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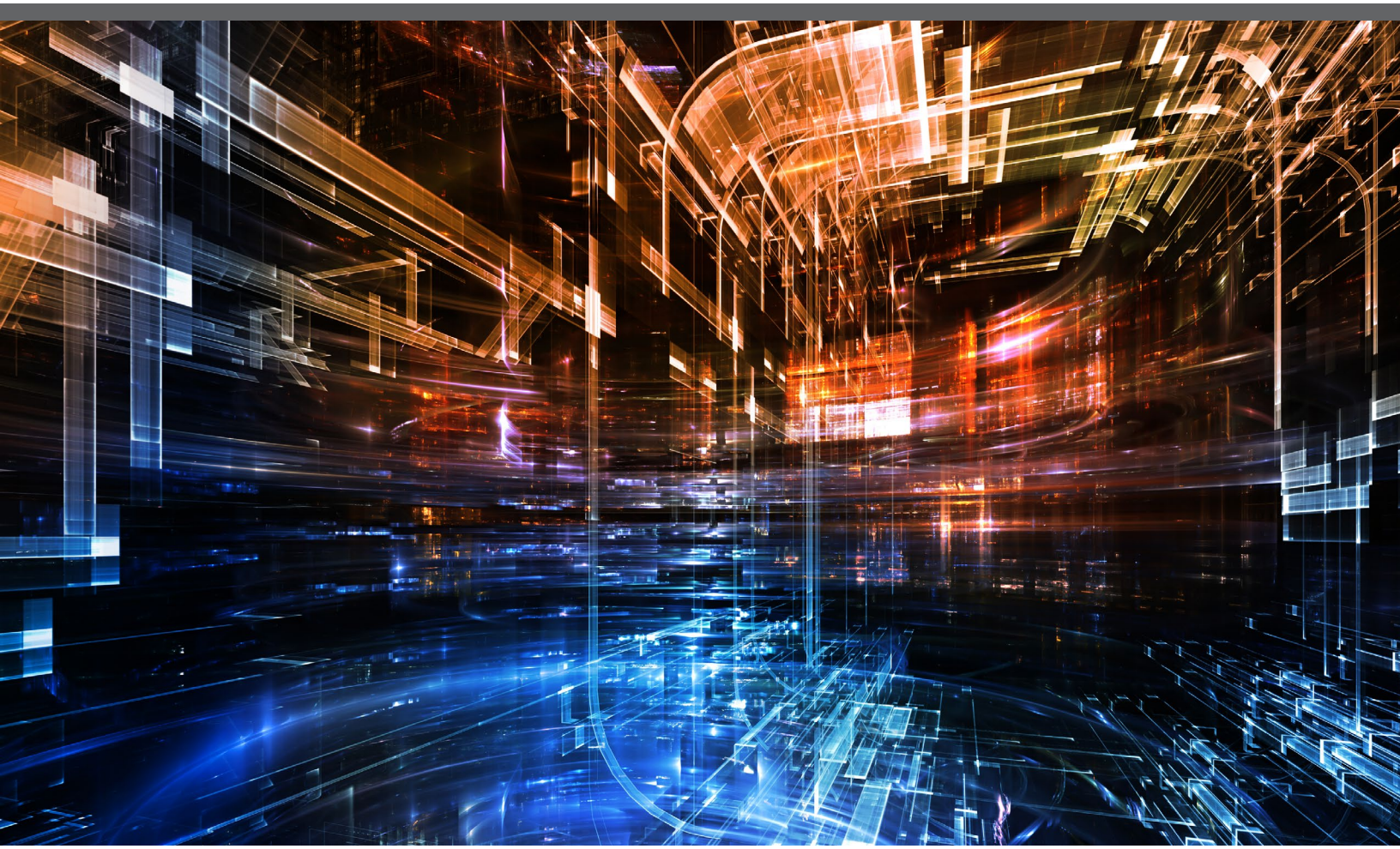

LENOVO HELPS ENVISION A BETTER FUTURE

"Where there is no vision, there is no hope."
—*George Washington Carver*

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Lenovo is providing technologies to non-profits that help people look forward to a better future.

Two case studies illustrating how technology can allow people to visualize solutions to problems highlighted a Lenovo sponsored webcast, "The Power to Change the World: Redefining the Role of the Workstation."

The webcast offered an opportunity to learn from "two of Lenovo's finest revolutionaries," said Scott Ruppert, workstation portfolio & solutions planning manager for Lenovo, in the introduction to the case studies. The two leaders in revolutionary uses of imaging technologies are The Hydrous, which focuses on helping people understand the importance of protecting marine environments, and Build Change, which is using 3D imagery to teach third world residents how to disaster proof their homes.

VISUALIZING IMPACT AND INCREASING COMMITMENT TO A CRITICAL CAUSE

First up in the webcast was Erika Woolsey, PhD, CEO & co-founder, The Hydrous, a nonprofit, based in San Francisco, focused on ocean science and education. A marine biologist, Woolsey has been studying coral reefs all around the world for more than a decade.

> "CORAL REEFS ARE INCREDIBLY IMPORTANT ECO SYSTEMS. THEY ARE LIKE THE RAINFORESTS OF THE OCEAN."
>
> —ERIKA WOOLSEY

"Coral reefs are incredibly important eco systems," she explained. "They are like the rainforests of the ocean. Unfortunately many of the places I've been studying have been dramatically transformed in a short amount of time and ocean environments in general are over exploited, under protected, and out of mind."

The threat to the fragile reefs led her to found The Hydrous, which seeks to bridge the disconnection between scientific discovery and public understanding.

"Our mission," she explained, "is to create what we call open access ocean so that all people may explore, understand and engage with marine environments which are severely threatened by climate change and more direct human impacts."

Cover Image: agsandrew/Shutterstock.com

Using Lenovo ThinkStation P series in The Hydrous offices and ThinkPad P series in the field, Woolsey is able to create 3D images of the endangered coral reefs to help people understand the need for preservation of these marine resources.

"As a marine scientist, my methods have been quite two-dimensional in the past," Woolsey said. "I'm used to going on dives and recording data with underwater paper. So, I've had to learn new methods and languages, especially with regards to

"I'VE HAD EXCELLENT ADVICE AND RESOURCES FROM OUR PARTNERS LIKE LENOVO." —ERIKA WOOLSEY

"These models that we create are very data rich and provide ecologically relevant and scientifically useful three-dimensional information that are captured in non-destructive ways," she explained.

Using 3D printing to create models of the reefs, The Hydrous is moving beyond science and into engagement and education by also partnering with museums, including the Smithsonian Natural History Museum and the California Academy of Sciences.

"Ultimately, we want to make these ocean environments that people get to experience accessible and visible in the public space," Woolsey said.

The goal is to use 3D models and virtual reality to allow people to experience the beauty and fragility of the reefs that Woolsey records with cameras and creates using Lenovo workstations.

This project has been a revolutionary experience for the marine biologist. processing and archiving files in a way that makes them most accessible. Luckily, I've had excellent advice and resources from our partners like Lenovo."

She is delighted by the ways scientists, educators and artists are collaborating to make creative use of the coral models.

"They've come up with ideas and questions and real-world applications that I wouldn't have imagined on my own," she explained. "For example, doing 3D prints made out of calcium carbonate which is the exact substance that the coral builds themselves. Or another recent example is a group of artists and tech professionals creating an augmented reality exhibit surrounding our coral model."

With virtual reality, visitors to the exhibit, who may never have done more than wade ankle deep in the ocean, are able to have an experience of scuba diving and see the reefs as Woolsey sees them. This furthers environmental education by moving beyond lectures with slides to

immersion in the marine world The Hydrous hopes to inspire them to preserve and protect.

"One of the most important pieces of advice I've ever received is, don't convince, connect," Woolsey told her webcast audience. "So, rather than trying to tell people what to do, connect with them and show why you're doing what you're doing. And try to engage and encourage."

The partnership with Lenovo is making this giant leap in learning possible.

"I really love working with Lenovo," Woolsey said in conclusion. "I love that the Lenovo philosophy is to support our mission by providing us with the platform and the resources we need to do our work."

HOW VIRTUAL REALITY CAN SAVE LIVES

The goal of Denver-based Build Change is to reduce death, injury and economic loss caused by housing and school collapses in earthquakes and typhoons, explained Kyla Gallagher, marketing and development officer for the organization.

"We've been operating for about 13 years and currently are working in six countries in Latin America, the Caribbean and Asia," she said. "We work both in pre-disaster prevention and post-disaster spaces with one simple understanding, that earthquakes do not kill people, it's rather the collapse of poorly built buildings. So, how can we make sure that buildings are strong enough to withstand natural disasters?"

People have to want their house to be safe before they will take action to make it safe. So education is important to the Build Change goal.

"We use a homeowner driven construction model which basically means that homeowners are trained to manage their own construction process including choosing the layout and materials of their house," Gallagher explained. "We offer training to homeowners, builders, materials producers and engineers to design and build safer buildings, so that long after Build Change is gone they can continue to implement safer techniques in the private sector."

Using virtual reality applications created and powered by Lenovo allowed Build Change to bridge the gap by making it easier for homeowners, governments and engineers to envision, understand and implement the basics of safer building. This helps create basic awareness projects to help spread knowledge about safer housing. Build Change follows the same philosophy as The Hydrous: Don't try to convince, but rather connect.

This begins by not trying to force U.S.-style construction on third world peoples.

"We emphasize small, low-cost changes to existing, culturally preferred

technologies and train local professionals how to build safely with them," Gallagher explained. "Using local solutions is not only cost effective, but increases demands for local businesses often leading to improved economic activity and job creation. And Build Change is also in a unique position to leverage the knowledge and skills of the best engineers and architects in the world both in the US and in emerging markets to ensure that the very best designs and design thinking are applied to the reconstruction effort while maintaining local sustainability and acceptance."

> "YOU CAN ACTUALLY GO INSIDE A 3D MODEL OF ONE OF OUR RETROFITTED HOUSES."
> —KYLA GALLAGHER

Creating an enhanced program to raise disaster resilience to new levels and scale was made possible by Build Change's technology partnership with Lenovo.

"The most exciting advancements are currently being made in our program in Nepal, where we've been working since April 2015 when the two earthquakes that struck the country left more than seven hundred thousand families homeless or living in unsafe houses," Gallagher explained. "We're working with the government there to support families in retrofitting or structurally strengthening their houses rather than tearing them down to build new ones. Retrofitting is generally more cost effective than new reconstruction and it is an important technique for people in high risk areas to understand how to use. In doing that, we're using ground imaging to understand the topography of damaged communities to inform reconstruction efforts and create a virtual reality experience to demonstrate the impact retrofitting can have to our constituents down the road."

With the Lenovo-powered virtual reality visualization everyone from homeowners in Nepal, to Build Change partners in New York or Brussels can walk through damaged and retrofitted homes to understand the process. Via virtual reality you can walk around an earthquake ravaged community in Nepal and see both damaged and retrofitted houses. This provides simplified explanations of how buildings are made safer through the reconstruction process.

"You can actually go inside a 3D model of one of our retrofitted houses as well as a neighboring damaged house, look around and visually click on information bubbles to understand how retrofitting works," Gallagher explained. "This is a really new technology for us and thanks to Lenovo providing two ThinkPad P50s to our Nepal office last year, the project was done entirely on Lenovo workstations.

The processing of the many parts of the virtual reality experience wouldn't have even been possible if it weren't for the graphics card and RAM memory that the Lenovo workstations provided for us."

To capture information in the field, Build Change team members used a variety of cameras including GoPro and 360 degree cameras attached to drones. They also used DSLR cameras for both point crowd scan and 360 video. All of which was later embedded into the virtual world. In all, they used 13 different Autodesk software packages, all run on Lenovo ThinkPad P series.

Architects and engineers were able to work on the same files in the field amongst the ruins of houses and simultaneously in downtown San Francisco using Lenovo hardware. This allowed the Build Change team to focus on the important things like supporting homeowners and rebuilding their lives rather than worrying about technical difficulties.

"This technology Lenovo has provided us has really advanced our processes in useful ways," Gallagher said. "First off, we will be using virtual reality presentations to simplify our conversations about the retrofitting process with homeowners, which is important while they are working with us to make decisions on how to best strengthen their homes. With the ability to show them their house in 3D, we can walk them through decision making steps to their final house design way more easily than just using traditional computer software. The same goes for donors and government officials. Where we're working, we're using 3D models and virtual reality which will allow them to see the work that's being done in remote areas of Nepal without the time and cost necessary to transport them there."

The Lenovo technology allowed the Build Change team to collect field data that can be implemented into design processes. Automating the number of steps required in the retrofitting design process, makes it more efficient so Build Change has been able to dramatically reduce the time needed to design a retrofit for a single house from more than three days per house to under three hours.

"What we are learning now is that including the right technology is a game changer," Gallagher told the webcast audience. "As a nonprofit we're always trying to keep our costs low, so our funds can go directly to those who need it most. And now we're taking our own advice and using the right technology for the situation in large part thanks to Lenovo."

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