Breaking the Mold— IEEE GEM 2019 Explores New Conference Presentation Modalities

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■ **THE IEEE GAMES** Entertainment and Media (GEM) Conference began in London in 2009, moving through venues in the U.S. and Canada until 2015. In 2018, the conference was successfully rebooted at the National University of Ireland Galway with more than 120 delegates. The 2019 IEEE GEM conference was hosted at Yale University.

Since its founding in 1701, Yale has been dedicated to expanding and sharing knowledge, inspiring innovation, and preserving cultural and scientific information for future generations. In hosting IEEE GEM, Yale drew together its deep connections with the arts and sciences to create a dynamic and experiential event that bridged technological advances with compelling humanistic and creative concerns.

VENUE

The conference was held at the Yale Center for Collaborative Arts and Media (CCAM), Yale's unique experiment center for visual art, computer science, music, architecture, film, theatre, dance, and literature. Centrally located on campus, the 5,000 square foot space featured state-of-the-art facilities, including a motion capture studio, immersive media labs, projection mapping system, creative suites, computerized audio and light systems, video studio, equipment lending library, wide-format printers, open workspace labs, and exhibition gallery.

The interactive media facilities and a range of custom exhibit and presentation spaces at CCAM, facilitated new modes for the presentation and exhibition of performances, artworks, and immersive experiences that leveraged the emerging technologies of motion capture, virtual reality, and augmented reality, Figure 1.

The IEEE GEM conference was originally established to facilitate new and original

Figure 1. One of the "immersive experience" spaces at the CCAM: this features Cecilia Suhr's "*I, You, We*" exhibit.

innovations in games and digital media and this year's conference lived up to this goal in a way that expanded the horizons of the conventional conference experience for delegates.

A great deal of credit is due to the members of the organizing committee who took the brave decision to break new ground in providing immersive experiences for conference participants. This new approach was very successful and received many positive comments and praise from presenters, keynotes, and other conference attendees.

In particular, Justin Berry, the conference chair, put in many hours of hard work to bring all aspects of the event together, delivering a unique experience to conference delegates. A big thank you to Justin from IEEE Consumer Electronics Society (CESoc). Thanks also to Elena Bertozzi, Randall Rhodes, and Johannes DeYoung for their roles on the organizing committee. Now, a whirlwind tour of the event to give our readers a sense of the immersive experiences of IEEE GEM 2019.

KEYNOTE SPEAKERS

Angela Washko is an artist, writer, and facilitator devoted to creating new forums for discussions of feminism in spaces frequently hostile toward it. Since 2012, Washko has operated the *Council on Gender Sensitivity and Behavioral Awareness in World of Warcraft*, an ongoing intervention inside the most popular online role-playing game of all time.

Washko's talk highlighted the role of games in contemporary culture and revealed how online communities shape the discourse around identity, gender, and sexuality. Her work walks a fine line between humor and serious matters such as harassment and sexual bullying tackling these with sensitivity and diplomacy. Her keynote opened a discourse on the nature of computer gaming, namely that the technology provides more than entertainment having evolved into delivery mechanism for meaningful experiences which shape our understanding of the world. As games evolve into a mainstream form of culture they deserve the rigorous interrogation that Washko's work provides.

Peter Burr is a digital and new media artist from Brooklyn, NY, USA. His practice often engages with tools of the video game industry in the form of immersive cinematic artworks. These pieces have been presented internationally by institutions including MoMA PS1, New York; and The Barbican Centre, London. Burr has in recent years devoted himself to exploring the concept of an endlessly mutating labyrinth and his keynote provided insights and artistic inspirations, focusing on his latest works, including *Dirtscraper*.

Projected onto the walls of a small, black room, "*Dirtscraper*" looks to be just a very detailed experimental film in the aesthetic of Commodore 64. But, with the help of a podium in the center of the room, it allows the audience to control certain levels and aspects of the game progression. Story mode screens add important points of narration and dialogue to progress the narrative.

"*Dirtscraper* speaks about the ways (we as a) society use gaming as an extension for the ways that we take control and power over societies through different mechanisms (such as) commerce, city planning . . . participants are allowed to navigate through this world going all the way from subterranean to the top of the narrative, but they don't actually have control."

Alex Thayer is the head of Research at Amazon Search. His Ph.D. in human-centered design and engineering is from the University of Washington, and he has a complimentary degree in communication and art history. Alex's research focuses on the future of mixed reality, and other topic areas at the intersection of people, practice, experience, and technology.

His keynote explored interesting relationships between the real-word and mixed reality

Figure 2. Kimberly Hieftje's keynote on Day 2 of IEEE GEM.

delving into the works of eccentric and irascible artists to draw inspiration in building immersion into technology-based experiences. Our journey began with a consideration of the Anne Frank house in Amsterdam; capturing the ambience and aesthetic of an old, sparsely furnished town house in a virtual or mixed reality experience requires a focus on intangible, emotional, and nonsensory elements of the experience. Immersion requires more than a duplication of the visual and audio elements of an environment to fully capture such unique experiences.

Thayer then led us on a fascinating journey into art history, drawing inspiration from the works of Salvator Rosa, known for his unorthodox, extravagant, and rebel lifestyle. We can learn a great deal about creating engaging and immersive experiences from the past, and the subtle devices and metaphors incorporated into old masterpieces find analogous representations in todays augmented and mixed reality.

Kimberly Hieftje's focus on the use of gaming technology in the healthcare sector is a regular theme at IEEE GEM, and Kimberly, director of *Play4Real* lab at Yale, gave a talk, Figure 2, on s*mokeSCREEN VR,* a virtual reality videogame intervention focused on e-cigarette and vaping prevention in high schools.

This work was cofunded by Oculus research. The game, s*mokeSCREEN VR,* represents a collaboration with local high schools and student focus groups. The player must navigate different types of peer pressure, including the pressure to vape in various social situations such as in the school bathroom, in the back of a classroom, and at a party.

There is significant potential for VR to impact health education and behavior change, especially in adolescent populations vulnerable to adopting risky behaviors such as vaping. The VR environment of *smokeSCREEN VR* uses voice recognition software, which allows the player to practice refusing peers in real time. The player must navigate different types of peer pressure, including the pressure to vape in various social situations such as in the school bathroom, in the back of a classroom, and at a party. The goal is to empower students to handle realistic social situations in a practical and realistic manner.

Other Keynote sessions were presented by Hyphen-Labs, and Anna Dyson of Yale.

SPECIAL EVENTS

The interactive media facilities and a range of custom exhibit and presentation spaces at the Yale CCAM facilitated new modes for the presentation and exhibition of performances, artworks, and immersive experiences that leveraged the emerging technologies of motion capture, virtual reality, and augmented reality. These included not only static exhibitions and demonstrators, but also a number of dynamic and inspirational "digital performances."

CURATED EXHIBITIONS AND DEMONSTRATORS

The conference features 14 curated exhibitions and six project/demonstrators. These were located in a "digital exhibit" corridor or in a number of specialized "immersive experience" spaces, located in the Yale CCAM.

Exhibits ranged from multiparticipant immersive VR Worlds, through a range of "digital" artistic works built on various framework leveraging state-of-art digital media. Delegates could visit museums, experience working in an Indonesian village or explore extraterrestrial environments with powerful audio and visual cues that were at times both unnerving and perceptually disturbing.

PERFORMANCES

There were four "performances" interspersed with conventional keynotes. These were held in several immersive performance spaces, such as at the CCAM. Performances blended a mix of
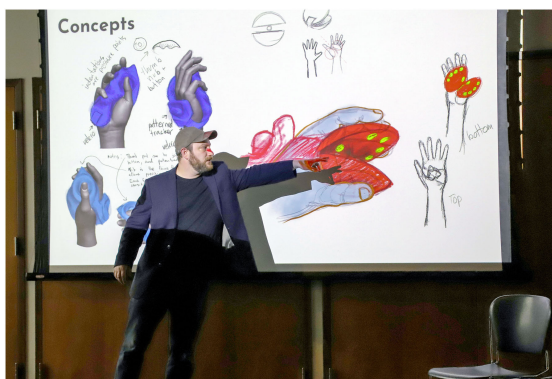
Figure 3. Justin Berry presenting on the Clamshell modular digital interface.

Figure 4. Peter Burr's keynote presentation on Day 1 of IEEE GEM 2019.

immersive audio and atmospheric lighting of the stage with more conventional modes of artistic expression.

In some cases, a VR element was incorporated into the performance and the audience was surrounded by a virtual reality mimicking the real-world performance. This was enhanced in some case by providing a video window, within the VR world back onto the audience themselves. Thus, we appeared to be participating in two distinct, yet interrelated performances. In VR new physical constructs could appear, actors could grow, or shrink in size, sprout wings and even fly. The key was to maintain a realistic connection between both performances to engage the audience and maintain the immersiveness of the experience.

Watching these artistic performances at IEEE GEM 2019 gives important clues to engineers and game designers (see Figure 3), on how to create immersive environments for other, more traditional gaming, and simulation use cases.

TECHNICAL PROGRAM AT IEEE GEM 2019

In addition to exploring new modes of exhibition and presentation, IEEE GEM 2019 also featured a strong technical program spread across three parallel conference tracks. It was very challenging to fit everything into a three-day program, so some workshops and sessions ran onto the Saturday morning. The main program opened on the afternoon of June 19th with exhibits and demonstrators running in the CCAM,

followed by the opening ceremony, reception and keynote talks by Angela Washko and Peter Burr (see Figure 4).

Technical sessions opened on June 20th with parallel sessions on *game platforms for learning*, *medical applications,* and *evaluating education*, chaired, respectively, by Johannes deYoung, Kai Erenli, and Kathleen Ruiz. In the afternoon parallel tracks on *new performance practices*, chaired by Elena Bertozzii, and *immersive learning* chaired by Ashwini Naik, ran together with a session featuring *dynamic demonstrators*.

In between the technical sessions, there were three plenary keynotes. To close the day, the late afternoon keynote, presented by Hyphen Labs, was followed by a performance of the fascinating mixed reality show.

Friday sessions opened with a keynote from Kimberly Hieftje, (see Figure 2) followed by sessions on *immersive visualizations*, chaired by Naomi Keena, and *applied science*, chaired by Gregory Luther. A lunchtime panel session discussed *Forms and Functions: Better Unions in Creative Process* and featured Thomas Oberender (Berliner Festspiele), Stephanie Riggs (author of *The End of Storytelling*) Johannes DeYoung (Carnegie Mellon University), and Kay Meseberg (head of Mission Innovation, ARTE). This panel discussed how developments in consumer electronics have radically altered platforms for storytelling.

An afternoon technical session on *expressive interfaces*, chaired by Elena Bertozzi, *emerging industry standards*, chaired by Gregory Luther, and

augmenting experience, chaired by Mohammed Aly Etman, were followed by three early evening performances.

REFLECTIONS FROM THE CONFERENCE CHAIR

When Justin Berry was originally asked to submit a proposal for IEEE GEM, he felt that the most important feature he wanted to include was an opportunity for people to see and touch the things that were being discussed. When he attended a conference, he was excited to hear about advances or experiments in his field, but often those ideas are difficult to convey through words alone. Even video, while an excellent form of documentation, does not fully communicate the nature of experiences in immersive media such as AR and VR.

At IEEE GEM 2019, the goal was to provide as many opportunities as possible for people to bring their work to life and share it with participants. A simple goal to describe but a very difficult one to achieve when many experiences require custom hardware or computer systems. By hosting at the Yale CCAM, we were able to leverage our access to space and equipment and allow as many participants as possible to share experiences based on their research.

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