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# RPPR Final Report

as of 11-Jun-2018

Agency Code:

Proposal Number: 68886CSREP  
**INVESTIGATOR(S):**

**Agreement Number: W911NF-16-1-0467**

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EIN: 850377670

**Report Date:** 14-Feb-2018

Date Received: 10-Jun-2018

**Final Report** for Period Beginning 15-Aug-2016 and Ending 14-Nov-2017

**Title:** Immersive Laboratory

**Begin Performance Period:** 15-Aug-2016

**End Performance Period:** 14-Nov-2017

**Report Term:** 0-Other

Submitted By: Mats Reiniusson

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**Distribution Statement:** 1-Approved for public release; distribution is unlimited.

**STEM Degrees:** 0

**STEM Participants:** 7

**Major Goals:** The Institute of American Indian Arts (IAIA) proposed the creation of a modern Immersive Laboratory by updating and augmenting our existing virtual reality facilities to enhance STEM education and research with the purchase and installation of state of the art projectors, computers, and theater equipment to update IAIA's immersive Digital Dome theater. The updated computer audio and vision infrastructure for high resolution immersive video and audio will assist in the exploration interactive immersive imagery, wireless motion capture, depth sensors and other interactive components that will aid in the development of immersive simulations. Students will be able experiment with this laboratory equipment alongside educators and researchers in the IAIA Immersive laboratory.

**Accomplishments:** IAIA is currently conducting the DoD project entitled "Interactivity and Simulation in Immersive Virtual Environments (proposal #67276-RT-REP)", which outlines a research initiative that builds on prior successful research to deliver interactive immersive displays. The primary research objective is the development of simulation and real-time interactivity for immersive technology through the use of gestural interfaces and biological sensors. Full-dome projection and interactivity are being extended to arbitrary display surfaces and head-mounted displays. A universal production pipeline for immersive displays is being developed, which includes 3D graphics and 3D sound. This project will directly feed into a research base in support of national defense: Virtual Simulation and Immersive Environments— while also supporting the STEM educational needs of our Native American student body.

The project defines an IAIA, STEM-based curriculum in computer programming and interactive immersive technologies thus increasing the number of underrepresented minorities participating in STEM disciplines. The project exposes students to courses and research in virtual technologies, simulation, and interactive immersive environments. The laboratory will enhance IAIA's capacity to deliver cutting edge technology training, enhance STEM components of IAIA's liberal arts curriculum, and support students' application of their creative capabilities into high-technology STEM fields. This will increase the economic and professional opportunities for IAIA students, and help develop an educated workforce in virtual and live immersive technology industries.

Summary of the most important results

IAIA was able to purchase and install of the equipment that was mentioned in the DOD project entitled "Interactivity and Simulation in Immersive Virtual Environments (proposal #67276-RT-REP)".

The items included the following:

Digital Dome Projection System with Five Barco WQXGA Projectors with Ultra Wide Angle Zoom, Noise Reduction Kits, Video Extenders, Mounting and Blending System

A three-dimensional Genelec 24.4 sound system that integrates with Digital Dome system

Upgrades to the Black Box computer system Mac Pro 12-Core Computer, Custom Intel Broadwell-E Core i7

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Quadro 4U PC Workstation, Rackmount GTX 1080TI VR workstations  
Fisheye Video Recording system with RED EPIC-W 8K and Scarlet Dragon 5K cameras and lenses  
360 Degree Video Recording System with 360Fly kits  
360 Audio Recording System with Sennheiser Ambeo, Zoom F8 for ambisonic recording  
Interactive and 3D simulation system with the Meta Motion IGS Cobra Motion Capture system  
Digital Dome Theater System upgrade with stage lights, DMX light controllers, Interactivity controllers, PA sound system

**Training Opportunities:** Immersive interactive training with the Cobra Motion Capture system  
Immersive interactive training with the HTC Vive system  
Dome calibration and dome setup training

**Results Dissemination:** Presentation of Digital Dome Immersive Laboratory upgrade and new Production Equipment disseminated through press release to local community, Colleges, Technology Magazines, local and international organizations and Institutions.

**Honors and Awards:** Nothing to Report

**Protocol Activity Status:**

**Technology Transfer:** Nothing to Report

### **PARTICIPANTS:**

**Participant Type:** PD/PI

**Participant:** Mats Reiniusson

**Person Months Worked:** 15.00

Project Contribution:

International Collaboration:

International Travel:

National Academy Member: N

Other Collaborators:

**Funding Support:**

**Participant Type:** Other Professional

**Participant:** Charles Veasey

**Person Months Worked:** 12.00

Project Contribution:

International Collaboration:

International Travel:

National Academy Member: N

Other Collaborators:

**Funding Support:**

**Participant Type:** Consultant

**Participant:** Robert Drummond

**Person Months Worked:** 3.00

Project Contribution:

International Collaboration:

International Travel:

National Academy Member: N

Other Collaborators:

**Funding Support:**

**Participant Type:** Consultant

**Participant:** Joe Dean

**Person Months Worked:** 2.00

Project Contribution:

**Funding Support:**

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International Collaboration:  
International Travel:  
National Academy Member: N  
Other Collaborators:

**Participant Type:** Undergraduate Student

**Participant:** Nathaniel Fuentes

**Person Months Worked:** 3.00

Project Contribution:

International Collaboration:

International Travel:

National Academy Member: N

Other Collaborators:

**Funding Support:**

Upload of accomplishments/progress for grant W911NF1610467.

Nothing to report in the uploaded pdf (see accomplishments)