VIRTUHOMA 2018

VIRTUAL +AUGMENTED REALITY SYMPOSIUM

OKLAHOMA STATE UNIVERSITY, 28TH SEPTEMBER, 2018

Welcome to Virtuhoma 2018!

Faculty members from different disciplinary areas at OSU came together to form the Virtual and Augmented Reality Coalition of Oklahoma (VARCO), as a means of working together using technologies such as Virtual Reality(VR) and Augmented Reality (AR) in their respective areas. This group organized a VR+AR Hackathon in January 2018, where multidisciplinary teams competed to solve a given problem. VARCO collected data on how team members interacted and worked together in this project, then subsequently presented their work in research conferences and prospective publications.

Virtuhoma 2018 was developed as an outlet for discussing the findings from the data collected during the Hackathon. This opportunity was also used to bring together other researchers working in the areas of VR and AR in Oklahoma and beyond.

VARCO TEAM MEMBERS

Tilanka Chandrasekera (Digital Design)

Aditya Jayadas(Industrial Engineering)

Alana Pulay (Interior Design)

Tutaleni Asino (Education)

Yongwei Shan (Civil Engineering)

Phil Choo (UX Design)

Cinthya Ippoliti (Library)

Luis Mejia Puig (Product Design)

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AGENDA

8.00-9.00	Breakfast and Registration
9.00-9.15	Welcome and Introduction
9.15-9.45	Keynote 1/Vinay Narayan (HTC Vive)
9.45-10.15	Nicole Sump-Crethar (Library Sciences-OSU)
10.15-10.45	Angelina Dayton (Anthropology-NSU)
10.45-11.15	Hackathon Participants/Project Discussion
11.15-11.45	Henry Segerman (Mathematics-OSU)
11.45-12.00	Panel Questions/ Presentation
12.00-1.00	Lunch Break
1.00-1.30	Keynote 2/Cathy Hackl (Futurist, "You Are Here", Advisor/ VRARA Advisory Board)
1.30-2.00	Elizabeth Pober (Interior Design-OU)
2.00-2.30	Chris Fennell (Chemistry-OSU)
2.30-3.00	Bill Endres (English-OU)
3.00-3.30	Newton D'souza (Head of the Department of Interior Architecture, FIU)
3.30-3.45	Panel Questions/Presentation

Vinay Narayan (Keynote Speaker)

Vinay Narayan is the Vice President of Product Management and Operations for HTC VIVE as well as a Board Member and Advisor for various VR and AR companies. As a customer focused product strategist, he oversees the portfolio of products for HTC including XR and other emerging tech.

AR/VR: Building the Bridge to the Digital Revolution

The potential possibilities and breadth of AR and VR are not new. A quick demo quickly unlocks the imagination for the numerous opportunities. While virtual reality (VR) headsets have been around for decades, they are just now readily available on shelves, thanks to the consumerization of VR. Augmented reality (AR) is quickly following a similar path, with mobile being the first platform for this enhanced environment.

If the value of AR and VR are so obvious, when will mass adoption happen? This has been a frequent analysts and investor question since the launch of Oculus DK2 and debated regularly with introduction of HTC VIVE, Microsoft HoloLens, and Sony's PSVR. Nonetheless, innovations in hardware are just the tip of the iceberg for the VR industry. The actual foundation is made up of innovative technology, partnerships, content creation, and content distribution. But, where do we see the depth of investment today in these foundational elements? Enterprise.

The current use cases of AR and VR are just the beginning of what the industry can offer. The integration of such technology results in AR and VR being the UI for emerging technologies (AI, Blockchain, XR, and Edge Computing among others) and new use cases that make up the Digital Revolution. This new collection of technologies will define how we interact with the world and resulting in new and more intuitive ways to engage.

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Cathy Hackl
(Keynote Speaker)

Cathy Hackl is an Emmy-nominated communicator turned Virtual Reality & Augmented Reality global speaker, producer, and futurist. She's a Partner at Mixed Reality Ventures and works as Lead Futurist at You Are Here Immersive Labs

Welcome to the Future

Sci-Fi movie technology has become reality. Digital Humans have become social media stars. Singing holograms are selling out stadiums. It's 2018 and the future is here. Futurist and one of the top women in the VR / AR industry, Cathy Hackl, has been to the far frontiers of technology and will share what lies ahead. Hackl will take attendees on a journey through the past, present, and future of where we are heading as humanity prepares for life beyond screens. Content is shifting and expanding 2D to content that is 3D, 360, augmented and holographic. We are moving toward a future where our physical and digital realities will blend together.

Nicole Sump-Crethar

Oklahoma State University

Nicole Sump-Crethar is Interim Associate Dean of Library Operations at Oklahoma State University. She graduated with a MS in Library and Information Science from the University of Illinois in 2005. Her research interests center on emerging technology and digital scholarship.

Virtual Reality in Libraries

The OSU library has introduced students to virtual reality as part of several different technology programs. As part of the Library Creativity Award, we have seen some impressive student projects using VR. We're never too grown-up for Show and Tell. Our portable VR equipment has traveled all over campus. School children have come to our VR room to get hands on experience with chemical models. We've recently hired a software development team with an eye toward several potential projects, some involving VR.

OSU's library is not the only one in the country experimenting with virtual reality. As a location on campuses open to students of any discipline, libraries offer the opportunity to interact with technology like VR to students for innovation, classwork and play.

Libraries have struggled with reintroducing the idea of serendipity to discovery of materials in their collections. The experience of browsing a library's physical shelves is not easily replicated in online catalogs and discovery systems, but libraries have begun exploring the possibilities of virtual reality to simulate the browsing experience.

As VR becomes more accessible and affordable, libraries hope to offer students a chance to gain familiarity with VR hardware and software in advance of entering their careers.

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Angelina Dayton

## Northeastern State University

Dr. Angelina Dayton is an Anthropologist and educator who studies ways of learning in indigenous communities. Her current research focuses on how to incorporate extended reality technologies into indigenous language preservation and cultural revitalization in the Cherokee Nation Immersion School.

A Fluid Medium

Research shows that Native youth are more likely to engage in collaborative behaviors while learning and playing (Rosado-May, Urrieta, Dayton, & Rogoff, in press). A group of children at the Cherokee Nation Immersion School were observed exploring virtual reality and engaging in collaborative play practices throughout the experience. This research explores the tendency for certain groups to create environments in which they can not only connect to others but also learn and play together (Dayton, in prep). This ongoing study engages physical and social/cultural anthropological theory explaining how humans aspire to connect and collaborate.

Through a line of inquiry that spans from introduction of computers into classrooms in the early 1980s to the adoption of virtual reality, I explore mechanisms that thwart collaboration and coordination and induce conflict within virtual environments. This continuing ethnography highlights how to recognize conflict tendencies and offers alternative methods of engaging emerging media collaboratively.
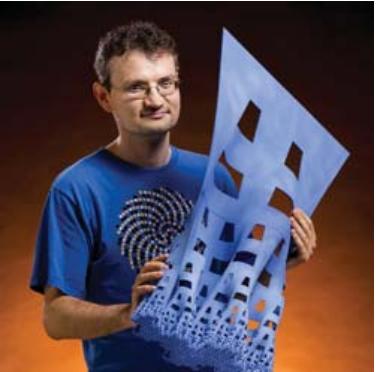
Henry Segerman

Oklahoma State University

Henry Segerman is a mathematician, working mostly in three-dimensional geometry and topology, and a mathematical artist, working mostly in 3D printing. He is an Associate Professor in the Department of Mathematics at Oklahoma State University.

Non-euclidean virtual reality

The properties of euclidean space seem natural and obvious to us, to the point that it took mathematicians over two thousand years to see an alternative to Euclid's parallel postulate. The eventual discovery of non-euclidean geometries in the 19th century shook our assumptions, revealing just how strongly our native experience of the world blinded us from consistent alternatives.

I'll talk about some simulations of three-dimensional non-euclidean spaces we have developed for the HTC Vive. These allow users with no mathematical background to directly experience some otherwise abstract and obscure phenomena about these spaces.

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Elizabeth Pober

University of Oklahoma

Elizabeth Pober is an Associate Professor and Director of Interior Design in the College of Architecture at the University of Oklahoma. She holds a Masters degree in Construction Administration and Bachelors degree in Interior Design.

Immersive Design Critiques: The Integration of Virtual Reality Platforms into an Interior Design Studio

Throughout the iterative design processes, both students and professionals rely on spatial thinking to develop and simulate design solutions. Designs are typically analyzed and revised with the traditional methods of representation, limited to the two-dimensions of visual information that are viewable on a traditional computer monitor or sheet of paper. These graphic representations do not provide a full-scale spatial environment to experience, nor do they provide the means to maneuver through environments in a natural way, as future inhabitants will ultimately do.

Emerging technologies, like virtual reality, present accessible solutions to these traditional design challenges by providing a low-cost but volumetrically accurate means to develop the spatial thinking abilities of would-be interior designers. Insofar as they respect real world scale and natural, body-centered interaction paradigms, the use of virtual reality systems also supports instruction focused on spatial reasoning. Immersive cohabitation, facilitated with virtual reality systems, allows multiple designers (or instructors and students) to conceptualize and reason volumetrically by partnering within detailed and complex model – at full-scale, in three dimensions. This presentation will share exploratory data suggesting how virtual reality systems can benefit undergraduate interior design processes by providing a means for accurately visualizing interior spaces.

Christopher Fennell

Oklahoma State University

Dr. Christopher Fennell is an Assistant Professor of Chemistry at Oklahoma State University. Dr. Fennell's research expertise is in Computational Chemistry and his lab does work in molecular modeling of condensed phase systems. He is notable for being the person that wrote the first chemistry application for the iPhone.

Immersive Molecules

The field of chemistry involves the study of matter and how it can change. This requires a perspective that extends from the macroscopic level down to the microscopic realm. While it is easy to gain a macroscopic perspective, such as from holding vials of water and mercury to compare their relative densities, it is a bit more challenging to gain a microscopic understanding. In my research lab, we use computers to bridge this gap in perspective through the modeling of systems of molecules and their fundamental interactions. To bring molecular models out of the flat world of computer screens, we use 3D printing to give others a tactile experience with molecular structure. When such physical models are limiting, we use virtual molecular environments in interactive Oculus Rift systems to, instead of bringing molecules out of the screen, insert people into molecular worlds. In this interactive session, we will explore these ways of modeling molecules and put molecular worlds into our hands.

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William Endres

University of Oklahoma

Bill Endres is an Assistant Professor in the English Department at the University of Oklahoma. His scholarship intersects the digital humanities, rhetoric, and manuscript studies. Currently, he is working to extend possibilities for studying medieval manuscripts through VR.

The Quiet Eye: Designing VR for Cultural Heritage

Technology tends to be viewed as quickening the pace of life. Through it, we accomplish things more rapidly, whether editing an article or keeping up with family and friends on social media. But does such quickening benefit research and study? In the realm of medieval manuscripts, it increases a certain type of access. Scholars can view high-resolution images online of manuscripts scattered in libraries around the world. At this writing, over 500 libraries have at least some of their manuscripts online. When I digitized the 8th-century St Chad Gospels and made images available, I also provided 3D renderings. They provide significant information about contours, reminding viewers that a page of parchment is anything but a flat surface. Furthermore, medieval manuscripts celebrate the human capacity for wonder. They were the iMax movies of their day. To provide a sense of this wonder, I have generated 3D flyovers of pages.

In my presentation, I will discuss my building of a two-person traveling VR workstation, funded by OU's Humanities Forum. With the workstation, I will consult with other scholars to identify tools, features, and the environment needed to facilitate studying and teaching medieval manuscripts in VR. I will examine promising approaches, such as a distributed model of the mind and recognition that humans have more than the Aristotelian five senses, with perception constructed with input from multiple senses.