

## Maryland artist and scientist team up to visualize Chesapeake Bay Augmented reality reveals microscopic life through creative stories, images and sounds

**BALTIMORE, MD (August 28, 2021)**— This fall, visitors to the Inner Harbor will be able to view life in the Chesapeake Bay in a new way. On October 9, 2021 from 1-4 pm, water itself will tell the story of life under the Chesapeake Bay in an augmented reality (AR) project called “Under the Bay.” Users will hold their phone like a microscope over water in the Inner Harbor near the Institute of Marine and Environmental Technology (IMET) and animated micro-organisms will appear in their camera view. These animations will change color when conditions in the Bay change. Stories and music will connect memory, science, and anecdotal observation.

“‘Under the Bay’ will tell a unique story for every user, changing over time, over seasons, but always from the viewpoint of the water itself,” said IMET artist-in-Residence Lisa Moren. “The microscopic dinoflagellates represented in AR are hundreds of millions of years old, and because they are at the very bottom of the food chain, they are important to all marine life.”

Live sensors in the Chesapeake Bay direct how the organisms appear and how the story is told. In addition to undulating forms and color, originally composed music will change in pitch and tempo based on the water conditions. Stories will describe the amazing survival strategies of these unicellular creatures called dinoflagellates that make their own light, food and energy when water conditions are favorable. When severe oxygen deprivation occurs in the water, voiceover stories of survival become choppy, fragmented, even choking.

The project was created by Lisa Moren, a multi-disciplinary artist from the University of Maryland, Baltimore County who works with emerging media, public space and works-on-paper and Tsvetan Bachvaroff a research professor at the University of Maryland Center for Environmental Science’s Institute of Marine and Environmental Technology. His research focuses on the evolution and biology of dinoflagellates, which are known for causing ‘red tides’ or harmful blooms. The sound score is by Baltimore electronic music [Dan Deacon](#), and the app was developed by [Marc Olano](#), associate professor director of the Computer Science Game Development Track at UMBC.

The first chance to see this augmented reality art and science project is October 9, 2021 from 1-4pm outside the Institute of Marine and Environmental Technology at 701 East Pratt Street, Baltimore. View a trailer for the project at [Lisamoren.com/underthebay](https://lisamoren.com/underthebay).

In the final project, a user will be able to download “Under the Bay” a free AR app and hold up a camera view of their phone over the water, creating a kind of microscope that reveals an invisible world of amazing critters living under the surface of the Bay. Dozens of tiny microorganisms, too small for the human eye to see, will appear beautiful, large, and changing in color over their field of view. Their stories will be told by the water itself. When the water is healthy, the organisms appear swimming and billowing over their field of view like a happy jellyfish. When the water is unhealthy, the organisms become shriveled like a discarded plastic bag in the water.

## BIOGRAPHIES

Producer, Lead Artistic Director, Author and Principal Investigator

[Lisa Moren](#) is a multi-disciplinary artist who works with emerging media, public space and works-on-paper. Lisa has exhibited her work widely at the Chelsea Art Museum, Creative Time Summit in New York City and in Brooklyn, the Cranbrook Art Museum and international venues including Ars Electronica [Austria] and Akademie der Kunst [Germany] and the Artists Research Network [Australia], and Ushaka Musuem [South Africa]. She received the National Endowment for the Arts award [ 2003 ], is a Fulbright Scholar to Czech Republic; a multi-year recipient of the Maryland State Arts Council and CEC Artslink International. Her writing and reviews of her work have appeared in The Guardian; Performance Research; Visible Language; Inter Arts Actuel; New Media Caucus for “Algorithmic Pollution: Artists working with Dataveillance and Societies of Control” and “CYBER IN|SECURITY”; and two books Intermedia; and Issues in Contemporary Theory for “Command Z: Artists Working with Phenomena and Technology” by D.A.P. Lisa Moren is a Professor of Visual Art in Intermedia + Digital Art at UMBC. Lisa lives in Baltimore City with her two children. She leads all artistic direction, technical production including interactive iterations related to fluctuating in-coming Bay data. She is also the author and voiceover for the stories.

Producer, Lead Marine Biologist, Data Analysis and Project Researcher

[Dr. Tsvetan Bachvaroff](#) is a Research Professor at the University of Maryland Center for Environmental Science [IMET]. His research focuses on the evolution and biology of Dinoflagellates, which are known for causing ‘red tides’ or harmful blooms. Dinoflagellates are usually swimming single celled plankton found in almost every marine system around the world, and about half of the known species are photosynthetic. His Ph.D. work at the university of Maryland College Park with Dr. Charles Delwiche focused on the origin of the peridinin plastid in dinoflagellates. He was a post-doctoral at the University of Maryland Biotechnology Institute, where he worked on culturing and sequencing harmful dinoflagellates from the Chesapeake Bay with Dr. Allen Place. Dr. Bachvaroff was awarded a fellowship at the Smithsonian Environmental Research Center where he worked on the Dinoflagellate Assembling the Tree of Life with Dr. Wayne Coats, describing and sequencing new dinoflagellate species. Dr. Bachvaroff’s recent work has focused on dinoflagellate evolution, protein translation and enigmatic dinoflagellate parasites using large scale sequencing projects. Dr. Bachvaroff leads the projects marine biology research and Chesapeake Bay data analysis.

Lead Programmer and Augmented Reality Developer

[Dr. Marc Olano](#) is Associate Professor and Director of the Computer Science Game Development Track at UMBC Co-director, VANGOGH lab, and Editor in Chief, Journal of Computer Graphics Techniques. He has worked on several gaming companies in Maryland including Firaxis. In his research he pioneered procedural shading on graphics hardware, currently a standard feature on PC and game platform and graphics hardware. He did key work on using normal maps on low-detail 3D models, now a common technique in games. Dr. Olano has also developed automatic shader program simplification allowing more complex hardware shaders, used by Pixar and Industrial Light and Magic for interactive previews of movie production shaders. Marc Olano has received numerous awards including a current Principal Investigator on a National Science Foundation and a National Endowment for Education for work on Sim Theater: A Social Media Game for Audience Development and Virtual Realty Design for Science and MRI: Acquisition of a 3D object and motion capture system and many others. He has led large-scale technical research for interactive screen based at the Imaging Research Center, UMBC for over ten years and is a principal investigator for NSF and NEA. Dr. Olano is an Associate Professor of Computer Science and Electrical Engineering at UMBC. Dr. Marc Olano directs all programming and technical aspects related to the live data acquisition from the Chesapeake Bay data, and coding within the app itself.

## Lead Composer and Sound Score

[Dan Deacon](#) is a recording artist and performer renowned for electronic music, his live performances in both contemporary and classical settings, and film scores. Deacon has premiered compositions at Carnegie Hall and Lincoln Center, and collaborated with artists and institutions including Kronos Quartet, Sō Percussion, The Baltimore Symphony Orchestra, the LA Philharmonic, and Justin Peck with the New York City Ballet. Deacon has toured internationally with recording artists Arcade Fire, Miley Cyrus, Future Islands, and The Flaming Lips. His albums were named Best New Music by Pitchfork, and received 4-star reviews from AllMusic and The Guardian. Deacon's original film and television scores include *Twixt* (Francis Ford Coppola, 2011), *Rat Film* (Theo Anthony, 2016), *Time Trial* (Finlay Pretsell, 2017), and *Well Groomed* (Rebecca Stern, 2019). Three new projects scored by Deacon premiered at Sundance 2021 and a fourth, Jessica Kingdon's *Ascension*, premiered at Tribeca 2021, where the film won Best Documentary Feature. For *Under the Bay*, Dan has composed the electronic sound scores including interactive iterations related to fluctuating in-coming Bay data.

John Boutsikas — Programmer

Austin Samson — Modeler and Animator

William Forrest — Animator and Technical Artist

Woody Lissauer — Voiceover Engineer and Male Narrator-02 [Scene: Water Moving Around My Fingers]

Ruskin Nohe-Moren — Male Narrator-02 [Scene: Water Moving Around My Fingers]

Aliyah Baruchin — Voiceover Editor

This project is generously supported by the Saul Zaentz Innovation Fund at Johns Hopkins University and the R.W. Deutche Foundation. This project originated during an artist in residence program supported by the Institute of Marine and Environmental Technology (IMET) and the Center for Innovation, Research, and Creativity in the ARTS at the University of Maryland, Baltimore County. We're grateful for the consulting and support from IMET; Maryland Department of Natural Resources; Danielle McPhatter and Harvestworks Digital Media Art Center, The IRC, CIRCA and CAHSS at UMBC and Antoine Cayrol of Atlas V Immersive Experiences in AR and VR.

**INSTITUTE OF MARINE AND ENVIRONMENTAL TECHNOLOGY** Located in Baltimore's Inner Harbor, the Institute of Marine and Environmental Technology is a strategic alliance involving scientists at the University of Maryland Center for Environmental Science, the University of Maryland Baltimore and the University of Maryland Baltimore County. Scientists are engaged in cutting-edge research in microbiology, molecular biology and biotechnology, using marine organisms to develop new drug therapies, alternative energy and innovations to improve public health. IMET contributes to sustainable marine aquaculture and fisheries in the Chesapeake Bay and marine ecosystems. IMET fosters early-stage companies and industry partnerships, contributing to economic development in Maryland.

**UNIVERSITY OF MARYLAND CENTER FOR ENVIRONMENTAL SCIENCE** Guiding our state, nation, and world toward a more sustainable future The University of Maryland Center for Environmental Science (UMCES) is a leading research and educational institution working to understand and manage the world's resources. From a network of laboratories spanning from the Allegheny Mountains to the Atlantic Ocean, UMCES scientists provide sound advice to help state and national leaders manage the environment and prepare future scientists to meet the global challenges of the 21st century.

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