

Polarimeter to UNify the Corona and Heliosphere



Update on PUNCH Outreach Program

For the PUNCH Science Meeting #2

Cherilynn Morrow, PhD
PUNCH Outreach Director
Consultant, Southwest Research Institute

9 August 2021



https://punch.space.swri.edu/punch_outreach_overview.php





Outreach
for the
NASA
PUNCH
mission

Update on PUNCH Outreach: Outline of Presentation

1. **Our Partners: Collaborators, Consultants, Advisors**
2. **Our Ancient & Modern Sun Watching Theme**
3. **Beginning of Respectful Collection of Chaco Photography**
4. **Summary of PUNCH Outreach Products and Events**
5. **Roles for Scientists in PUNCH Outreach**





PUNCH Outreach interweaves Western and Indigenous science

“I applaud the work of the solar scientists for many reasons, but in particular because I know their work will augment and enhance Native Traditional Knowledge. It will expand and complement the mystery explored by our Puebloan Ancestors. ”



Phillip Tuwaletstiwa, Member of the Hopi Tribe
Episodic Advisor for PUNCH Outreach





The PUNCH Outreach Core Consortium [POCC, pronounced "pock"]

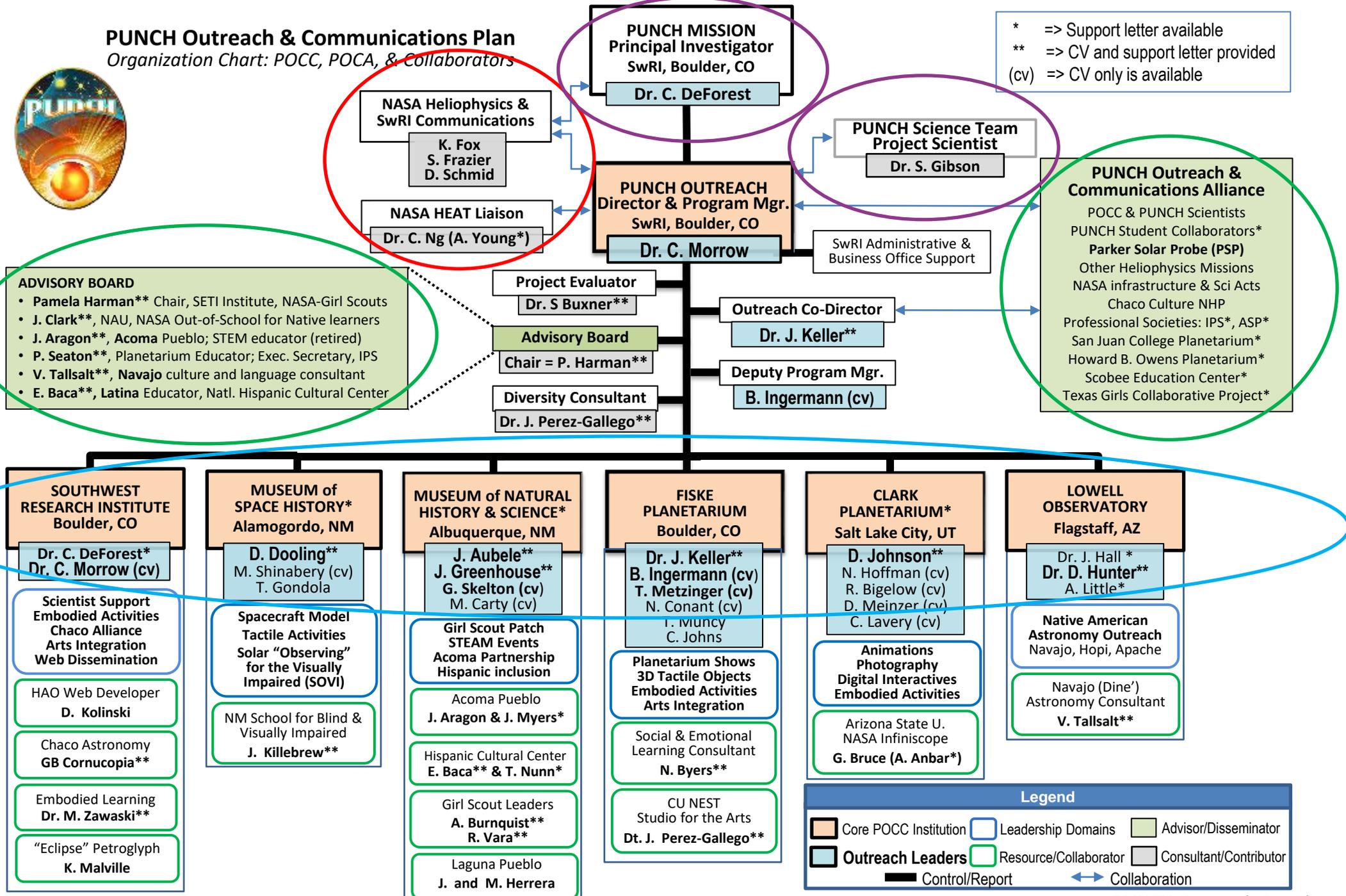
SwRI + Five Outstanding Outreach institutions in the 4-Corners states of the US Southwest



PUNCH Outreach & Communications Plan

Organization Chart: POCC, POCA, & Collaborators

* => Support letter available
 ** => CV and support letter provided
 (cv) => CV only is available





Eight Guiding Principles for the PUNCH Outreach Plan

An invited talk at AGU 2021 will elaborate on these principles of possible value to others considering proposing a plan for mission-embedded outreach

1. Engaging outreach expertise in collaboration with mission leadership
2. Synergizing the Science, Outreach, and Communication Teams (e.g., on website content, on an outreach press release & blog post, and on our first national outreach talk to the Night Sky Network)
3. Coordinating & synergizing with allied NASA groups & missions
4. Enacting a thematic approach to broaden participation
5. Aligning mission attributes with outreach participants, partners, and products
6. Leveraging strengths & partnerships among multiple institutions
7. Learning from those we intend to benefit from the start
8. Using evidence-based practices & integrating evaluative processes

Eight KEY principles guide the development and implementation of the PUNCH Outreach plan.

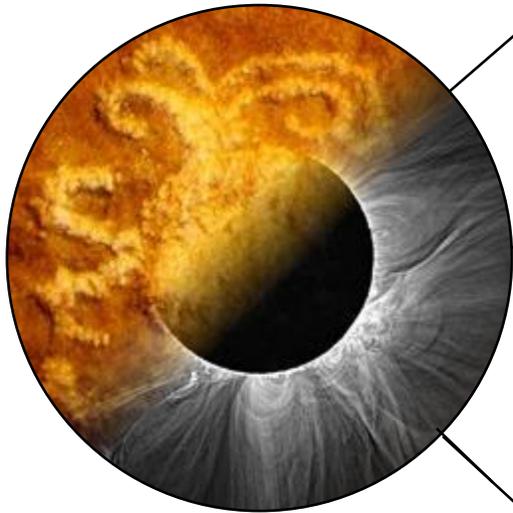


Outreach
for the
NASA
PUNCH
mission

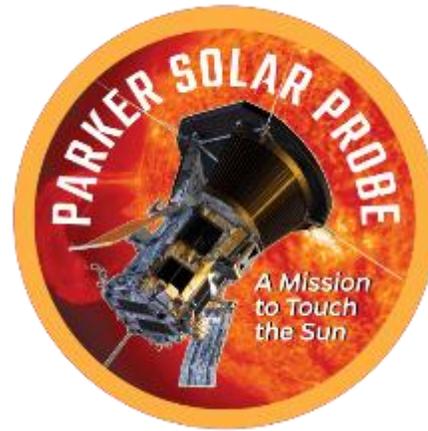
Update on PUNCH Outreach: Outline of Presentation

1. Our Partners: Collaborators, Consultants, Advisors
2. **Our Ancient & Modern Sun Watching Theme**
3. Beginning of Respectful Collection of Chaco Photography
4. Summary of PUNCH Outreach Products and Events
5. Roles for Scientists in PUNCH Outreach

**Elements of the
PUNCH Outreach
Ancient & Modern
Sun Watching Theme**



**NASA
Heliophysics
Missions**



**Ancient
Sun Watching
in Chaco
Culture NHP**



**Personal Sun
Watching in
modern times**



An invited talk at the AAS Winter Meeting in Jan 2022 will elaborate on the activation of our thematic approach to mission-embedded outreach.



PUNCH Outreach is founded on authentic needs & opportunities

*“I greatly appreciate the **Ancient and Modern Sun watching theme** you have chosen and that you will be **encouraging children to observe the sunrise and sunset**. The Dine’ people honor the Sun (Johonnaa)*

*I see using the context of a **NASA** mission to explore the Sun interwoven with cultural traditions as beneficial....”*



Verna Tallsalt, Low Mountain, AZ
Navajo Culture & Language Consultant
Member, PUNCH Outreach Advisory Board



*“Girl Scouts encourages girls to spend **quality time outdoors** and **increase their exposure to nature** to help them thrive.”*

Pamela Harman, Education Director, SETI Institute
PI for NASA-GSUSA, “Reach for the Stars”
Chair, PUNCH Outreach Advisory Board

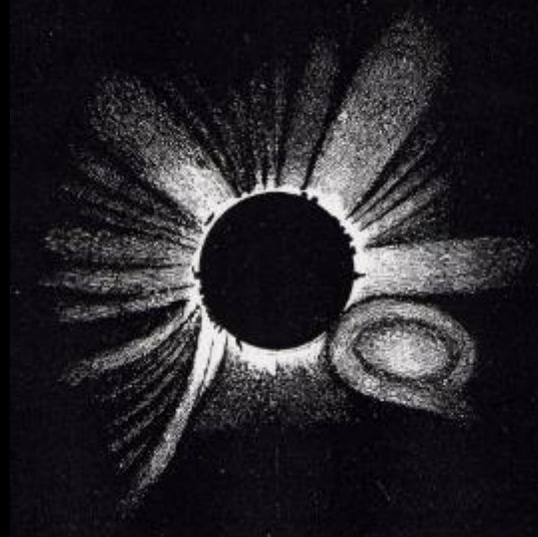


PUNCH Outreach is founded on authentic needs & opportunities among the populations we intend to benefit and learn from.

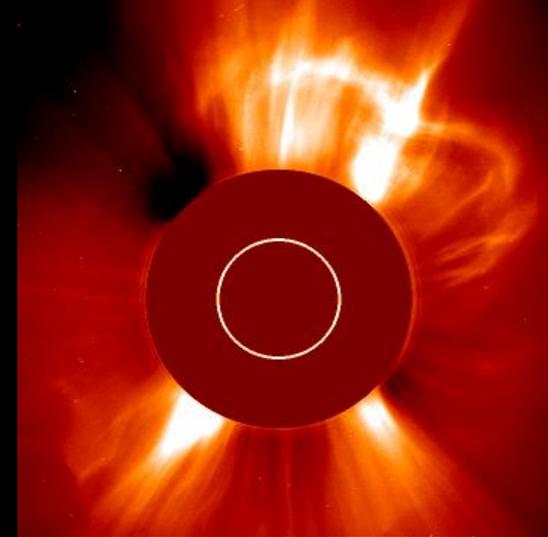
A Chaco Petroglyph is the Conceptual Portal for the Ancient & Modern Sun Watching Theme of PUNCH Outreach



Ancestral Puebloan petroglyph in Chaco Canyon. **1097 eclipse?**
1098 is estimate of Solar Max



An **1860** hand drawing of a total solar eclipse (G. Tempel).



2005 coronagraph image from NASA SOHO with CME

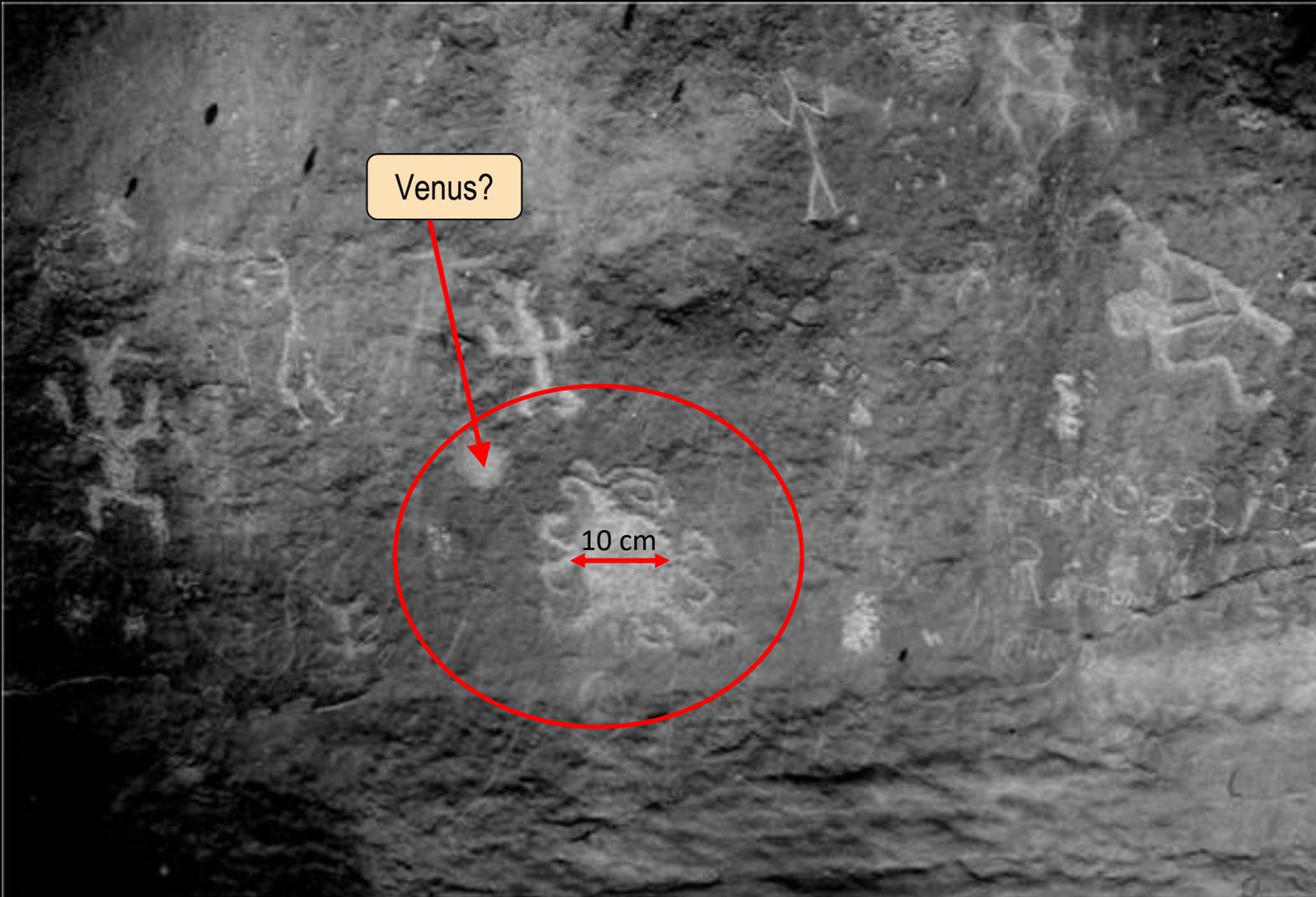
PUNCH Outreach involves collaborating with our Native American partners and the NASA Heliophysics Communications group to amend the Western narrative on the history of eclipse observations in a cross-culturally appropriate manner in preparation for the 2024 total solar eclipse at a time of high solar activity.

There is now a ramp for ranger-guided programs at 29SJ514.
NASA Heliophysics content in a National Park interpretive program



The southeastern *rock art* panel is newsworthy

29SJ514 is an Ancestral Puebloan site in Chaco Canyon, NM



This rock art panel was newsworthy in 2017 (e.g., Smithsonian and Scientific American) and will be newsworthy again in the coming years of eclipses, high solar activity, and heliophysics mission milestones.

One of the 3-D printable tactile objects envisioned by PUNCH Outreach for use by Blind and Low-Vision learners is of this “eclipse” petroglyph .



PUNCH Outreach is founded on authentic needs & opportunities

“Having an opportunity to participate through tactile and/or auditory means will excite blind or visually impaired learners while giving them a sense of belonging and acceptance.”



Jeff Killebrew

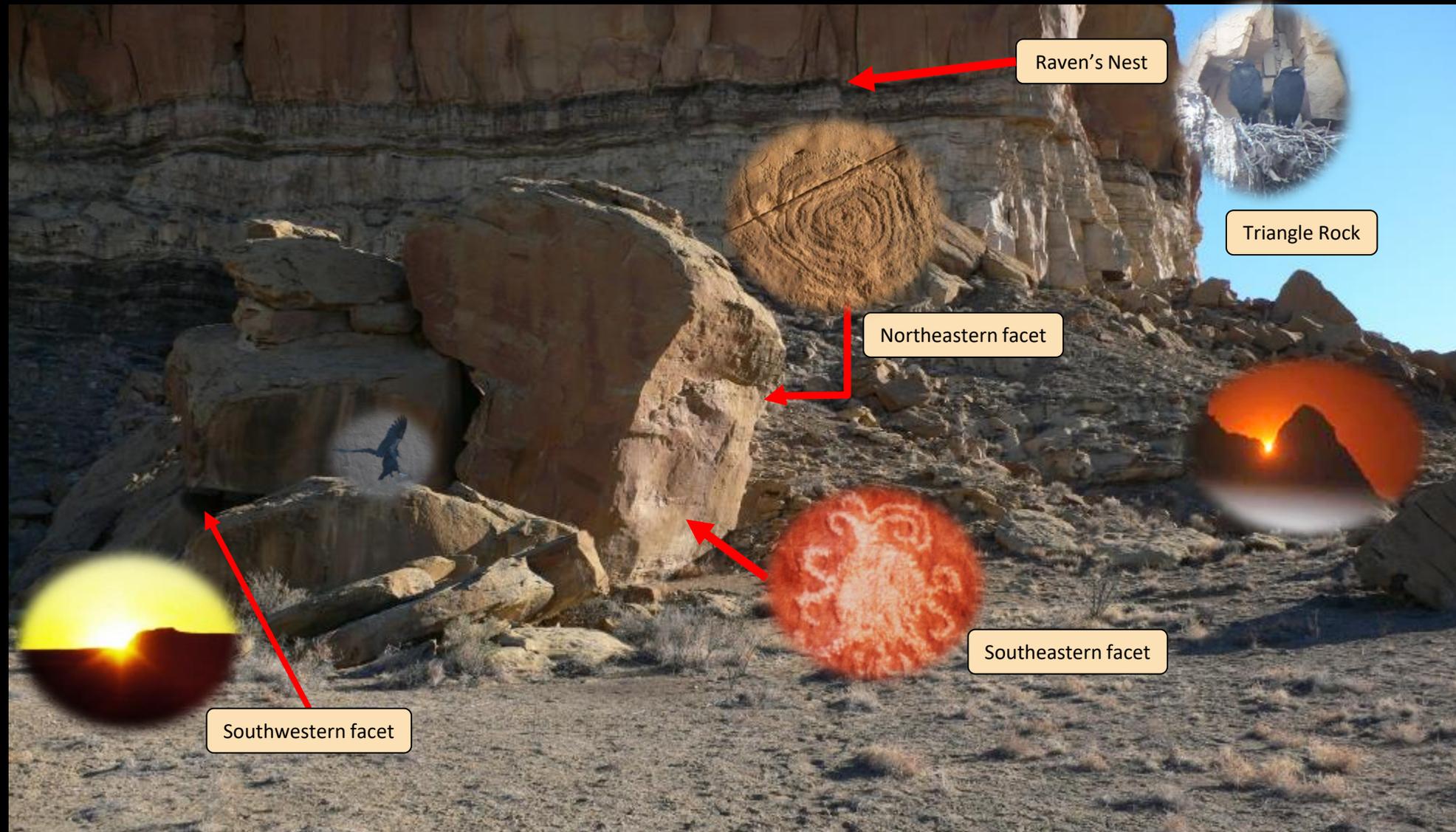
NASA Airborne Ambassador, STEM Teacher,
NM School for the Blind & Visually Impaired
Alamogordo, NM



PUNCH Outreach is founded on authentic needs & opportunities among the populations we intend to benefit and learn from.

There are several reasons to consider 29SJ514 as a Sun watching site

This is an Ancestral Puebloan cultural site in Chaco Canyon, NM that requires **special permitting arrangements**





Outreach
for the
NASA
PUNCH
mission

Update on PUNCH Outreach: Outline of Presentation

1. Our Partners: Collaborators, Consultants, Advisors
2. Our Ancient & Modern Sun Watching Theme
3. **Beginning of Respectful Collection of Chaco Photography**
4. Summary of PUNCH Outreach Products and Events
5. Roles for Scientists in PUNCH Outreach

PUNCH Outreach has begun respectful collection of photography in Chaco Canyon

During June and July, PUNCH Outreach deployed photographic expeditions to collect photography at an ancient Sun-watching site



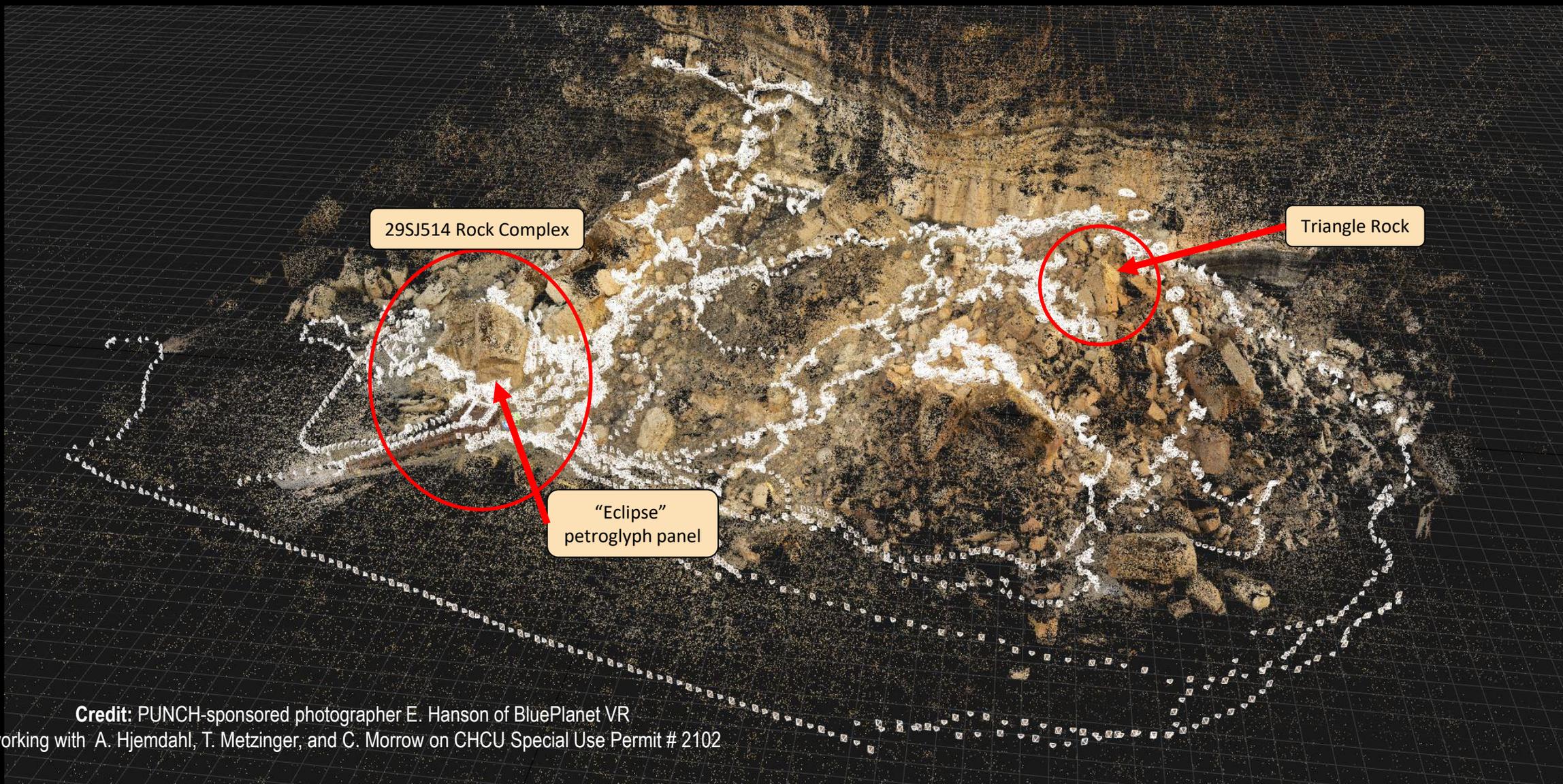
Photo Credit: PUNCH-sponsored photographer E. Hanson of BluePlanet VR working with A. Hjemdahl, T. Metzinger, and C. Morrow on CHCU Special Use Permit # 2102

- Our friends in the Native community have emphasized to us that ***“These sites are as alive today as they were to the ancestors.”***
- Thus, in working at such places they have advised us that ***“It is critical that we respect them and have a pure heart when we enter them. We need to honor the ancestors.”***
- As such, our photography team learned to engage in a moment of reflection and appreciation each day before starting work at the site.

PUNCH Outreach has begun respectful collection of photography in Chaco Canyon

The July expedition collected 9,650 42 MP photos over 3 days to support the development of a 3D model of 29SJ514 and the surrounding area

These data will allow the creation of fly-over animations, VR explorations, and digital interactive lessons



Credit: PUNCH-sponsored photographer E. Hanson of BluePlanet VR
working with A. Hjemdahl, T. Metzinger, and C. Morrow on CHCU Special Use Permit # 2102



PUNCH Outreach is founded on authentic needs & opportunities

Mr. Aragon (quoted below) has committed to gather Native American youth who consult on PUNCH Outreach products and events intended for them and their families.

*“I am interested in the overlap of cultural significance and NASA science learning that is possible, including potential links to the Acoma language revitalization project, emphasis on **our ancestral connection to Chaco**, and increased understanding of the movement of the Sun through its cycles.*”

This project can provide a way for our Acoma and Laguna students to experience NASA science and envision a future career in science, without losing touch with their culture.”



Joe Aragon
STEM Educator (retired), Acoma Pueblo, NM
PUNCH Outreach Cross-cultural consultant



PUNCH Outreach is founded on authentic needs & opportunities among the populations we intend to benefit and learn from.

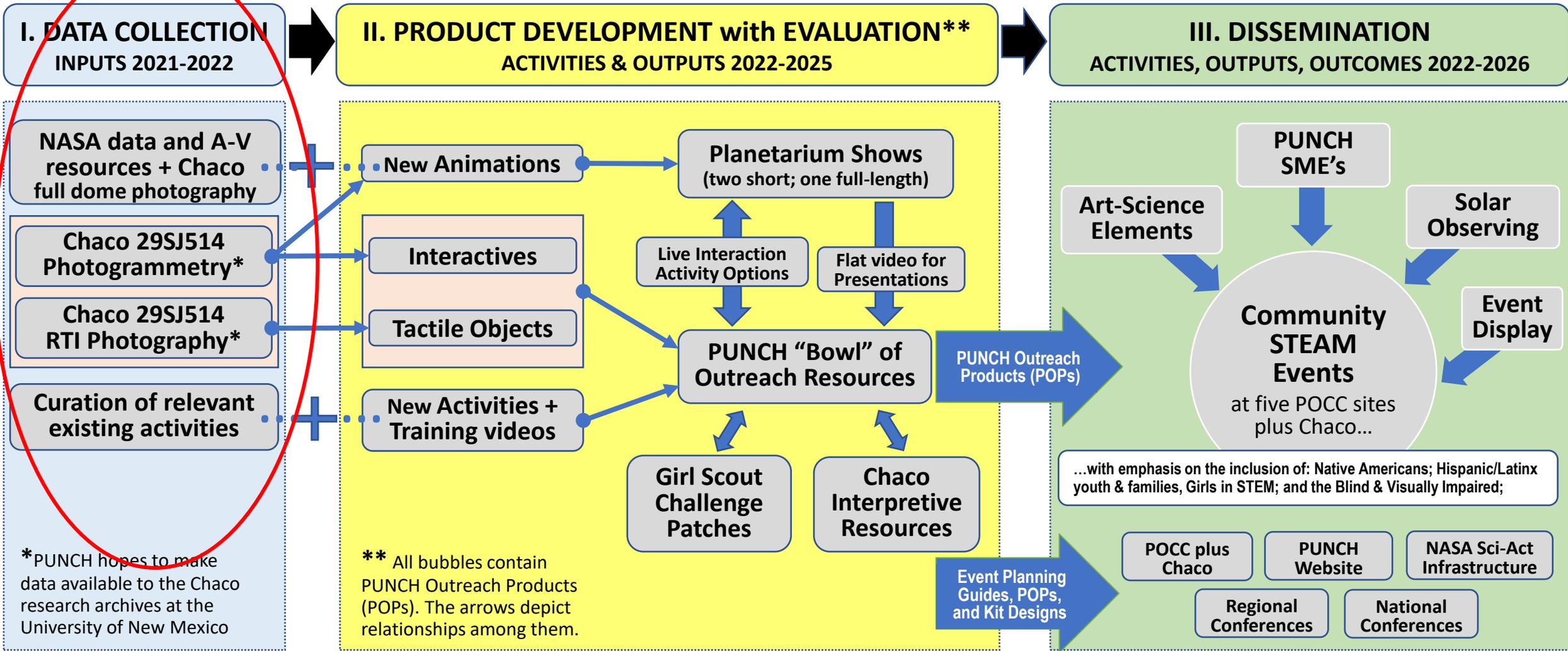


Outreach
for the
NASA
PUNCH
mission

Update on PUNCH Outreach: Outline of Presentation

1. Our Partners: Collaborators, Consultants, Advisors
2. Our Ancient & Modern Sun Watching Theme
3. Beginning of Respectful Collection of Chaco Photography
4. **Summary of PUNCH Outreach Products and Events**
5. Roles for Scientists in PUNCH Outreach

Workflow for PUNCH Outreach – This summer we have begun Phase I



Front End Assessments of Needs and Opportunities

Field Testing and Formative Evaluation

Summative Evaluation of Outputs and Outcomes

Kinesthetic and other embodied activities are a key element of all PUNCH Outreach Products & Events

Veteran practitioners of *Kinesthetic Astronomy* met at Clark Planetarium for PUNCH Outreach planning

Salt Lake City, UTAH 5-6 August 2021

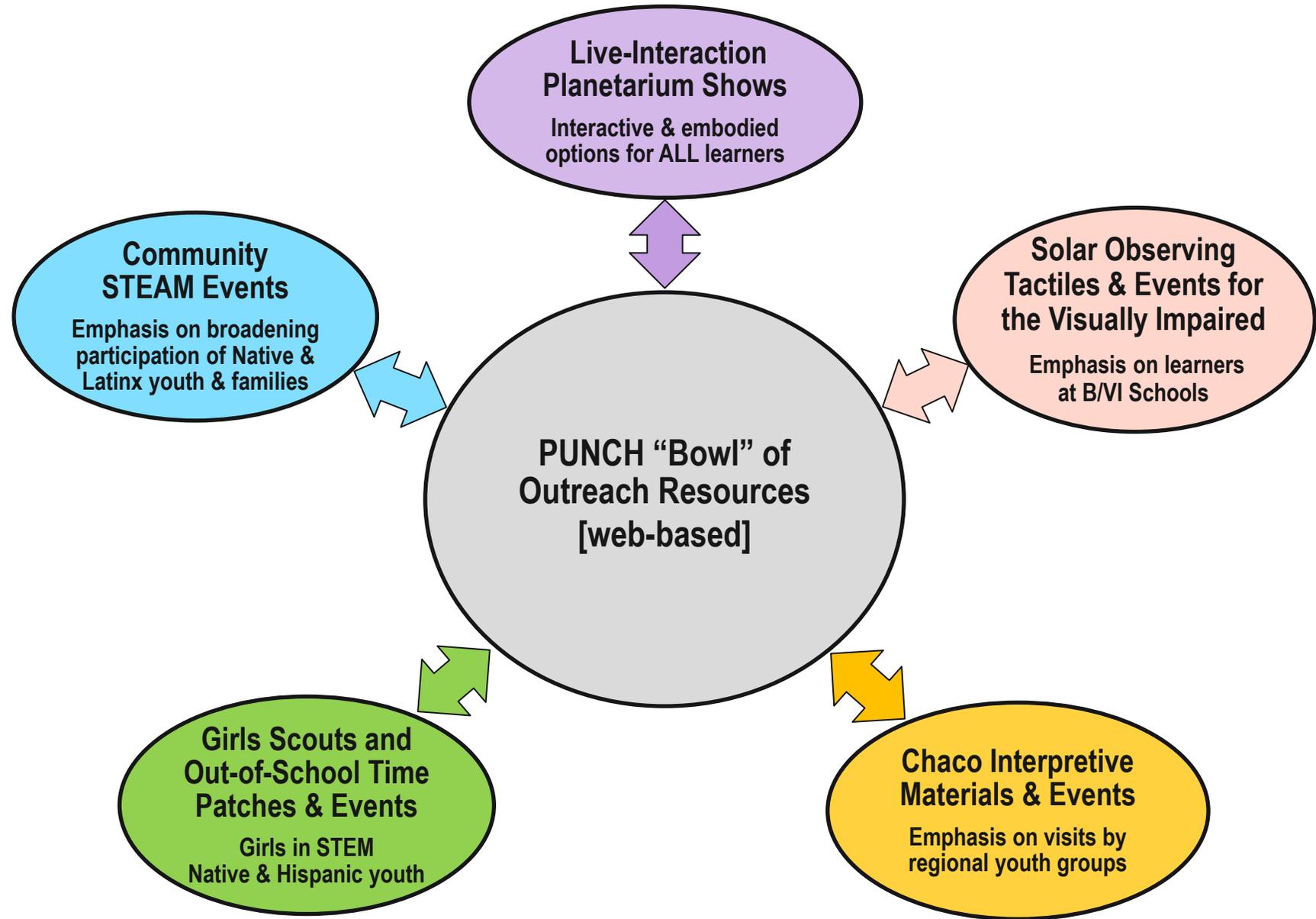


Lesson One : Sky Time
On the Astronomical Meaning of the Day, Year, and Seasons

PUNCH Outreach Products & Events are inspired by PUNCH data, science, and people

PUNCH public engagement events feature common elements...

1. access to PUNCH scientists
2. arts integration
3. direct & indirect solar observing modalities
4. multi-sensory activities (audio, visual, tactile, kinesthetic)
5. news and up-to-date information on mission milestones and discoveries
6. pathways to more enduring NASA options for STEM engagement including citizen science programs (e.g., [Sungrazer](#) – a project to discover comets passing close to the Sun in NASA spacecraft data)





PUNCH Outreach is founded on authentic needs & opportunities

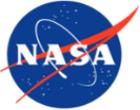
Dr. Nunn (quoted below) has committed to gather Hispanic youth who consult on PUNCH Outreach products and events intended for them and their families.

*“We are passionate about this collaborative effort that is not only innovative but will also ensure the presentation of **products and events that will be inclusive and relevant to historically underserved populations and in so doing, enhance the value of our efforts for all people in all communities.**”*

Tey Marianna Nunn, PhD
Director and Chief Curator
National Hispanic Cultural Center Art Museum
Albuquerque, NM



PUNCH Outreach is founded on authentic needs & opportunities among the populations we intend to benefit and learn from.



Outreach
for the
NASA
PUNCH
mission

Update on PUNCH Outreach: Outline of Presentation

1. Our Partners: Collaborators, Consultants, Advisors
2. Our Ancient & Modern Sun Watching Theme
3. Beginning of Respectful Collection of Chaco Photography
4. Summary of PUNCH Outreach Products and Events
5. **Roles for Scientists in PUNCH Outreach**

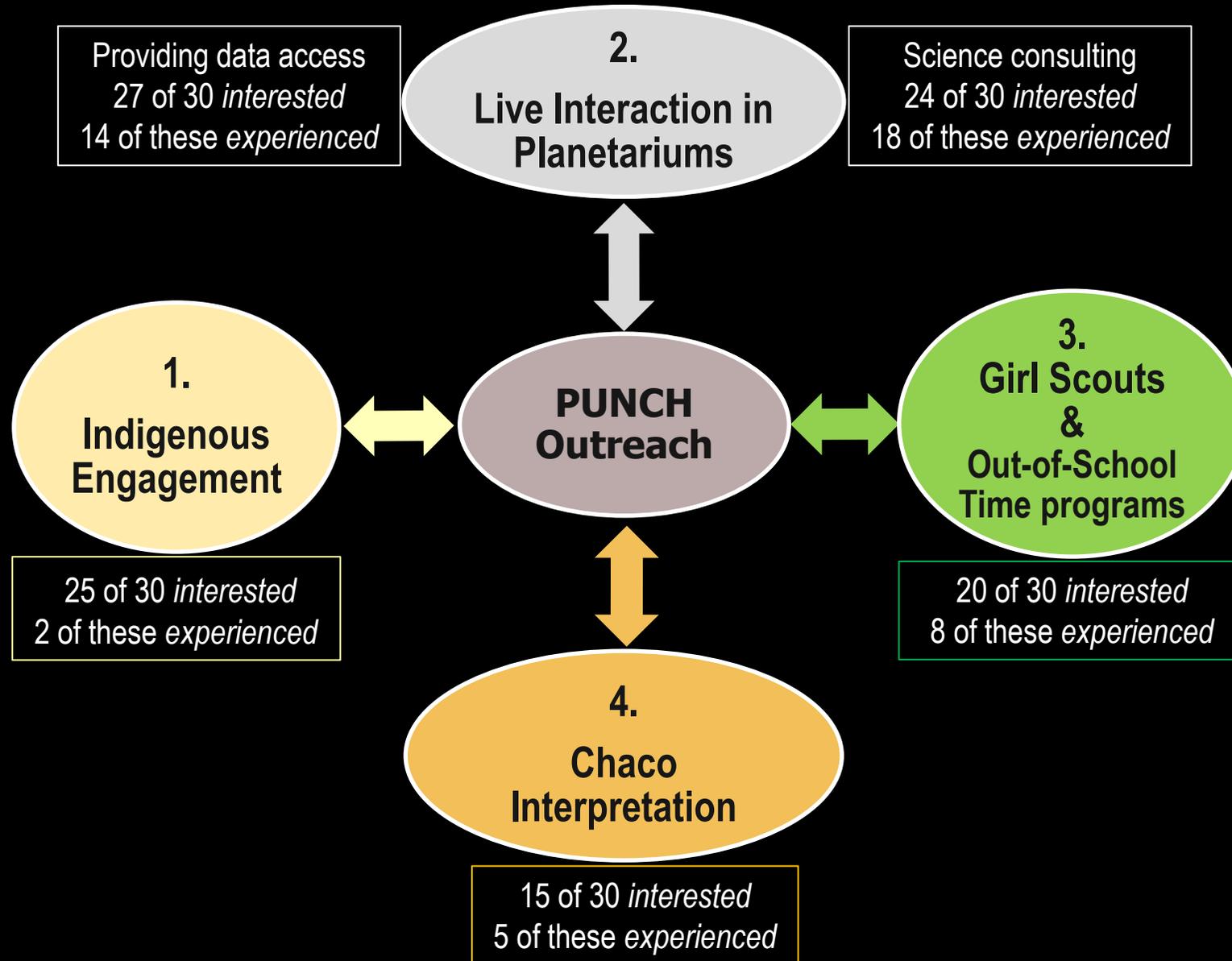


The PUNCH Science Team is Enthusiastic about Outreach

Survey of the <u>PUNCH Science Team</u> (N=30) 1-3 June 2020	I love to teach	I love to communicate my science to diverse audiences	I enjoy being a resource for the news media
% who “Agree” or “Strongly Agree”	> 60%	> 85%	> 65%

PUNCH leadership and the science team are providing an environment where an integrated program of outreach can THRIVE!

The PUNCH Science Team has the *interest* and *experience* to be effective in PUNCH outreach domains!

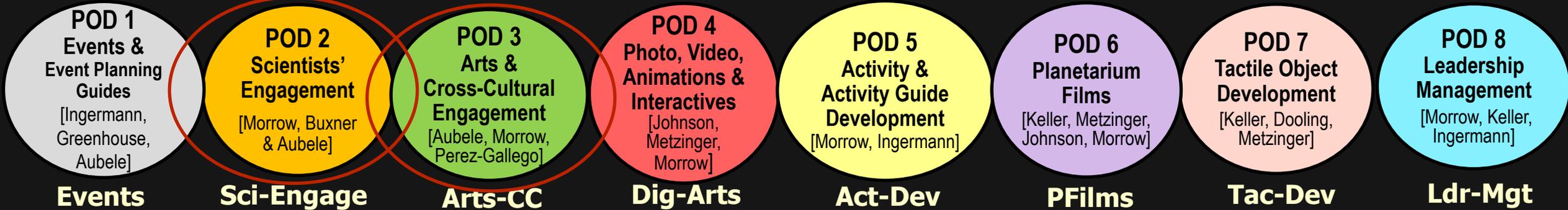


15 of 30 PUNCH scientists surveyed expressed interest in applying their artistic endeavors to an outreach context.



Dr. Heather Elliott – PUNCH Co-I, SwRI San Antonio, TX – Scene Setting Talk for WG1A

- Dr. Elliott studies Co-Rotating Interaction Regions in the heliosphere.
- The shapes and movement of her veils can represent features in the solar corona and solar wind.
- Dr. Elliot has expressed interest in contributing to our Girl Scout patch events and cross-cultural Community STEAM events. STEAM = **S**cience, **T**echnology, **E**ngineering, **A**rts, **M**athematics



We are “OPENING the *POD* Bay Doors” to the PUNCH Outreach Program!

PODs = *PUNCH Outreach Domains* assist with clustering collaborators from multiple institutions + consultants & advisors



Open the Pod bay doors, please, HAL.





There are diverse roles for scientists in addition to outreach talks

Diverse roles for scientists and other Subject Matter Experts (SMEs) in PUNCH Outreach

1. Provider of ideas & access to scientific data for planetarium films & tactile objects
2. Advisor, reviewer, or collaborator on outreach product development – Concepts & Options
3. Presenter, Artist, or Ask-a-Solar-Astronomer at outreach events for Girl Scouts, Latinx/Native American youth & families, Blind/Visually Impaired, Chaco visitors
4. Solar telescope operator at an outreach event
5. Featured interviewee for the Scientists as Hobbyists and Artists (Sci-HArt) podcast series
6. Episodic advisor for Girl Scouts earning a Sun-watching patch
7. Heliophysics presenters or consultant for the outreach team (e.g., at Annual Team Meeting this fall)
8. Mission or scientific leader that encourages outreach participation among peers

**Interested scientists on all NASA Heliophysics Missions are welcome!
Please contact me with your interest in contributing to PUNCH Outreach**



PUNCH Outreach will leave a legacy of products and partnerships that endure!

- PUNCH Outreach will positively affect hundreds of thousands of people in the 5-year period of PUNCH funding, and vastly more people as our sustainably designed products and event planning guides are used for many years afterward.
- PUNCH Outreach will also leave a legacy of interconnection and new institutional capacities of ongoing benefit to NASA's public engagement goals, even after the PUNCH mission is complete.
- PUNCH Outreach will engage interested heliophysicists and missions in high-impact, enjoyable outreach opportunities that allow support for diverse learners. Please contact me with your interest

