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Middle, Senior High Students Visit Ancient Sites in 3D – Without Leaving La Jolla

Students and teachers from La Jolla Country Day School in front of Atkinson Hall. To watch a one-minute video about the visit, click here. Photos by Anna Liza Smith/Qualcomm Institute.

The Center for Cyber-Archaeology and Sustainability (CCAS) and the Qualcomm Institute (QI) played host to nearly 200 students on the UC San Diego campus from the neighboring La Jolla Country Day School.

On January 31, the entire freshman class and older students in Computer Science, Robotics and AP World History made the trek to Atkinson Hall, the headquarters building of QI (named for former UC President and UC San Diego Chancellor Richard C. Atkinson, who still maintains an office in the building that bears his name).

Institute Director Ramesh Rao welcomed students and teachers to QI. “Human imagination is our greatest resource,” said Rao, urging students to use their imagination and keep asking questions. The electrical engineer also described a new project his team is working on: a wireless brain modem, part of the NeuroGrain initiative.

Rao then introduced CCAS Director Thomas E. Levy, a Distinguished Professor of Anthropology and Archaeology at UC San Diego. Levy leads a variety of archaeology projects that have helped the Qualcomm Institute become a pioneer in the field of cyber-archaeology, which he calls “the marriage of archaeology, computer science, engineering and the natural sciences.” As he told the La Jolla Country Day students, CCAS is a new center that aims to provide “21st-century solutions to safeguard the past for future generations.”

Among those projects, Levy leads the high-profile At-Risk World Cultural Heritage and Digital Humanities project funded by the University of California Office of the President Catalyst program. The project brings together archaeologists based at UC San Diego, UCLA, UC

CCAS director and archaeologist Tom Levy introduces the At-Risk World Cultural Heritage and the Digital Humanities project.

Merced and UC Berkeley, with projects at ancient sites in eight countries to date. According to Levy, the campuses are sharing advances and new approaches to safeguarding historic sites and artifacts through capturing and digitizing data from excavations, curating artifacts and sites, performing analyses that cross space, time and discipline, and disseminating findings over the web and through 3D virtual-reality display systems such as the CCAS facility in Geisel Library, which allows students to visit ancient sites – virtually and visually – without leaving campus.

The students from La Jolla Country Day School were treated to a tour of QI's extensive visualization facilities and interactive programs developed to interest and educate students in archaeological expeditions. Accompanied by faculty members and "tour guides" including QI tours manager Sarah Turner, the visitors divided into four groups which rotated through four locations.

Clockwise from top left: Tom Levy and Chris McFarland introduce students to the WAVE display; Jurgen Schulze (far right) navigates a site in the StarCAVE; students take in the TourCAVE; and CCAS anthropology Ph.D. student Matt Howland explains how teams capture and store excavation data (as depicted on the Vroom wall display).

Graduate and undergraduate students presented some of their current research on the Vroom video wall, focusing primarily on the tools they develop and use to record excavations and store data. Walking to the nearby Structural and Materials Engineering Building, the second group of students started in the Virtual Reality Lab of Professor (and CCAS member) Falko Kuester, including the Wide Angle Virtual Environment (WAVE) virtual-reality system made up of 35 high-resolution flat screens powered by 18 gaming PCs with 20 terabytes of storage. With 3D glasses on, students immersed themselves inside a Mayan temple on the screens. QI research scientist and UC San Diego alumnus Albert Lin ('04, M.S. '06, Ph.D. '08), who is CCAS's associate director for remote sensing, gave students a first-hand account of what it took to create the digital representation of the unique Guatemalan heritage site.

The third stop took students to the Immersive Visualization Laboratory, with demos by CCAS co-PI Jurgen Schulze and grad students including Brady Liss. The lab features three cave-like spaces – the five-sided StarCAVE 360-degree VR room, the two-story TourCAVE, and the

NexCAVE. The systems allowed small groups of students to navigate ruins including the Temple of Apollo in Luxor, Egypt, and Mayan tunnels in Guatemala, all in high-resolution 3D. All of the CAVEs were developed by the IVL team led by QI research scientist Tom DeFanti, who is also a faculty member in CCAS.

Demonstrating personal HTC Vive 3D headset (left) and unmanned aerial vehicle used at CCAS archaeological sites to take video, photos of excavations.

The fourth venue was the main lobby of Atkinson Hall, where individual students had the opportunity to put on head-mounted displays, including HTC Vive and Oculus Rift headsets. The students used the personal VR devices to navigate archaeological sites around the world, and when virtual reality wasn't sufficient, they took the 3D headsets off and instead got a hands-on demonstration of unmanned aerial vehicles –drones – that CCAS graduate students use to capture aerial and other imagery of archaeological sites (on which many of the visualizations on display were based). Two officers of the undergraduate Virtual Reality Club at UC San Diego – Connor Smith and Anish Kannan – presented the demos, because both are students on the Catalyst project.

To see more of what the La Jolla Country Day School students took in during the three-hour visit, watch a one-minute video of the day's activities, or view photos from the school visit. CCAS thanked LJCDS board member Anthony Potamianos for making possible the student visit to CCAS and the Qualcomm Institute.

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