

Virtual Reality for Good (UFVRfG)

Proposers: Sid Dobrin, Professor and Chair, Department of English, Director of Trace Innovation Initiative (CLAS); Benjamin Lok, Professor, Computer and Information Science and Engineering; Director, Virtual Experiences Research Group (HWCoE); Sara Gonzalez, Physical Science, Mathematics, and Visualization Librarian, Marston Science Library (GASL); Matt Pendleton, IT Associate Director, Student Affairs (UFDSA); Maria Rogal, Professor and Interim Director, School of Art + Art History (COA); Sriram Kalyanaraman, Professor of Journalism, UF Online Learning Institute, (COJC).

Sponsoring Organizations: College of Liberal Arts and Sciences; Herbert Wertheim College of Engineering; George A. Smathers Libraries; College of the Arts; UF Division of Student Affairs; College of Journalism and Communications.

Purpose and Specific Objectives: To provide University of Florida students with the infrastructure, equipment, skills, and guidance to develop virtual and augmented reality (VR/AR) applications that foster positive social and ecological change. The last five years have witnessed a rapid increase in accessibility and applied uses for VR technologies, making VR one of the fastest growing emerging technologies potentially to be employed across nearly every discipline. It is crucial that UF students develop familiarity and expertise with VR equipment in order to be prepared to engage such technologies in their professional, civic, and personal lives. UF VR for Good (UFVRfG) enhances instructional technology resources for students and faculty in order to promote applied VR development and use in capacities that exceed popular entertainment use, focusing instead on the technology's application in fostering social and ecological change.

This proposal seeks to encourage UF students to learn, write, create, and distribute VR applications through building a collection of VR technology that students can borrow to use in the MADE@UF spaces in Marston Science Library and in the Infinity Residence Hall, as well as in the Trace Lab in Turlington Hall and in the School of Art + Art History in collaboration with existing resources in the Department of Computer & Information Science & Engineering and the Department of Journalism. By offering access, development, and training at these multiple venues across campus, this proposal works to make the UFVRfG program accessible and beneficial to large number of students and faculty. The UFVRfG initiative grows from the imperative that emerging VR technologies must be developed beyond gaming and entertainment value to the end of cultivating cultural, societal, and ecological benefit—core values of the University of Florida mission.

A fundamental part of supporting the UFVRfG initiative will be providing hardware and software infrastructure that collaborative student teams will need to build their projects. The equipment requested in this tech fee grant application would significantly help our student teams by providing access to dedicated space and the latest equipment to develop UFVRfG projects. These projects are envisioned to become the foundation for grant proposals, prototypes for new intellectual property and companies, and opportunities for students to learn critical skills in an emerging field.

Technology Distribution and Use:

The technology to be used in the proposed program will be designated for use as follows:

•*MADE@UF, Marston Science Library*: VR technology currently available includes 2 Oculus Rifts with PC workstations, 1 Microsoft Hololens and 3 OSVR headsets. This proposal adds 2 HTC Vive VR headsets, the top requested technology by students, to complement these resources, along with 3 PC workstations that can properly render the computer graphics. The MADE@UF space will also house a portable large monitor so that student groups can easily collaborate and showcase their VR development. A Cintiq 27QHD monitor with an input pen will give students a superb interface for graphic design. Finally, we are requesting a large number of inexpensive Google Cardboard kits to give to students who attend VR workshops and events to encourage the exploration of VR apps that are already available on the Google Play and Apple App stores. The requested equipment will partner with the existing 3D and app development resources housed in MADE@UF.

•*MADE@UF, Student Affairs, Infinity Hall*: VR technology currently available includes 2 Oculus Rifts, 3 PC workstations, 6 Mac workstations, 1 Microsoft Hololens and 2 Epson MoveRio headsets. This proposal adds 2 HTC Vive VR headsets, the top requested technology by students, to complement these resources, along with 2 PC workstations that can properly render the computer graphics. The MADE@UF space will also house a portable large monitor so that student groups can easily collaborate and showcase their VR development. A Cintiq 27QHD monitor with an input pen will give students a superb interface for graphic design. Finally, we are requesting a large number of inexpensive Google Cardboard kits to give to students who attend VR workshops and events to encourage the exploration of VR apps that are already available on the Google Play and Apple App stores. The requested equipment will partner with the existing 3D and app development resources housed in MADE@UF. The equipment will be stored and checked out using the existing process.

•*Trace Lab, Department of English*: The Trace Lab is located on the 4th floor of Turlington Hall. It currently has one PC capable of handling VR graphics capability, one Oculus Rift, and one HTC Vive. The tech fee grant would allow the addition of 2 PC workstations and five headsets: HTC Vive, Oculus Rift, Hololense, Samsung Gear, and Google Daydream, as well as 360° cameras and development softwares. Trace Lab will also use a portable large monitor so that student groups can easily collaborate on VR development. Trace labs will primarily serve the development of sustainable training mechanisms for the program.

•*Art + Art History, College of the Arts*: The requested equipment will reside in one of the A+AH's many studio/lab collision spaces. There are currently several of these spaces in the FAC, FAD, and Warphaus buildings under consideration and the A+AH administration is dedicated to identifying the best space for this equipment and attendant learning and interactions. The space will house VR headsets, PC workstations, 360° cameras, and development software.

Collectively, access to these technologies at the four locations across campus will empower students to develop applications for their UFVRfG projects, as well as their coursework.

Impact/Benefit: University Libraries serve as a central space for all disciplines and thus are uniquely suited to make visualization technology available. Usage of the libraries is extremely high, especially Marston Science Library with 668,525 visitors in Fall 2016, an average of almost 6,000 daily visitors, providing significant promotion of new VR technology. MADE@UF in Infinity is also a highly visible and accessible building, with over 300 students living in the residence hall and the lab's location on the main floor is open to the public 24x7. There are also a

number of UF classes and departments that currently incorporate virtual reality into coursework and research, including offerings from CISE, Journalism, Anthropology and the Digital Worlds Institute. This proposed new technology will open new instruction capabilities to faculty who wish to include virtual reality devices and projects into their syllabi.

Currently, one of the most active VR entities at UF is the student organization Gator VR, a group which recognizes not only the importance of VR development and application across numerous disciplines, but has issued support for the UFVRfG program and Tech Fee Grant Application. As Ryan Leiblein, President of Gator VR, has put it:

"Acquiring more equipment for GatorVR would open the door for endless opportunities. Not only would students be able to efficiently work on current and future projects, while establishing GatorVR as one of the biggest Virtual Reality clubs at any university, but also students would gain hands-on experience amongst an array of devices and technologies to better prepare themselves for the quickly approaching VR boom."

This proposal will benefit students by providing them with the resources to apply the knowledge gained through their areas of study to innovative VR applications. Students will benefit from the UFVRfG program by learning to navigate and innovate through VR technologies, skills that will be of use in their careers as VR becomes a more ubiquitous technology. Students will benefit from considering how their technological and educational skills might be applied to social and ecological good.

This initiative leverages the VR expertise of University of Florida faculty to teach students to develop VR applications that contribute to the improvement of social and ecological conditions globally. In doing so, the UFVRfG initiative strives to boost technology skills and competency of students in order to improve their chances for success. Likewise, UFVRfG provides opportunities to cultivate faculty's capacity to create quality learning environments that address emerging technologies and also function within VR spaces. In turn, this proposal aims to establish UF as the national leader in applied VR technologies.

Access and Location Specific Use: Student access for VR development will be provided at five locations on campus with two primary access models in mind:

- First, the majority of VR development equipment will be available to students (undergraduate and graduate) through the MADE@UF spaces in Marston Science Library and Infinity Hall. These spaces will provide students with the opportunity to work with the VR equipment individually or in teams as they build their UFVRfG projects. Access to these spaces will be provided during the open hours these locations already provide.

- Second, access will be provided to students (undergraduate and graduate) and faculty through spaces in the School of Art + Art History and the Trace Lab in the Department of English. These spaces will provide VR app development opportunities and will specifically focus on training development for advanced UFVRfG participants, graduate students, and faculty. These spaces will be used to promote sustainable training workshops for UFVRfG and classroom use of VR technologies. Because the MADE@UF space in the library is restricted from faculty use (due to intellectual property rights issues) these other spaces are necessary to ensure faculty mentorship for students to lead UFVRfG training and for faculty input into UFVRfG projects. The spaces in A+AH and Trace are critical to the sustainability of the UFVRfG program and for the development of detailed training mechanisms.

Students will have access to the MADE@UF spaces according to the schedules and rules of those locations. Students and faculty will have access to the A+AH and Trace locations

through the Directors of those spaces. The Director will assign keys to those requesting access in order that the individual or group have convenient access to the space.

Training: Training is central to the UFVRfG mission. Three primary forms of training will be established:

- First, a significant hands-on workshop approach will be developed to teach students how to use the VR equipment and how to apply that technological know-how to the development of UFVRfG projects. These workshops will be provided in the MADE@UF space in Marston Science Library. Training workshops will be initially taught by faculty and graduate students from the Trace Innovation Initiative. Once undergraduate students begin to develop UFVRfG projects, more advanced project participants will be invited to conduct training workshops independently of or in coordination with graduate students and faculty (see next point).

- Second, students and faculty will need to learn how to develop and deliver training workshops. VR equipment located in the Trace Lab and A+AH will also be used to prepare students and faculty to deliver various training workshops. All UFVRfG projects will require that students participate in training development and deliver training workshops as part of the completion of their projects. That is, training will support sustainability: experienced users will train new users.

- Third, A+AH and Trace will work with MADE@UF to develop a comprehensive package of training materials to be available online for UFVRfG participants. These online tutorials will include training in the same areas as the hands-on workshops, as well as “how-to” help pages. The intent of the online training is to extend access to core training of the hands on workshops during times when workshops are not being offered. Such resources will allow students to better recall information from the workshops, as well as locate information not covered in the workshops.

Development of all three training mechanisms will be a priority for the UFVRfG proposers as soon as the equipment is installed.

Knowledge Building: UFVRfG is designed to promote six integral kinds of learning:

1. *VR Programming and App Development:* emerging VR technologies have been identified as one of the most important technological developments of recent. There is little question that students will benefit from knowing not only how to operate in VR environments, but from knowing how to program and build those environments.

2. *VR Navigation:* VR environments stimulate learning. VR allows students to visualize abstract concepts; observe phenomena at scales ranging from microscopic to galactic; and examine and interact with places and environments often impeded by time, distance, or safety.

3. *Immersive experiences:* hands-on experiences facilitate learning. VR technologies promote mastery, retention, and understanding.

4. *Collaborative and Interdisciplinary Learning:* UFVRfG teams encourage collaboration between students from multiple disciplinary locations. This approach enforces the idea that solving social and ecological problems requires multidisciplinary perspectives and knowledge bases to succeed.

5. *Civic/Public Engagement:* UFVRfG projects are designed to encourage students to work beyond the classroom, to use VR technologies to engage social and ecological problems in ways that will have real-world consequences. Because UFVRfG projects will require students to

circulate their work beyond UF borders, students will learn about the results and ramifications of public circulation.

6. *Research Based:* UFVRfG projects will require students to develop interdisciplinary research methodologies and to conduct rigorous inquiry in order to build research-backed content for all UFVRfG projects.

These learning objectives will be facilitated through faculty and senior project leader mentorship and instruction. The required project guidelines will ensure student engage UFVRfG projects through each of these learning objectives.

Community Building: At its core, UFVRfG is designed to promote community interaction. First, all UFVRfG projects require students to develop interdisciplinary teams to propose and foster VR projects. This will require students to reach beyond their disciplinary comfort zone to talk with, describe, and revise possible projects, thus fostering interdisciplinary collaborative communities on campus. Second, upon completion of a UFVRfG project, students will be required to circulate their projects publically, contact and work with industry, civic, and entrepreneurial leaders in order to further develop public interaction with their VR work. This aspect of UFVRfG projects helps students learn to work within communities beyond UF borders in order to promote their own community participation.

Sustainability: Because the UFVRfG project is designed to encourage student participation, including student training and mentorship, we envision the program sustaining intellectually and instructionally through a transitional process in which students move from project participants to project leaders to program mentors. Senior participants will help develop training materials and will help prepare novice students to participate in VR projects.

Promotion: Sustained by the production resources of the Trace Innovation Initiative and UF Libraries, supporting members of the UFVRfG will develop a multi-media promotion plan designed to 1. Identify the UFVRfG program to UF students and faculty in order to encourage participation in UFVRfG teams; 2. Announce training sessions and other UFVRfG events; 3. Provide campus-wide introductions to the UFVRfG program; 4. Develop a PR campaign to promote UF and UFVRfG as the nation's leading applied VR institution. This campaign will include a comprehensive social media campaign, as well as a direct contact campaign in order maintain national visibility and promote student work.

ALL UFVRfG space, training, and access will adhere to EIT Accessibility guidelines, specifically WCAG 2.0 AA and will support diversity through its contact across a broad spectrum of UF students and faculty.

Timeline:

| | |
|-------------------------------|--|
| April 14, 2017 | Proposal Submitted |
| April 28, 2017 | Acceptance Notification |
| September, 2017 | Funds Distributed |
| September-October, 2017 | Equipment ordered and installed |
| November 2017- March, 2018 | Proposers initiate three-fold development: 1. UFVRfG project proposal form for students and proposal schedules 2. Training program outlines and schedules 3. PR outreach to students to introduce UFVRfG and invite proposals |
| April, 2018-August 2018 | Initiate UFVRfG project solicitation/PR program Initiate UFVRfG training |
| Fall Semester, 2018 | Objective: 12 teams begin to develop UFVRfG projects |
| Spring Semester, 2019 | Proposers assess and evaluate initiated process for revision First UFVRfG projects promoted and made public |
| Fall, 2019 | Revised UFVRfG in place; Objective: 12 new UFVRfG added each semester Objective: first UFVRfG students begin training new project proposers Objective: sustained rotation and development now in play |

Budget:

| Technology | Price/each | MSL | Infinity | TRACE | SA+AH | Total # | Total Cost |
|---|-------------------|------------|-----------------|--------------|--------------|----------------|-------------------|
| Samsung Gear VR Headset | \$ 130.00 | 2 | 2 | 1 | 1 | 6 | \$ 780.00 |
| Google Daydream VR Headset + case | \$ 75.00 | 2 | 2 | 1 | 1 | 7 | \$ 500.00 |
| HTC VIVE VR System | \$ 800.00 | 4 | 4 | 1 | 1 | 10 | \$ 8,000.00 |
| Oculus Rift + Touch | \$ 600.00 | 2 | 2 | 1 | 1 | 6 | \$ 3,600.00 |
| Oculus Touch | \$ 100.00 | 2 | 2 | | | | \$ 400.00 |
| Cases for VIVE & Rift | \$ 75.00 | 8 | 8 | 2 | 2 | 20 | \$ 1,500.00 |
| PC Workstations | \$ 2,000.00 | 4 | 3 | 1 | 2 | 10 | \$20,000.00 |
| Video Display (60") | \$ 1,000.00 | 1 | | | | 1 | \$ 1,000.00 |
| Display Monitor Stand with Locking Wheels | \$ 500.00 | 1 | | 1 | | 1 | \$ 500.00 |
| 360° Cameras 360fly 4K | \$ 325.00 | 6 | 6 | 2 | 2 | 16 | \$ 5,200.00 |
| KVM Monitor Switch | \$ 150.00 | 4 | 4 | 1 | 1 | 10 | \$ 1,500.00 |
| | | | | | | | \$42,980.00 |
| | | | | | | | |
| | | | | | | | |
| Cintiq 22QHD Monitors | \$ 2,000.00 | 1 | 1 | 1 | 2 | 5 | \$ - |

