2024 Technology Fee Concept Proposal

Title: **Large-scale Immersive Visualization for Experiential Education (LIVE²)**

Proposers: Tim Difato, Acting Director – Digital Worlds Institute, tim@digitalworlds.ufl.edu;
Jeremiah Blanchard, Director of Computer Engineering, Department of Engineering Education; Luis Mejia-Puig, Assistant Professor Interior Design, Design Planning & Construction;
Digital Worlds Institute Faculty: Amelia Winger-Bearskin, A.I. Banks Preeminence Chair; Angelos Barmpoutis; Darius Brown; and James Oliverio

Contact: Tim Difato (352-294-2000)

Sponsoring Organization: Digital Worlds Institute, College of the Arts

Purpose and Specific Objectives:
With the current emergence of generative AI across the entire digital economy, UF students are well-supported pedagogically through the University's "AI Across the Curriculum" program.

The purpose and specific objectives of this proposal are to augment UF students' current learning environment with a state-of-the-art visualization system that scaffolds the converging fields of generative artificial intelligence (GenAI), computer generated imagery (CGI), virtual and augmented reality environments (VARE), and experiential learning. The interaction and experiences offered by this system will inure to the benefit of students from a wide range of disciplines as they progress towards graduation and enter the 21st Century workforce.

We are proposing to acquire a high-resolution 16x9 ft immersive display created by Florida based Vū Technologies. The Vū One virtual production LED Volume (VOLV) system will empower UF students to create, experience, and develop fluencies at the intersections of GenAI, CGI, and VARE. Working directly with Vū Technologies in Tampa, we have already secured a commitment to discount what is normally a quarter of a million-dollar system down to $190,000. Acquisition of the VOLV will provide access to immersive experiential learning across a spectrum of disciplines in UF's sixteen Colleges.

This 2.5 minute video showcases the immersive capabilities of the Vū system from the perspective of the global firm Accenture. Combined with generative AI, discipline specific environments, and student-produced content, the UF VOLV will create experiential learning environments of unprecedented power and potential. This technology will be supported by the mentorship of multi-displinary faculty from the College of the Arts, Design Planning and Construction, and Computer Scicene and Engineering.

Use Case: In the traditional film, pre-visualization, and game development industries, large green screen walls are commonly used as backdrops to capture high-quality performances with actors and presenters. These performances are later composited with various visual environments in a post-production process requiring numerous technical artists to create a compelling photorealistic production result. The current Digital Worlds (DW), curriculum offers experiential learning in said techniques in addition to several specialized areas including digital animation, game engines, and AI. But recent technological changes in the creative industries have led to the adoption of new

digital tools and techniques, and pedagogy related to these technologies differs from traditional digital production education. Innovative interdisciplinary teaching with these new tools requires students to understand level design, 3D animation, modeling, texturing, physics simulation, networking, and C++ programming. DW, DCP, and ENG currently cover these core subjects, but are not able to empower students to practice, learn from, and create content for what is rapidly becoming a new benchmark in research and education.

Experiential education utilizing this technology is currently in place and being offered to students at other key universities including, Florida State University, University of South Florida, Arizona State University, UNLV, University of Tampa, and state colleges such as Santa Fe. DW, ENG, and DCP curriculum (as detailed in the impacts section) currently teaches this new technology and the production techniques required but is unable to provide students the ability to practice without the actual VOLV. To address the existing educational gap, DW has organized visits for students to studios across Florida and other universities equipped with the necessary technology, allowing them to engage in this process firsthand. However, UF students are limited by being spectators rather than creators and participants.

Revolutionary production pipelines and techniques developed by [ILM](), [Lucas-Films](), and Disney are now being utilized in the industry by pairing real-time game development environments ([Unreal Engine]()/[Nvidia Omniverse]()/[Unity]()) and large, closely packed pixel LED walls to replace the antiquated greenscreens. This technology paired with active studio-based learning techniques will allow student game developers/designers to create virtual worlds and partner with live production students (cinematographers, interior designers, lighting designers, actors, dancers, data-visualization research students) in real-time film and content creation by displaying the virtual sets on the LED wall. The VOLV can be connected to a high-powered PC (or HiPerGator) to render real-time graphics from the game engine to produce stunning photorealistic environments for studio production learning and simulation research. Over $100,000 of previously acquired DW cinema cameras, lenses, and motion tracking systems will be repurposed and synchronized with the game engine allowing students the ability to film using tangible devices on stage while also affecting the virtual world rendered on the LED wall, thus reducing the time to capture, edit, and render a high-quality production. This will also allow UF Online students to collaborate in the film creation process by building virtual worlds in game engines that will directly appear on the LED sets for on-campus productions, which will create an unparalleled hybrid learning experience between on campus and online.

The VOLV will also be incorporated into the research curriculum for students to grasp the utilization of large displays for immersive simulation, real-time analysis, and time-based three-dimensional design. This will involve connecting the display to HiPerGator virtual machines that run omniverse digital twin simulations via content streaming and collaborative development, such as utilizing the Nvidia L40 GPU node. By developing these environments in a high-resolution VOLV and weaving together strands of generative artificial intelligence (GenAI), computer generated imagery (CGI), virtual and augmented reality environments (VARE), student researchers can visualize and experience a variety of real-world scenarios, from construction management to role-

played training simulations to real-time collaborative artistic performances. This offers students a unique learning opportunity that is only available through UF and Nvidia.

Impact/Benefits:
Through academic classes and UF-wide co-curricular activities, the VOLV technology would be available to all students across the campus. The technology will have an immediate impact on over 25 UF courses across three colleges (*see list below*). It will be available for UF student-generated content, interactive productions, and interdisciplinary research in disciplines across the University. Research opportunities include the development and display of Nvidia Omniverse digital twins of semiconductor facilities, hospitals, remote and typically in accessible environments, the development of AI generative 3D environment tools, and spatialized UI-UX navigation. Additionally the technology could be used for up-close visualizatons of physical and electro-magnetic systems in engineering coursework and research.

This technology will also improve and support UF co-curricular activities taking place across the campus, including hack-a-thons, game-jams, and design-a-thons. DW and ENG have already co-hosted numerous such events. During these events, students can put classroom knowledge into action by tackling real-world challenges in a 48-hour competition, fostering connections with industry professionals. We already have hosted several Virtual-Production Jams where students compete in virtual world building in collaboration with industry partners.

By leveraging existing resources in the partnering Colleges and programs, the VOLV system will utilize faculty strengths in AI, computer science, game design and production, digital animation, interior design, video production, and digital design to create and impart new methodologies and technical skills to a wide spectrum of UF students.

UF's innovative convergence of GenAI, CGI, and VARE with experiential learning will uniquely prepare students for 21st century careers and distinguish them from graduates of peer institutions.

The following courses would immediately utilize the technology:

IND2313 Design communications
IND2214 introduction to architectural interiors
IND4930 Interactive Media
 Communications
DIG 2005 Introduction to Digital Technologies
DIG 2021 Foundations of Digital Culture
DIG 2121 Principles of Digital Visualization
DIG 3121 Principles of Interaction & Usability
DIG 3313C 2D Digital Animation
DIG 3305C 3D Digital Animation
DIG 3525C Design and Production Studio 1
DIG 3526C Design and Production Studio 2
DIG 3713 Game Content Production 1
DIG 3433 Digital Storytelling

DIG 4841 Senior Project Research
DIG 4970 Senior Project in DAS
DIG 3329 3D Modeling and Texturing
DIG 4306C Advanced Digital Animation
DIG 4353 3D Character Animation
DIG 4527C Game Design and Production
DIG 4184C Motion Design
DIG 4185 Experience Design for Social Engagement
DIG 4540C Production of Immersive Environments
DIG 4552 Advanced Design/Production
DIG 4944C Production Practicum
CAP 3027 Introducton to Digital Arts & Sciences
CAP 3020 Theory & Practice of Multimedia

Production	IDS 2935 AI + Art/Science/Fiction
CAP 4053 Artificial Intelligence for Games	DIG 3623 Playable Patterns: Science
CIS 4914 Senior Project	Storytelling with AI & Games

Sustainability:

The VūOne VOLV is a one-time purchase consisting of a 16 ft L x 9ft H wall with a 1.8 pixel pitch and truss system for ground support. The installation would be housed at the Digital Worlds Research, Education, and Visualization Environment (REVE) at Norman Gym. Its acquisition and deployment is a natural next-generation evololution to DW's existing Polymodal Immersive Classroom Theatre (PICT) and DW's current Research, Education, and Visualization Enviroment (REVE). No significant construction or infrastructure improvements will be required to update the REVE to host the new system, which will be in daily use for instruction, production, and research & development. The acquisition comes with support setup from the company as well as on the ground training and ongoing customer support. There are no monthly re-occurring costs. The VOLV system itself would be completely maintained by the specialized Digital Worlds technical staff.

Timeline:

Time	Activities
March 2024	• Quote from Vū already received. Company provided one-time $50k discount.
August 2024	• Funds Awarded • Planning for VOLV installation and implementation in Studio • Place PO
October 2024	• Receive VOLV (10-60 days from purchase) • Installation by Vū (3-4 days) • Training (48 hours) • Use for classes (November 1, 2024)

Budget: $190,000

Item	Notes/Price
Vū One System *(Novastar System, 2D / Display Workflow)*	*Full System Hardware,* *Installation and Training, discounted $50,000. For a UF price of $190,000.00*
Virtual Studio OS	Vū OS Software (5 Seats) Complimentary *2-years (Software not required to run VOLV)*
Taxes, Shipping, Travel	Included in Total
Working Total	**$190,000.00**

Technology Fee Full Proposal Template Sponsor Signature Form

Title: Large-scale Immersive Visualization for Experiential Education (LIVE2)	
Proposer's Name: Tim Difato	

Note: By signing this form the sponsor is making a commitment to support the project. This may include providing startup, recurring or equipment replacement resources as presented in the attached budget.

Signature of sponsor: College Dean, or Unit Director, or VP for Student Affairs.

Jennifer Setlow

3/13/2024 | 3:54 PM EDT

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Jennifer Setlow, Interim Dean College of the Arts   **Date**

Note: By signing this form the UF IT unit is making a commitment to manage the project if selected for submission of a full proposal. This may include providing startup, recurring or equipment replacement resources as presented in the attached budget.

Signature of unit UFIT Director of a core unit:

Jameson Johnston

3/13/2024 | 4:14 PM EDT

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Jameson Johnston, Associate Director, Learning Spaces & Technology UFIT   Date