



Hidden Within

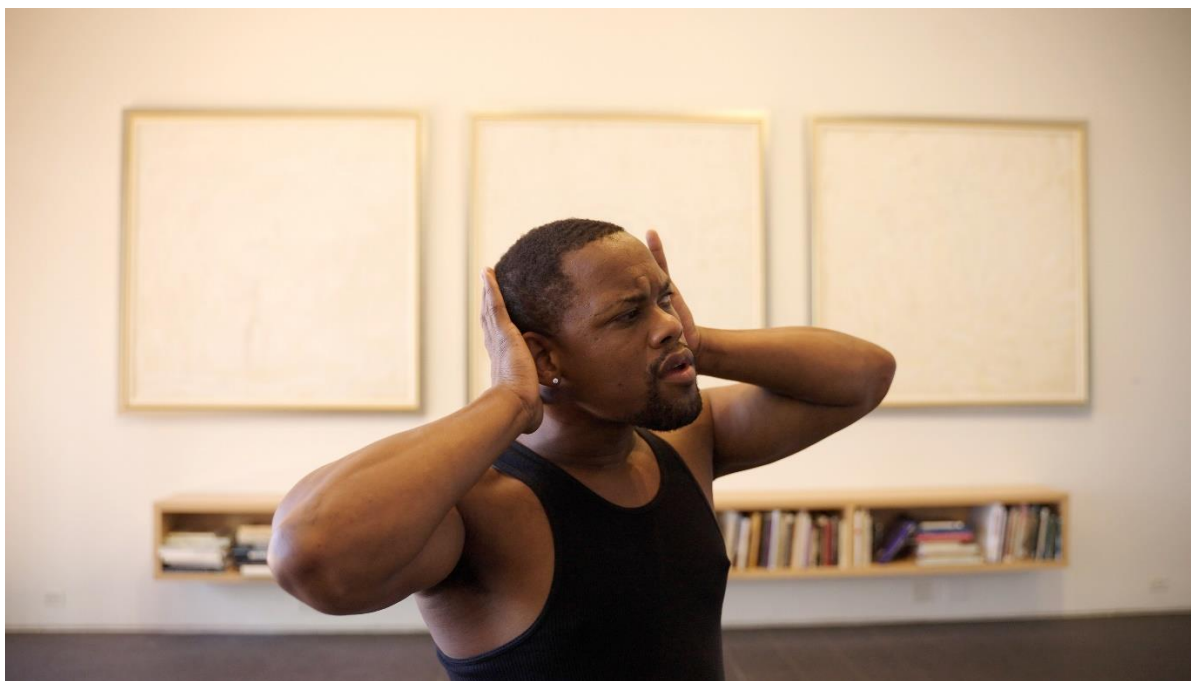
An Immersive Video Installation with Spatial Sound by artist Janet Biggs, mathematicians Agnieszka Międlar and Paul Cazeaux, physicist Daniel Tapia Takaki, and audio engineer Tanner Upthegrove

Commissioned by the Commonwealth Cyber Initiative (CCI) and Virginia Tech's Institute for Creativity, Arts, and Technology (ICAT)

Location: The Cube at The Institute for Creativity, Arts, and Technology (ICAT), Virginia Tech, 190 Alumni Mall, Blacksburg, VA 24061

Opening Reception: May 7, 2024, 5:30 – 7:00 pm

Public Hours: May 7-10, 2024, 10:00 am – 5:00 pm, May 11, 10:00 am – 4:00 pm



CCI and ICAT are pleased to present ***Hidden Within***, an immersive installation by artist Janet Biggs, Virginia Tech mathematic professors Agnieszka Międlar and Paul Cazeaux, high energy nuclear physicist, Daniel Tapia Takaki, and immersive audio engineer for Virginia Tech's Institute for Creativity, Arts, and Technology (ICAT), Tanner Upthegrove, with MFA candidate and artist Sarah Hammer. The installation features dancer Davian Robinson and Virginia Tech's elite Gregory Guard.

Inspired by NextG Wireless Security, this research-based project led to the production of a video and spatial sound installation exploring aspects of quantum communication and steganography by experimenting with ways sensitive data can be encrypted and sent via light sources, like fiber-optic cables, and in our case video projections and sound.

The overt line of inquiry is exploring how information can be hidden, detected, and extracted. The subtext is introspection, and the various ways hidden information functions: from giving voice to individuals and ideas silenced by oppressive regimes to the spread of conspiracy theories, from cyber technologies' impact on the natural world to its infiltration into human consciousness. This project will part the curtain, revealing the science and the subjective viewpoints behind detection and extraction.

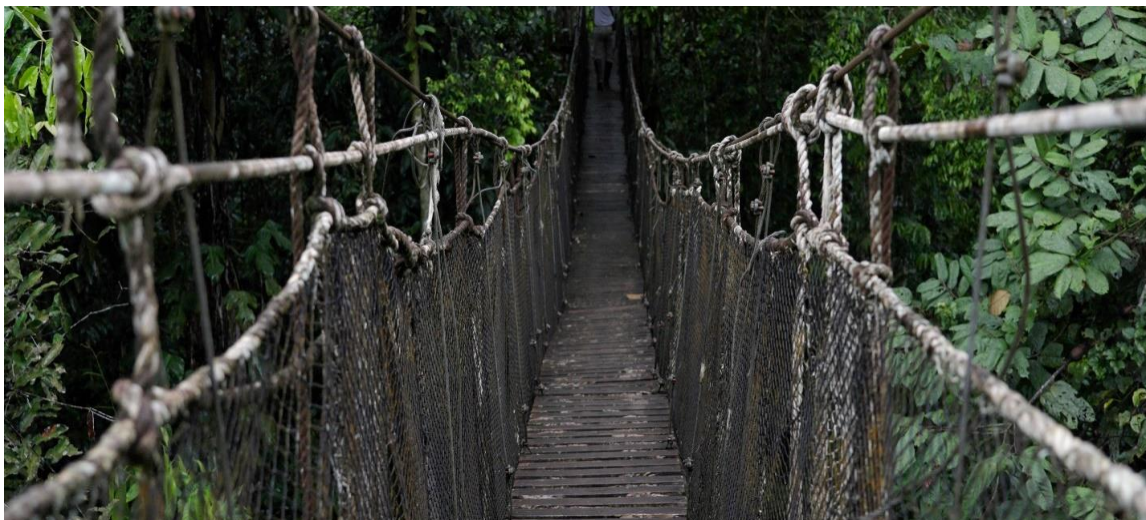
The installation unfolds in three interconnected segments: the first focuses on Davian Robinson, a vision-impaired dancer who uses echolocation to understand and navigate unknown spaces. The second takes the viewer deep into the Amazon headwaters of Peru, with the final segment featuring Virginia Tech's elite Gregor Guard silent drill team. Each segment presents imagery that can be interpreted in multiple ways. Viewers will bring their own experiences and histories, building narratives and meanings that may be hidden to others.

Imagery of light filters down through the dense, otherworldly vegetation of an Amazon rainforest. The camera slowly pans up a massive kapok tree, wrapped by the roots of a strangler fig. Acting as a metaphor for multiscale analysis, the kapok branches and strangler fig roots contain layers or ranks of information.

With a soundtrack created specifically for the Cube's world-leading audio system, complete with over 140 loudspeakers, and hidden transducers, Hidden Within presents a unique immersive sonic experience.

Positioned in the center of the space is a series of long reflecting pools that act as water vibration encoders. Audio from the installation creates interference patterns that ripple through the pools. Light sources and project imagery create moiré patterns, revealing another layer of information.

As an interdisciplinary group originally brought together by the Arts Research Integration (ARI) program at the University of Kansas' Spencer Museum of Art, the collaborators work collectively to produced work that is generative of each other and has relevance in each of their disciplines. Through experimentation and innovation, they create new knowledge, including tools and perspectives to advance their respective fields and elicit the audience's engagement and curiosity.



Bios

Janet Biggs is a research based, interdisciplinary artist working in video, film and performance. She is recognized for her immersive and multidisciplinary approach, often incorporating sound, moving images, and language to create new perspectives and possibilities. Biggs' work focuses on individuals in extreme landscapes or situations, navigating the territory between art, science and new technologies. She has worked with institutions from NOAA to NASA and CERN. Biggs' work had been supported by the Guggenheim Foundation, the National Endowment for the Arts, and exhibited at museums and institutions worldwide. Biggs works with Cristin Tierney Gallery, NYC; Galerie Analix Forever, Geneva; CONNERSMITH, Washington, D. C., and Hyphen Hub, NYC.

Agnieszka Międlar is an Associate Professor of Mathematics at Virginia Tech. Her research lies in the general area of computational mathematics and scientific computing, with a focus in numerical linear algebra. Międlar holds a M.Sc.Eng. in Computer Science from the Wroclaw University of Technology, Poland and PhD in Mathematics from the Technical University of Berlin, Germany. She was an IARI Faculty Fellow at the Spencer Museum of Art at the University of Kansas in the Spring 2021. Her research has been supported by the Simons Foundation, the National Science Foundation (NSF) and the Lawrence Livermore National Laboratory (LLNL), and she is a recipient of the 2022 NSF CAREER Award.

Paul Cazeaux is Assistant Professor of Mathematics at Virginia Tech. His research interests lie in the mathematics of modeling and scientific computing, in particular targeting challenging problems from materials science exhibiting multiple scales of space and/or time such as moiré patterns in two-dimensional layered materials. Cazeaux holds a Diplôme de l'Ecole Normale Supérieure and a PhD from Sorbonne Universités (ex-Université Pierre et Marie Curie) in Paris, France. His research has been supported by the Simons Foundation, the National Science Foundation, and the Commonwealth Cyber Initiative (CCI).

Daniel Tapia Takaki is a high energy nuclear physicist and a professor of physics at the University of Kansas. He is a member of the ALICE (A Large Ion Collider Experiment) collaboration at CERN's Large Hadron Collider, where he studies fundamental aspects of protons and nuclei using photons. Tapia Takaki also works for the Electron-Proton/Ion Collider collaboration at Brookhaven National Laboratory.

Tanner Upthegrove, MFA in Spatial Audio and Technical Direction, thrives at the intersection of arts and technology as Immersive Audio Engineer for Virginia Tech's Institute for Creativity, Arts, and Technology. Tanner designs audiovisual systems with a focus on immersive experiences. Tanner composes for multichannel audio systems. Tanner has presented spatial audio at the Audio Engineering Society, the Institute of Electrical and Electronics Engineers, the International Congress on Sound and Vibration and Moogfest. Tanner is published by the AES, the IEEE, and the Computer Music Journal. Tanner has collaborated with Sound Artist Stephen Vitiello, and Trey Spruance of Secret Chiefs 3

Sarah Hammer is an artist and graduate student in the Creative Technologies MFA program at Virginia Tech. Her artistic practice challenges the boundaries between body and landscape through explorations of emergent surfaces and patterns. She has previously earned a BS in Traditional Mathematics and a BFA in Studio Art both from Virginia Tech.

About ICAT

Powered by advanced technology and networks of creative people, the Institute for Creativity, Arts, and Technology (ICAT) brings together and supports teams of faculty and students from across academic disciplines to address grand challenges and creative opportunities, ranging from large societal problems to industry-specific issues to the frontiers of artistic expression. For more information, see <https://icat.vt.edu/>

About the Cube

ICAT is home to a collaborative research environment called the Cube – a completely reconfigurable immersive environment unlike anywhere else. The Cube is a highly adaptable space for research and experimentation in big data exploration, immersive environments, intimate performances, audio and visual installations, and experiential investigations of all types. This unique four-story theater and high-tech laboratory features one of the most advanced 3-D audio/visual system in the world.

The Cube is 42 feet high (five stories), 50 feet long, and 40 feet wide. We refer to it as a black box theater because the color black absorbs all light and makes it possible to make almost anything technological or artistic happen therein, from musical performances to robot ensembles to XR simulations to art exhibitions.

Currently, the Cube is equipped with three modular 4K projectors (with two of them packing 10,000 lumens each and the other one capable of going up to 30,000 lumens), one disguise vx4 (multimedia presentation server and projection mapping system with four 4K UHD outputs), 134.6 channels of 3D spatial audio, nine holosonic directional loudspeakers, sixteen channels of wireless headphone transmitters, a 24-camera Qualisys Optical Tracking System, a triptych immersive projection screen, four channels of Pozyx Ultra-Wide Band (UWB) Radio Frequency Tracking, and nineteen miles of analog and digital audio, video, and data patchable connections.

About CCI

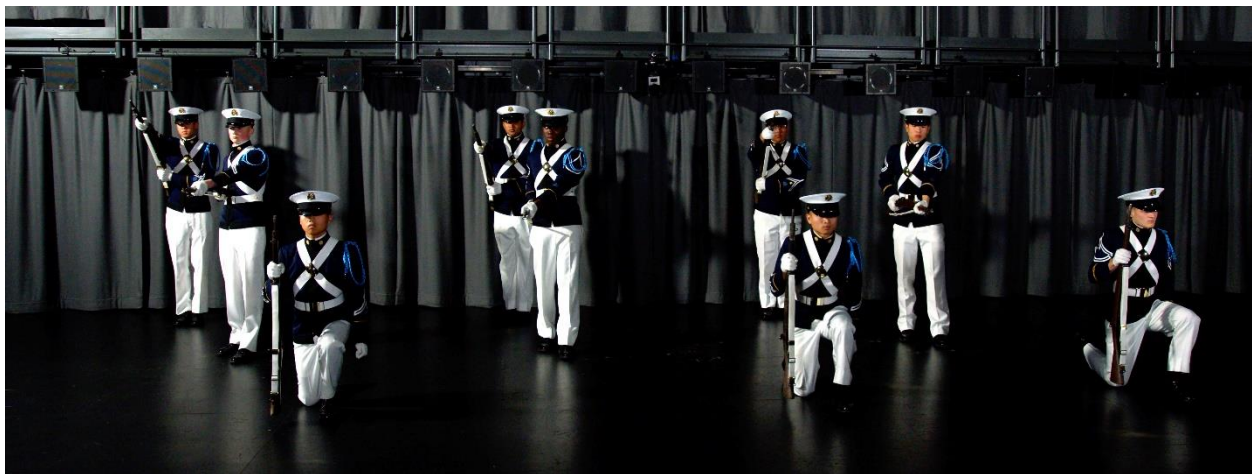
The Commonwealth Cyber Initiative (CCI) is Virginia's main access point for cybersecurity research, innovation, workforce development, and news. In this community, researchers find funding and collaboration, students discover diverse career possibilities, and new innovations come to life.

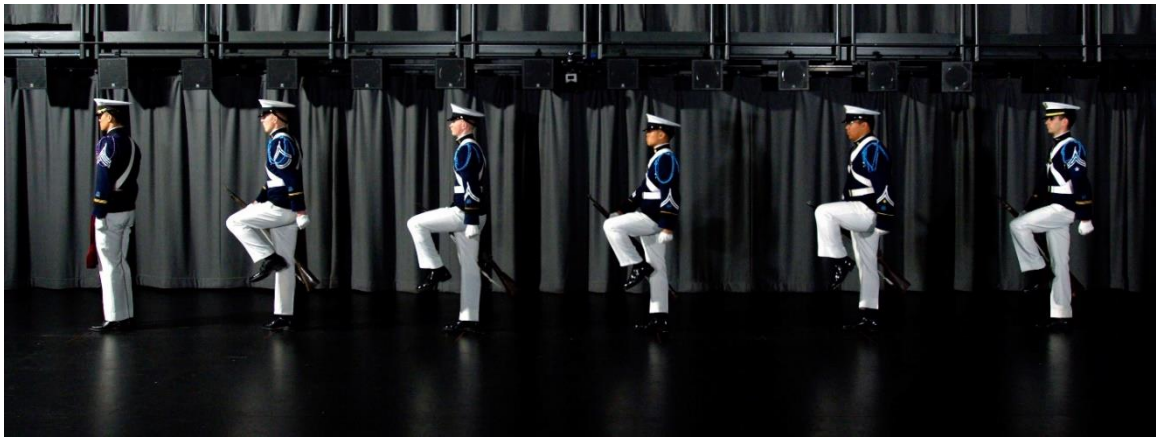
For more detail on CCI's 2023 CyberArts Program, see :

https://cyberinitiative.org/content/cci_research_vt_edu/en/research/funded-projects/cyber-arts-and-design-project-2023.html

For the Commonwealth Cyber Initiative website, see: <https://cyberinitiative.org/>

Thanks to Todd DeShields Smith and the Bechtler Museum, Charlotte; Lindblad Expeditions-National Geographic; and CDR Nate Brown and the Virginia Tech Corps of Cadets' Gregory Guard.







All images © Janet Biggs