



# The Cosmic Serpent

Bridging Native Ways of Knowing and  
Western Science in Museum settings

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[www.cosmicserpent.org](http://www.cosmicserpent.org)

## WELCOME FROM THE CO P.I.

In this newsletter we reflect on the final Cosmic Serpent workshops and I would like to share two of my own reflections. The first is a reflection on the presentations by and conversations between Cosmic Serpent Fellows. These moments of sharing were rare and precious opportunities to truly deepen our learning about a wide variety of topics, such as Western Science, Indigenous Knowledge, historical trauma, the never-ending struggles for different worldviews and cultures to thrive in America, multiple intelligences from multiple cultural perspectives, and the importance of diversity in all that we do. I could write essays on everything I learned on each of these topics, but here I will take a brief moment to share my learning about diversity. The importance of biodiversity in the natural environ-

ment is fairly understood and documented in the scientific world, and yet an appreciation of the importance of cultural diversity in all that we do – including science – does not seem to be as understood. In these last few workshops, I began to appreciate more just how important it is to have that same type of (bio)

diversity in scientific endeavors as we now strive for in natural ecosystems.

The Cosmic Serpent workshops provided a glimpse of what could be possible if what we currently call Western Science embraces the principles of diversity – those same principles that have shown to allow life on

Earth to thrive. What scientific knowledge will we uncover and how will it help life on Earth once we bring true diversity of thinking to science?

The second is a reflection on the comparison between the first workshops and the final workshops that we hosted. The first workshops were incredibly rewarding and challenging in many ways. During these first set of workshops, the Cosmic Serpent team was still forming and solidifying the processes of their collaborative work; there were participants who had come to the workshops to see what it was we were doing but who eventually decided that their work and the objectives of this project did not overlap; and the workshops had amazing learning moments and new awakenings and at times were interspersed between moments of tension and closure. By the time we held these final follow-up workshops in Alaska and California – the final two follow-up workshops, our team had



### In This Issue

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Isabel's Article

**We are very pleased to announce that IEI has been awarded a new, four-year National Science Foundation grant for Native Universe: Indigenous Voice in Science Museums. Through close partnerships with the `Imiloa Astronomy Center, Center for Science Education at UC Berkeley's Space Sciences Laboratory, and the Institute for Learning Innovation, Native Universe will help science museums build their capacity to educate the public on issues of environmental change as well as the human relationship to nature from Indigenous peoples' perspectives. Stay tuned for more information on this exciting new project (as well as some changes to this newsletter) in coming issues!**

created a sound collaborative partnership and collegial networking system. We had the experience to support the Cosmic Serpent Fellows in learning from one another. Many of the participants at these final workshops had engaged in the prior Cosmic Serpent workshops and were committed to exploring the idea of holding Western Science and Indigenous Knowledge with respect side-by-side; and the workshops had mostly positive and reflective moments that were truly conducive to listening and learning as well as a level of exploration through hands-on learning. Many of our Cosmic Serpent Fellows shared their voices over the past four years with our evaluators and our team, helping us to refine and learn how to bring such diverse and intelligent people together around the Cosmic Serpent concepts and ways of knowing. I want to truly thank each and every one of you for helping this project to succeed and to take the difficult steps forward of learning from people with different worldviews.

*Laura Petacolas*



## NORTHWEST FOLLOW-UP WORKSHOP

We had a spectacular workshop in Fairbanks, Alaska for the Northwest Follow-up Workshop. We gathered in Fairbanks. We welcomed participants on the evening of September 19, at the lovely Pike's Waterfront Lodge on the banks of the Chena River. It was wonderful to see so many familiar faces and a few new ones as well. We were happy that our NSF Program Officer, Sylvia James, was able to join us for the week and to experience first hand how our project was going. Christopher Teren and Traci Walter from San Juan Island, WA, also joined us as professional photographers and technical support.



Robert Charlie, a renowned Athabaskan Elder, and Director of CHEI (Culture and Heritage Education Institute) opened the workshop with a greeting and welcome to Fairbanks. He has been a good friend of Nancy Maryboy and David Begay for many years. He and his wife Bernadette Charlie contributed immeasurably to the workshop, even hosting a potluck dinner at the conclusion of our sessions.

We continued with a group welcome from the PI and Co Is – Nancy Maryboy, Laura Petcolas and David Begay, and a look at the logistics of the week, as provided by Ruth Paglierani and Renee Frappier. Jill Stein gave a report on the previous NW Workshop, held at Semiahmoo in Blaine, WA. She discussed the evaluations that she and her team have collected and how they informed the following workshops. Almost everyone asked for more time to collaborate and network and we tried to build that relationship-building into this Alaskan workshop.

Because relationship-building is at the heart of our project, we had introductions around the room and then we had more detailed introduc-





### Highlights:

#### The Cosmic Serpent Legacy Document is coming soon!



Cosmic Serpent:  
Collaboration with Integrity

tions around each of the round tables. This gave a chance for previous Cosmic Serpent Fellows to catch up on each other's experiences and accomplishments in the past year, as well as for newcomers to the group to introduce themselves and learn about the other CS Fellows.

Laura Huerta-Migus provided a virtual presentation through powerpoint, of the Association of Science and Technology Centers' focus on the value of diversity, entitled "Science Centers: Awareness of Diversity." This provided a foundation for the work of the week.

After a short break, Nancy Maryboy introduced Ray Barnhardt, Professor at the University of Alaska, Fairbanks, who spoke on the "Alaska Experience: Examples from the NSF Rural Systemic Initiative." His work was conducted through a years long partnership with Oscar Angayuqaq Kawagley, who was not able to be with us during the week, as he was hospitalized.

During the afternoon we had several presentations from different museum participants, on the topic of "Models for Museum Outreach – Climate

Change in the NW" (Survival of Fish Through Land and Water Stewardship). Kyrie Kellett and Lori Erickson discussed the OMSI Salmon Camp: Educating the Next Generation. Jenny Atkinson, Director of the Whale Museum in Friday Harbor, WA, talked about the status of the Southern Resident Community of Orcas in the Salish Sea. Libby Nelson gave a presentation on Tulalip Tribal Stewardship (From the Mountain to the Sea. Robert Charlie talked about Alaska Sustainable Fishing.

After a lively buffet dinner the project leadership team of Maryboy, Peticolas and Begay offered an Armchair Dialogue – an informal discussion on western science and Indigenous ways of knowing, which was mandatory for all new Cosmic Serpent participants. This has become a very popular session at all our recent workshops, and many Cosmic Serpent Fellows from previous workshops attended and joined in the engaging informal discussion.

Late at night the first of many opportunities to view the Northern Lights drew many of us outside to see the dancing lights in the sky. Biologist Traci Walter identified a young Great Horned Owl on the roof of a nearby building. She and Christopher Teren took many photos, actually thousands, which he stitched together the next day into a moving picture. We learned that you can see the Aurora better through the eyes of a good digital camera than you can with the naked eye.



On the second day, Tuesday, Paul Coleman, barefoot Astrophysicist from Honolulu, gave his famous stereotype-busting presentation. Beginning with standing on a table with a plastic bag over his head, he proceeded to break down stereotypes of western scientists and paint a picture of the value of diversity. As you might imagine, a lively discussion followed his presentation.

During the morning and into the afternoon, we had a Showcase of Collaborations, led by Isabel Hawkins. This featured posters and informal discussions of various projects that focused on collaborations between traditional knowledge holders and scientists. It is amazing to see what kind of collaborations are taking place, and how many are being seeded by the Cosmic Serpent experience.

We had an interactive Roundtable discussion based on science center interactions with local communities, "Working with the Indigenous Community: Collaboration with Integrity." Discussions were contributed by David Begay, Nancy Maryboy, Roxanne Gould, Jim Rock, Isabel Hawkins, Paul Coleman, Ray Barnhardt, and Kalepa Baybayan.

Later Dennis Martinez gave a fascinating presentation on "Restoring the Earth's Balance: How Climate Change is Upsetting the Relationship of Earth, Fire, Water, and Air, and Indigenous Adaptation Responses." It is always interesting to see how Dennis weaves local knowledge into each of his presentations, engaging the participants in a most deep and relevant manner.

After dinner and quite late at night, participants drove out to Poker Flats for a tour of the Aurora research facility and Aurora viewing. Hans Nielsen gave a most informative talk on the science of the Northern Lights and his former student Laura Petcolas explained how she had done her doctoral research in this very facility.

We did not see any Auroras at the facility which was a disappointment, but we did see the comfortable chairs that scientists could use to conduct some of their research. Much later Christopher and Traci went out under the night skies and did see spectacular auroras which they shared with us the next day, as photos.

On Wednesday, Lynn Morgan, our "resident psychologist," led a day long workshop on multiple intelligences and how applying the study of these various intelligences to visitor learning can be utilized by museums to reach diverse audiences. As we have seen in our other workshops, the small groups that worked together to develop prototype projects created some really innovative museum exhibits, including native and non-native ways to perceive relevant content.

Later in the afternoon we visited two museums, one was the science center Museum of the North, on the UAF campus. The other one was a

cultural/natural history museum developed by local Athabaskans, the Morris Thompson Cultural and Visitors' Center. These visits were much appreciated by the participants.

During the day several very lucky and hard working participants went to the North Pole (a town near Fairbanks) home of Robert and Bernie Charlie to help butcher a moose for

the potlatch dinner. Robert, who is in his 80s had been sick the previous week, but had gotten out of bed and gone moose hunting with a permit for an educated moose. What in the world is an educated moose, you might well wonder. No, it is not a moose with a PhD. It is one that can be hunted for benefit of a educational group. People who were there told stories and will long remember the day of butchering the moose. The photos of Native Hawaiians, carrying huge chunks of moose out from the garage to cut up with a chain saw are some of the most memorable photos of the entire week. Talk about relationship building!

There was a real feast at the hotel to celebrate the NW workshop. The Charlies brought moose and salmon. A friend of Lynn Morgan, Dr. Beth Bergerone







who works in the geophysics department of UAF, a researcher in the Antarctica, brought caribou meat. Other local foods were featured. Bernie Charlie brought some of her beautiful bead-work which sold as soon as it came out of her bags. Robert Charlie led

the group in traditional Athabaskan dances with much humor and skillful drumming. In the tradition of gifting, as is usual at a potlatch, gifts were exchanged and collaborations were facilitated.

The last day time was devoted to several discussions, all based on "where do we go from here." Some were large group discussions and some were small group discussions at round tables. Participants continue to work on the art pieces that they were developing at their tables. Working hands on with clay, colored pencils, and other media enabled participants to concentrate more closely we have learned. Jill Stein led an Evaluation Focus Group in exercises designed to learn how participants experienced the workshop.

It was hard to say goodbye at the end of the day. The leadership team stayed one more night to share and process their reflections of the week. And some people, we won't say who, missed their flights out of Fairbanks.

All in all it was a most memorable week. We were very pleased that Sylvia James had been able to experience the interactions and collaborations that occurred between traditional knowledge holders and western scientists, and we hope that she was able to report the experience back to the National Science Foundation in Washington DC.

*Dr. Nancy Maryboy*



## CALIFORNIA FOLLOW-UP WORKSHOP

The Cosmic Serpent California Follow-up Workshop was held in Palm Springs, January 25 to 28, 2011.

It was wonderful to see new and old friends and to enjoy the winter sun of Palm Springs. The workshop was held in the Hyatt Regency Suites with a location that allowed us to walk around Palm Springs and enjoy the many museums and restaurants.

We began the workshop with a welcome to the land, a local tribal greeting by traditional Bird Singers from the Agua Caliente and Rincon Band of Luiseno Indians. Sean Milanovich, Cultural Specialist from Agua Caliente began with a explanation of what we were going to hear, and he was joined by lead singer Joe Saubel, Chase Welman and Tim Siva. It was great to hear young singers carrying on ancient traditions.

The Cosmic Serpent Leadership Team, led by PI Dr. Nancy C. Maryboy, Co-PI Dr. David Begay and Co-PI Dr. Laura Peticolas, Ruth Paglierani, Renee Frappier and Ashley Teren, provided an update and instructions on logistics.

We had short introductions around the room and then had more comprehensive introductions at each of the round tables. Using technology, our partner Laura Huerta-Migus from ASTC (Association of Science and Technology Centers) gave us a talk on *Awareness of Diversity in Science Centers*. Laura was not in Palm Springs but her powerpoint spoke powerfully to us.





After a short break, our first Keynote Speaker, Dennis Martinez from the Indigenous Peoples' Restoration Network spoke. His illuminating talk, *Taking Care of the Land: Ecocultural Restoration, Kincentric Ecology, and Ecosystem-based Adaptation to Climate Change*, focused on issues of interest

in Southern California. A lively audience exchange followed his talk.

We had lunch served outside on an upper deck and enjoyed the winter sunshine and balmy weather.

Following lunch we had a multi media presentation on *Acorn Mush* by Angela Hardin (Federated Indians of Graton Rancheria) and Chuck Striplen (Amah Mutsun Tribal Band) Watching the large screen presentation of elders making acorn mush, we listened to Angela (Federated Indians of



Graton Rancheria) as she gave her presentation entirely in her traditional Coast Miwok language, using the many implements she had brought with her.

We continued with a very informative presentation by Chuck Striplen, Associate Environmental Scientist with the San Francisco Estuary Institute, *Deepening Partnerships Through Cosmic Serpent: Telling the Story of Valley Oaks in the San Francisco Bay Area: Past, Present and Future – a public, private and tribal collaboration*.

Dr. VerlieAnn Malina-Wright, Chairman of the Native Hawaiian Educational Council and former President of NIEA (National Indian Education Association) gave a compelling presentation on *Indigenous Science as Sovereign Science*, using many vivid examples from her Hawaiian homeland.

Dr. Isabel Hawkins from the San Francisco-based Exploratorium, and Dona Maria Avila, Maya elder and knowledge holder from the Yucatan, Mexico, gave a most entertaining and informative

hands-on demonstration on *Cooking with Corn – the Science of Corn*, bringing together western science knowledge of corn with traditional Mayan ways of knowing and living with corn. The lively presentation was done in Spanish and English

with use of cooking implements and Mayan textiles.

After dinner, to conclude a long and interesting day, we held an *Armchair Dialogue*, an informal discussion of western science and Indigenous ways



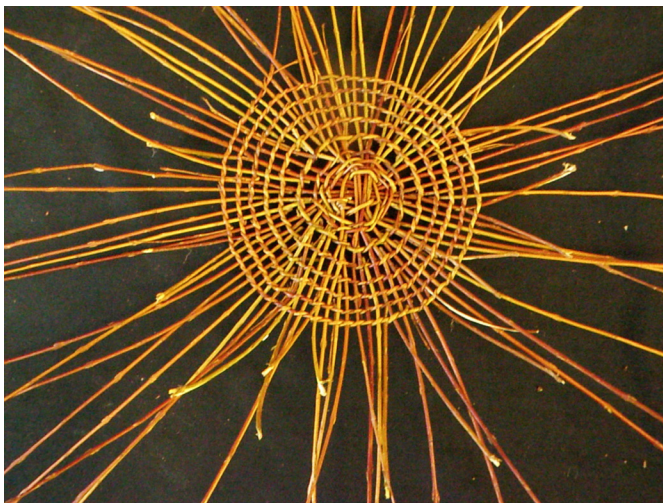
of knowing. The dialogue was led by Dr. Nancy C Maryboy, Dr. David Begay, Dr. Laura Peticolas, Dr. Isabel Hawkins and introduced by Ruth Paglierani. This was an opportunity for Cosmic Serpent Fellows to introduce issues of interest to them, and to discuss the issues from multiple perspectives.

Ben Aleck from the Pyramid Lake Museum and Donna Cossette from the Churchill County Museum led off the lively discussion. Ken Phillips from the California Science Center and Kalepa Baybayan contributed their perspectives to the dialogue.

Kaimana Barcarse from 'Aha Punana Leo on the Big Island of Hawaii began our sessions on Wednesday by chanting a wonderful chant that he had written in Hawaiian especially for Cosmic Serpent.







We then had an up close and hands on session *Landscape Maintenance for Basketry Plants with a Demonstration of Willow Splitting for Fine Weaving Strands* led by Margaret Matthewson of Oregon State University. It was informal learning at its best as Margaret talked about the biology of willow and everyone got to try to split willow branches with their teeth. Naturally experienced basketmakers, like Donna Cossette, were the best at the splitting and they helped us all.

After a good discussion of what had been presented during the morning session, we continued with a Showcase of Collaborations, presented by Cosmic Serpent Fellows. We walked to the Agua Caliente Cultural Museum where we were all welcomed by Director Michael Hammond and his gracious staff. The museum welcomed us with a reception and we were able to view the new exhibit on California baskets.

That evening we showed a video, *River of Renewal*.

Thursday we began our sessions with Dr. Lynn Morgan's visual presentation of *Multiple Ways of Knowing: Applying Diverse Ways of Knowing to Museum Settings, Reaching Diverse Audiences*. This interactive workshop continued most of the day. Lynn was assisted by Laura Huerta-Migus from

ASTC and Pam Woodis from NMAI (National Museum of the American Indian). After learning about Multiple Ways of Knowing, participants were seated in small groups at the round tables. Each group developed a museum exhibit using diverse way of knowing. Topics included climate change, baskets, water, and birds. The presentations of each group were extremely creative and humorous. For example, imagine evaluator Erik Jones flying around the room as a vulture!

That night we had dinner on our own. There was a street fair outside of our hotel so we all enjoyed walking around, networking with one another, and relaxing.

The final day, Friday, we had a group discussion *Where Do We Go From Here?* The discussion was led by Dr. Nancy C Maryboy, Dr. David Begay and Dr. Laura Peticolas. We discussed our Culminating Conference which will be held in Taos, NM in early May.

We discussed the Generations of Knowledge project which OMSI (Oregon Museum of Science and Industry) just received from the National Science Foundation. Partners collaborating in the project include the Indigenous Education Institute, Tamastslikt Tribal Museum in Umatilla, OR, and the soon-to-be-open Hibulb Tribal Museum in Tulalip, WA. Additional partners include NMAI and ILI (Institute for Learning Innovations).

These are all relationships that came about as a result of the Cosmic Serpent workshop. We are very proud that OMSI was awarded this grant to develop a 2000 sq ft traveling exhibit. Many science centers, natural history museums and tribal museums at the workshop showed great interest in hosting this traveling exhibit when it is completed. The exhibit will focus on the value of multiple perspectives of seeing the world, in terms of sustainable ways of living in this world.

*Dr. Nancy Maryboy*

**The Cosmic Serpent project is a personal and professional development experience for informal educators that seeks to increase participants capacity to enrich their practice by exploring the mutually beneficial relationship between indigenous knowledge and western science paradigms.**

**Newsletter designed and edited by Ashley Cottrell Teren**

## WHY USING MULTIPLE INTELLIGENCES WORKS IN MUSEUM SETTINGS

In the most complex forms, museums are unique cultural settings, historical raconteurs, mechanisms for preserving societies and art, vehicles for the preservation of languages and artifacts, and reminders of times past, present, and future. In the simplest of forms, museums are learning centers. Since at the heart of every museum lays the desire to educate and further the knowledge of their visitors, then the creative applications of learning theory and intelligences can have many benefits in the development of quality museum exhibits.

Many times the general perception of learning theories and intelligence might seem like they are merely dry and esoteric psychological concepts without much relevance in application. However, many ways of knowing and attaining wisdom have always been part of growth and development processes for all the relations throughout the lands. Much research about human learning attempts to answer the following questions. How do people learn? Does everyone learn in the same way under the same circumstances? Who defines intelligence and by what measures is a person intelligent? Is there only one definition of intelligence or many?

Millennia before the Europeans “discovered” elements of personality, “developed” learning theories, and “practiced” dream analysis, there were indigenous medicine men and women, knowledge holders, sages, healers, native astronomers, lamas, celestial navigators and others who knew of and practiced many forms of intelligences. These wisdom holders practiced science, mathematics, astronomy, medicine, environmental science, linguistics, and psychology through the disciplined practices of huna, dream analysis, healing, meditation, sounds, music, drumming, dancing, amakwas, proverbs, totems, signs, and interpretation of symbols, to name only a few.



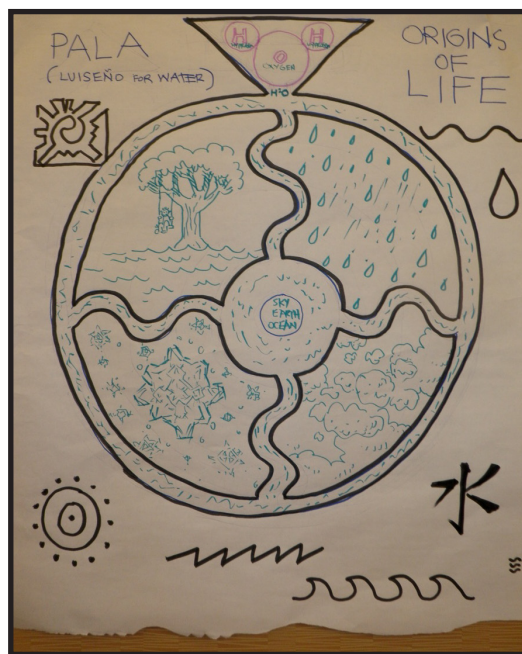
These knowledge holders understood that all of nature teemed with intelligence and that all forms of life were connected.

Sometime in the early 1800's, the Europeans were working on determining ways to define and measure intelligence. This process of defining the concept of intelligence led to a rift between various psychological theorists. There were those, like Binet, who proposed there was a single, unilinear concept of “general” intelligence that could be measured with levels determined through testing. Other psychologists thought this single intelligence research was reductionist, and countered that

intelligence should be defined based on evaluating the holistic functioning of the individual in multiple settings with varied tasks over time. A Harvard University psychologist named Howard Gardner has been one of the largest proponents in recent years of the latter holistic psychological approach to determining intelligences. His research has been called Multiple Intelligences Theory.

Howard Gardner is still researching his Multiple Intelligences Theory, however so far he has determined there are at least nine different

types of intelligences in every person to some degree, while each individual may have preference for using one or two of these intelligences over others. These nine Multiple Intelligences are Bodily/Kinesthetic, Musical/Rhythmic, Visual/





Spatial, Logical/Mathematical, Verbal/Linguistic, Existential, Interpersonal, Intrapersonal, and Naturalistic. All of these nine areas of intelligences work flexibly together and they are present in people of all ages and stages of development. Most people develop all nine intelligences to an adequate level while experiencing individual differences in how they express their intelligence within each.

In relevance to developing museum exhibits, stakeholders in the exhibit combined with museum staff offering different strengths in the various areas of multiple intelligences would prove extremely beneficial in providing a multipronged and diverse presentation of the chosen materials in ways that could be appreciated by many visitors of all ages. The exhibit would use a variety of ways of knowing, educational materials, learning approaches, and levels of interaction that correspond to the nine areas of multiple intelligences and the intent of the exhibit.

In addition to individual differences within the nine areas of multiple intelligences, there are cultural intelligences, norms, and practices indigenous to a multitude of groups and these applicable cultural intelligences also need to be considered when developing museum exhibits. It is most important, for example, to honor the native language and applicable practices within the spectrum of museum exhibits. The practice of including the respective Native elders and knowledge holders into the discussions of a particular exhibit development is crucial to the authenticity and integrity of the exhibit.

When considering the efficacy of creatively presenting museum exhibits, Multiple Intelligences Theory offers extensive educational possibilities, perhaps limited only by funding. For an example of how Multiple Intelligences Theory can be applied to developing a museum exhibit, let's consider an exhibit on Local Medicinal Herbs and Plants. The initial planning step consists of forming an exhibit planning and development group composed of relevant museum staff, pertinent stakeholders, Native elders, knowledge holders, and other technical resource people. This group meets to discuss the goals of the exhibit and how to use Multiple Intelligences Theory for providing the most appealing exhibit learning environments to convey the intended messages of the exhibit. The exhibit planning and development group also meet

to choose materials and activities for each multiple intelligence area within cultural authentic practices and knowledge.

Here are some possible activities and choices of materials that could be adapted for each area of multiple intelligences on the exhibit topic cited above:

- Verbal/Linguistic- storytelling, written materials, vocabulary, lectures, oral histories
- Logical/Mathematical- problem-solving games, creating and deciphering codes, patterns
- Musical/Rhythmic- drumming, singing, dancing, playing musical instruments, nature recordings
- Bodily/Kinesthetic- hands-on activities, manipulatives, field trips, crafts, cooperative games
- Visual/Spatial- art work, charts and maps, photography, CAD software, orienteering
- Interpersonal- cooperative groups, role-playing, simulations, team problem-solving
- Intrapersonal- self-paced instruction, quiet space, independent learning, personal growth
- Naturalistic- nature walks, dissections, petting zoo, tidal pool, binocular use, animal handling
- Existential- spiritual discussions, spirit stories, parables, relaxation and meditation, symbols

I am currently developing ways to incorporate multiple intelligences into the processes of museum exhibit evaluation. If museum exhibits are developed using a variety of activities for a multitude of learners from many cultures, then perhaps the exhibit planning and development group would wish to choose more creative and authentic means of evaluating the designated exhibit. Traditional museum exhibit evaluations often rely on one evaluation measurement, such as time studies which calculate the time spent on one exhibit piece by each person. Time studies provide little information on the meaningfulness of the exhibit's message since this limited practice only provides quantitative evaluation data, namely numbers by time. It is equally or more important to also obtain qualitative evaluation data on museum exhibits, such as: What was learned in how many different ways by which people of what ages?

*Dr. Lynn Simek Morgan*

## ISABEL'S ARTICLE

When I first visited Chaco Culture National Historical Park in New Mexico back in April of 2004, the thousand year old ruins that were built by Ancestral Pueblo people really impressed me. The amazing Great Houses stood in front of me full of wonder and mystery, but they stood silent. Before that visit, I had not known that Chaco existed, and I did not know anything about the Pueblo people. With my partners at Berkeley and Exploratorium, we were producing a series of public programs and resources on ancient astronomy, so I had to catch up fast and had a crash course on cultural astronomy from many experts and wonderful people including GB Cornucopia from the National Park Service and Dr. Shelly Valdez of Laguna Pueblo. With the guidance and teachings of my new friends at the Pueblos and at Chaco, the voices of the ancestors finally started to be heard in my consciousness. New understandings began to emerge through my relationship with the living descendants of the people who had built Chaco, and who have continuously lived in the southwest for thousands of years.

My crash course was no more than a spark, and now it was up to me to fan the flames of learning and understanding. I found that the fire of knowledge could roar through love, respect, sharing, gratitude, and humility. When I first visited Chaco, my mind wanted to find the evidence for ancient astronomical observations, I wanted to measure alignments, and document equinox and solstice light shafts. I wanted to understand Chaco through the tools and methods of my training as an astrophysicist. All it took was helping Shelly serve at Feast Day at Laguna Pueblo. After witnessing the March Feast Day dances and other activities, I realized that the ancestral knowledge, including science, was kept and guarded as part of their traditions. It was not appropriate to try to dissect Pueblo knowledge into disciplines for the sake of my understanding. It became clear to me that time and relationship would teach me as much as I was supposed to know, and whatever that was, I would welcome it in my heart. Finding evidence of intentionality in a solar marker became immaterial. Intentionality was right in front of me, purpose and wisdom nourished the dry earth of Laguna's square







with every drop of sweat that fell off of those dancer's brows. Rain came, and the land was thankful, balance was restored. And, boy, did we eat! At 11 in the evening on that Feast Day, when we had cleaned the kitchen for the umpteenth time after each wave of folks

came in to be fed since 8 in the morning, and the door opened with eager young faces, my question "Should we serve food again?" was a plea for Shelly to answer in the negative, but, nay, we had to serve! Feast Day makes Thanksgiving look like a walk in the park! And I cook the turkey and trimmings for the family, so I should know.

As a result of these experiences, Shelly and I became fast friends – sisters, we say. And we got to talking, and found a mutual frustration in the fact that there was a certain disconnection between the Pueblos today and Chaco. While thousands of tourists visited the Park on a regular basis, most Pueblo people did not, especially the youth. "Well, we just gotta do something about that" said Shelly, and I couldn't agree more.

With the help of the wonderful and caring interpretive staff from the National Park Service, most especially our dear friends and colleagues Russ Bodnar, GB Cornucopia, and Lauren Blacik, we started to bring waves



of Pueblo youth from Laguna and Acoma to Chaco for what we called "The Chaco Experience." Since 2008, we've had 5 groups of youth and teacher chaperones from the Pueblos at Chaco for a few days of immersion in this powerful and beautiful place. At Chaco, we experienced the rhythms of nature, waking up with the Sun and going to bed after storytelling around a campfire. Learning outdoors and in the context of the ancient structures allowed the youth to connect with the knowledge of their ancestors vividly. What better way to learn than from Kirby Gchachu, a Zuni educator, who demonstrated with sticks and rope how the mathematical construct of the golden ratio is embedded in the geometry of the sacred kivas at Chaco!

The students worked with Kirby right on the plaza of the Great House Pueblo Bonito, next



to the largest kiva in the building, where Pueblo ancestors would have held their ceremonies under an enormous roof supported by only four posts. The position of those posts is key, and is guided by the natural symmetries of the golden ratio. The students found these post positions by identifying these symmetries in the round kiva, and marking them with stakes. This was a very powerful moment. Nobody spoke, but everybody was paying attention, and understood.

The youth participated in many other wonderful experiences, including a 3 hour hike to the high mesa where one can see Pueblo Bonito as a bird would see it. The half Moon shape of the building and the exquisite alignment of its walls to the cardinal directions are easily discerned from this perspective. And this is the best spot for a group photo! Shelly and I had our own children in our hearts when we organized these Chaco Experiences for young people. My daughter Mary Ellen and her son Kyle were in the group, and we know they liked it because they returned several times. Our hope for the Pueblo youth was that learning about the legacy of their ancestors in Chaco would motivate them to preserve the richness of their culture. My hope for my own child was that the experience





would open her mind and spirit to learning from relationship to people from a culture very different from her own. I also hoped that she would let the land teach her. All of us who participated – students, chaperons, educators, and Park staff – are more than pleased with the outcomes!

Enter Doña María. She was born in Xul, Yucatán, and as she puts it, she does not have the advantage of “formal study” but, what she knows comes from the teachings of her grandparents. Doña María is a Maya elder who speaks her mother tongue, Yucatec Maya, and who knows how to track the Sun to plan the planting cycle of corn. Her grandmother taught her to stroke the back of a coralillo snake as a child, so that she would absorb the wisdom of the snake with its colorful geometric patterns and become an accomplished “costurera” – embroidering these patterns on her traditional dress with the technique of *xoc bichui* (counting the stitches). My relationship with Doña María started through her language, because I wanted to learn it, and she heard me speak it when I was giving a talk about astronomy at a Maya community event in California. She has 10 sons, most of them living in the Bay Area, and she travels back and forth between Mexico and the US several times per year, visiting her extensive family. It was

during one of her trips to Mexico in 2006 that we went together to the archaeological site of Uxmal, where her ancestors built impressive pyramids and where astronomy was practiced with similar intentions as the Pueblo ancestors had done around the same time, about 1000 years ago. And guess, what, Doña María had lived for more than 60 years near Uxmal, and had never been there. She did not feel comfortable going there, with so many people from other places, and the government employees who seemed like a barrier to her. She felt out of place speaking Yucatec Maya and wearing the traditional huipil. The irony hit my face like a hot wind. In the very place where her ancestors had spoken her language, and had worn her style of dress, she felt uncomfortable. “Well, we just gotta do something about that” I said to myself. Thankfully, similarly to Chaco, the people who care for Uxmal are the most dedicated and wonderful of human beings! Don Pepe Huchim, a Maya archaeologist who directs the site, is fluent in his native language, and was able to welcome Doña María with “Bix yanilech!” Everything was smooth sailing after that. Since then, we have worked with a team of archaeologists and educators to bring Maya youth from the small towns surrounding Uxmal to the site for astronomy workshops and Maya hieroglyph reading and writing workshops. This work rests on a strong foundation



set by Don Pepe, who has been working with women and men from the small town of San Simón, 15 km from Uxmal, to involve them in the restoration of the ancient buildings. For more than ten years now, people from San Simón, who had never been to Uxmal, are involved in the actual archaeology and restoration work. This involvement has awakened in them a connection with their past and

with the people who built the most amazing cities, and who developed a unique and rich culture.

Many of you reading this newsletter know Doña María, and most if not all of you know Shelly,





since she is in the evaluation team. Probably most of you know me as well. My daughter Mary Ellen knows all three of us, and she thinks we are crazy, but in a good way! The reason is because we wanted to bring the Pueblo and Maya worlds together. During the August 2010 “Chaco Experience” for Pueblo youth, Shelly and I invited colleagues from Casa De La Cultura Maya to Chaco. Casa De La Cultura Maya is a non-profit organization in Los Angeles that is dedicated to the stewardship of Maya culture and Maya communities. Our friends Marco and Lulu Pacheco lead the organization and, guided by their physical and spiritual strength, do the work of 100 people! During their participation at Chaco, they shared many aspects of Maya culture and also learned about Pueblo culture, finding many parallels among them. As a result of their visit, we pledged to bring Maya Yucatec and Pueblo youth together at Chaco the following year. The dream came true!

From August 3rd through 10th, 2011, eight Maya youths from towns in the Yucatán, and ten Pueblo youths from Laguna participated in the First Maya Yucatan – Pueblo Cultural Exchange at Chaco!

With Marco, Lulu, Doña María, and Russ Bodnar of Chaco, Shelly and I collaborated as a tight team to make this program a success. The program brought together diverse agencies, including National Park Service, Western National Parks Association, Laguna and Acoma Pueblos, state and

local government agencies of the Yucatán, Native Pathways (a non-profit organization in Laguna Pueblo), and Casa De La Cultura Maya for sponsorship and support.

The youths chosen for this program were highly-qualified – students from the Yucatán were required to speak their maternal language, Yucatec Maya, in addition to Spanish and were asked to share traditional knowledge from their people, such as art, dance, food, science, and architecture. The Pueblo youths were also knowledgeable of their cultural traditions, including the Keres language and various

forms of dance, song, and dress. This exchange offered both groups an authentic connection to their cultural roots through explicit comparisons, contrasts, and links with other indigenous groups. There are so many cherished memories from this experience, but a couple stand out in my mind. It was so awesome to see kids showing each other how to dance their respective traditional Jarana and Corn Dance! It happened spontaneously, around the campfire, when the drum was beating. The Pueblo kids started to dance, and all the other youth joined, including Mary Ellen, the only blondie in the group! That is all she would talk about with her friends when she got home, how the dance was so fun and so \*hard\* because of the stamina required. The Yucatec girls showing the Pueblo kids how to dance jarana, and it became clear that the language “barrier” was no barrier at all! The kids now want to bypass English and Spanish and are committed to learning each others’ native languages to better communicate. Google translate was doing a poor job anyway between the Spanish and English! Mary Ellen was doing her best to be a living “Google translate” since she is bilingual English/Spanish. She really enjoyed doing this. What a trip we had!

The workshop started with a visit to the Feast Day of Santo Domingo, the largest of the Pueblo feast days, where many local families gen-



erously welcomed the students and us into their homes for feasting and sharing traditions. Then the group travelled to Chaco Culture National Historical Park to explore the cultural and scientific legacy of Pueblo and Navajo people with educators, scientists, and park personnel for the next several days. G.B. Cornucopia led tours of Pueblo Bonito and Chetro Ketl, Lauren Blacik gave a presentation on ancient trade and cultural connections, and Phil Varela led a geology hike. Astronomer Ron Sutcliffe taught the complexities of the lunar cycle, and Maya students immediately recognized many of the concepts in their own traditions.

Every evening, we shared presentations, songs, dances, and stories around the campfire. During one presentation, Ramona Begay (NPS employee and Navajo Nation tribal member), Doña Maria, and Shelly demonstrated the use and significance of corn in Navajo, Maya, and Pueblo traditions. It was amazing to hear the “pat pat” of the tortilla making demonstration while the local women demonstrated how to use the metate and mano to grind the corn!

What was most amazing to me is that so much learning and sharing occurred without many words, by showing, teaching each other to do particular tasks, or by dancing, singing, hiking, and laughing. Language became secondary and, in many ways, silence opened our minds to new possibilities. Spanish/Maya and English/Keres speaking youths became incredibly fast friends.

On another occasion the Maya youths danced Jarana and performed a play in their native language, and the Laguna youths danced Eagle and explained the significance of their traditional clothing. In the Yucatán, the participating Maya students live in villages that surround their ancestral sites, such as Chichén Itzá, Uxmal, and Dzibilchaltún, and in that way found a lot of common ground with their Laguna and Navajo peers. In particular, the kids discussed how to encourage cultural pride in their communities and represent themselves at ancestral sites.

The young participants continued their cultural exchange by meeting with the governor of Laguna Pueblo and visiting Acoma Pueblo before heading back into Albuquerque. The last stop included a visit to the Indian Pueblo Cultural Center (IPCC), where we were honored with a personal welcome by Ron Solomon, CEO of IPCC. Exhibit designer Gregg Analla of IPCC gave our group a tour of the Cultural Center, and special guest Maya artist Francisco López from Guatemala taught us how to draw Maya hieroglyphs! The exchange ended with pizza and a fun trip to the mall.

Facebook is keeping the students and chaperones in touch until we see each other again in the Yucatán in the year 2012.

To access the Facebook Page,  
<http://www.facebook.com/pages/First-Maya-Yucatan-Pueblo-Cultural-Exchange/145158368905184>

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