

Coretta Sharpless, Principal



Kimberly Ferrington, Assistant Principal

To Whom It May Concern,

I am pleased as Instructional Technology Facilitator at Northside Elementary School in Chapel Hill, North Carolina to write this letter in support of the education/outreach component of the proposal entitled, ***“Collaborative Research: Effect of Atmospheric Organics on Aerosol Soluble Iron in Surface Ocean: Laboratory Studies, Model Development and Applications”*** submitted to the National Science Foundation. Northside Elementary School has an intense academics agenda that includes programs in English as a Second Language (ESL), Exceptional Children (EC), Gifted Education, Literacy, and STEM Education.

Recently, from 2016 to 2017, Northside Elementary School has interacted with researchers from the Center for Applied Aquatic Ecology at North Carolina State University through their Augmented Reality Sandbox (ARS) program. The ARS uses computer projection coupled with a Kinect 3D camera to visualize three-dimensional changes in the sand surface. The students can build and manipulate landforms in the sandbox and see real-time changes in contour lines and water surfaces. They can also make it rain on the landforms illustrating flow and collection of water. We used this technology to introduce the principles of geomorphology, hydrology, earth science and environmental studies to more than 250 students in first, and fifth grades along with our Newcomers program whose students are new arrivals in our country. This learning experience included discussions of landforms, elevation and best land management practices for the protection of water resources. The opportunity to experience this hands-on environment to support vocabulary introduction and growth along with real time visual illustration and demonstration of our learning objectives is invaluable.

For the proposal being submitted, we plan to include demonstrations and hands on activities with the assistance of the NCSU scientists addressing the importance of aerosols, cloud chemistry and global climate change due to changes in the atmosphere. This will introduce the students to all components of the water cycle, including both terrestrial and atmospheric components.

Sincerely,

A handwritten signature in blue ink that reads 'Cathy Musci'.

Cathy Musci

Northside Elementary School  
Chapel Hill/Carrboro City Schools

February 20, 2017



To Whom It May Concern,

As the Community Outreach and Special Programs Coordinator of Kidzu Children's Museum, I am delighted to offer support for North Carolina State University Center of Aquatic Ecology and the Augmented Reality Sandbox. As a Chapel Hill-Carrboro institution focused on STEM education and the building of 21st century skills for all children, I am thrilled to support the continued use and funding of the Augmented Reality Sandbox as a tool for hands-on environmental and engineering education.

Kidzu has worked with the AR Sandbox for 2 years. In January 2017 the museum saw around 1,500 families in two weeks interact with the exhibit, many of which were seeing it for the first time. Children of all ages and abilities are captivated by this tool. The AR Sandbox opens the floodgates through which instructors can impart knowledge, even to the visitors whose attention seems hard to grab attention. The therapeutic sensation of the sand and the captivating, colorful display holds the children as they participate, ask questions, and absorb important information about our planet. Families rush to the Makery for an experience with the Sandbox. Our Earth and Water Science Units would be hard-pressed to find an exhibit as effective and enchanting as the AR Sandbox.

The highlight of with the sandbox experience at Kidzu was the culminating Saturday morning program. Linda Mackenzie and her team spoke to children about the use of the sandbox as a tool for scientists, and explored concepts such as watersheds, water basins, and topography. This was a wonderful program that we hope to continue on a yearly basis.

We are thrilled to continue this relationship with the Center of Aquatic Ecology and look forward to working with them again soon.

Most sincerely,

A handwritten signature in blue ink that reads "Rose Cuomo".

Rose Cuomo  
Community Outreach and Special Programs Coordinator  
Kidzu Children's Museum



November 28, 2017

To Whom It May Concern,

The Lab at the Museum of Life and Science had the privilege of facilitating North Carolina State University Center of Aquatic Ecology's Augmented Reality Sandbox from November 14<sup>th</sup> – November 19<sup>th</sup>. The week's activities revolved around Climate Change, and the AR Sandbox was a fun and educational addition.

In our exhibit, guests were able to explore the Sandbox with little instruction in the beginning. This allowed each guest to have a unique experience and follow their own path of inquiry. The Sandbox is an excellent tool to use with inquiry based learning, and allowed us to see what interested each one person. It was a favorite station of our guests, and many would skip the other stations altogether. It was wonderful watching people discover how the water moved with their designs in the sand.

The Museum of Life and Science looks forward to working with NC State University Center of Aquatic Ecology again. There are many possibilities with the AR Sandbox that we look forward to exploring with our guests.

Sincerely,  
Tomara Gee

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