Lakota Cosmology meets Particle Physics
Converging Worldviews

A series of interdisciplinary roundtable discussions that investigate native science, western science and the arts as parallel 'ways of knowing' and understanding our place in the universe.

Taos
Harwood Museum
April 12
6-8pm

Espanola
Northern New Mexico College
April 13
12-2pm

Santa Fe
Biocultura
April 13
6-8pm

FREE: Register in advance. Limited seating

Youth Workshop - Professional Development - Roundtable

April 12 and 13, 2017

Taos - Española - Santa Fe

Dr. Steven Goldfarb, CERN Physicist

Dr. Greg Cajete, Director Native American Studies, UNM

Steve Tamayo, Lakota Cultural Specialist and Water Protector

Agnes Chavez, Artist/ Moderator

Lakota Cosmology meets Particle Physics: Converging Worldviews, is an interdisciplinary roundtable discussion that investigates native science, western science and the arts as parallel 'ways of knowing' and understanding our place in the universe. Powerful new microscopes, particle accelerators and telescopes are revealing an interdependent relationship with the universe that is challenging the modern worldview. Only through open dialogue and interdisciplinary exchange can we begin to move toward a new worldview; one that combines the advances of the scientific method and technological innovations with native science as a life-sustaining ecology that is participatory and in balance with nature. Join us for a multimedia presentation and lively discussion with Dr. Greg Cajete, Dr. Steven Goldfarb and Steve Tamayo, moderated by Agnes Chavez.

Harwood Museum
238 Ledoux St, Taos, NM
April 12
6:00-8:00pm
Roundtable Discussion

Taos is the launch site for this series of roundtable discussions traveling through Northern New Mexico. Taos Integrated School of the Arts (TISA) students will participate in the youth workshop, *Lakota Cosmology Meets Particle Physics: Exploring Dark Matter*, which was the catalyst for this collaboration.The Harwood Museum will be the sponsoring venue for a lively roundtable discussion that will expand your mind, inspire your creativity and warm your heart!

Northern New Mexico College
2921 N Paseo de Onate,
Espanola, NM
April 13
12:00-2:00pm

The intercultural and interdisciplinary topics being explored through this collaboration are vital to the future educators and leaders in our community. For this reason we are offering a special presentation for students at Northern Community College in Española. We invite students from all departments; education, science, art, humanites, to come hear from these exciting speakers and to become part of this global conversation.

Biocultura
1505 Agua Fria St
Santa Fe NM
April 13
6:00–8:00pm
Presentation and
Roundtable Discussion

Join us for a lively and inspiring conversation at the newly formed Biocultura space in Santa Fe. This event marks the opening of this unique venue.

Biocultura, created by the artist/designer team Andrea Polli and John Donalds, supports Bio Art and Design education and creation in a restored adobe home on the historic Camino Real near the Santa Fe River, combining public art, architecture and networked media with the aim of supporting and connecting Bio Art and Design projects and practitioners to our daily lives, histories, communities and environments through workshops, presentations and events.

The youth workshop is the launch of this interdisciplinary collaboration. 4th and 5th grade students from TISA in Taos, New Mexico will explore the mystery of Dark Matter through the lens of two worldviews. Through CERN physicist, Dr. Steven Goldfarb, they will learn about the Large Hadron Collider, the largest particle accelerator in Geneva Switzerland and how it is used to discover particles that are the key to our understanding of the universe. Through Lakota cultural specialist, Steve Tamayo, they will learn the indigenous way of doing science as a participatory and creative process to understand the world around us. Students will participate in the building of a Lakota Tipi and dreamcatcher as they hear the oral stories that through metaphor share the cosmological observations of indigenous peoples. Guided by the research and wisdom of Santa Clara author and professor of Native American studies, Dr. Greg Cajete, the interdisciplinary team will encourage youth to imagine a new worldview that combines the advances of the scientific method and technological innovations with a life-sustaining ecology that is participatory and in balance with nature. They will investigate the topic of dark matter through this newly created lens. New media artist, Agnes Chavez, will work with Steve Tamayo and students to transfer their newly created stories into animated electronic projections from the inside of the tipi to create an installation that they will share with the community. The live tipi installation will take place at dark on April 11th at the Taos Integrated School of the Arts (TISA). Video documentation from this workshop and installation will be shown at each of the presentations.

Lakota Cosmology Meets Particle Physics: Exploring Dark Matter

Youth Workshop

TISA, Taos, New Mexico

April 10-11, 2017

Open to TISA students

Guest Speakers

Dr. Steve Goldfarb is a physicist from the University of Melbourne, working on the ATLAS Experiment at CERN in Geneva Switzerland. He is active in education and outreach, webmaster for the ATLAS public web pages, co-chair of the International Particle Physics Outreach Group, on-site coordinator of the REU Summer Student and Research Semester Abroad programs for American undergraduates at CERN, and advisory board member for Quarknet.

Steve Tamayo is based in Omaha Nebraska. He draws upon his family history as a member of the Sicangu Lakota tribe. His fine arts education (BFA from Singe Gleska University), along with his cultural upbringing, have shaped him as an artist, historian, storyteller and dancer. Steve provides activities during his residencies that include art and regalia making, drumming, powwow dance demonstrations and lectures on the history, symbolism and meaning behind the Native customs and traditions. Most recently leading workshops with kids at Standing Rock Oceti Sakowin Camp.

Dr. Greg Cajete is a Native American educator whose work is dedicated to honoring the foundations of indigenous knowledge in education. Dr. Cajete is a Tewa Indian from Santa Clara Pueblo, New Mexico. He has served as a New Mexico Humanities scholar in ethno botany of Northern New Mexico and as a member of the New Mexico Arts Commission. Dr. Cajete has authored five books: “Look to the Mountain: An Ecology of Indigenous Education,” (Kivaki Press, 1994); “Ignite the Sparkle: An Indigenous Science Education Curriculum Model”, (Kivaki Press, 1999); “Spirit of the Game: Indigenous Wellsprings (2004) ,” “A People’s Ecology: Explorations in Sustainable Living,” and “Native Science: Natural Laws of Interdependence” (Clearlight Publishers, 1999 and 2000).

Generously sponsored by the Martin Foundation, Taos Integrated School of the Arts, ATLAS Experiment@CERN, Harwood Museum, Northern Community College, Biocultura, Quarknet, Moving Arts, Americorps VISTA and the Paseo Project.

PROJECTING PARTICLES

ATLAS EXPERIMENT

Connecting Particle Physics and Media Arts for Deeper Learning

Projecting Particles is a 6-year 'Innovation and Development' project to deepen and personalize learning about particle physics through new media arts, designed for students in secondary schools in underserved communities around the world.

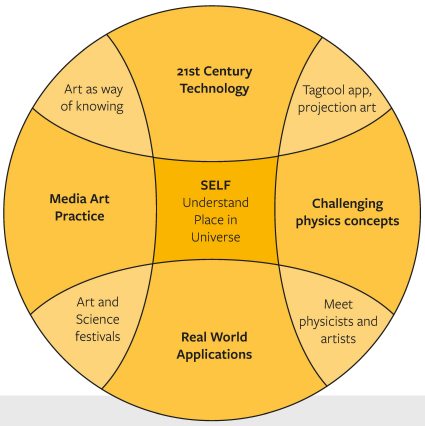
The goal of Projecting Particles project is to create and disseminate a Sci-Art Teaching Module that is scalable and allows educators to facilitate a highly engaging Sci-Art workshop that connects particle physics content and new media art.

The Projecting Particle Teaching Module includes components from the ATLAS masterclass to deepen physics learning, and an innovative projection art app that allows students to explore and visualize physics concepts.

STEMARTS LEARNING MODEL

The STEMarts mission is to increase appreciation for both the art process and the scientific process as complementary means to make sense of ourselves and the world we live in, and to communicate this understanding to others.

The methodology is to provide students with a multisensory and interdisciplinary experience which includes access to expert new media artists and physicists, exciting 21st century technologies, and valuable opportunities to perform at public art and science festivals.



PHYSICS INSTRUCTION

The workings and discoveries of the experiments at the Large Hadron Collider and its implications and relevance.

The Standard Model is the current theoretical framework for our understanding of matter.

The behavior of particles is governed by conservation laws and mass-energy conversion.

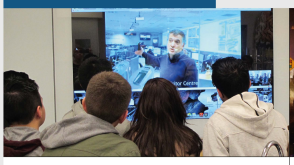
MEDIA ART INSTRUCTION

Understand how physics concepts are influencing artists use of space, form, and medium.

Use of Tagtool projection art app as an investigative tool to understand and communicate science concepts through personal expression.

Introduction to 21st century thinking, technologies and communication tools.

PROJECT TIMELINE



2013

First pilot workshops with ATLAS Virtual Visit led by Steve Goldfarb.

Identify partnerships and participating schools with first sponsor, Los Alamos National Laboratory.

Venues: National Hispanic Cultural Center and Explora, Albuquerque, NM

2014

First workshop with students performing at an international immersive art festival.

Development of teaching strategies and resources continues.

Festival: The PASEO, Taos, NM

Venue: Taos High School/The Paseo Festival, Taos NM

2015

Agnes Chavez research stay at CERN to expand physics understanding and teaching strategies.

Invitation to lead/perform workshop as part of Havana Biennial art festival, Cuba with UNM partnership.

Physics instruction by Luis Flores Castillo at high school/ universities in Cuba.

2016

Partnership with QuarkNet to integrate ATLAS Masterclass into the workshop, led by Dr. Michael Wadness and Dr. Sally Seidel.

Teens as lead teachers begins through partnership with Teen Engagement program at Harwood Museum.

Festivals: New Mexico School of the Arts, Santa Fe, Lighting of Ledoux, Taos, Los Alamos ScienceFest

What's next?

Design and produce a physics add-on for the workshop Tagtool app.

Development of an online Projecting Particles 'Teaching Module' with app.

Beta-test the online 'Teaching Module' at partner schools to be identified.

TEAM

Agnes Chavez
Artist/STEMarts Lab Founder

Dr. Steve Goldfarb
ATLAS Outreach, Melbourne University

Markus Dorninger
Artist/Tagtool App Developer

Dr. Luis Flores Castillo
Physicist and Instructor, Chinese University of Hong Kong

Dr. Michael Wadness
Science Educator and Quarknet Fellow

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With support from: US-ATLAS, QuarkNet, University of New Mexico, Americorps VISTA, Los Alamos National Laboratory

STEMarts LAB

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About Projecting Particles

Agnes Chavez, Project Director/Moderator

Projecting Particles combines projection art and particle physics to explore and visualize the radical new discoveries taking place in the field of particle physics, expanding our understanding of the universe and the fundamental laws of nature. We coordinate a series of teen-led youth workshops that allow students to participate in an interdisciplinary collaboration with artists and physicists through hands-on Sci-Art activities, culminating in a projection event that communicates their discoveries to the general public. This project is in partnership with ATLAS Experiment at CERN and Quarknet, whom provide virtual and real visits with physicists and the latest research to share with students. Agnes Chavez collaborates with artists for the art and technology integration. This event is an initiative of Projecting Particles and Americorps VISTA STEAM NM.

Agnes Chavez is a new media artist and educator, working at the intersection of art, science, technology and social practice. She partners with scientists and programmers to explore our relationship to nature and technology through data visualization, sound and projections. Her recent installation, Origination Point, visualized the origins of matter and the Higgs field, informed by a research stay at the ATLAS Experiment at CERN in 2015. Agnes is Co-Director of The PASEO, the first outdoor participatory arts festival which brings projection, performance and installation art to the streets of Taos, New Mexico. In 2009 she founded the STEMarts Lab which em-powers youth through STEAM workshops that integrate science, technology and new media arts through social practice.

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