participants' responses to the questions posed by email. By participating, attendees helped to support the ETC's mandate, which is to accelerate the understanding and facilitate the adoption of promising new entertainment technologies within the entertainment community.

Summaries of the 6 Presentations

Gene Munster, Senior Research Analyst, Piper Jaffray

Mr. Munster defined Augmented Reality (AR) as the experience where virtual objects are superimposed on the real world. Mixed Reality (MR) is the term he uses for the experience where you can actually manipulate those virtual objects. Applications for both of these include being able to "recall" a person's name through facial or voice recognition, seeing a restaurant's menu just by looking at the building, and real-time language translation.

The challenges for mass market adoption of MR include investment in R&D for both technology and experience development, and establishing sustainable business models.

He sees consumer adoption starting with the phone and transitioning to wearable devices as they become socially acceptable.

Key AR/MR companies that Piper Jaffray tracks include Microsoft (HoloLens), Facebook (Oculus), Magic Leap, Google (their Magic Leap investment, Project Tango, and beyond), Daqri, Amazon, Apple, and Alibaba. The growing number of employees with AR experience at these companies indicates their development priorities.
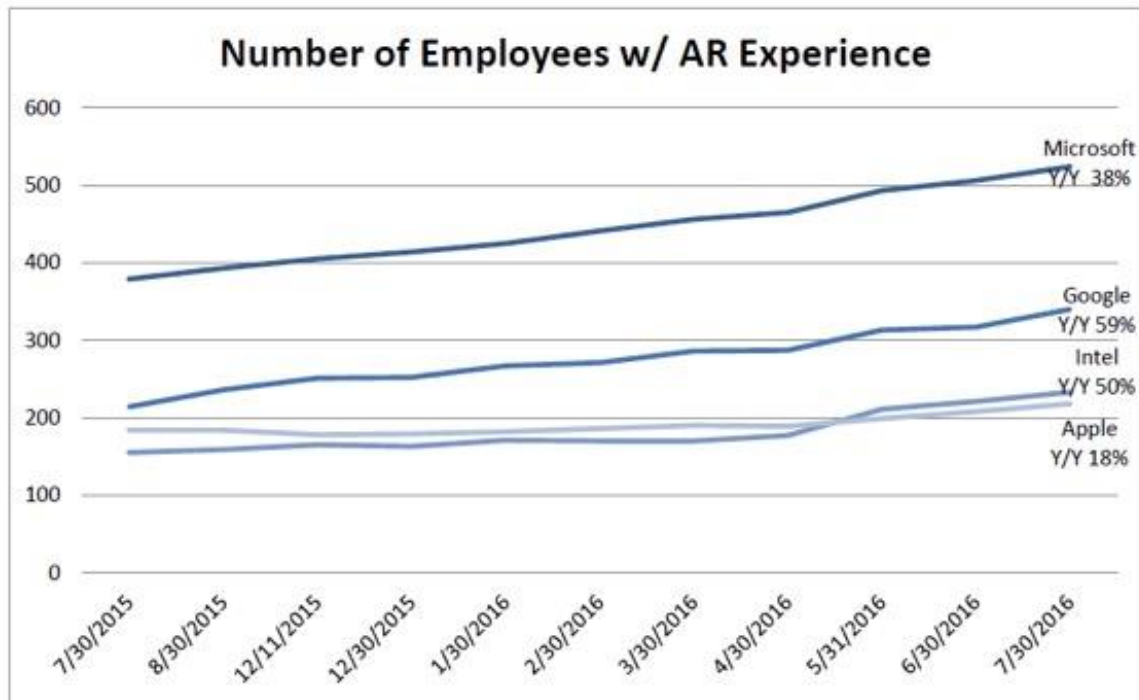
Major Tech Companies Pursuing AR/MR, Piper Jaffray Companies (used with permission)

Given recent statements by its senior management, recent high-profile hires, and the number of patents filed and granted in the AR/MR space, Apple is likely to be a major player in this space, says Mr. Munster.

Key AR/MR applications he sees as showing near-term promise include shopping, virtual TV and computer monitor screens, educational applications, and indoor navigation.

Currently, computing power needs to be in, or physically near, the AR/MR display to avoid latency and other technology-based factors that can degrade the experience. Mr. Munster speculated that once 5G networks are deployed, it will be the "secret tailwind" that will allow greater use of cloud-based resources in untethered AR/MR experiences.

Tom Emrich, Partner, Super Ventures, Co-Producer, Augmented World Expo (AWE)

Super Ventures provides seed capital to early stage companies working on fundamental technologies in AR and VR. The company also has an incubator that helps brands understand this new platform and connects them to startups that can help them realize their vision.

Super Ventures has identified six topics for capital investment that will be fundamental elements of the AR experience:

1. Bionic Vision: high quality 3D visualization of virtual objects in our natural line of sight, as well as image capture, processing, and tracking from the perspective of our natural line of sight.

2. 3D-ifying the Real World: hardware and software solutions for 3D scanning and mapping of the user's surroundings are required to create the metadata for AR's operation. In addition, the next generation of applications will be powered by computer vision platforms that use machine learning and algorithms to recognize anything from text to faces, objects, and buildings, plus semantic spatial understanding tools to establish context for that data.

3. World Building: 3D asset creation and management, and content creation, measurement, and optimization tools that allow the virtual objects to blend seamlessly and act naturally in the mixed reality environment.

4. Natural I/O: full body and multi-sensory interaction capabilities, including personalized spatial audio solutions and haptic feedback.

5. Telepresence: tools that further communication, cooperation, and social engagement, as well as tools that give a more natural feel to interactions with avatars, text and 2D information feeds, and other current screen-based activities.

6. Super Intelligence: tools and approaches that allow individuals to tap into expert resources through AR devices in a natural, intuitive way, giving them "super intelligence" in real time.

<u>Keith Boesky, Principal, Boesky & Company</u>

Mr. Boesky quoted the Jewish sage Baal Shem Tov (1700-1760) as the first person to define augmented reality: "You are where your mind is." Boesky walked attendees through the history of AR, noting that, "the very first media room happened in 1977 … and then Moore's Law caught up." He noted that TV football broadcasts' first down line overlay is an augmentation of reality, and that PokemonGo has taught us what personal AR is. Other examples include Spectacles, Snapchat's new glasses, which are introducing the world to wearable AR technology; Google Translate, which uses our smartphone camera to detect and display real-time translation of foreign text; and Ikea's AR app to visualize furniture and explore possibilities before making a purchase decision. Hyundai's phone-based AR Owner's Manual guides us through basic car repair, and RE'FLEKT has done something similar for the industrial, professional, and brand marketplace, including AR experiences for Audi, BMW, and Range Rover vehicle repairmen. There are even apps for trying out virtual tattoos before the consumer commits to getting inked.

 "The AR future is here now," he said. Quoting Chase Jarvis, chief executive of CreativeLive, "The best camera is the one that's with you." The best VR device is the one that you have in your pocket, Boesky said, and right now that is a cellphone. As the military and industry invest in improved miniaturized AR devices, consumers may shift to AR glasses. "AR is a lot harder than VR," Boesky added, saying he expects consumer glasses to come out starting this January.
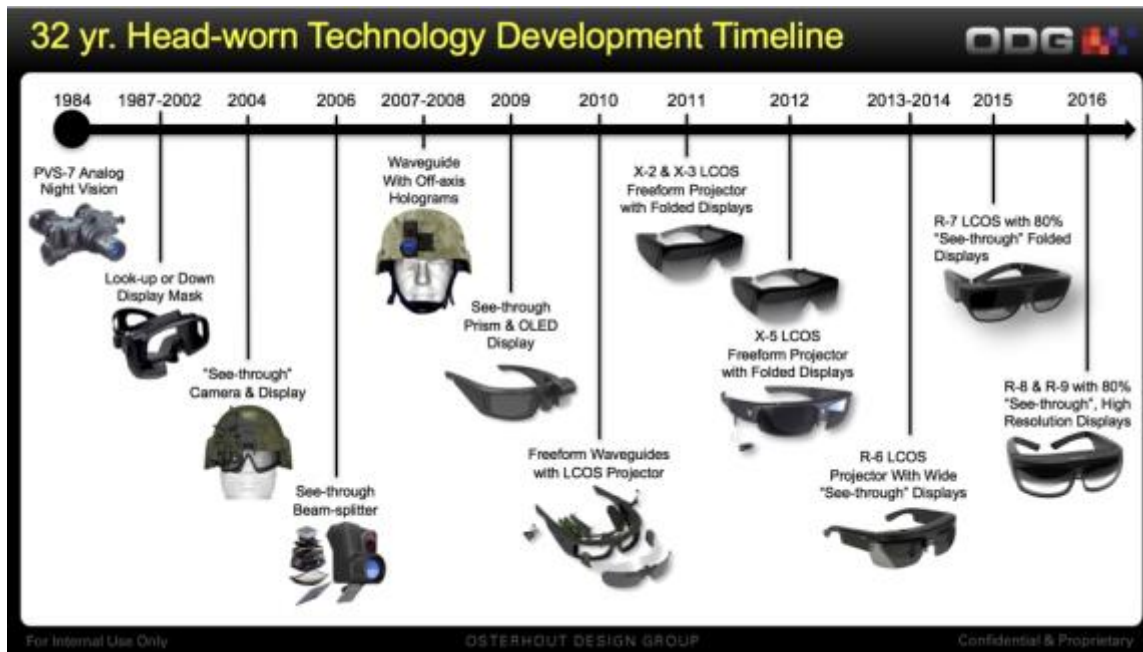
From ODG (used with permission)

Nobody is going to buy the glasses until there is content for them, and until technical challenges such as pixel-free viewing, occlusion, and reflection are addressed, he pointed out. He invited the audience to be a part of developing the grammar of this new medium.

<u>Aaron Pulkka, CEO, Rabbx Inc.[1]</u>

Mr. Pulkka's talk focused on his work, with his partner Mr. Cyrus Lumm, on Google's Project Tango and Microsoft's HoloLens.

Defining the technical elements of spatial awareness necessary for good AR/MR experiences, he explained that spatial awareness involves motion tracking, depth sensing, and area learning, all of which enable surface reconstruction, and plane and void detection (e.g. where things are and where there is a space).

Last year, Pulkka and Lumm developed Ghostly Mansion, a Google award-winning story-driven 'hidden object' drama that utilizes Project Tango technology and whose design depends on motion-tracking. Ghostly Mansion forces the participant to get up, move around the room, and look under and over things. Actions are triggered when the player approaches objects. This type of mixed reality user experience (UX) embraces 3D space, prioritizes motion over controller button-pushing, makes substantial use of 3D audio, and "re-flows" the environment. (Re-flowing means detecting, understanding, and mapping to the current environment each time the experience is activated, which is based on mesh generation, plane extraction, and void identification.)

The HoloLens is a full Windows 10 PC designed as a wearable. It has spatial awareness capabilities, and motion and gesture detection. Microsoft has made many HoloLens tools available through GitHub.

Earlier this year Mr. Pulkka and Mr. Lumm entered a hackathon and won a prize for Behemoth, an epic cinematic experience on the HoloLens. Behemoth's spatial awareness design allows it to be experienced in any space. It detects where the floor, walls, and the ceiling are. A monster then attacks the space, breaking through the walls while glowing bugs crawl in the corners of the room.

Pulkka noted that Tango and HoloLens are essentially the same thing, just designed so that the former is handheld and the latter is worn on the head.

Products currently available or nearing release include ODG R7 smart glasses, Occipital MR dev kit which works with an iPhone, the yet-to-be announced Apple iPhone with dual forward-facing cameras with two focal lengths plus PrimeSense and Mateo technology, Intel's Project Alloy prototype with inside-out tracking using Intel RealSense, Oculus Santa Cruz untethered prototype with inside-out tracking, and the wireless Vive, which is a project of HTC with chipmaker Nitero. The Tango-enabled Lenovo Phab 2 phone/device was released weeks ago at a consumer friendly price point around $500.

Apple hasn't shown anything yet, but when they do, says Pulkka, it will likely be transformational.

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[1] A video of an expanded version of Aaron's presentation, given at Augmented World Expo 2016 Berlin can be found here: https://www.youtube.com/watch?v=mxWe5NKQwsg . The Berlin presentation deck can be found here:
http://www.slideshare.net/AugmentedWorldExpo/aaron-pulkka-awe-eu16aaronpulkka

AR doesn't have the disorienting effect that VR has because the user is still part of the real world around him and can interact with both the physical and the virtual elements. But we are still working to discover the emotional drivers in AR.

During Q&A Aaron commented that after spending time in VR and now in AR, the future is absolutely going to be AR over VR. "There's no question," he said. "AR subsumes VR. You can always fall back on VR. It's easy. AR is a lot harder."

John Zuur Platten, Creative, Niantic Labs

Ingress, a global AR role-playing experience, celebrated its fourth year on Nov. 12, said Platten. He noted that "the most important thing you need for a great AR experience is player buy-in and engagement," which means Agent buy-in for Ingress and Trainer buy-in for PokemonGo.

Designing a geolocation AR experience is like going to Disneyland, said Platten. "You are in the experience, moving from portal to portal, until you leave Disneyland," he said, noting that "in AR, the whole world is the playing field." You never really leave. You can only disengage.

Live Ingress events are called Anomalies. To date over 1 million people have participated in Anomalies around the world. The Agents, who enthusiastically assume roles, are part of the experience and part of the fiction, and take ownership of the properties. Niantic listens to them and what they do, and works to keep them engaged and challenged.

After the ETC AR Salon, Platten, and Niantic Lab's, Mr. Flint Dille, spent the following 24 hours engaging up to 50,000 people in 9 cities in another Anomaly around a new Via Noir AR geolocation experience.

"Niantic is about adventures on foot," he said. Niantic encourages people to explore their world. More importantly, Niantic encourages them to interact with other people who are doing what they are doing. There is no tutorial. If you want to learn how to play a Niantic experience, you have to ask other players. Niantic encourages social interaction because that is where AR becomes real.

Flint Dille, Creative Lead, Niantic Labs

Mr. Dille recounted the origin of PokemonGo. He was invited to a meeting with Niantic Labs founder, John Hanke, who was also one of the original developers of Google Earth. "John said that he wanted to do a geomobile augmented alternate reality game," recalled Dille. "And I said, I'm in." The original goal was to get people out into the real world. We asked ourselves how could the real world become more interesting? Our answer was to put an idea into people's heads, so that suddenly they see a lot more going on around them than is really there.

Mr. Dille noted that they didn't see the social aspect of it coming. "Social became the magic," he said. With PokemonGo, old ladies were talking to their grandkids about it.

The soul of AR is the social experience and how it augments people's lives, he continued. Why can't the real world take on the qualities of a theme park? People are really plausible stand-ins for intelligent agents, he joked. We all live in alternate realities that we create and share with other people. The idea goes back to seeing a movie with other people in a theatre. People like sharing and comparing the experience.

"At Niantic we have some rules," he said. They don't tell people that they have walked for 20 miles and its good for them. They don't advertise their games as a social good. "But we found out, as people ran around catching pastel creatures this summer, that people really like each other," he said. Now Niantic wants to move beyond the 'poking your phone with your finger' user interface. Whatever tech they move to must be cool and unobtrusive so their community won't look foolish.

Geocaching is slightly under the radar, said Mr. Dille. "We created a profoundly cool spy game," he said. "We worried about people taking the game too seriously, but humans seem to self-correct in the real world."

In response to an audience question of whether interactivity is the enemy of narrative, Flint responded that he is creating the toolkit for the individual to create the narrative in his or her own head. He used his personal experience as a beneficiary of a family trust to explain this point. The trust is being disputed, and a summons server was trying to track him down to give him a subpoena. He decided that his job was to not be caught by the "subpoena guy." He developed a mental model for everyone in his neighborhood: people sitting in cars, people walking down the street, neighbors, etc. For him, every one of them was a potential summons server. He worked out the logistics of getting on with his life without being served a summons by any of them. "It got to be fun and compelling," he said, recounting that, for example, he didn't open the sunroof of his car because he could be served a subpoena through the sunroof. That experience will inform the next real world game he designs.

Summary of breakout group discussions

Moderators

- Dr. Anthony Borquez, CEO, Grab Games, Faculty, USC

- John Canning, Chairman New Media Council, Producers Guild of America

- Jeanette DePatie, Lead Writer/Producer/Techsplainer, Propellerhead Inc.

- Lori Schwartz, Principal, Story Tech (The Tech Cat)

Discussion of the language of AR

The Director shapes the audience's experience of a movie, and there already exists a defined cinematic language. In games, you have a designer that hides the fact that they're in control. If players have ultimate control, they get bored.

But in the zone between gaming and passive linear storytelling occupied by AR and VR, we don't know the language and toolkit for reliably constructing a satisfactory experience.

If you work to have either the interactive aspect or story aspect dominate, then one or the other will be shortchanged.

One person with 20 years of gaming experience said that his entertainment has always been interactive. If it's on your DVR, you're interacting a couple of times an hour. In a game, that interaction comes rapidly through the buttons.

You have to leave breadcrumbs so that you lead the audience member (aka the 'visitor') through a satisfying experience. Even if you're leading them, you still need to make it so that the visitor thinks that they are doing it all on their own. You want to lead people down a path but give them alternatives and let them decide how long they want to dwell.

Within interactive spaces, people come up with their own stories. It may not be about the narrative the creator has spun. The story may become who the visitor met and what they experienced within the world.

Narrative storytellers need to let go, in part because the visitor's story may not become what the storyteller intended.

A huge question that should be asked is 'who am I?' What is my role in the experience? You must give the visitor a clear point of view throughout the experience. Otherwise it is just a surround version of a normal flat-screen TV production.

The role of the visitor has to be specifically tailored for the medium used to amplify or drive the experience forward. The greatest game mechanic with a bad story can be very successful. A narrative without the proper game mechanics can fail.

Does interactivity kill narrative? It doesn't seem to in gaming. You can interview characters to gain deeper understanding of the story. You could build a personal relationship with characters, especially if they are AI-enabled and that engagement could be monetized.

If you want to please a global audience, you have to think beyond the Western idea of story. There are fundamentals that transcend culture and allow stories to resonate with people in the developing world, in Japan, Korea, and elsewhere. Ingress is hugely successful in Japan in part because, from a cultural POV, the storyline resonates and helps them break down cultural barriers.

Fragments, a first-person crime scene detective experience developed for the HoloLens, was considered one of the coolest AR experiences currently available by many people in the room. It plays the action over your own environment. How do you tell a story with interactivity and agency that works in any room? It's like writing a story that's nonlinear, and now you don't even know where it takes place!

Discussion of AR platforms and the impact of technology on story

While HoloLens, Magic Leap, hardware that incorporates Project Tango's technology (ex. Lenovo Phab 2), and whatever Apple develops, are being developed for the consumer mass market, the killer apps for AR could come out of left field using entirely different approaches. The reality is a high-priced headset won't be purchased by someone in Central America for a while, but they will have the phone in their pocket.

The fundamental story experience evolves as it moves to different platforms. One person described how he experienced reading books on his phone. Story transcends platform, but platform can enrich or diminish story.

The AR narrative challenge gets interesting when you tie a story to the technologies in our lives. If your clock tells you that you are late for a meeting, that's just a data point. But if the clock is tied to a story point about getting out of the house in time, you're creating a narrative.

A master storyteller will lead with story, not technology. They will choose the technologies that help them best realize their vision. When you move into another technology, you get to frame the story differently.

Participants were amused by how much the AR discussion was like talking about theme parks. Ultimately we're trying to make the world one big theme park. AR is about keeping you in the real world.

AR experiences extend beyond personal devices. The open environment can be changed through projection of images onto surfaces. Two companies at AWE (Augmented World Expo) Europe 2016 leveraged projectors and Microsoft Kinect devices to overlay games on ping pong tables and augment golfing spaces. Expect projection to be part of the box of crayons we can play with as we experiment with AR experience creation.

One challenge that must be addressed if you use the entire real world as a map for your story world is that the experience is hard to tune. How do you make the experience equally enjoyable to people in sparsely populated areas and to people in dense urban environments?

The geolocation aspect of AR will allow specific stories to be unlocked at specific locations (similar to geocaching). We already have this in themed restaurants and

stores – El Torito, MacDonald's, Disney Stores. The ability to transport yourself to different scenarios is the tech version of dinner theatre. These are clearly monetizable opportunities.

Discussion of Ingress and PokemonGo

Ingress, the global location-based massively multiplayer role playing AR experience, is designed to encourage people to look at art and architecture. The story develops through the content and the experience that the agents (aka Ingress players) are having. It is about emotion and engagement, which can emerge from story and characters. PokemonGo plays on people's proclivity to care for pets. Each of us can act as a storyteller, story-crafter, story-maker, world-builder, or whatever role descriptor you choose.

Niantic Labs is in the process of redefining story. When people show up to an Ingress event, they are in the story. They introduce themselves by their Agent name. Many people have known each other for 3 or 4 years, but only through their Agent names - their fictional persona created for the game. They are role-playing because of the game. Is that story? That's where we have to think about how we redefine story.

An interesting challenge is reconciling realities. You might see the world around you as Mars and I might see it as the Old West. People in the same space can each experience the space differently. What are the mechanics and language for sharing experiences with other people? Ingress chose to deal with this issue by not allowing you to identify who else in the space around you is an agent and who is simply nearby and unaware of the Ingress activity. This may add to the social dynamic of the Ingress experience by making everyone around you suspect.

PokemonGo worked because younger people who had a history of it knew what it was, created a dialogue around the game, and ended up teaching other people, including older generations, how to play. It was a brilliant decision to use that IP.

Discussion of the business aspects of AR

A business strategy of pursuing niche opportunities that solve specific business problems, such as customer sales and support resources, or medical and industrial applications, was seen by some attendees as the path successful AR experience creators will follow in these early days. It was pointed out that mobile tech started in business. People used their Blackberries at work, brought them home, and seeded interest in personal applications that eventually built the personal smartphone market. The entertainment business, at the end of the day, is about wide reach and mass adoption and engagement. That will come later. The good news for the entertainment industry is that other industries are investing in the technology, gaining understanding of the user, and – like the Blackberry analogy – laying the groundwork for the mass market.

Heads-up displays in cars bring contextual information and intuitive UI design to the driving experience. This lays the groundwork for contextual geo-storytelling

experiences. The current challenge for the creative community is financing and creating compelling interesting things while we wait for the mass market to develop.

The most important thing for a brand is market penetration. The funding from advertisers will come when there are enough people able to view the AR experience to justify the cost. A project pitch can be framed as "we're doing something cool, and you can be a part of it." But it will be harder to find a willing client.

When companies approach you to "make another PokemonGo," you really have to go back and ask some key questions. What's your goal? Most people don't know. Are you trying to show the device off? Reach people? Sell a device? Check off the box so that you can say that you are doing something in AR?

After you answer the question "why am I making this," you need to address how broadly you are going to go with this. Do you want everyone to play? Is it a premium experience that is specific to a location? Are you going to build for only a specific product or platform (ex. HoloLens or Project Tango), or more broadly and deal with alternative feature sets and interoperability issues?

From there you can start building your experience. Define its rules and limits, its character, story arcs, and obstacles.

One breakout group listed the characteristics of a good AR product: geolocation-aware, safety, naturalism, interaction with characters, good narrative (active and passive), clear feedback and guidance within the experience. The group also listed what scared them: design challenges, trust, cracks or holes in the design, stability, and contributing to constructing Skynet (e.g.; a dystopian future).

Some data on AR's market potential that is widely cited is not statistically sound. One person who works in market research reported that a widely quoted report is based on polling 2000 people and analyzing 400 responses from a self-selected cohort that does not represent the broader market.

Malls, theme parks and arcades are ripe for having AR experiences layered on top. Three considerations need to be addressed in ticketed or rental location based AR experiences: throughput, hygiene, and cost. The first two, especially, have not been adequately spotlighted.

The out-of-home, location based entertainment (LBE) experience market in China is different from the US and Europe. Internet cafes with the latest sophisticated gear for rent by the hour are big in China, in part because people don't have the money or space for the sophisticated gear at home.

AR could be used in simple ways to make in-stadium sports experiences better, such as ordering a beer from your headset while you're sitting in the stands, or showing you the TV feed as you watch the live game on the field.

Discussion of social, safety, psychological, and ethics issues

Intelligent design of whole-world game experiences can drive foot traffic in ways that achieve a social good. For example, Pokestops at LA Metro stations drove a boost in

ridership. But there are also unintended consequences to turning the whole planet into an experience map. There were inappropriate Pokestops at places like the Holocaust Museum and Rosa Parks's grave. This concern extends inside homes and buildings, where stairs and other common features can pose a hazard. Geolocation must somehow detect and avoid unsafe or inappropriate spaces. Depth-sensing technology and other approaches to location mapping could address this. As the hardware and experiences get smarter, they can actually react to what the player is doing and warn them against unsafe and inappropriate zones.

In general, the more anonymous people are on the web, the worse they can behave. It is the emergent behavior that becomes dangerous.

For example, how do we make it not possible to cheat or abuse the virtual experience? There is a VR poker experience in which some players started moving over and peeking at other players' cards. The experience designers responded to this behavior by having the cheater simply disappear and exit from the game if they got too close to the other players.

Facial recognition in glasses is already a real thing. Everybody wants that tech but few want to be part of that database.

Google Glass, with its forward-facing camera, suffered from a creepiness factor. Snapchat is doing a better job of making people comfortable with the tech. Snapchat, for better or worse, is normalizing the experience of being videoed by strangers without your consent.

Privacy is a currency. Research shows that people are more likely to give up their privacy if they are made aware that they are getting in exchange.

One person said, "As someone who has experienced a lot of VR, I have dreams of being in other places that I've only visited through a head set. [The virtual and the real] blend in your brain and you can't separate them." Harassment and assault are going to feel even more real in AR. We need to understand the psychological and social impact of VR and AR better.

A few people working on projects that utilize AR and VR for social good commented that AR/VR discussions would benefit from involving an anthropologist to take stock of how this is changing us. AR and VR have more power than mobile or the computer because it is an immersive world. It is one thing to watch a documentary about prisons on TV, and quite another to experience being in a virtual prison. It is important to have an ethicist or social anthropologist at the table. We don't have enough of those people in the mix. This touches on the question of what is a 'social good' message versus what is propaganda.

We are cognizant of the 'information filter.' The 'bubble' on Google and Facebook. The one-sided conversation that marginalizes or entirely omits opposing points of view. Each new wave of this filtered experience becomes more impactful than the one before. Because we're so early on, we have to work to shape experiences that have good, constructive impact…or at least are not evil. Like any technology tool, it can go either way.

Aggregation of the responses to the 4 questions.

Every attendee was sent the email in the box below. What follows are the 33 unedited responses in random order.

From: Philip Lelyveld <plelyveld@etcenter.org>
Subject: Today's AR event at USC - your feedback - 4 questions
Date: November 11, 2016 at 5:53:16 PM PST
To:

Thank you for participating in today's event.

Please take a moment to send me bullets of one or more things brought up in the presentations or in your discussion group that you...

1. thought were very important

2. found interesting

3. hadn't thought of before

4. disagreed with

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

#1

Apologies for the delay in responding to the follow-up email. I enjoyed the salon event last Friday and thought it was incredibly well programmed and an excellent way to bring together all those minds!

1. What was brought up in the presentations or in your discussion group that you thought were very important?

- In the discussion group, the topic of content moderation came up in addition to the social, emotional and psychological ramifications of creating experiences that caused people to lose touch with what is real/unreal or to spend too much time in experiences that caused anxiety or fear (ie, horror). I not only think this is a very important topic, but one that should continue to be discussed and championed as AR becomes more ubiquitous in our lives.

2. What was brought up in the presentations or in your discussion group that you found interesting?

- I loved the discussions related to the social dynamics created and curated when people interacted with stories and content through AR. AR entertainment is being framed as inherently a social medium that encourages interaction with our physical world.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

- How we will measure feedback from people's interaction with experiences with AR (and VR) - loved learning about the mention of biometric feedback platform company Lightwave.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

- As someone who is currently working with VR, I thought the bright lines being drawn around AR as the 'right' technology as opposed to VR was interesting. I agree that AR or MxR will certainly have the widest adoption and most use in commercial applications, but VR will have its purpose and appropriate context - sometimes we will not want to mix realities, we will want to submit ourselves to the alternative world with its own set of inputs (and therefore, shut out inputs from the reality). Also, a lot of work is being done in VR to selectively bring in desired parts of the physical world...much of the work for VR and AR will converge.

Thanks very much for hosting this amazing afternoon. I look forward to future events.

#2

1. What was brought up in the presentations or in your discussion group that you thought were very important?

Especially in the discussion group, future strategy regarding AR. I was put in a wonderful group of studio people that had some great questions and comments. Much more of this kind of brainstorming and information sharing must be done. From the discussion meeting, it became clear to me that there needs to be more education with regard to the tech end of VR, especially having to do with HMDs, and then with AR possibilities.

2. What was brought up in the presentations or in your discussion group that you found interesting?

See comment above.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

Since I am so immersed in the industry, can't say this happened, but what I heard validated what I had been thinking in terms of need for basic tech information among the studio people.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

I didn't really disagree with Gene Muster – I just found that his presentation could have been more up-to-date. (I realize that his area of expertise is much wider than VR and AR…)

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

Social VR and AR

VR and AR personalization

VR and AR intersection with classic gaming techniques

#3

Q1: It's big and entertainment isn't the obvious application for it.

Q2 and Q4: the reason I kept asking questions about Project Tango is because I felt the presentations were focused on the devices and the end application, and didn't look enough about the complexity developing an immersive AR experience

Q3. Not much.

#4

1. What was brought up in the presentations or in your discussion group that you thought were very important?

The use of AR to tell story. Very difficult nut to crack and different way to think about story.

2. What was brought up in the presentations or in your discussion group that you found interesting?

How people are already using AR in the every day market outside of the gaming and entertainment space.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

4. What was brought up in the presentations or in your discussion group that you disagreed with?

There was disagreement on when folks expected the consumer AR market to be mature and a product that we use in every day life. Absolutely looking into a crystal ball but who knows, always fun to try and guess.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

What does AR mean from the context of storytelling? How do we use the tech to tell stories. Drive narrative. What does that look like in AR?

#5

1. What was brought up in the presentations or in your discussion group that you thought were very important?

While much has been made of the future of AR, all these predictions are being made mostly in a vacuum. The two players whom everyone expects to the heavies in the market, Apple and Magic Leap, have released no product specs or use cases. Our estimations of the future could change drastically once their first products launch.

2. What was brought up in the presentations or in your discussion group that you found interesting?

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

4. What was brought up in the presentations or in your discussion group that you disagreed with?

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

What is the expected breakdown of use cases expected to be in AR (e.g., 50% useful real world augmentation such as directions, 25% game play, 25% narrative storytelling)

#6

1. What was brought up in the presentations or in your discussion group that you thought were very important?

The relative unimportance of VR for some working in AR.

2. What was brought up in the presentations or in your discussion group that you found interesting?

We are at the ground floor of identifying basic parameters for designing mixed reality content.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

How mixed reality content might butt up against physical obstacles in the real world.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

Specific creative concerns unique to nonfiction VR content such as emotional overload. Documentary filmmakers have been grappling with that issue for decades.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

Where does professional content, especially video, fit into this scenario?

#7

Generally I found the presentations interesting and well chosen. However I was not clear on the goal of the event. If it is simply exposure then, of course it was successful, however the singular nature of the event suggested more.

The breakout was terrific. It took a few minutes but eventually the moderators were able to steer the conversation towards genuinely provocative topics. In the future I think we should introduce ourselves and comment on our experience with AR/VR. It was hard to gage the level of understanding amongst us.

Topics going forward might include exploring the new grammar for Narrative in VR and/or what the production/distribution landscape will look like in 5 years and how to plan for it.

As always thanks for including me.

#8

1. What was brought up in the presentations or in your discussion group that you thought were very important?

Far and away most important to me was the Piper Jaffray Presentation. I appreciated the statistical insight they shared, and it boosted my confidence that AR/MR is going to be a key tool in the very near future.

2. What was brought up in the presentations or in your discussion group that you found interesting?

I thought that the tension between AR and VR was interesting; how certain people keen on AR see zero potential for VR...

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

I just hadn't given much thought to the vast diversity of little companies, with extremely specific focuses, that make up the whole of an AR or MxR experience, like Tom outlined.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

That I think there will definitely be a place for VR in entertainment and other verticals; that extremely high resolution and natural field of view VR will be better suited for gaming and cinematic experiences. I also think that since VR will be less expensive and AR will more or less depend on VR to drive early adoption of such tech in the media and society at large, even though it is much different.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

I would love for ETC@USC to have a presentation that focuses on an in-depth analysis of best-in-class content, supplemented with stats on engagement and retention. It'd be followed up with a discussion of "why" this content is so compelling.

#9

1. What was brought up in the presentations or in your discussion group that you thought were very important?

The ethics of AR and VR. This new medium has the ability to come very close to real life simulation and as the technology becomes more realistic, there are many issues that need to be considered. What responsibilities do we who are leading this new industry have?

2. What was brought up in the presentations or in your discussion group that you found interesting?

I enjoyed the concept of "mega-trends" and identifying AR and VR as the next mega-trend. Additionally the conversation about how AR and VR are new interfaces that allow for a much more human way to interact with computers and machines.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

Using AR to help the blind. This is something that was briefly touched on, but was fascinating. Would have loved to had more time to discuss that. It's so counter-intuitive, and truly demonstrates the wide open possibilities of these technologies.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

I don't agree that Apple is going to be the company that bring AR to the masses. They will come out with AR, but it will not be Apple that single handedly makes AR, or that makes the big AR advances.

I don't agree with the notion that AR is ahead of VR. It is clear to me that VR is absolutely ahead. AR will surpass VR at some point due to the fact that it has more utility than VR, but all in all the two will converge and we will have devices that do both.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

Regarding VR, I'd like an in-depth overview of all of the "immersion" challenges that are being worked on, from locomotion, haptics, force feedback, 3D audio, etc. All the areas that need to be overcome to create full immersion.

Regarding AR, I'd like to have an in-depth overview of the hardware and technology behind both the 3d mapping and the display technologies being used. Both of these aspects are unique to AR and are of great interest to me.

#10

1. Everyone seems to agree that AR is going to unlock a whole new universe of experiences. But there seems to be a conflict between those who argue that the technologies are here today and the market which seems not ready.

2. The presentations were great because we could hear from an interesting group of innovators who are already working in this space. I liked hearing the stories from people with experience. I found particular value in the big picture perspective from the investor.

3. It was all pretty broad far-ranging future optimism. I'd like to hear more practical realities. It got me thinking about how much we don't know. How different kinds of sensors work and the limitations they have, how much processing power is required to render on the real world, what different display technologies are really capable of. It's really easy to say "in the future this will all work". The value we need is to figure out what works and what doesn't. What is easy and what is hard?

4. I disagree that VR<->AR is a continuum. I think they are independent things with different uses and different fundamental technology platforms.

#11

1. What was brought up in the presentations or in your discussion group that you thought were very important?

Glad to hear that terminology (and interest) is moving from AR to MxR.

2. What was brought up in the presentations or in your discussion group that you found interesting?

Grateful that Aaron Pulkka put some of this work in context by showing previous R&D efforts.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

4. What was brought up in the presentations or in your discussion group that you disagreed with?

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

More of a deep dive in the technical issues next time. For example, no one talked about how to render light and shadow correctly in MxR, very important topic.

#12

1. What was brought up in the presentations or in your discussion group that you thought were very important?

- you set the stage with your indy AR video trailer — that's there's a path for independent creation and development in AR.

2. What was brought up in the presentations or in your discussion group that you found interesting?

- JZP and Flint (who I worked with on Universal Interactive's Roddick game) describing their mission to design experiences that get people out into the world and benefiting from social interaction.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

- Possibility of arcade resurgence.. in the U.S. (had considered it before, but heard it again from multiple sources)

4. What was brought up in the presentations or in your discussion group that you disagreed with?

- That pokemon has cracked truly social AR. (About to level up to 22 mystic. wbu? :)

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

- How narrative storytellers can interact with worldbuilders, experience designers, and VR/AR developers to explore a shared language for crafting more immersive experiences.

#13

1. What was brought up in the presentations or in your discussion group that you thought were very important?

The big tech companies that are deeply exploring and investigating AR… the investment dynamics and overall opportunities that exist in the space as it emerges.

2. What was brought up in the presentations or in your discussion group that you found interesting?

The discussion on what Apple might be doing, with the limited info that's out there and who they are staffing jobs with.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

Nothing totally new for me, but i'm pretty heavily involved in all this… was good to see more in depth info on the areas we are pursuing.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

Perhaps some of the predicted growth patterns and consumer adoption curve. I always think that there are more cycles then everyone is aware of to reach full adoption / acceptance curve and migrate one step forward in their consumer tech devices.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

If you can get the manufacturers of the various AR systems and AR software developers to show what they are working on in more depth, that would be highly valuable.

#14

It was an awesome event! You guys always host the best events- something historical has always happened for me at each ETC event.

1. What was brought up in the presentations or in your discussion group that you thought were very important/interesting?

User Generated Content is going to save VR / AR because people want to matter and make a difference in an experience.

User expectations are changing and people need a reason to leave their house now so we need to give them an experience to go to that is sharable and social.

Roles in the industry are changing, instead of Directors telling stories, we must have experience designers who are generating experiences based on the viewer's desires and expectations.

Event based experiences are the way to go in showing immersive media content. (examples: Geocashing, Childish Gambino's Pharos Show)

4. What was brought up in the presentations or in your discussion group that you disagreed with?

I posed a question around a quote from Oculus Story Studio's Yelena Rachitsky at VR on the Lot : "Interactivity is the Enemy of Narrative" to Niantic's speaker, Flint. I'm still not sure where I stand on this other than the fact that it is not black and white. I think interactivity has its place in certain mediums and narrative has its place in certain mediums. Storytelling in the immersive media space (storytelling being definted by someone –usually a director/writer- who is telling you the consumer a story) is different than an experience that inspires a narrative.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

AR & VR / Immersive Media in Home Entertainment vs. AR & VR / Immersive Media in the Location Based experiences.

Distribution and target audiences

#15

1. What was brought up in the presentations or in your discussion group that you thought were very important?

– AR currently seems to be the favored medium and the most complex to create.

2. What was brought up in the presentations or in your discussion group that you found interesting?

- The technology invention to adoption curve. Venture capitalists are forecasting VR/AR/MR will continue to grow in demand vs 3D that was looked upon as fad.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

- Reaching 500 million units sold will make VR/AR/MR mainstream.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

- I don't believe it will take 10 years before AR/VR/MR reaches full adoption. My estimate is 5 years from today.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

The relationship between artificial intelligence, machine learning and the creation of content for each of the mediums (AR,VR,MR) respectively.

#16

1. What was brought up in the presentations or in your discussion group that you thought were very important?

    what works regarding story in this space. what are the social obligations if any

2. What was brought up in the presentations or in your discussion group that you found interesting?

    same as above

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

    the social impact

4. What was brought up in the presentations or in your discussion group that you disagreed with?

    nothing specific

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

    how is this monetized—is there a path-- for a story teller

#17

1. What was brought up in the presentations or in your discussion group that you thought were very important?

The use of AR as a utility tool for interior design, purchase of appliances, TVs, furniture, artwork or any item that needs to be imagined in the space in which it is intended can help the buyer more easily make the correct decisions. Most importantly about this for me: I feel that the use of AR or mixed reality for utility apps will wean the public on to the idea of seeing things in AR/MR or VR for longer periods of time. This will ultimately allow content creators to make longer narratives and games without people becoming overwhelmed after 5 minutes.

2. What was brought up in the presentations or in your discussion group that you found interesting?

The reality that the headsets are still about 10 years away from being user friendly, cost effective and less cumbersome. I think the biggest thing people need to work on is making this technology user friendly, cost effective and less awkward. People will always continue to to make interesting content of the technology and the devices are there.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

Mixing AR, VR or mixed reality in a 3D space. Aaron Pulkka gave Randal and me some great pointers to software that we can start with to make this task easier.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

I can not say I disagreed with anything, because I am new to this space and I am still learning about it.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

I would like to learn more about how post sound (SFX and music score) can be mixed in 3D more easily. Right now people need to wear the headsets to be able to fully designate the space of the sound and where it is coming from. It would be great if some sort of surround system could be created where the sound moved from one speaker to the other as the mixer panned the sounds around, allowing the post mixer to mix without the headsets. That way, everyone in the mixing booth would be able to communicate without constantly taking headsets on and off during the mix session.

#18

1. What was brought up in the presentations or in your discussion group that you thought were very important?

I think it was very important to talk about the whole continuum of AI that it's more than Pokeman Go, but not necessarily requiring a HoloLens.

2. What was brought up in the presentations or in your discussion group that you found interesting?

I was fascinated by some of the live and social aspects of AI. That large groups of people are gathering to use it together in the same physical space.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

Funny enough, I hadn't thought about how male-dominated this space was. We need more women!

4. What was brought up in the presentations or in your discussion group that you disagreed with?

Some people suggested that people are just happy to give up privacy in exchange for products and services and I'm not sure that's really true in many cases.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

I would love to talk about how AI can be used to make the world a better place. Thanks!

#19

1. What was brought up in the presentations or in your discussion group that you thought were very important?

The path towards getting AR in the hands of the users. Including "the best device is the one you have"

2. What was brought up in the presentations or in your discussion group that you found interesting?

Many of the devices and use cases were not something I've thought or heard of before, including use in medical.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

Niantic's approach to AR, which seems to include geographical based interactions. At the end of the day, the reality is "augmented" by adding user interfaces. Their explanation helped me realise why they thought of it that way.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

The blurring of the lines between Augmented and Mixed realities. I personally don't see simple HMDs or Google Glass as a form of AR. Google Glass for example does not *augment* my reality, it's simply a wearable screen in a relatively fixed position.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

Better understanding of relevant tech, their definitions, use cases, and technology and understanding of human behaviours needed to take it further.

Relevant tech here includes 360 videos, user perception of wearable devices, HMDs, augmented virtuality.

#20

1. What was brought up in the presentations or in your discussion group that you thought were very important?

I was unable to stay for the discussion groups but I was exposed to a whole world of online social gaming from Flint and company.

2. What was brought up in the presentations or in your discussion group that you found interesting?

I had no idea that there were millions of people around the world doing live events every week.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

Now, I'm thinking about how a narrative story could be integrated in this crowd type event.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

There was much talk about how AR is going to eclipse VR in popularity. Maybe in usage, but I think effective VR experiences will have more impact with vie wers.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

There are so many students around the world working in VR. It would be great to reach out to them for a festival or contest and see what they are coming up with.

#21

1. What was brought up in the presentations or in your discussion group that you thought were very important?

Timelines of consumer ready devices and costs

2. What was brought up in the presentations or in your discussion group that you found interesting?

Depth scanning issues and solutions with games

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

n/a

4. What was brought up in the presentations or in your discussion group that you disagreed with?

n/a

#22

1. What was brought up in the presentations or in your discussion group that you thought were very important?

AR is going to be the basis of future computing, as big as the internet and as smartphones, and 5G is going to be the killer app for AR.

2. What was brought up in the presentations or in your discussion group that you found interesting?

I thought the Niantic/Ingress part was the one I was the least aware of, and was very interesting to hear both Flint and John's POV on the experiential side.

It was also interesting to hear that there is still ground to cover in making hollywood talk to online tech and to hardware and everyone to work together efficiently.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

The idea that AR could be the basis of virtual hardware, why would you need several TVs in every room in your house if you can have the content displayed at great resolution and great quality anywhere you would like.

Just as the smartphone killed cameras, calculators, watches, personal organizers, etc…. AR headsets are going to kill more redundant hardware.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

Nothing I can recall, it's still all very speculative.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

Out in the world branded AR entertainment.

#23

1. What was brought up in the presentations or in your discussion group that you thought were very important?

The idea that AR is not some distant dream, it's happening right now in many forms.

2. What was brought up in the presentations or in your discussion group that you found interesting?

Tom Emrich's 6 key areas of opportunity: Bionic Vision, 3D-ifying the world, World Building, Natural I/O, Telepresence, and Super Intelligence. It's great to know where VC's are investing in the space.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

The notion of how to interact and coexist in the real world in a future with unlimited multi-verses. If we are all in a room together, but simultaneously in different pokemon-go style MR universes, how will we interact? Fascinating stuff!

4. What was brought up in the presentations or in your discussion group that you disagreed with?

There was a considerable amount of shade thrown at Tango. I seem to be more bullish on Tango (or mobile AR) than many of the attendants.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

I'd love to hear about ideas for funding content. When I asked John Zuur Platton about it, his advice was to "just make it". That's all well and good, but the hard truth is that content creators need funding to make things in most cases.

I'm extremely aware of the trappings of searching for funding for innovative projects in the commercial and music industries. How do independent content creators find investment for original IP in mixed reality? I would love to pioneer mixed reality filmmaking and could use advise on how to kickstart it from a financial perspective.

#24

1. What was brought up in the presentations or in your discussion group that you thought were very important?

- The need for, and current lack of, compelling hardware (headsets)

2. What was brought up in the presentations or in your discussion group that you found interesting?

- It seems like there are far too many definitions of what AR is. Phones with positional tracking are banded about as AR, but to me that's something very different (and far less compelling) than a Hololens.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

- How to use AR for social good, not just entertainment. It opens up a lot of doors to give somewhat abstract information context in the real world. That could be very powerful.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

- Like I said above, I don't think "real" AR is looking through the camera on a phone. I understand that it exists already and has interesting uses, but to me it's not the same thing as real AR glasses, even if it uses a lot of the same underlying technology.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

- What I'm struggling with the most is creatively, how to build non-linear interactive narratives for these devices that still 'feel' like traditional narratives (films/TV). When a person has free will in an interactive world, getting them to do the 'right' thing in a certain order or timeframe is extremely difficult, therefore building tension is difficult as well.

#25

1. What was brought up in the presentations or in your discussion group that you thought were very important?

With the window of experimentation tolerance starting to close, we must take whatever funds are given and use it *responsibly*.

2. What was brought up in the presentations or in your discussion group that you found interesting?

The methods of designing AR experience and the questions that we must ask ourselves as creators, which include: why? what purpose is this experience serving? what are the mechanics of the game/experience, and how do they serve the narrative or allow for a wide enough playground for the user?

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

Snapchat glasses, though not AR themselves, will drive the transition to wide comfort of wearable technology/cameras.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

Some mentioned that VR and reality are started to become blended as memories; I still think VR is not true or realistic enough, graphically and otherwise, to be mistaken for real memories.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

Ethics and social impact of hyper-intelligence.

#26

1. What was brought up in the presentations or in your discussion group that you thought were very important?

AR will be the next big thing after Internet and mobile. VR is nothing but an intermediate step to wait for AR device availability.

2. What was brought up in the presentations or in your discussion group that you found interesting?

The discussion about the social impact of AR and VR. We have to find ways to make VR social-aware while AR can easily integrate social concept.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

This social aspect importance.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

AR related privacy issue due to the use of cameras. I am not sure the privacy issue will remain with regards to the kind of services it will offer.

I am not sure either that as light and thin as possible everybody would agree to wear glasses. Alternative device less solutions such as projections could also be investigated.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

AR and storytelling.

#27

1. What was brought up in the presentations or in your discussion group that you thought were very important?
    a. I think the overall landscape of the AR industry and where it was headed was important. It is a very young industry and hard to really speculate the information and road map. Lots and lots of directions it could go.
    b. There needs to be standardization of terminology amongst the leaders in the industry. There needs to be some sort of independant consortium that has the major companies in different industries driving this standardization.
2. What was brought up in the presentations or in your discussion group that you found interesting?
    a. I think it was interesting that all of the devices that were called out during the presentation. I think the bigger issue is the friction those devices cause from a general user actually purchasing one of those devices and then actually using it. There will be an "Ah Ha"! moment but I didn't see anything during the presentation that made me think that is the moment during the presentation.
    b. Pokemon Go is frictionless since anyone with a smart phone can play it. It really help demo what AR is to the general user.
    c. Adding devices is something that is costly for the hardware manufacturer to make money on.
        i. You have to:
            1. Design, Manufacture, Get Distribution, Market, Sell, Operate, and Support
            2. This is a ton of costs. It will work for B2B but B2C will probably have a niche audience for a long time.
3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

    a. Who is paying for this and does it make sense.

        i. We had a bunch of studios in the discussion group and someone said they had a meeting and the AR people wanted the studio to pay when the studio wanted the AR company to pay.

        ii. For a studio does it increase ticket sales, product sales, ratings, etc…

        iii. What is the distribution of AR capable devices.

            1. How many of those devices can be used by the studios target demographic for the property they want to market.

            2. Does it increase any revenue for that property and or any form of a metric that makes it worth the studios time?

4. What was brought up in the presentations or in your discussion group that you disagreed with?

    a. I do not like the comparison between AR and VR. They are two different mediums and both have their plusses and minuses. It is like comparing TV to movies or video games. It is not like you are comparing Amazon Prime to Netflix as an example. All of the mediums take minutes out of my day. I as a consumer have to figure out how I want to give those minutes to each medium.

    b. There was discussion of the AR glasses in my group. I find an additional cost for a device hard to pay for. It can only be experience by me at one time and not everyone else in the room. When people want to be entertained with media properties they are typically conditioned to sit on a couch 12 feet from a screen. I look at the 3D glasses and 3D in general and compare it to AR from a device and content standpoint. If I was lying down on the couch the 3D glasses displayed weird. I had to look at the TV sitting up. The others int he room watching could not see a nice picture like I was. The TV was about $1k or a little more with a few glasses. The AR glasses are going to cost more than a gaming console. That gaming console can do so much more. That is the competition for minutes out of a consumers day that AR is competing with.

5. Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

    a. I think there needs to be some sort of analytics attached to this medium. How do you measure its success, failures, and ways to monetize it more effectively.

        i. Where is the "Google Analytics" for the industry?

        ii. People can buy a device it does not mean they are using it.

            1. What are they using it for?

            2. Why are they using it for that?

            3. When are they using it?

4. How long are they using it?

5. What demographics are using it?

6. What are those demographics spending money on?

7. Who is the target demographic?

   iii.   How do you provide reports to advertisers?

   iv.   Do advertisers want to spend money in this area?

   v.   If content is made for these mediums does it increase sales in other mediums or brick and mortar?

#28

Thank you for having me at Friday's event.

I think I was coming at VR from a somewhat unique perspective because I've been creating content for VR that directly impacts or tries to help society's most vulnerable (in the case of Project Empathy - it's the U.S. prison population and those affected by mass incarceration).

Given the election results last Tuesday, I feel stronger than ever that society's vulnerable populations and even minority groups in the U.S. will need a voice and possibly help from creative technologies to go forward.

For AR + VR topics for future events, it would be great to explore howthese unique and creative technologies can be used to amplify free speech, combat hate crimes, and make communities more inclusive, if possible.

That's what is most interesting to me.

#29

It was an interesting event on Friday. I especially enjoyed the small group discussion. I hadn't realized that Technicolor was so active in the space and liked hearing about what the studios are thinking about re new technology, Fox especially.

The most informative presenter was Aaron Pulkka, because he gave specifics about the actual development process on Hololens and Tango. I didn't think we needed to hear from two presenters from Niantic, a bit repetitive. And I've given the Keith Boesky presentation before, most recently for Google at a developer's conference two weeks ago, so I didn't learn much from Tom or Keith.

Thank you for inviting me.

#30

1) It was good to get a buff on the state and future state of the industry. The thing that's becoming evident to me is that while we were kind of alone in the wilderness a year ago (by we, I mean Niantic), the world is growing.

2), 3) and 4): I'm still processing this, but I hadn't really heard the distinctions between Augmented Reality and Mixed Reality. I realize that there are terms stumbling over each other and I guess its necessary to have a bunch of terms, but to me it's all the same stuff and all of the mediums will grow as they merge together.

But still thinking about it.

#31

The AR Salon was very interesting. Thank you for the invite.

1. thought were very important

Piper Jaffrey and Super Ventures discussion of the business markets was good information regarding the market and time scale of adoption. Also, with all of the wild speculation in this field, it was good to see what numbers and reports they were valuing.

2. found interesting

Ingress discussions from Niantic were very interesting, entertaining, and thought-provoking. Could have listened to that all evening.

Focus on what Apple will do next year and Project Tango. Neither was directly represented, but the rumor-mill showed the interest/nervousness of the audience, which was in itself interesting.

3. hadn't thought of before

Discussions in the break-out sessions about content and on-line community.

Content transitioning from publicity stunt to compelling on-going content. When does this happen? Not clear yet.

With the hardware changing so quickly, how should a creator pick a platform?

On-line community, how to deal with social responsibility and toxicity.

4. disagreed with

The rush to nomenclature. Mixed, AR, VR, and Amplified Realities. AR v. VR with pejorative VR statements.

They are fundamentally similar and don't think that the distinctions will matter much to the consumer. The ability to fluidly change from one paradigm to another will be expected, and the genre of content will probably end up defining the distinctions, with the hardware/technology secondary.

#32

1. What was brought up in the presentations or in your discussion group that you thought were very important?

The Niantic talks were particularly fascinating. It was great to hear from them how they think about new types of entertainment that can work at scale today on current generation hardware.

2. What was brought up in the presentations or in your discussion group that you found interesting?

I love how Niantic approaches storytelling and community building.

3. What was brought up in the presentations or in your discussion group that you hadn't thought of before?

Our discussion group really provided a lot of great insights as to how creators think about the tools that tech providers such as my company are providing. Those were great insights.

4. What was brought up in the presentations or in your discussion group that you disagreed with?

Not sure I can think of anything on this front.

Bonus question; What topics or questions related to AR and VR would you like the ETC@USC to focus on for future events or research?

I'd love to see a focus on anyone doing activations with AR (with Hololens, Google Tango, etc.). I think AR (or MR) is at the point where VR was a few years ago, and we'll start to see a lot of activations at events like SXSW.

#33

1. Defining a language for storytelling in AR

2. How to use AR for social good

3. Games over the real world (ala pokemon) are inherently unfair because the world isn't "designed" to be fair (population centers, weather, etc. all affecting access to virtual resources)

4. Tango's viability as a platform

Bonus:

I think AR for social good is an interesting topic, which kind of dovetails into non-game applications for AR. Like, what would you do with an AR device that you wear all day? It can't be just games...how does AR actually apply to everyday life, much like our phones do today?

List of companies and organizations represented

Amazon Studios	ON Track Music Inc.
Boesky & Company	OSSIC
Comcast	Paramount Pictures
Create Advertising	Paranomal Media
Devious Media	Piper Jaffray
DIRECTV-AT&T	Positron
Disney ABC Television Group	Propellerhead-Inc.
DTS	Rabbx
Entertainment Technology Center @ USC	Reality Fabrication Inc
Ericsson	Sony Pictures
Fantasmo.io	SpoutVR
FLARB LLC	Springbok Entertainment
Fluid Studios	StoryTech
Fourclops	Super Ventures
FOX Studios	Technicolor
FOX Sports	Trigger	The Mixed Reality Agency
FrameStore	Universal Pictures
Grab Games	USC Donrsife School of Letters Arts & Sciences
Randal Kleiser Productions	USC Institute for Creative Technologies / SCA
Independant Immersive Media Producer	USC School of Cinematic Arts
Legacy Interactive / Legacy Games	VNTANA
Marvel Entertainment	Intel VR Center of Excellence
Marvel Studios	VRSC
MOFILM	VRScout
NBC Universal	Walt Disney - Parks & Resorts
New Amsterdam Media	Walt Disney Studios
Niantic Labs	Warner Bros
ODG	WME

Event program

ETC AUGMENTED REALITY
SALON

Produced by
The Entertainment Technology Center @ USC

November 11, 2016
USC School of Cinematic Arts
Los Angeles, CA

Program

1:30 pm - Welcome & Introductions

Ken Williams, Executive Director & CEO, Entertainment Technology Center @ USC

1:35 pm - AR Event Opening Remarks

Phil Lelyveld, VR/AR Initiative program lead, Entertainment Technology Center @ USC

1:45 pm - 10 Minute Presentations (with brief Q&A)

The Business of AR
- **Gene Munster,** Senior Research Analyst, Piper Jaffray
- **Tom Emrich,** Partner, Super Ventures
- **Keith Boesky**, Principal, Boesky & Company

The Art and Technology of AR
- **Aaron Pulkka**, CEO, Rabbx Inc.
- **John Zuur Platten**, Creative, Niantic Labs
- **Flint Dille,** Creative Lead, Niantic Labs

3:15 pm - Discussion Workgroups (90 Minute Moderated Sessions)

Moderators

- **Dr. Anthony Borquez,** CEO, Grab Games, Faculty, USC
- **John Canning,** Chairman New Media Council, Producer Guild of America
- **Jeanette DePatie,** Lead Writer/Producer/Techsplainer, Propellerhead Inc.
- **Lori Schwartz,** Principal, Story Tech (The Tech Cat)

4:45 pm - Networking in the Lobby

Speakers

Philip Lelyveld, VR/AR Initiative program lead
Entertainment Technology Center at USC

Philip Lelyveld runs the Virtual Reality / Augmented Reality Initiative at the Entertainment Technology Center (ETC); a think tank within the USC School of Cinematic Arts. His VR/AR Initiative studies and works to influence the creative, technical, and business issues that will shape this new, emerging art form. His ETC events are designed to bring hands-on professionals together to share ideas and build community. Phil also consults on emerging opportunities and product strategies with Virtuosity (http://virtuosityvr.com) a consulting firm formed with Lawnmower Man director Brett Leonard and Digital Domain founder Scott Ross. Mr. Lelyveld keynoted the 2016 Singularity University Global Summit, the 2016 AES Int'l Conference on Audio for VR and AR, and produced the afternoon VR program at NAB 2016.

Gene Munster, Senior Research Analyst
Piper Jaffray

Gene Munster is a managing director and senior research analyst at Piper Jaffray, specializing in Internet. He joined Piper Jaffray in 1995. Munster's coverage includes Google, Amazon, Facebook, and Apple. He has authored several key industry reports on technology including "Next Paradigm in Mobile Computing is Mixed Reality" and "Next Mega Tech Theme is Virtual Reality". He is quoted frequently in key financial and technical news journals, along with frequent guest appearances on CNBC and Bloomberg. Munster holds a bachelor's degree in financial management and new venture strategies from the University of St. Thomas.

Aaron Pulkka, CEO
Rabbx, Inc.

Aaron is an interactive entertainment executive producer with many years of development experience, including design, programming, and publishing for Disney, Sony, THQ, Vivendi, and Activision. Started working in VR/AR 25 years ago, highlighted by his master's thesis work at the HITLab in Seattle, design and programming at the Walt Disney Imagineering VR Studio, and most recently consulting and contributing to independent projects through his own companies (Rabbx in Los Angeles and Metal Rabbit Games in China) including award winning development on the HoloLens and Tango platforms.

Ken Williams, Executive Director & CEO
Entertainment Technology Center @ USC

Williams currently serves as Executive Director and CEO of the Entertainment Technology Center at USC, a technology think tank which brings together the top entertainment, technology and consumer electronics companies to better understand and collaborate on the impact of new technology on all aspects of the entertainment industry. A media industry veteran, Williams, spent 18 years with Sony Pictures Entertainment including Treasurer of Columbia Pictures Entertainment and EVP, Sony Pictures Entertainment, culminating as President of Sony's Digital Studios Division. Williams is a graduate of Harvard University and holds an MS in Business Policy from Columbia University. He is a voting member of both the Academy of Motion Picture Arts and Sciences and Television Arts and Sciences.

Speakers

Keith Boesky, Principal
Boesky & Company

Keith Boesky has been defining the intersection of the content and technology communities for over twenty years. He advises clients on both sides of venture financing, covering mobile games, casual games, online games and more. Boesky & Company has closed more game and intellectual property deals than any agency in the world. In 1996, after Boesky theorized in the Eidos IPO prospectus that games could be used to platform intellectual property, the CEO made him President of Eidos, where he moved the newly launched Tomb Raider video game across all media. He also spent 2 years at ICM, bringing games into film and tv and clients into games, anime, comic books and other media. Keith is an adjunct professor in Carnegie Mellon University's MEIM program where he teaches the business of games.

Flint Dille, Creative Lead
Niantic Labs

Flint Dille, screenwriter, game designer, and novelist, is the design team leader for D². Flint Dille is currently Creative Lead on Google/Niantic Labs which has two products' Ingress and Pokemon Go.. He designed and authored "Grey Space" (an early rendition of D²) for DARPA, and teaches at USC in both the Cinema School and Annenberg. His Agent 13 Novels (co-written by Dave Marconi) are in fast track development at Universal Studios. Deemed by the Writer's Guild of America to be the Most Published Game Writer in the World, Dille has twice won Game Script of the Year (Riddick: Escape from Butcher Bay (with JZP), and Dead to Rights), and was nominated for Ghostbusters and Dark Athena. He has multiple platinum titles and has worked on crown jewel franchises, including James Bond, Uncharted, Mission: Impossible, Tiny Toons, Batman: Rise of Sin Tzu (Guinness Book of videogame records for creating the first Batman villain outside of the comics), and has also penned novelizations for properties such as Superman, Dungeons & Dragons, Teen Titans, Diablo III and Scooby-Doo. He has a BA degree in Ancient History from U.C. Berkeley (1977) and an MFA from USC (1981) and has taught Environmental Gaming at USC Cinema and currently teaches The Dynamics of the Mobile Revolution at USC. Taught Alternate Reality Games at UCLA Cinema previously. He co-authored The Ultimate Guide to Video Game Writing and Design with John Zuur Platten and The Sagard Series with Gary Gygax. As a screenwriter, Flint was showrunner on Transformers G1 and other animated series'. Flint has written four feature films.

Tom Emrich, Partner
Super Ventures

Sometimes called the "man from the future" Tom Emrich is a leading voice in wearable technology committed to driving adoption and innovation in technology augmenting the human experience. He is an investor and partner at Super Ventures, the first fund and incubator dedicated to augmented reality and a community builder, founding We Are Wearables, the largest wearable tech community of its kind in the world with a reach of over 100,000 and chapters across North America. He is also co-producer of Augmented World Expo (AWE) the largest AR and VR conference now in California, Europe and Asia. His passion for this space is driven by his belief that wearable tech plays a critical role in our human evolution. You can follow his thoughts on Twitter @TomEmrich.

Speakers

John Zuur Platten, Creative
Niantic Labs

John has a twenty-year career in the entertainment business, writing for video games, films, television, digital media and books. John has written and designed over sixty projects for every major publisher and studio, including: HAWx2, Apache Air Assault, Wanted: Weapons of Fate, Ghostbusters, F.E.A.R. 2: Project Origin, Fantastic Four: Rise of the Silver Surfer, Escape from Butcher Bay and Dark Athena (Chronicles of Riddick saga) and Wheelman. John created Fear Effect for Eidos. It was named the Playstation action game of the year by IGN, was the basis for the film Venom, and is being rebooted with his help by Square Enix Collective. John's book The Ultimate Guide to Video Game Writing and Design (co-authored by Flint Dille) has remained a top seller on Amazon.com since its release.

Moderators

Dr. Anthony Borquez,
Chief Executive Officer
Grab Games, Faculty USC

John Canning, Chairman
New Media Council
Producer Guild of America

Jeanette DePatie, Lead Writer/
Producer/ Techsplainer
Propellerhead Inc.

Lori Schwartz, Principal
Story Tech (The Tech Cat)

Entertainment Technology Center @ USC

www.etcenter.org

About The Entertainment Technology Center

The Entertainment Technology Center at the University of Southern California is a think tank and research center that brings together senior executives, innovators, thought leaders, and catalysts from the media & entertainment, consumer electronics, technology and services industries, along with the academic resources of the University of Southern California to explore and act upon topics and issues related to the creation, distribution, and consumption of media & entertainment content. As an organization within the USC School of Cinematic Arts, ETC helps drive collaborative projects among its member companies and engages with the next generation consumers to understand the impact of emerging technology on all aspects of the media & entertainment industry, especially technology development and implementation, the creative process, business models, and future trends. ETC acts as a convener and accelerator for entertainment technology and commerce through research, publications, events, collaborative projects, shared exploratory labs, and demonstrations.

Executive Board Members:

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- Kathy J. Liu, Notetaker
- Charlene Kao, Notetaker
- Jyostna Kadimi, Notetaker
- Sondhayni Murmi, Notetaker

etc ^{SM} | ENTERTAINMENT TECHNOLOGY CENTER

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Future Activities

Based upon the strong and continuing interest in the information-sharing and community-building activities in VR, AR and MR produced by the ETC, it is our intent to dramatically expand our profile in this emerging technology. This will include a series of major events in the coming year that will provide for dramatically increased attendance, structured discussion and dialogue, and significantly expanded product display and demonstration capabilities. Please let us know if your company would be interested in participating in the enhanced program effort through sponsorship and product demonstration. Email us at Events@ETCUSC.org.

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