

ChronoZoom: A deep dive into the history of everything

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This collage demonstrates how the time scales for the cosmos, Earth history and the histories of life and humanity span a range of a million billion, making it impossible to view them together on the same timeline. Using zoom technology from Microsoft Research Connections, ChronoZoom allows you to zoom easily from one timescale to another, and imbed multimedia that tell the history of everything.

Imagine a timeline of the universe, complete with high-resolution videos and images, in which you could zoom from a chronology of Egypt's dynasties and pyramids to the tale of a Japanese-American couple interned in a World War II relocation camp to a discussion of a mass extinction that occurred on Earth 200 million years ago – all in seconds.

Based on an idea from a University of California, Berkeley, student, ChronoZoom – essentially a zoomable timeline of timelines augmented with multimedia features -- is coming to life.

A University of California, Berkeley, geologist and his [students](#) have

teamed up with Microsoft Research Connections engineers to make this web-based software possible. ChronoZoom is being designed to help students, or anyone, visualize [history](#) and to assist researchers in viewing large amounts of data to find new historical connections.

A beta version of ChronoZoom was released today by Outercurve Foundation, a non-profit organization that supports open-source software.

The idea arose in a UC Berkeley course about Big History taught by Walter Alvarez, the campus geologist who first proposed that a comet or asteroid smashed into the Earth 65 million years ago and killed off the dinosaurs. Big History is a unified, interdisciplinary way of looking at and teaching the history of the cosmos, Earth, life and humanity: the history of everything.

One of the difficulties of teaching history -- and teaching Big History, in particular -- is conveying a sense of the time scale, which ranges from the 50,000-year time span of modern humans to the 13.7 billion-year history of the universe, Alvarez said. Human history compared to cosmic history is like "a postage stamp relative to the whole size of the United States," he said.

"With ChronoZoom, you are browsing history, not digging it out piece by piece," said Alvarez, a Professor of the Graduate School in the Department of Earth and Planetary Science. Alvarez, who taught his Big History course for five years, said that ChronoZoom will be the best visual way to date to help students understand the grand sweep of history.

"ChronoZoom could revolutionize the teaching of history," said Saekow, an interdisciplinary studies major who graduated from UC Berkeley in 2009 and has worked on ChronoZoom ever since. "ChronoZoom is very

visual and can help provide context, like a map. It might one day help visualize all the information in Wikipedia or all the world's libraries."

Saekow was taking Alvarez's Big History course in 2009 when he submitted a term paper demonstrating a crude, zoomable timeline of history.

"When Roland presented his paper on ChronoZoom, the students burst out in applause," Alvarez said.

Alvarez worked with Saekow to build a prototype that they showed to people at Microsoft Live Labs in 2010. The research division of Live Labs was intrigued, and offered to help the two develop a zoomable timeline using Live Labs' proprietary Deep Zoom (Seadragon) software, which is designed to zoom in on portions of images.

"They did a wonderful job with version one, but we wanted more flexibility," Alvarez said. "We wanted to add changes quickly, and let others do so, too."

That's when Microsoft Research committed resources to support 25 researchers – including eight current and former UC Berkeley students – in an intense, six-month project to create an entirely new piece of software, also called ChronoZoom, that makes it easy to update the cosmic timeline with more specialized timelines, videos, [images](#) and even research papers. ChronoZoom 2.0 is based on Microsoft Azure, a platform that lets developers create applications that manipulate data across a "cloud" of datacenters, and HTML5, the newest — though still evolving — language for displaying content on the Web.

Professor Sergey Berezin and six of his students at Moscow State University in Russia joined the project to make the code development possible.

“They’ve really thrown resources at it in a big way,” Alvarez said. “ChronoZoom is not completed, but it has a good enough start that Microsoft feels comfortable sharing it widely and seeking a response from people about what works and how it can be improved.”

While Alvarez and his students provided much of the content currently in ChronoZoom, the team’s goal now is to excite other people to add timelines and multimedia in order to allow users to delve deeply into all aspects of history.

“We need help with the content to take ChronoZoom to the next level,” Saekow said. “This is just the beginning.”

ChronoZoom will not only be useful for students learning history, Alvarez said, but also for teachers interested in the concept of Big History and scholars in the humanities, not to mention archeologists and paleontologists focused on prehistory and geologists studying Earth history.

“ChronoZoom is a visualization tool allowing for the first time people to mash up data from all sorts of different places in different formats enabling new insights that would never have been possible before,” said Microsoft Research Connections program manager Michael Zyskowski. “Scientists, researchers, even students can discover new things they would never have been able to discover before.”

Provided by University of California - Berkeley

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