2019 IEEE Games, Entertainment, Media Conference (GEM 2019)

New Haven, Connecticut, USA
18 – 21 June 2019

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Wednesday, June 19

Wednesday, June 19 8:00 - 9:00

R1: Registration

Room: bakery

Wednesday, June 19 9:00 - 12:00

W1: Workshop: Motion Capture Intensive

Room: leeds studio

Wednesday, June 19 12:00 - 13:00

L1: Lunch

Room: drama 1 & 2

Wednesday, June 19 13:00 - 16:00

W2: Workshop: Business Modeling in GEM

Room: leeds studio

Wednesday, June 19 17:00 - 18:00

K1: Keynote: Angela Washko

Room: drama 1 & 2

Wednesday, June 19 18:00 - 19:00

O1: Opening Reception

Room: drama 1 & 2

Wednesday, June 19 19:00 - 20:00

K2: Keynote: Peter Burr

Room: drama 1 & 2

Thursday, June 20

Thursday, June 20 8:00 - 9:00

R2: Registration

Room: bakery

Thursday, June 20 9:00 - 10:00

K3: Keynote: Alex Thayer

Room: drama 1 & 2

Thursday, June 20 10:15 - 11:45

Session 1: Platforms for Learning

Room: leeds studio

10:15 *A Large Curved Display System in Virtual Reality for Immersive Data Interaction....1*

Lizhou Cao (University of Alabama in Huntsville, USA); Chao Peng (Universtiy of Alabama in Huntsville, USA); Jeffrey Hansberger (Army Research Lab, USA)

This work presents the design and implementation of a large curved display system in a virtual reality (VR) environment that supports visualization of 2D datasets (e.g., images, buttons and text). By using this system, users are allowed to interact with data in front of a wide field of view and gain a high level of perceived immersion. We exhibit two use cases of this system, including (1) a virtual image wall as the display component of a 3D user interface, and (2) an inventory interface for a VR-based educational game. The use cases demonstrate capability and flexibility of curved displays in supporting varied purposes of data interaction within virtual environments.

10:37 *Circles, Multi-platform Multi-learner Virtual Reality learning Framework WIP....N/A*

Anthony C Scavarelli (Carleton University & Algonquin College, Canada); Ali Arya (Carleton University, Canada); Robert J. Teather (Carleton University, unknown)

Circles is a web-based Virtual Reality (VR) framework that connects people together across virtual times and spaces. This platform aims to enhance learning through socially scalable learner interactions and the experiential exploration of virtual environments accessible via multiple platforms (Mobile, Desktop, and Head-Mounted Display, HMD, VR). Currently, the framework has (3) environments about Viola Desmond, a Canadian Civil Rights pioneer.

11:00 *The Verb Collective....5*

Justin Berry and Bobby Berry (Yale University, USA)

Rapid experimentation and prototyping tool geared towards teaching interaction design rather than relevant coding strategies.

11:22 *Tiny Online Game Engines....N/A*

Jonah Warren (Quinnipiac University, USA)

A Tiny Online Game Engine (TOGE) is an online tool that allows designers to create small games of a certain genre easily, often without programming. This paper explores the trend by examining three of the most popular TOGEs available: Twine, PuzzleScript, and Bitsy.

Session 2: Medical Applications

Room: loria 250

10:15 *Gamified vision test system for daily self-check....9*

Kenchi Hosokawa and Kazushi Maruya (NTT Communication Science Laboratories, Japan); Shin'ya Nishida (Graduate School of Informatics, Kyoto University, Japan); Masayo Takahashi (RIKEN CDB, Laboratory for Retina Regeneration, Japan); Satoshi Nakadomari (Kobe City Eye Hospital, Japan)

We propose a new system consisting of gamified tests for self-eye check. The gamified tests can be played in a short (3-4 min.) time and with more enjoyable ways than in conventional tests and can be utilized in screening tests.

10:37 *Impact of a Web-Based Tobacco Product Use Prevention Videogame Intervention on Adolescents....N/A*

Kimberly Hieftje (367 Cedar St & Play4real lab at Yale Center for Health & Learning Games, USA); Claudia-Santi F Fernandes (Yale Center for Health & Learning Games, USA); Lynn Fiellin (Yale University School of Medicine & Yale Center for Health & Learning Games, USA)

smokeSCREEN is a web-based videogame and tobacco use prevention intervention designed to increase knowledge and improve refusal skills. We examined the impact of the game on participants' beliefs and knowledge of tobacco product use, as well as data on the game's feasibility.

11:00 *PATRONUS: Blended Care for Virtual Reality Exposure Therapy....N/A*

Bernard François (PreviewLabs, Inc., USA)

PATRONUS aims to deliver blended care for virtual reality exposure therapy (VRET) as a safe, controlled, and cost-effective alternative to traditional exposure therapy - innovating by assessing the patient's anxiety level during exposure. Goals, process, and preliminary findings are discussed.

11:22 *Virtual Slots Game for Rehabilitation Exercises....17*

Ashwini G Naik and Steve Jones (University of Illinois at Chicago, USA); Patton Jim (Rehabilitation Institute of Chicago & University of Illinois at Chicago, USA); Robert Kenyon and Hoangminh Huynhnguyen (University of Illinois at Chicago, USA)

Research has shown that compliance to interactive training in tasks such as movement therapy following injuries, stroke and major surgeries is sub-optimal. Efforts are being made to make the rehabilitation process a more engaging experience to motivate patients to adhere to therapy. The use of games and virtual reality has gained interest among researchers and clinicians as it may cost less than clinical therapy and can be made portable for use at home. However, without the encouragement of a physical therapist motivating patients may be difficult. In this paper, we propose a virtual slot machine game and hypothesize that it can potentially make individuals increase time devoted to therapy. Since this game requires minimal skill for game-play, patients can simply reach a target to trigger a reel spin. We hypothesize that the anticipation and uncertainty of this game will capture patients' interest and motivate them to play longer. This preliminary study with able-bodied individuals may be used to tune the testing designs for future efforts on patient populations that need to repetitively practice arm movements.

Session 3: Evaluating Education

Room: loria 351

10:15 *Cartes: Teaching pre-calculus through gaming....N/A*

Bernard François (PreviewLabs, Inc., USA); Brett C Smith (Yale University, USA)

Cartes is a multiplayer game, aiming to reinforce students' understanding of mathematical functions to help prepare them for calculus. We describe the process of prototyping, implementing Cartes in a calculus course, and assessing the impact on learning and motivation.

10:33 *Cyber Learning and Augmented Reality in STEM Education....21*

Mojgan Matloob Haghanikar (Suny Polytechnic Institute, USA)

The rapid advancements in digital holography, virtual and augmented reality, have allowed extensive possibilities to elucidate scientific communication. A growing body of research (Hegarty, 2014) in psychometrics and science education literature has reported the high correlation between learners' spatial abilities and success in the sciences. A significant number of abstract concepts in physics, chemistry, math, astronomy, and biology are three-dimensional entities. However, the challenges are not limited to the obscurity of the third dimension. Communicating science is troublesome whenever the speed of transition, scale or time frame is beyond the realm of our perceptions and our daily life experiences. The recent advancements in mixed reality technologies, hold a vast potential to enhance the visualization and interactions to promote learning scientific processes. The unique characteristics of mixed reality technologies such as 3D interactive allowance, the physical and virtual world merger and the flexibility to connect various layers of information are the most promising features to enhance scientific communication. In this project, we will emphasize on five standpoints of immersion, interaction, cognitive processing, embodiment and visibility to sketch a new platform for communicating scientific concepts.

10:51 *SMACK: Subjective Measure of Applied Contextual Knowledge....30*

Mohammed S Alshair, Michael Wilson, Brian Holtkamp, Daniel Biediger, Chang Yun and Kyungki Kim (University of Houston, USA)

We developed an augmented-reality application to investigate if an AR-based assessment tool better tests a student's real-world knowledge and skill compared to pen-and-paper-based assessment. Although the participants preferred the AR-based assessment, they had higher performance rating in the traditional assessment.

11:09 *The development of a school climate tool/game....N/A*

Claudia-Santi F Fernandes (Yale Center for Health & Learning Games, USA); Jessica Hoffmann (Yale Center for Emotional Intelligence, USA); Alvin Tran (Yale Center for Health & Learning Games, USA); Kimberly Hieftje (367 Cedar St & Play4real lab at Yale Center for Health & Learning Games, USA); Tyra Pendergrass (Yale Center for Health & Learning Games & Play2PREVENT Lab, USA); John Joy (Schell Games, USA); Marc Brackett (Yale Center for Emotional Intelligence, USA); Lynn Fiellin (Yale University School of Medicine & Yale Center for Health & Learning Games, USA)

In a collaboration, the play2PREVENT Lab (p2P), Schell Games (SG), and the Yale Center for Emotional Intelligence (YCEI) developed a school climate assessment tool that will collect data from students, and embedded this tool into an overall interactive videogame with intervention components. Data from the assessment tool will inform students of how to adapt current aspects of their schools.

11:27 *Upskilling for Digital Transformation Preparing the Fashion Supply Chain for the Future of Work....N/A*

Sarah Krasley (Shimmy Technologies, Inc. & MIT Solve, NYU Future Labs, USA)

Automation in apparel manufacturing will reduce the workforce by 80 percent soon. We built a game with a novel UX design on top of a reciprocal apprenticeship AI to retrain sewing machine operators in digital model assembly. Most users had never used computers or smartphones.

Thursday, June 20 12:00 - 13:00

L2: Lunch

Room: drama 1 & 2

Thursday, June 20 13:15 - 14:15

K4: Keynote: Anna Dyson

Room: drama 1 & 2

Thursday, June 20 14:30 - 16:00

Session 4: Dynamic Demonstrations

Room: leeds studio

14:30 *I, You, We....N/A*

Cecilia Suhr (Miami University Regionals, USA)

I, You, We is I vs. You: We is an interactive audio visual installation/performance which is created to overlay our mirror image with that of others, thereby blurring the concept of "me vs. you" into a collective "we."

15:15 *New Atlantis....N/A*

Peter Sinclair (Ecole d'Art d'Aix-en-Provence, France); Benjamin Chang (Rensselaer Polytechnic Institute, USA); Ludmila Postel (Aix-Marseille University, France); Peter Gena (The School of the Art Institute of Chicago, USA); Jonathan Tanant (Independent, USA); Rob Hamilton (Rensselaer Polytechnic Institute, USA)

The New Atlantis Project has been focusing on the use of 3D virtual environments for making sound and music for the past decade. New Atlantis is both a research project and a shared online platform for audio experimentation in virtual space.

Session 5: New Performance Practices

Room: loria 250

14:30 *Avatar Selection for Live Performance in Virtual Reality: A Case Study....40*

David Gochfeld (New York University, USA); Kiira Benzing (Double Eye Studios, USA); Alex Coulombe (Agile Lens, USA); Kevin Laibson (Atlantic Theater School, USA)

We explore how different types of avatars affect actors' experience of performing live in real-time multi-user virtual reality.

14:52 *BEYOND IMITATION: Generative and Variational Choreography via Machine Learning....N/A*

Mariel Pettee, Chase Shimmin and Douglas E Duhaime (Yale University, USA); Ilya Vidrin (Harvard University, USA)

Our team of dancers, physicists, and researchers has developed machine-learning tools to generate sequences of movement and variations on movements using recurrent neural network and autoencoder architectures from a training dataset of choreography captured as 55 3D points.

15:15 *Lemniscate....N/A*

Elena Tilli (222 York Street & Yale School of Drama, USA); Danilo Gambini (Yale School of Drama, USA)

Lemniscate is the result of an experimental laboratory with the aim to investigate new forms of relationship among sound, image and dance. The conversation evolved around the concept of infinite. How infinite is a concept that our brain and mind cannot really picture, if not conceiving a finite image of it. Thinking of infinite, as something that goes up in scale, took us from the earth, through the solar system, ending to the milky way. All the concepts brings to our minds finite shapes and arrangements of objects. Even when thinking of infinite, as smaller and smaller subdivision of elements, the imagination still leads to something finite. Our body. The atom, which we imagine like a sphere surrounded by little satellites. The nanoparticles, which are pictured as spheres; again a finite shape. From there, the whole concept developed and evolved to open the space to the sound and dance contributes. The projection design focused on the infinite possibilities that would come by empowering the performer to influence the shape, the direction and the evolution of an image, using a part of the body. The idea of creating a different form of intimacy between what happens on stage and who is watching, based on the individuality of the piece and driven by the unique feelings conveyed during each performance. The media design is been accomplished using depth sensors to capture the motion of the dancer and to create a connection between a part of the body and a digital mass created with Touch Designer. Like the properties of a real mass, this mass is influenced by gravity, forces, turbulences and reacts to the pull-force introduced by the hands of the performer. The activity involved since the beginning the investigation of the interaction between the performer and the technology as a medium that would create a new/different performance each night and still be based on the narrative core of the piece, in an infinite combination of possibilities.

15:37 *Using Motion Capture to Accelerate an Augmented Reality Dance Application....N/A*

Patrick Pennefather (University of British Columbia & Simon Fraser University, Canada)

This investigation discusses several insights that may be useful to AR developers. Motion capture was used to accelerate a 3D animation pipeline for an Augmented Reality dance application used to complement live dance productions.

Session 6: Immersive Learning

Room: loria 351

14:30 *Augmentations in the Palace of Culture: Animate Soundscapes at the Carnegie Library of Pittsburgh....45*

Johannes Deyoung and Annie Hui-Hsin Hsieh (Carnegie Mellon University, USA)

How virtual media augmentations impact user experience by bridging historic and new media collections at the Carnegie Public Library.

14:52 *EcoResilience: Games, Art, Science....N/A*

Kathleen Ruiz and Krysia Kornecki (Rensselaer Polytechnic Institute, USA)

Art, games and ecological science come together as a radical act of knowledge preservation. Through VR and AR games, we are enabling people to experientially see, hear and touch plankton in new ways in order to understand their vital importance to freshwater ecology.

15:15 *'EXPERT' and 'CASUAL' INTERFACES for MUSEUMS in DIGITAL TIMES Board and Field Games: MUDs and MMORPGs: Things and Networks....50*

Gavin Hogben (Yale University, USA)

Mobiles/handhelds are everywhere - how should museums develop new narrative structures, digital infrastructures and physical architectures? This paper presents the museum as a global physical/digital interface - akin to a game environment with varied local game-mechanics and levels/territories for expert/casual use-groups.

15:37 *Museum in Your Living Room: Recreating the Peace Corps Experience in Mixed Reality....59*

Krzysztof Pietroszek, Amelia Tyson, Felipe Simas Magalhães, Carlos MacHer and Patricia Wand (American University, USA)

We describe a design and implementation of a prototype of a mixed-reality version of the Museum of Peace Corps Experiences. The museum exhibits were reconstructed using the photogrammetry and made interactive using real-time physics simulation and freehand interaction. We also recorded the volumetric captures of Returned Peace Corps Volunteers telling the stories related to the reconstructed artifact. The prototype was evaluated in a pilot study with positive response of the audience.

Thursday, June 20 16:15 - 17:15

K5: Keynote: Hyphen Labs

Room: drama 1 & 2

Thursday, June 20 17:00 - 18:00

P1: Performance TBD

Room: leeds studio

Friday, June 21 8:00 - 9:00

R3: Registration

Room: bakery

Friday, June 21 9:00 - 10:00

K6: Keynote: Kimberly Hieftje

Room: drama 1 & 2

Friday, June 21 10:15 - 11:45

Session 7: Presentations: Creative Process

Room: leeds studio

10:15 *DIMONscapes - LEARNING THROUGH ART....N/A*
Roz Dimon (DIMONscape / DIMON STUDIOS, USA)
A multi-layered digital painting where for instance a recent commission launching July 2019 takes 300 years of history and makes it into a single work-of-art, inviting all in to its multi-layered story via a QR code/website, accessible by smart devices

10:35 *Fire Underground: Real-Time Simulation, World-Building, and Cinema....N/A*
Nick Crockett (Carnegie Mellon University, USA)
I will be presenting on my research and process for Fire Underground, a feature length animation built in Unity which presents an alternative history and prehistory of coal, and combines hand-made objects with game-like logic and cinematic language.

10:55 *That Kind of Guy - Performance Capture Comparison....N/A*
Alex Coulombe (Agile Lens, USA); Shon Arieh-Lerer (Independent, USA); Kevin Laibson (Atlantic Theater School, USA); David Gochfeld (New York University, USA)
A demo in augmented and virtual reality comparing the same solo, comedic performance recorded in two different ways: with motion capture mapped onto a 3d avatar and with volumetric video capture.

Session 8: Immersive Visualizations

Room: loria 250

10:15 *Effects of VR Gaming and Game Genre on Player Experience....63*
Michael Carroll, Ethan Osborne and Caglar Yildirim (State University of New York at Oswego, USA)
With the increasing availability of modern virtual reality (VR) headsets, the use and applications of VR technology for gaming purposes have become more pervasive than ever. Despite the growing popularity of VR gaming, user studies into how it might affect the player experience (PX) during the gameplay are scarce. Accordingly, the current study investigated the effects of VR gaming and game genre on PX. We compared PX metrics for two game genres, strategy (more interactive) and racing (less interactive), across two gaming platforms, VR and traditional desktop gaming. Participants were randomly assigned to one of the gaming platforms, played both a strategy and racing game on their corresponding platform, and provided PX ratings. Results revealed that, regardless of the game genre, participants in the VR gaming condition experienced a greater level of sense of presence than did those in the desktop gaming condition. That said, results showed that the two gaming platforms did not significantly differ from one another in PX ratings. As for the effect of game genre, participants provided greater PX ratings for the strategy game than for the racing game, regardless of whether the game was played on a VR headset or desktop computer. Collectively, these results indicate that although VR gaming affords a greater sense of presence in the game environment, this increase in presence does not seem to translate into a more satisfactory PX when playing either a strategy or racing game.

10:35 *Exploring visual and non-visual 'biophilic' impacts on human health using experimental methods in simulated abiotic and biotic environments....N/A*
Mandi Pretorius and Phoebe Mankiewicz (Yale University, USA); Mohamed Aly Etman (Yale University & CEA Yale, USA); Nick Novelli (Yale University & CEA: Center for Ecosystems in Architecture, USA); Anna Dyson (Yale University, USA)
Assessing aspects of the natural environment's impact on human health, through visual and non-visual sources of biotic exchange and cognitively perceived 'biophilia,' simulated using experimental methods in immersive, virtual and augmented environments in combination with select biotic and abiotic factors.

10:55 *In Out Into Infra....N/A*
Carla Leitao (Rensselaer Polytechnic Institute, USA)
The CRAIVE Lab at Rensselaer Polytechnic Institute is an immersive audio visual 32'x39' room. In the past 4-5 years, I led Architecture studios and seminars that engage the potential of this space to conceptualize future architecture typologies.

11:15 *Sound Space: Communicating Acoustics Through Interactive Visualization....69*
Christopher Morse (SHoP Architects, USA); Sabrina Naumovski (Terreform ONE, USA); Adam Chernick (SHoP Architects, USA); Luke Gehron (Payette Architecture, USA); Zeyu Ren (Rhode Island School of Design, USA)
We present Sound Space, an interactive and engaging environment in which to explore some of the more basic concepts and consequences of acoustic design. As an immersive three

dimensional visualization, we reduce barriers to acoustic considerations in early design phases.

Session 9: Applied Science

10:15 *Blasey Ford v Kavanaugh and the Split-Brain Interface....73*
Gregory P. Garvey (Quinnipiac University, USA)
The story of the testimony of Christine Blasey Ford and the rebuttal of Brett Kavanaugh as part of the Senate Nomination Hearings for Kavanaugh's appointment to the Supreme Court is retold using the split-brain interface.

10:35 *Encephalogames (Brain/Mind Games): Inclusive health and wellbeing for people of all abilities....78*
Steve Mann (MannLab Canada, Canada & MannLab, USA); Diego Defaz and Tamer Abdulazim (University of Toronto, Canada); Derek Lam (MannLab Canada, Canada); Mike Alford (University of Western Ontario, Canada); Jeremy Stairs (University of Toronto, Canada); Cayden Pierce and Christina Mann (MannLab Canada, Canada)
We present devices and system architecture for EEG (ElectroEncephaloGram) gamification for health and wellbeing for people of all abilities. We create a game in which brainwave-controlled water pumps provide increased flow when a player's mind is in a state-of-flow.

10:55 *KneeVR: Using HTC Vive Trackers for Knee Surgery Rehabilitation....N/A*
Bernard François (PreviewLabs, Inc., USA)
Using HTC Vive Trackers, the KneeVR project complements the recovery process of knee injuries (specifically after ACL surgery) with VR in order to speed up recovery and make it more enjoyable. Project goals and findings specific to tracking are presented.

11:15 *The VIRTUALTIMES Project. Manipulating Time Perception with Virtual Reality for the Treatment of Psychopathologies....N/A*
Federico Alvarez Igarzabal (Institute for Frontier Areas of Psychology and Mental Health (IGPP), Germany)
This presentation will describe the concept behind VIRTUALTIMES, an EU-funded project starting in 2019, which aims at developing a virtual reality environment to treat psychopathologies such as depression and schizophrenia through the manipulation of time perception.

Friday, June 21 12:00 - 13:00

L3: Lunch

Friday, June 21 13:15 - 14:15

PN1: Panel Discussion: Forms and Functions, Better Unions in Creative Process

Friday, June 21 14:30 - 16:00

Session 10: Expressive Interfaces

14:30 *The Clamshell: Rethinking the Virtual Reality Interface....88*
Sara Abbaspour, Justin Berry, Lance Chantiles and Isaac Shelanski (Yale University, USA)
The clamshell is both an experimental interface for Virtual Reality and a tool for rapid prototyping of new interface design models.

14:50 *Designing for Collaborative Play in New Realities: A Values-Aligned Approach....93*
Marcella Prieto (CUNY Hunter College & Radiant IRIS, USA); Krishnan Unnikrishnan (Radiant IRIS, USA); Colin Keenan (North Carolina State University, USA); Kaochoy Danny Saetern (Bad Honey Bun Games, USA); Wendy Wei (Massachusetts Institute of Technology, USA)
An extended abstract for a case study of real-time networked gameplay by whole-body controller developed from a values-driven design process.

15:10 *Game Controller Position Tracking using A2C Machine Learning on Inertial Sensors....97*
San Kim (Kyung Hee University, Korea); Doug Young Suh and Jiho Kim (Kyunghee University, Korea)
Various VR devices, including Oculus Rift, HTC Vive, and Samsung Gear VR, have been developed over the past five years. In particular, devices such as Oculus Rift and HTC Vive track the location of the controller using external sensors to provide a more immersive experience for the user. However, it is difficult to track the position of the controller when the controller enters the blind area of external sensors. Therefore, in this paper, a method is proposed to trace the position of the controller without the aid of external sensors by using the reinforcement learning. The proposed method tracks the position of the controller with only the information obtained from the IMU (Inertial Measurement Unit). However, since the error accumulates when tracking the position suing only the information obtained from the IMU, the proposed method uses Advantage Actor-Critic(A2C), one of the reinforcement learning algorithms, to correct the tracked position to prevent accumulation of errors. It was also confirmed that the proposed method maintains a maximum error of 50cm and an average of 20cm for very dynamic controller movements of more than 3 minutes.

15:30 *The Impact of Controller Type on Video Game User Experience in Virtual Reality....103*
Daniel Hufnal, Theodore Johnson, Ethan Osborne and Caglar Yildirim (State University of New York at Oswego, USA)
The recent resurgence of interest in and widespread availability of virtual reality (VR) technology have paved the way for the use of VR systems as a gaming console. With the incessant

popularity of VR gaming, the question then arises as to which input method affords the most intuitive interactive experience and provides the most enjoyable gaming user experience (UX). In an attempt to address these questions, the current study examined the impact of controller type (native VR controller vs. traditional gamepad controller) on video game UX in VR while playing a strategy game and an FPS game. Using both the native VR controller and traditional gamepad controller in a counterbalanced order, participants played a strategy and FPS game in VR and provided video game UX satisfaction ratings. Results of the strategy game experiment indicated that the two controllers were comparable in terms of perceived controller naturalness, sense of presence, and video game UX satisfaction during the gameplay, indicating that using a more natural input device did not lead to a superior VR gaming UX. Results of the FPS game experiment indicated that the two controllers were comparable in terms of, sense of presence and video game UX satisfaction during the gameplay, indicating that using a more natural input device did not lead to a superior VR gaming UX. However, results indicated that perceived controller naturalness was rated higher in the Oculus controllers than in the Xbox controllers, exhibiting that the Oculus controllers felt more natural.

Session 11: Emerging Industry Standards

Room: Ioria 250

14:30 *A Security Case Study for Blockchain Games....112*

Tian Min and Wei Cai (The Chinese University of Hong Kong, Shenzhen, P.R. China)

Blockchain gaming is an emerging entertainment paradigm. However, blockchain games are still suffering from security issues, due to the immature blockchain technologies and its unsophisticated developers. In this work, we analyzed the blockchain game architecture and reveal the possible penetration methods of cracking. We scanned more than 600 commercial blockchain games to summarize a security overview from the perspective of the web server and smart contract, respectively. We also conducted three case studies for blockchain games to show detailed vulnerability detection.

14:50 *A Study on Accessibility in Games for the Visually Impaired....120*

Imran Khaliq (Media Design School, New Zealand)

Gamers with disabilities face difficulties when it comes to playing most games. This percentage of the gamers population is largely overlooked. With the understanding what game accessibility is and how important it is to disabled gamers, we will provide techniques how to achieve accessibility in games. Although there are many categories and types of disability, this paper will be focusing on visual impairment only. We will explore the current state of technology and design practices surrounding games that are designed and/or provide support for the visually impaired demographic.

15:10 *EMOVAC: Designing a Mixed Reality Experience for 5G....N/A*

Ben Nicholson and Fidelia Lam (University of Southern California, USA); David Warhol (Realtime Associates, USA); Scott S Fisher (University of Southern California & USC School of Cinematic Arts, USA)

Research on the future of gaming suggests that over the next 5-7 years there will be increasingly blended digital and physical worlds in the games and entertainment industry. That future is predicated on the low latency high bandwidth convolution of 5G, IOT and Edge Computing. This paper is a summary and postmortem examination of the main design and technology issues encountered in the development of a mixed reality experience designed to demonstrate the capabilities of 5G network technologies.

15:30 *VR Fact Sheet 2019 - An Overview of VR Movies & Games....127*

Kai Erenli (UAS BFI Vienna & Arx Anima, Austria)

The consumption of Virtual Reality content has been steadily increasing over the past years. Even though there are numerous statistics about market size, hardware sales and user behavior, there is still a major lack of the documentation of Virtual Reality projects. This paper describes the approach taken by a project team to gather important data about existing Virtual Reality content and to add it to the VR Fact Sheet 2018, creating a new updated version, the VR Fact Sheet 2019. Therefore 1096 Virtual Reality projects were identified, evaluated and documented.

Session 12: Augmenting Experience

Room: Ioria 351

14:30 *Bright: an augmented reality assistive platform for visual impairment....136*

Ashish M. Bakshi (Ashish M. Bakshi, USA); Cesar de Castro (Cesar de Castro, USA); Andreas Dias (Andreas Dias, USA); Jan Simson (Jan Simson, Germany); Chenyang Yu (Chenyang Yu, USA)

Bright is an AR solution (on HoloLens) to assist those with significant vision impairment in tackling everyday challenges, from reading text to recognizing faces. Bright won Best AR + Best in Health at the MIT Reality Virtually hackathon in January 2019.

14:50 *Differentiated Learning Patterns with Mixed Reality....140*

Tuba Ozkan (The New School, Parsons School of Design, USA); Nouf Aljowaysir (Havas, USA); Taeyeon Kim (The New School, Parsons School of Design, USA)

A mixed reality experiment to augment traditional classroom settings into accessible spaces for three main groups of learners: non-native English speakers, students with hearing disabilities and students with language-based learning disabilities.

15:10 *LiVRation: Remote VR live platform with interactive 3D audio-visual service....144*

Takashi Kasuya (the University of Tokyo & Takenaka Corporation, Japan); Manabu Tsukada (the Univerrsity of Tokyo, Japan); Yu Komohara (The University of Tokyo, Japan); Shigeki Takasaka (SED, Japan); Takuhiro Mizuno and Yoshitaka Nomura (Alphacode Inc., Japan); Yuta Ueda (CRI Middleware Inc., Japan); Hiroshi Esaki (The University of Tokyo, Japan)

We design and implement an interactive 3D audio-visual service system called LiVRation, with a free-view-listen point. For subjective evaluation, 211 people were made to experience LiVRation and answer a questionnaire, subsequently.

15:30 *Programming with Affect: How Behaviour Trees and a Lightweight Cognitive Architecture Enable the Development of Non-Player Characters with Emotions....151*

Curtis Gittens (University of the West Indies, Cave Hill, Barbados); Shakir Belle (The University of the West Indies Cave Hill Campus, Barbados); Nicholas Graham (Queens University, Kingston, Ontario)

In this paper, we present a tool that integrates behaviour trees into an emotion modeling framework. We introduce two new nodes, the Emotion Adder to trigger emotions in NPCs and the E-Selector to incorporate the mood and emotion into the decision-making process. This framework will help developers integrate and manipulate psychologically-valid moods and emotions of NPCs using the familiar behaviour tree model.

Friday, June 21 16:00 - 17:00

P2: Performance TBD

Room: leeds studio

Friday, June 21 17:00 - 18:00

P3: Performance TBD

Room: leeds studio

Saturday, June 22

Saturday, June 22 9:00 - 10:00

P4: Performance TBD

Room: leeds studio

Saturday, June 22 10:15 - 11:45

P5: Performance TBD

Room: leeds studio

Session 13: Performative Lectures

Room: loria 250

10:15 *Looking In, Performing Worlds: Outer Space as a Metaphor of Possibility for Players and Creators of Games, Entertainment, and Media...159*
Elizabeth Shores (Artist, USA)
In this performative lecture, the author argues that the use of outer space as a metaphor for possibility enables players and creators of games, entertainment, and media to build social awareness and develop affective technologies for post-conflict resolution.

10:35 *Radical Digital Painting & Fantastic Media Manipulation....N/A*
Jeffrey Alan Scudder (18 North Main St., USA)
Radical Digital Painting groups and presents several ideas and artifacts related to contemporary painting and contextualizes its connection to historical processes and digital technology. It is inspired by and is a continuation of Radical Computer Music. Through demonstrative, interactive performance lectures, American artist and educator Jeffrey Alan Scudder presents homegrown software inventions and new theories about painting and picture making.

Session 14: Presentations: Experiments in Education

Room: loria 351

10:15 *PoeceptibleVR: Reinterpreting Chinese Traditional Calligraphic Poetry in VR with Multiple Scales and Senses....164*
Xiaobi Pan (Harvard Graduate School of Design, USA)
PoeceptibleVR reinterprets Chinese ancient poetry as a multi-sensorial cross-scale experience. It allows viewers to "walk" through and "feel" the poem. Poeceptible enables a global audience to appreciate Chinese culture and the Chinese to defamiliarize with and rediscover their heritance.

10:35 *Sustainable Production and Consumption in 360 Degrees....176*
Reese Muntean (Simon Fraser University, Canada); Mei-Ling Park and Yulia Rubleva (United Nations, France); Kate Hennessy (Simon Fraser University, Canada)
SCP in 360° is a series of 360° videos making sustainable production and consumption engaging and relatable to a wider audience. This research explores if and how immersive visual technologies can better communicate values and the importance of sustainability efforts.

10:55 *The Social Homelessness on US Campuses....180*
Yeohyun Ahn (University of Wisconsin Madison, USA)
The social homelessness on US campuses is a multidisciplinary art and research project to raise awareness of Asian female faculty on US campuses with a series of self-portrait photograph with the software, Being Ignored 2.0.

Saturday, June 22 11:45 - 13:00

P6: Performance TBD

Room: leeds studio