

# IDIA

## L A B

BALL STATE UNIVERSITY

## INSTITUTE FOR DIGITAL INTERMEDIA ARTS

COLLEGE OF ARCHITECTURE AND PLANNING

2020.1 & 2020.2

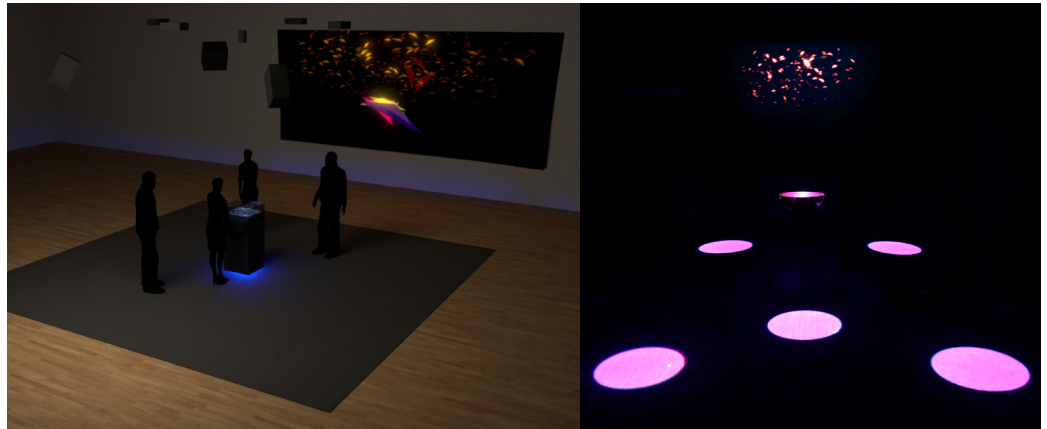
### UPCOMING

IDIA is working under direct contract with the Department of the Interior to produce an augmented reality application for Mesa Verde National Park. The app will bring to life static visitor center dioramas – dynamically interpreting the pueblo culture cliff dwellings.

IDIA Lab is designing an augmented reality app that restores Indianapolis' Monument Circle to its former glory. The app will be a prototype for a city-wide partnership with IUPUI's Polis Center for the bicentennial celebration of Indianapolis.

IDIA is collaborating with Kristin Barry, CAP and her immersive class project supported by the Digital Scholarship Lab. The Lab is helping produce a tour app highlighting the architecture of Columbus, IN.

College of Architecture and Planning's IDIA Lab creates technological innovation in the arts, sciences, and humanities. The Lab engages students, staff, scholars and clients in collaborative projects in 3D, virtual reality and mobile applications. This newsletter includes updates on current IDIA Lab projects including a new virtual learning platform we call *Meet3D*, a virtual moon base for an international space consortium, a disaster response VR app for Seattle Children's Hospital, an NEH grant investigating celestial alignments in a recreation of ancient mounds sites in the Ohio River Valley and an invitational exhibition at the National Museum of China in Beijing. Due to COVID-19 related delays, this newsletter encompasses IDIA Lab issues 2020.1 and 2020.2.



### EXHIBITION AT THE NATIONAL MUSEUM IN CHINA

John Fillwalk and IDIA Lab were invited to design and exhibit an artificial intelligent installation at a seminal international art exhibition at the National Museum of Art, Beijing, China. Their custom designed experience *Wishing Well* (许愿池), is an immersive installation creating an environment where visitor's interaction shapes the substance, meaning and character of the artwork through artificial intelligence. *Wishing Well* (许愿池) engages both private and public spaces in the creation of a simultaneously intimate and collective social experience. Upon engaging the installation, a participant speaks in Mandarin, a wish into a pool of water that only they can hear using ultrasonic speakers.

The tone of the wishes aggregated by the system is processed via AI systems and delivered into this social sculpture via synthesized whispered voice spoken in Mandarin. The water pool, or wishing well, is vibrated by an embedded speaker creating a three-dimensional dynamic sound wave image (*cymatic*) of the actual wish. Virtual abstracted lanterns appear overhead processed by Unity 3D projected onto the wall with each wish and will launch skyward to become

part of the larger collection of dreams.

The spoken wish is collected by an artificially intelligent set of custom software and hardware that begins to process the viewer's hope. Through a complex set of instructions engaging IBM's Watson, once each wish is recorded it is spoken back in a transformed in a poetic manner by text to speech synthesis in a whispering tone through Amazon's Polly. The individual viewer privately hears this once – their wish then is processed to become part of a larger collection of all wishes which can be heard through synthesized voice through the directional speakers. The tone of the aggregate of all collected spoken wishes is analyzed and is assigned a light hue, an ambient sound composition processed by Max MSP, and the color and brightness of the light produced above and below the cymatic pool.

[http://www.enad.tsinghua.edu.cn/news\\_events/article/682.htm](http://www.enad.tsinghua.edu.cn/news_events/article/682.htm)



## APOLLO 11 FILM AND VIRTUAL MOONBASE

IDIA Lab was commissioned to direct and produce a computer animated short film in commemoration of the 50th Anniversary of the Apollo 11 landing. The historically and scientifically accurate film was produced for the International MoonBase Alliance (IMA) - an association comprised of leading scientists, educators, and entrepreneurs from space agencies and industries worldwide to advance the development and implementation of an international base on the Moon.

Their priority is to create an action plan that will culminate with the building of MoonBase prototypes on Earth, followed by a sustainable settlement on the Moon. Building on discussions and recommendations from the Lunar Exploration and Analysis Group (LEAG), the European Lunar Symposium, the International Space Development Conference, the NewSpace Symposium, the International Astronautical Congress (IAC), and other worldwide space forums, they are formulating an integrated strategy for establishing a proposed multinational lunar base.

IDIA Lab has also been commissioned to design and host an upcoming virtual multiplayer world for the consortium, where international space agencies such as NASA, ESA, JAXA, et al will experiment and prototype in a virtual simulation before building physical experiments.

[moonbasealliance.com/](http://moonbasealliance.com/)



## EVAC+ VR DISASTER SIMULATOR

IDIA Lab partnered with physicians at the Seattle Children's Hospital to develop an immersive virtual reality simulator to train staff in training responses in the simulation of various disasters.

The EVAC+ Virtual Disaster Simulator leverages virtual reality to train health care providers to react quickly and effectively to unexpected events that threaten patient safety. It was developed after pilot live simulations, user focus groups, surveys, and a successful pilot of the initial EVAC system. After the need for more communication opportunities and variations in disaster responses was identified in the pilot, EVAC+ was created.

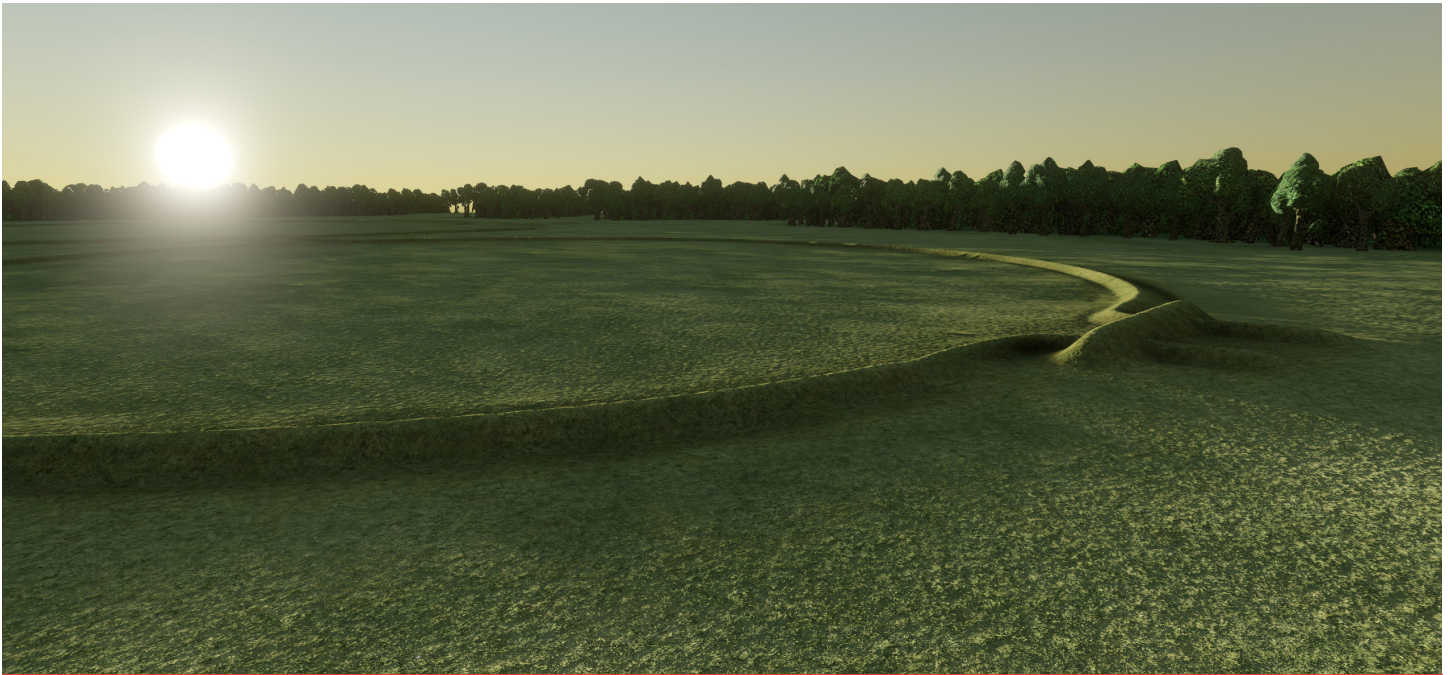
EVAC+ leverages the same ability to prepare patient equipment for an evacuation but with significantly more features allowing for interacting with a hospital room, other staff, and family members. Upon entering the EVAC+ environment providers are oriented to the virtual space, including navigation, interacting with objects, and how to interact verbally with non-player characters. Once they are comfortable with the space they can choose from a menu of disasters to experience, including earthquakes, fire, and an active shooter event. Learners practice how they would provide a status update using the SBAR technique to their charge nurse, use closed loop communication, and respond to anxious family members. After each scenario the user is guided through a self-debriefing on how well they performed on key disaster and communication behaviors. Information on how they managed and packed medical equipment is presented along with evidence-based information on how experts would recommend managing equipment. Users can choose to repeat any scenario to practice or refine their responses and can explore the scenarios in any order.

IDIA's environment is accessible on head-mounted VR systems and tablets. Amazon Web Services (AWS) supports voice communication and real-time analytics. The EVAC+ system fills a unique need for accessible, interactive, sustainable disaster training for healthcare providers.

## NOTES

- IDIA Lab director John Fillwalk met on-site with a council of Tribal elders and National Park representatives at the Bighorn Medicine Wheel, WY to propose a celestial study of the monument.
- BSU Marketing and Communications requested IDIA create a virtual 3D model of Beneficence. IDIA staff employed their state of the art drone to gather hundreds of images of the sculpture from various angles to create a three dimensional model that can be used for visualization or reproduction.
- IDIA Lab's mobile VR training app for the Seattle Children's Hospital was presented at the International Meeting on Simulation in Healthcare (IMSH). - training pediatric nurses in disaster scenarios.





## NEWARK EARTHWORKS: AN INTERACTIVE 3D SIMULATION

The public will be able to explore the prehistoric Newark Earthworks in Ohio the way they appeared 2,000 years ago thanks to an interactive 3D simulation under development at Ball State University. The Newark Earthworks comprise the largest set of geometric earthen enclosures in the world, built by the Hopewell People between A.D. 1 to A.D. 400 to serve a variety of cultural and spiritual purposes.

Ball State's Institute for Digital Intermedia Arts (IDIA Lab) and Applied Anthropology Laboratories (AAL) are collaborating in designing an interactive virtual world that recreates the earthworks in their original condition, surrounded by a period-accurate environment.

The attention to detail includes accurate celestial alignments using data from NASA's Jet Propulsion Laboratory employing a process created by IDIA Lab that they have applied on a host of archeological sites.

The project is a collaboration between Ball State and the Ohio History Connection, with support and partnership from several federally recognized American Indian tribes, including the Eastern Shawnee Tribe of Oklahoma and the Shawnee Tribe. Nolan and co-project director John Fillwalk, senior director of IDIA Lab, recently received a \$99,996 award from the National Endowment for the Humanities (NEH) Digital Humanities Advancement Grant to fund their project.

Spread across four miles in what is now present-day Newark, Ohio, mounds and walls are constructed to record significant celestial alignments on the landscape, including the 18.6-year lunar cycle. The earthworks created community for the Hopewell People and provided sacred spaces for religious rituals and ceremonies related to their society.

Chief Glenna Wallace of the Eastern Shawnee Tribe of Oklahoma expressed her support for the project by sharing how it will reconnect her tribe with their Ohio homeland and stories from the past. The government forcibly removed the Shawnee from Ohio in 1832 and relocated the tribe to Oklahoma. "This project offers the possibility of 'winding back the sky' so we can see how these sacred earthworks and the heavens have danced together across these past 2,000 years," she said.

Until a virtual version of these impressive wonders is available, you can learn more about the Hopewellian people by visiting the [Hopewell Culture National Historical Park](#) in south-central Ohio. You can learn more about the Newark Earthworks by visiting the [Ohio History Connection](#), the [Ancient Ohio Trail](#), and [World Heritage Ohio](#).

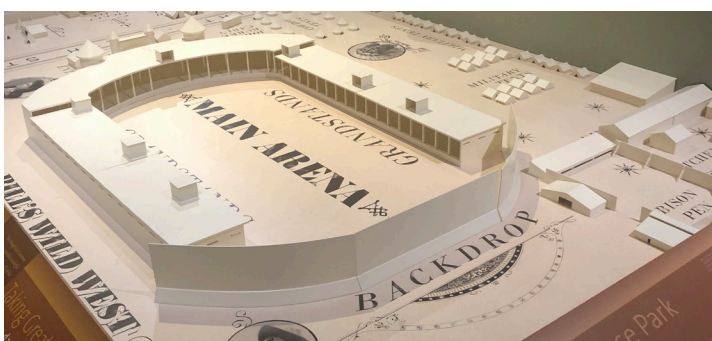


**MEET3D**

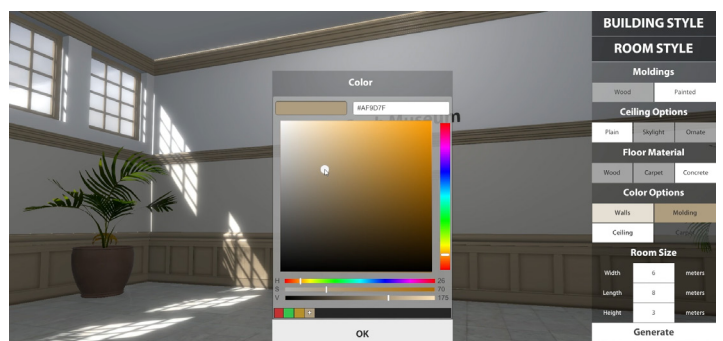
*Meet3D* is a virtual collaboration platform created by IDIA Lab that brings people together to share, learn, and work – wherever they are. Private or public auditoriums, classrooms, conference halls or offices can be joined by any group or audience on demand. *Meet3D* was developed to bring remote participants together in common shared spaces and facilitate a sense of physical presence.

Users can select and customize various environments based upon their needs for each forum. For instance, meeting organizers can select various settings that create a tone and context for a particular meeting – choosing from environments such as a natural or urban setting such as forests, beaches or even Paris and Venice! *Meet3D* is available in browser-based, mobile (iOS and Android) and executable versions for both Windows and MacOS.

<https://meet3d.online>



**VIRTUAL WILD WEST**



**VIRTUAL GALLERY DESIGNER**

IDIA Lab has designed and installed several permanent interactive museum exhibitions at the Buffalo Bill Center for the West in Cody, WY. The showpiece exhibit is a large-scale white model of a Wild West Show in Brooklyn that acts as a trigger for an augmented reality experience – bringing the diorama to life with animated characters and sounds. The collection of exhibitions can be previewed here: <https://bit.ly/2ZBqail>

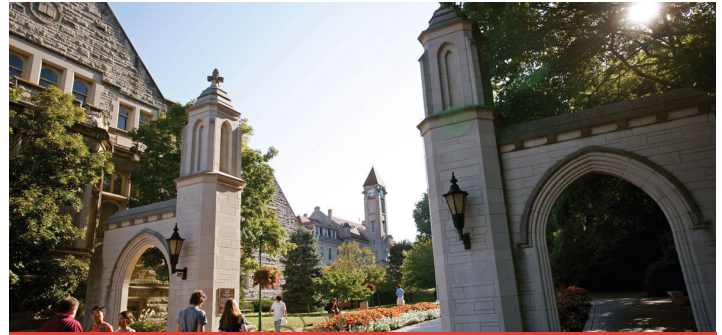
IDIA Lab was contracted to create an interactive gallery system in partnership with virtual world creator Sinespace, a multi-user virtual world platform based in the UK. The *Virtual Gallery Designer* is an easy to use system to create museum exhibitions with any web hosted images. Users can select gallery styles - customizing an experience that is complementary to the exhibition theme. <https://sine.space>





## CULTURAL HERITAGE CONFERENCE

IDIA Lab director John Fillwalk presented one of lab's latest projects: The Virtual Meridian Augusti App on iOS at the Cultural Heritage and New Technologies (CHNT) in Vienna, Austria. Our app analyzes aspects of our ongoing research on the largest sundial of the ancient Western world in Rome. The app allows for the analysis of solar alignments on a site buried well under modern Rome using accurate data from NASA.



## CAAV CONFERENCE KEYNOTE

The CAAV conference (The Campus Alliance for Advanced Visualization) invited IDIA director, John Fillwalk to be the keynote at their annual meeting. CAAV, which was held on the Bloomington campus of Indiana University, brings together academic, industrial, and government users of immersive platforms, virtual reality, and advanced visualization. Fillwalk surveyed projects of Ball State's IDIA Lab over the past 15 years.



## VIRTUAL SPACE HABITAT

The HI-SEAS space habitat is located in an isolated position on the slopes of the Mauna Loa volcano in Hawaii. IDIA Lab was selected to create and maintain a virtual simulator – a 3D multiplayer platform designed for Amazon's new game engine, Lumberyard. Members of the international consortium include NASA, European Space Agency (ESA) and Japan Aerospace Exploration Agency (JAXA).



## NSF VIRTUAL TEACHER TRAINING

IDIA was invited to participate in an NSF grant proposal lead by a consortium of MIT and Indiana University faculty. The project, entitled *The Online Practice Suite: Practice Spaces, Simulations and Virtual Reality Environments for Preservice Teachers to Learn to Facilitate Argumentation Discussions in Mathematics and Science* proposes to create a virtual classroom simulator for training teachers variety of age groups.

## ABOUT IDIA

The Institute for Digital Intermedia Arts at Ball State University explores the intersections between the arts, sciences and technology. Scholarly, creative and pedagogical projects investigate virtual reality, Human Computer Interface, augmented reality, mobile apps, visualization and 3D simulation. The lab's staff, faculty and students develop collaborations in partnership with a host of international clients in this innovative studio initiative designing research at the forefront of emergent media design.