

International Big History Association Members' Newsletter



Volume III Number 4

ADVENTURES WITH BIG HISTORY AND CHRONOZOOM

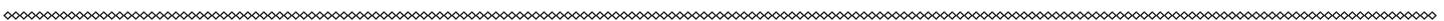
Walter Alvarez
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Geology is a wonderful excuse for adventure, and I was fortunate to marry someone as attracted to adventure as I was. Milly had already traveled through Mexico when we met, and our geological life together has taken us to Colombia, to Holland, to Libya, Egypt and Tunisia, to Russia, Tajikistan, and Kyrgyzstan, to Belize, to Cyprus, Corsica, Sardinia, Spain and Italy, and again to Mexico.

Geologists study the history of the Earth, written in rocks, but Milly and I also found ourselves fascinated by the histories of the people who live in the places where geology took us. Learning those histories, together with the local cultures, languages, and music, became a great passion for us. And living in many cultures led to a very broad view of human history, rather than a focused interest in just one country's past.

Italy emerged as the place where we would spend the most time and where we would become most comfortable and at home. This started in a chance way one summer when we volunteered to work on an archaeological dig an hour north of Rome. It was there that we learned the techniques of excavation that enable archaeologists to recover the histories of people whose past is not recorded in writing. We continued this work for several years, and ended up spending many months at the British School at Rome, a center for archaeological research, and later doing geo-archaeological research in the Roman Forum.

In this issue of the *International Big History Members' Newsletter*, we are proud to highlight IBHA Board Member, **Walter Alvarez** of the University of California, Berkeley (pp 1-5). **Roland Saekow** gave presentations on ChronoZoom in China (p 6). **Dana Visalli** has taught Big History in Afghanistan (pp 7-9). Metanexus is sponsoring the **One Day Universe** (p 10) and IBHA member **Jennifer Morgan** gave the keynote address, telling the Big History story to the American Montessori Conference attended by 3,000 (pp 11-12).



A field trip with Italian geologists to the Italian Apennine Mountains started our lifelong love affair with that mountain range, where deep-water limestones record Earth history perhaps better than anywhere else on the planet. It was there that I became fascinated with the Cretaceous-Tertiary boundary, the abrupt mass extinction 66 million years ago that spelled the end of perhaps half of the species of animals then living, including the dinosaurs. Our research at Berkeley led to the 1980 theory, now strongly confirmed, that the Cretaceous-Tertiary mass extinction was the result of the impact on Earth of a comet or asteroid, perhaps 10 km in diameter. The strongest confirmation came from the discovery of a hidden crater, buried beneath the surface of the Yucatán Peninsula of Mexico, that was just the right size and exactly the right age.

In the decades of research that followed the 1980 Berkeley theory, I had the opportunity to learn a great deal from experts about life history, because the Cretaceous-Tertiary boundary extinction is one of the great events in the evolution of life, and about cosmic history, because of the astronomical cause of the extinction.

And so this unplanned and very fortunate career trajectory gave me the opportunity to learn in depth about all five of what we now consider the great regimes of Big History — Cosmic history, Earth history, Life history, Human prehistory, and Written history. And Milly, whose field is psychiatric social work, brought a deep understanding of the human nature that underlies human history.

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For most of my life I considered myself exclusively a scientist – a geologist whose expertise dealt with the Earth – and I thought of all those other historical interests as just hobbies. But gradually, as the millennium turned, I began to wonder if there might not be a way to bring all those interests together and develop a synthetic understanding of all of history. I came to think of this dreamed-of synthesis as “Panhistoria.”

And then, in a remarkable coincidence, I received an e-mail from a professor in Amsterdam named Fred Spier, inquiring whether there was any possibility that I might be interested in teaching a course in Big History. This was a term I had never heard, but Fred explained what Big History was, that it had originated with David Christian in Australia, and that both he and

David had written books about it and were giving Big History courses at their universities.

It was the perfectly-timed inquiry! I was delighted to find that other people were thinking about synthesizing the entire past, and I quickly dropped “Panhistoria” in favor of “Big History.” I expressed the greatest interest, and both Fred and David offered to help me plan a course at Berkeley. David was by then at San Diego State University, and Milly and I met him once when he came to the Bay Area, and we have become great friends. But could I do a Big History course at Berkeley?

Fortunately at that time I had a remarkable graduate student named David Shimabukuro who, in addition to being a fine geologist, also has an unquenchable interest in everything, especially in remote countries and their histories. David never missed an opportunity to travel, and one time returned from his field area in southern Italy on the Trans-Siberian Express. He was the ideal person to help design a Big History course, and we had great fun doing it together. David was the founding Graduate Student Instructor, or TA, and later four other outstanding GSIs followed him.

We found ourselves less interested in telling a sequential history of everything, fearing that it would be like four or five very abbreviated introductory courses strung together. Instead we opted for a more philosophical approach, which might jump back and forth between regimes as we considered the nature of time, the role of contingencies and continuities,



Roland Saekow explaining ChronoZoom to class

and the Big History that underlies familiar features of our world today, like the human body, the many kinds of human tools, and the cuisines of different countries. This is now called the “little Big History” approach, and it had the advantage of making our course fascinating to students, but the disadvantage of making it so personal to David and me that it could not easily be transferred to other instructors.

To our mild surprise and great delight, the Berkeley Committee on Courses accepted our proposed course with enthusiasm. The course was given for five years, 2007-2011. We kept the enrollment to no more than 50 so we could get to know all the students. The students applied for admission and were accepted largely on the basis of a short essay about why they wanted to take a course in Big History; the students chosen in this way came from every major you can imagine, and were just a delight to teach. We did not give grades, but offered the course only on a pass/no pass basis, to encourage learning for the joy of it, without grade competition. In 35 years as a professor, these were the most exciting, intellectually stimulating courses I have taught. The lectures are available online at <http://bighistorylabs.com/>.

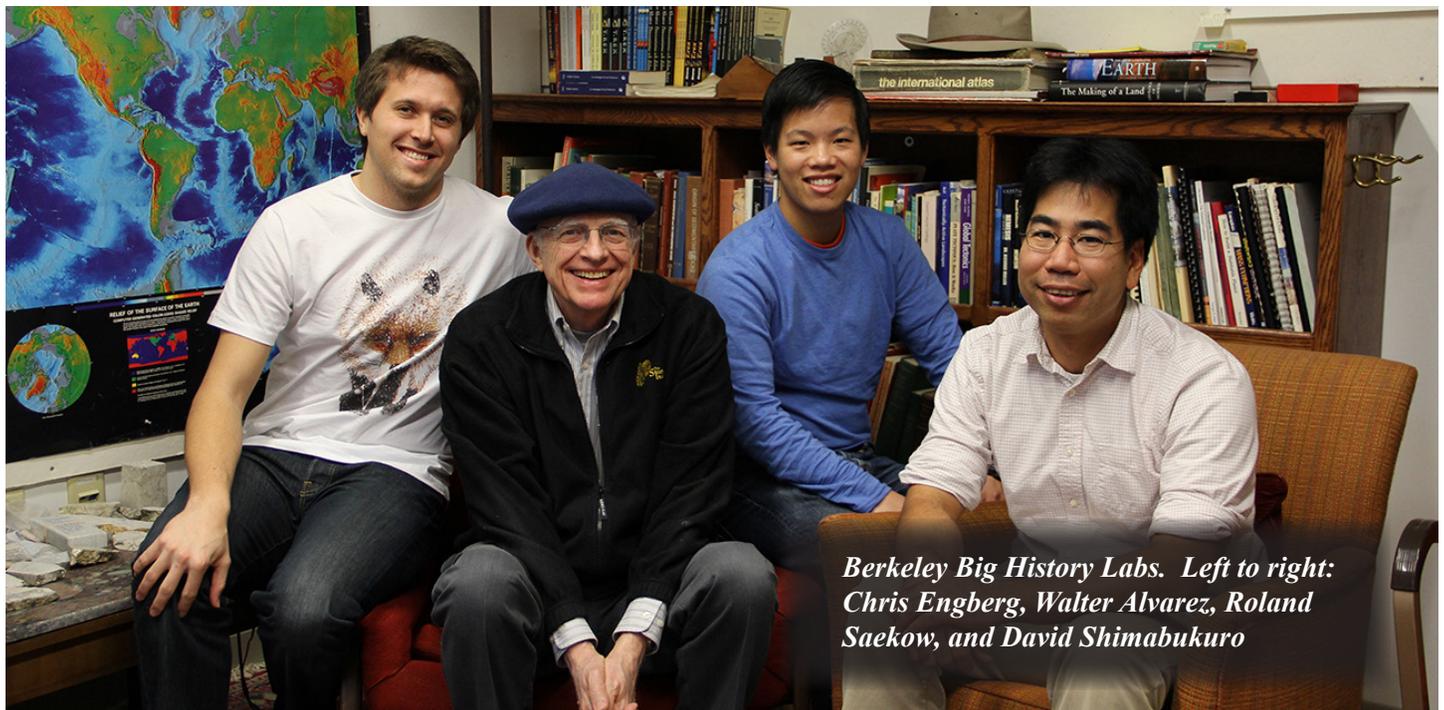
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Each year I found the hardest part of teaching Big History was trying to get the students to wrap their minds around the time scales involved, from the

few decades of a human life to the more than 10 billion years of cosmic history. I tried everything I could think of — linear scales, log scales, repeating expansions, analogies and comparisons, the “Earth year” — and it never worked. Probably that was because I could not really wrap my own mind around the time scales. Geologists know what happened when, but have no more gut understanding of deep time than anyone else does.

And then in 2009, after I had failed once again to convey deep time, Roland Saekow, one of the students, came up after class to suggest that perhaps it could be done using computer-zoom technology. I urged him to take that on as his class research project, and his presentation was so exciting that we have been working together ever since on what we call “ChronoZoom,” a zoomable timeline of all of Big History.

Roland discovered that the best computer-zoom technology was Seadragon, an experimental project at Microsoft Live Labs. Our Industrial Research Alliance group at Berkeley, IPIRA, helped us to contact Microsoft Research, and that was the beginning of a wonderful collaboration that still continues. Roland and Microsoft Live Labs prepared a first version of ChronoZoom to accompany the Faculty Research Lecture I gave at Berkeley in 2010 (<http://www.tinyurl.com/alvarez2010>). That first version was based on raster graphics — essentially a single vast graphic representation, or painting, of all of history in time-line form — and could not easily be modified.

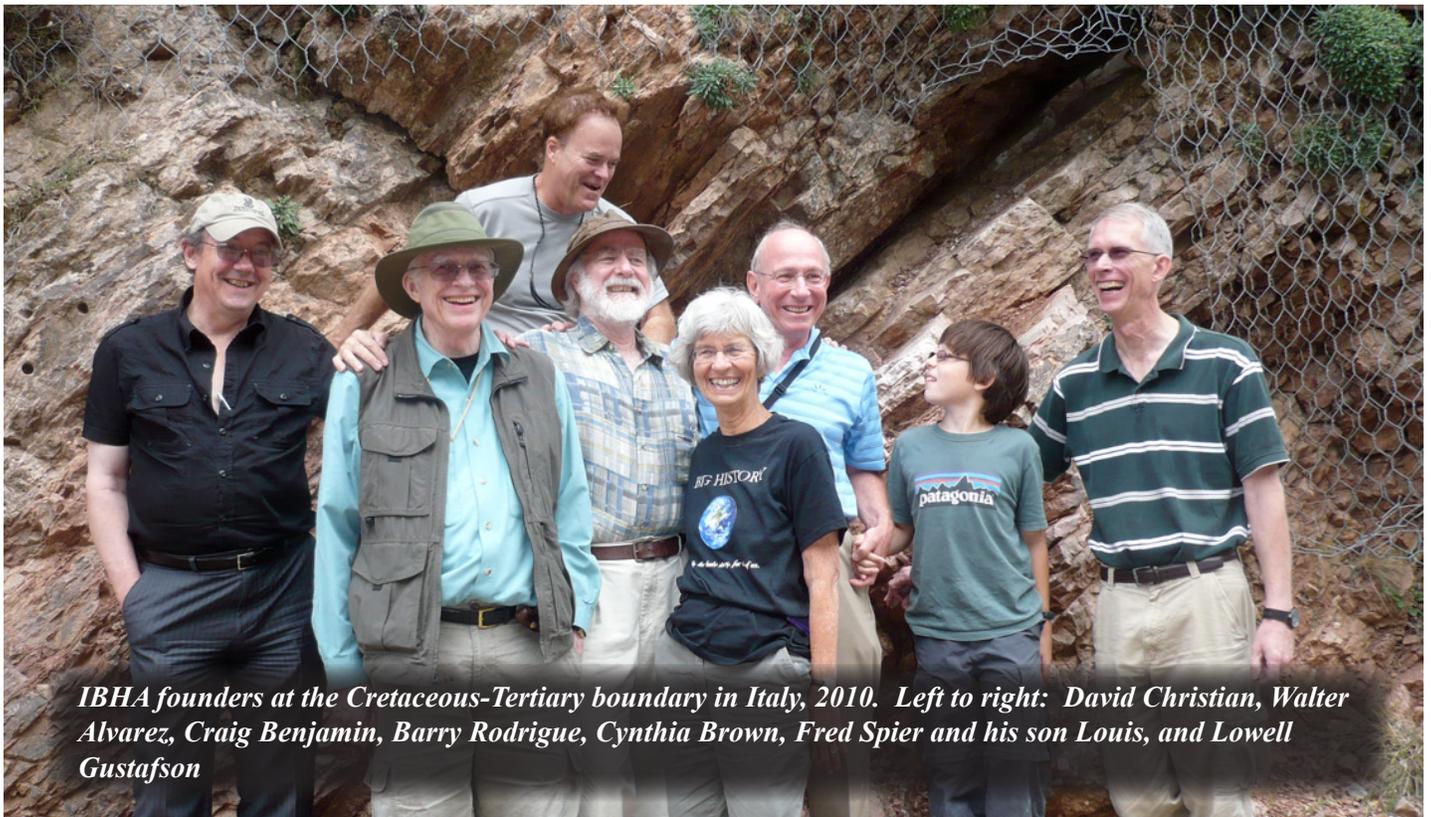


Berkeley Big History Labs. Left to right: Chris Engberg, Walter Alvarez, Roland Saekow, and David Shimabukuro

So we then began working with Microsoft Research to develop a vector-graphics version, with much more flexibility. Another Berkeley Big History student, Chris Engberg, joined our group to work with Roland, and Chris's creativity is central in designing the ChronoZoom experience. The project became a collaboration between our Berkeley group, Microsoft Research, and a computer-science team at Moscow State University, who do all the coding. This collaboration works very well, and in the Spring of 2012 we released a beta version of ChronoZoom (<http://www.chronozoomproject.org>), which shows what ChronoZoom can be, although it does not yet have all the features needed to make it really useful. ChronoZoom is free, open-source software, not a commercial product.

So now we are in a new engineering phase with Microsoft Research and Moscow, and with an information group at University of Washington, with the aim of producing a fully functional version of ChronoZoom. We hope it will be of great use to students, teachers, and researchers and will contribute to the evolution of Big History as a vibrant and critical field of human understanding. Look for it in July of 2013. We hope you will find it useful, and will use it a lot!

In the fall of 2010 David Shimabukuro, Alessandro Montanari and I organized a workshop in Italy to teach other Big Historians how geologists read Earth history written in rocks. Sandro Montanari had done his PhD with me at Berkeley and then founded a private geological research and teaching institute at Coldigioco, in the Umbria-Marche Apennines, and we held our workshop there. It was attended by Big Historians David Christian, Fred Spier, Barry Rodrigue, Lowell Gustafson, Cynthia Brown, and Craig Benjamin, along with Daron Green and Michael Dix from Microsoft Research and Roland Saekow from Berkeley. It was at Coldigioco that we first realized the importance of forming an IBHA — an International Big History Association, and where we took the first steps to make it happen. The organization has really taken off, and under the leadership of Craig and Pamela Benjamin, and IBHA Office Coordinator Leslye Allen, the first meeting of the IBHA was held at Grand Valley State University in Michigan in the summer of 2012. Now we are looking forward to the second IBHA meeting in 2014 at Dominican University in California. It seems like Big History now has a real head of steam, and it has been a privilege and a delight to be involved in its early stages.



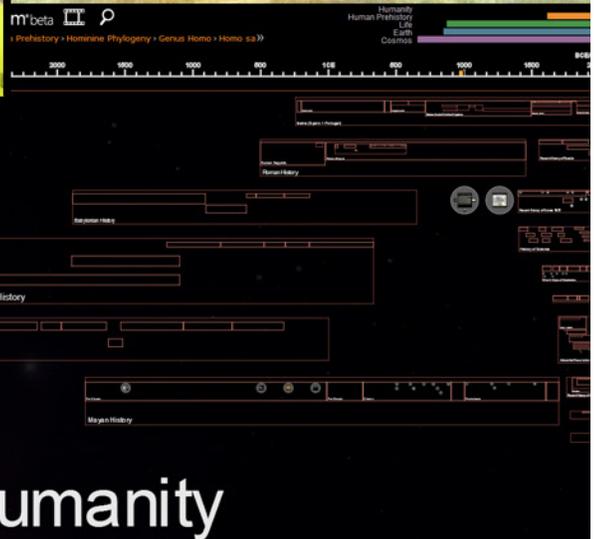
IBHA founders at the Cretaceous-Tertiary boundary in Italy, 2010. Left to right: David Christian, Walter Alvarez, Craig Benjamin, Barry Rodrigue, Cynthia Brown, Fred Spier and his son Louis, and Lowell Gustafson

ChronoZoom Wins SXSW Award

ChronoZoom won a *South by Southwest* Interactive Award on March 12. The popular SXSW in Austin, Texas awarded ChronoZoom the “Educational Resource” of the year award, one of 15 awards handed out at the SXSW conference this year.

The Microsoft Researchers with Roland Saekow in the photo below are Donald Brinkman (left) and Michael Zyskowski (right).

The 16th Annual SXSW Interactive Awards Ceremony was presented by Bloomfire, with the Austin Steamers, who played a great set during the Pre-Party and the ceremony emcee, comedienne Aisha Tyler.



Roland Saekow gave two presentations about Big History and ChronoZoom in China. The first was at Shandong Normal University (SNU) on March 20. The presentation was hosted by the School of Information Science & Engineering and organized by Barry Rodrigue, the IBHA International Coordinator (center of dinner table picture). A dialogue has now begun between IT and Big History. Following the presentation, the directors of the International Office and the Dean of the History Faculty hosted a very nice dinner and discussion. Then at Capital Normal University, Beijing (CNU) on March 21, Roland met with 15 graduate students from the Global History department and Professor Sun Yue, who participated in the inaugural IBHA conference. Sun is working to promote Big History in China. Roland's Mandarin skills were well utilized!



SHANDONG
NORMAL
UNIVERSITY

Teaching Big History in Afghanistan

by Dana Visalli

I recently finished a two-week project volunteer teaching biology and ecology at a private school for girls in Kabul, Afghanistan called SOLA—School of Leadership Afghanistan. The school is doing an outstanding job preparing a small number of Afghan girls to go to college in the United States—an then finding them scholarships so that they can afford such an expensive endeavor (read more about SOLA at www.sola-afghanistan.org).

I'm enchanted with the Big History/Journey of the Universe/Evolutionary story, and wanted to share what I could of that tale without being offensive to the students' Moslem beliefs or getting myself in trouble. The girls are from all over Afghanistan, and they go back to their conservative cities, towns and farms during school breaks. The director of the school pointed out that it wasn't going to play very well for them to go home and tell their parents that they are being taught "evolution" when at SOLA. "They can learn that in



Maryam and Shahira start to prepare the garden. It took two kids to run the shovel.

college," he opined, and under the circumstances I agreed.

A useful aspect of the title Big History is how harmless it sounds, and is, except for its capacity to change our mental constructs of the world. I realized that there was a lot of the Big History story that I could work on with the kids without having to address the seemingly threatening element of humans evolving from apes. I also found that it is almost impossible to teach biology and/or ecology without reference to "change over time," which is my favorite simple definition of evolution.

I made a point of showing them one native Afghan plant and animal every day. These children are just as sweet and charming as can be, and are very bright—but they know almost nothing about the land they live in (unfortunately that is true in the U.S. as well). The did recognize *Papaver somniferum*—the opium poppy—when I showed pictures of it, but not the



We planted a postage-stamp sized garden, with four potatoes and short rows of carrots, radishes and lettuce.



After a hard day's work in the garden, we rested on our laurels. Sayedgul, leaning on my shoulder; lost a foot in a battle between the US & the Taliban.



The students are studying photosynthesis, trying to reconfigure water and carbon dioxide into sugar. It's a tough job, but somebody has to do it.

When one of the girls fell asleep in the back of the class I realized I was talking too much and they were sitting too much. So when we got to the magic trick of making sugar out of carbon dioxide and water—also known as photosynthesis—I had them come up to the front of the class and divided them up into the two compounds, linking arms to show their electro-chemical affinities. Then all it took was a little energy from a sunny student to break those bonds and rearrange the atoms in the necessary configuration to come up with sugar. There was some oxygen left over so we let it drift up into the atmosphere. In universal style of children, they were laughing their heads off because they were playing while learning.

crocus, or the lily, or Asian black bear or the Marco Polo sheep. They are such enthusiastic learners though that they often tried to learn the scientific name as well as the common one.



Students prepared to fuse hydrogen mudballs into helium mudballs.

I had to question my sanity when I decided I needed to talk to them about nuclear fusion and fission. Unfortunately you just can't build a universe without fusion and there will be no dynamic planet without fission. We were short of equipment, so we went out in the backyard and made hydrogen atoms out of mud. It was easy then to show the difference between H₂—two mudballs attached at the hip—and two

The Asian black bear has a big white patch on its chest, and the Marco Polo sheep has outrageously large horns, and I had to ask them why these physical characteristics would appear, rather than use the word evolved. We did some classification of animals to show how the groupings indicated relationships—again leaving out the word evolutionary. One of the brightest girls, Miriam, was very resistant to grouping humans with the other mammals. Her rationale was, “How can they be related? People live in houses, and animals live in the zoo.” I said, “Wait a minute, I’ve got to write that one down.” Further strengthening her argument, she added, “They are not clean at all, but we are clean.” My comment to another teacher later in the day was that Miriam was so bright that she would clearly be “vulnerable to reality” in the years to come. By-the-way, Miriam says she plans to become a neurosurgeon.



Maryam and her father; both are deeply grateful that she will have the opportunity to receive a college education.

hydrogen atoms fusing into helium—just squeeze the two mudballs together.

We couldn't find any magnets to show the mysterious effect of two positive charges together, until they remembered that the bottoms of their chess pieces were magnetic. It turned out that the king and queen both had the same charge and didn't like one another at all when aligned foot-to-foot.

This demonstration was helpful when we made our 92-proton uranium nucleus out of mudballs—we did a symbolic version of that large number. They could easily understand how the positively charged protons might start coming unglued. At that point we all enjoyed throwing a few muddy alpha particles at one another. It was interesting to me that we could talk about the appearance of the 92 elements through the fusion process and not mention evolution.

Unfortunately tracing the story of “change of time” leads one to DNA. In our case we arrived there by looking at flowers. The girls assumed that flowers had been made by god to beatify the earth for humans. We looked inside a few and found the stamens and pistils, and I had to explain to them that flowers were also for reproduction. They took it pretty well. I pared the DNA down to just two strands, that could then separate and recombine, but Shahira, the youngest girl at eleven years old, would have none of it. She raised her hand and asked, “What is DNA?” I replied that it was a sort of a chemical thread, and she said, “What is ‘chemical,’ and what is ‘thread?’” I’m not sure we ever worked through all of that issue.

Talking about reproduction lead to “limits to growth,” which give rise to the global and Afghan problem of population growth. Afghanistan had 15 million people in 1970, has 35 million people today,



One of the tough scenes on the street in Kabul; a pile of household garbage near my guesthouse, being grazed by sheep.

and is projected to have as many as 135 million people in the year 2100. I asked them if they thought this might be a problem; their answers varied. One girl thought that if god made more people he would also make more food. Another felt that they better improve their agricultural system. Many of them could see that this was an important issue. One of the older girls pointed out that family sizes in the 1970s had shrunk to

three or four children (at least in the cities), but the years of war had eroded this ecological wisdom and families were back to eight or ten children. From a Big History perspective, it is fascinating to see the interplay of our biological imperatives with our emerging intelligence.

On the last day I started to say my goodbyes. It became clear to me that they were upset I was leaving, and this caused me to tear up—which caused several of them to tear up. Admitting that we care about one another and the world can be like opening floodgates of feeling. One can only wonder what part love still has to play in our emerging universe.

Dana Visalli is an environmental educator and organic farmer in living in Twisp, Washington. He can be reached at dana@methownet.com. His recent article on the ecological impacts of war, “Afghanistan, Ecology and the End of War” can be googled by title or read at <http://tinyurl.com/dyfjj6u>.



IBHA One Day Universe 2013.09.21

By William Grassie

While IBHA members might wish that universities, colleges, and high schools would all start teaching courses on Big History, there remain significant societal, institutional, and intellectual obstacles to widespread adoption of this innovative curriculum.

Humanity has made a lot of progress through specialization and division of labor. Educators are trained and rewarded for being specialists, not Big History generalists. Professors and teachers today are also mostly overwhelmed with the exponential growth in specialized knowledge, new educational policies, the latest pedagogical fads, and a new generation of hyper-distracted students. And while these are all the more reasons to promote Big History, just because we build it, does not mean that they will come.

So why not teach Big History in a single day? That is the idea behind “One Day Universe: Visualizing Big History.” The inaugural event will be held on Saturday, September 21, 2013 at Liberty Science Center on the New Jersey side of New York Harbor.

One Day Universe is a 13.7-hour marathon celebration of science from the Big Bang to the Anthropocene. It will involve over 20 speakers presenting Big History to an audience of 700. The day will be organized in 5 sessions — Cosmos, Microcosmos, Earth, Humans, and the Anthropocene. The program will be interspersed with music, special exhibitions, and

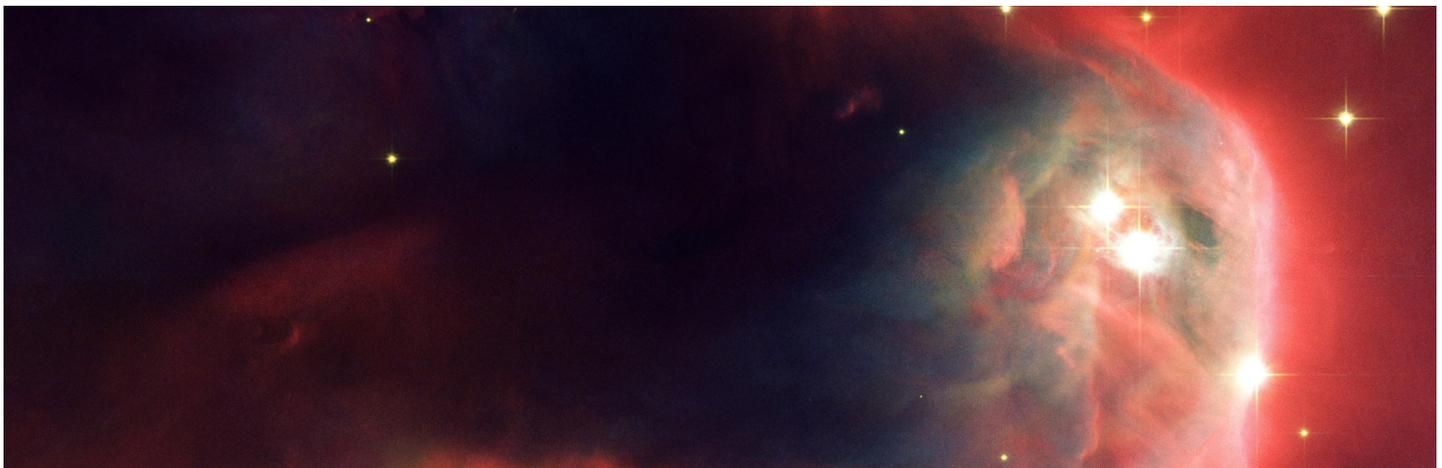
several Little Big Histories. A number of ancillary projects are also planned in cooperation with corporate sponsors. One Day Universe aspires to replicate the rigor of TED with the energy of SXSW in the service of Big History.

IBHA members are invited to register for this inaugural event with an exclusive \$200 discount before March 15, when One Day Universe will be officially launched. If you can't attend in person, we invite you to register for the live stream of the event and watch online. Even better, you can host your own Universe Party in your home, school, library, church, or community center. We also invite IBHA members to help publicize the event by liking, linking, tweeting, and helping spread the word.

And it is not too early to start planning your own One Day Universe on September 20, 2014. Every college and university has the in-house expertise to host a One Day Universe, but we rarely put it all together for our students or ourselves as such. The strategy is to replicate One Day Universe as an annual celebration of Big History, the discovery of which is perhaps the most significant accomplishment of human civilization.

One Day Universe is produced by Metanexus in partnership with Liberty Science Center. For more information, go to OneDayUniverse.org.

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“Let us give the child a vision of the whole universe... No matter what we touch, an atom, or a cell, we cannot explain it without knowledge of the wide universe.”

– Dr. Maria Montessori

To Educate the Human Potential (1948)

IBHA Member Jennifer Morgan gives Keynote Address at national American Montessori Society conference (attended by 3,000)

In the late 1940s, Maria Montessori and her son Mario developed the Cosmic Education Curriculum for the Elementary Level – an astounding curriculum for its prescience since the Big Bang theory was still coming into shape. She was the first educator to understand the importance of the story of the universe as the context for all subjects, indeed for everything. Michael and D’Neil Duffy’s (IBHA Members) book *Children of the Universe: Cosmic Education in the Montessori Elementary Classroom*, is the most recent book on the subject.

Given her scientific training in observation as the first woman medical doctor of Italy, she noticed that as the child enters the elementary years, they ask the great cosmic questions: Where did I come from? Where does everything come from? She concluded that the elementary years are the time to introduce the story.

IBHA member Jennifer Morgan gave a keynote address at the recent AMS national conference in Orlando, Florida on March 17, titled “The Cosmic Community: Igniting the Imagination in Every Child.” She explored her experiences with her Universe Story Trilogy (Books 1. Born With a Bang, 2. From Lava to



Life, and 3. Mammals Who Morph), including those with her son and numerous groups of children and adults . . . and how the story deeply activates within all a sense of belonging to something so vast and incredible . . . the Greatest Adventure of All . . . the macro adventure of an evolving universe. The world needs this just this kind of perspective right now, she said, to address the pressing issues we are facing today in everything from energy to social justice.

Her “electrifying universe robe” certainly helped demonstrate the point, to the delight of all, about how Big History/Cosmic Education shifts our sense of identity to something far larger than ourselves. “The Cosmic Education Curriculum itself continues to evolve,” says Jennifer Morgan, “and here’s where Big History at the high school and university levels come in. At the conference there was a lot of conversation around how to turn Cosmic Education into a continuum over ALL levels, so that all teachers are steeped in Cosmic Education/

Montessori Cosmic Education Centers on Five Great Lessons/Stories

- 1. The Story of the Universe**
- 2. The Story of Life**
- 3. The Story of Humans**
- 4. The Story of Communicating in Signs**
- 5. The Story of Math**

All subjects hang on this scaffolding.

Big History and see how their particular level fit into that continuum in age appropriate ways. This was a hugely exciting development in the conference. A Cosmic Education committee is being formed to explore these ideas, and it would be fantastic to relate what's happening in Cosmic Education with what's happening in Big History at the high school and college levels . . . getting a Big Picture of how all the levels fit together.”

For more information about Jennifer Morgan’s books and programs, go to www.universesstories.com. To contact her directly, write to jmuniverse@gmail.com.



Definition of Cosmic Education

- 1. A unitary vision of the universe.
Demonstrates the oneness of all creation.**
- 2. A knowledge of the universe as an evolving/self organizing force.**
- 3. The universe is the primary context and all subject are taught inside this context.
Relates all subjects to each other.**
- 4. A pedagogy that passes from whole to detail.**
- 5. A appreciation that all things are dependent upon, and in communion with, each other.**
- 6. An appreciation of cosmic gift/cosmic task. We have work to accomplish on behalf of the universe.**
- 7. Each generation experiences new possibilities and responsibilities.**

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