Presentation to NASA Astrophysics Advisory Committee

National Aeronautics and Space Administration

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Science Engagement
and Partnerships

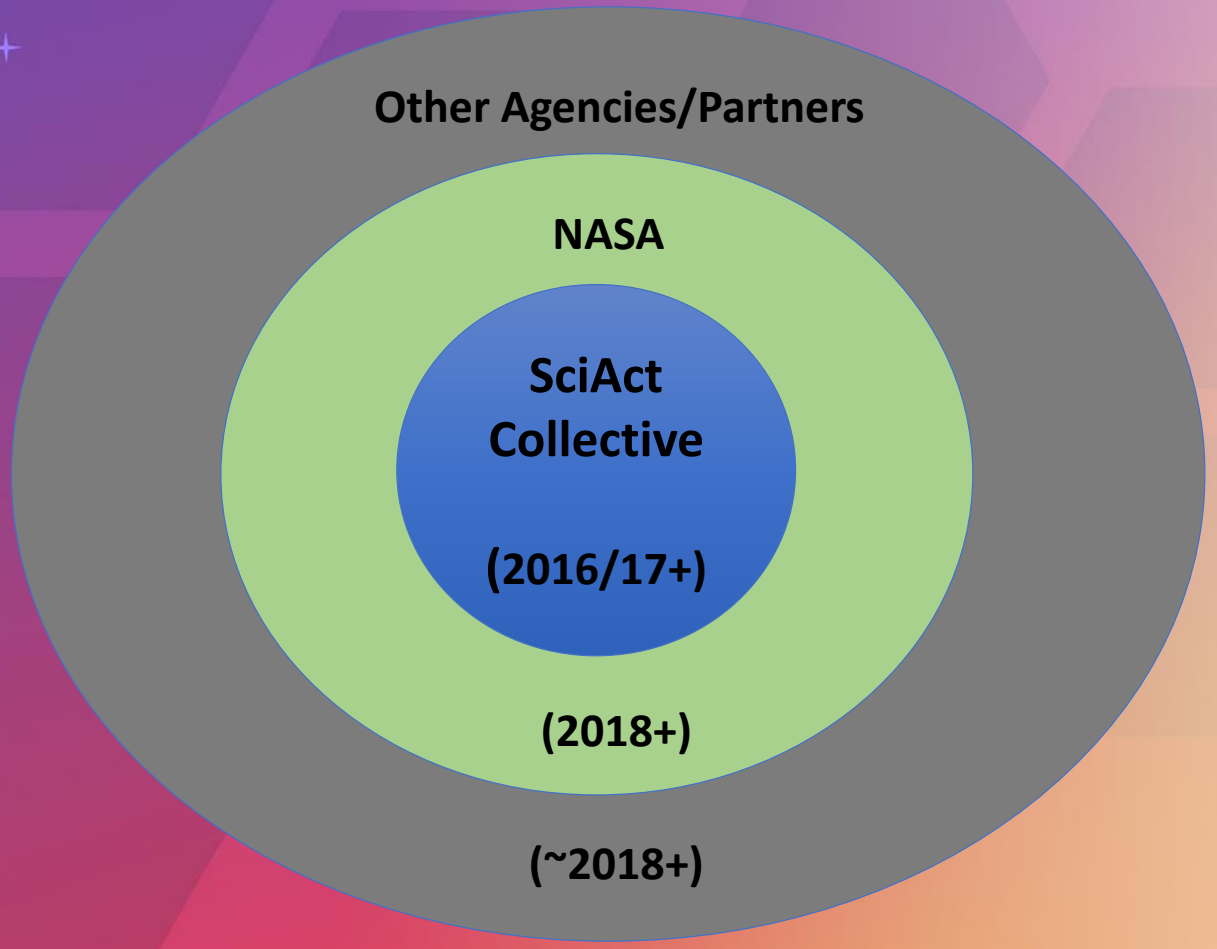
July 24, 2018

SMD Science Activation Desired Outcome:

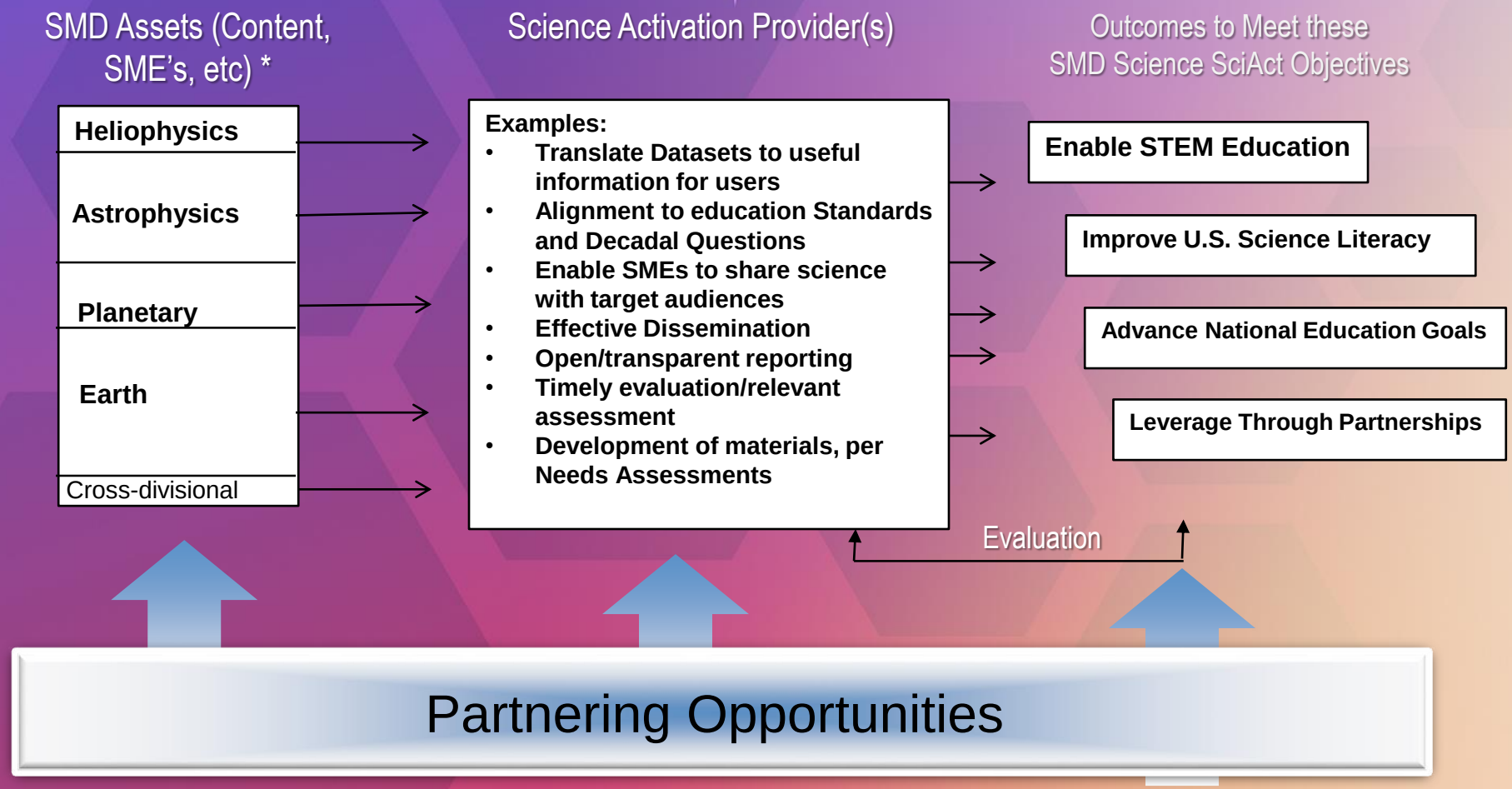
To further enable NASA science experts and content into the learning environment more effectively and efficiently with learners of all ages.

Perspectives

Baselined in November 2016, this collaborative model enables over 200 partnerships through a network of science and community-based institutions using a “multiplier effect” across the U.S. to achieve Objectives. Includes a number of digital learning approaches maximizing SMD’s unique capabilities (e.g. ViewSpace). Each agreement uses independent evaluators to validate performance.

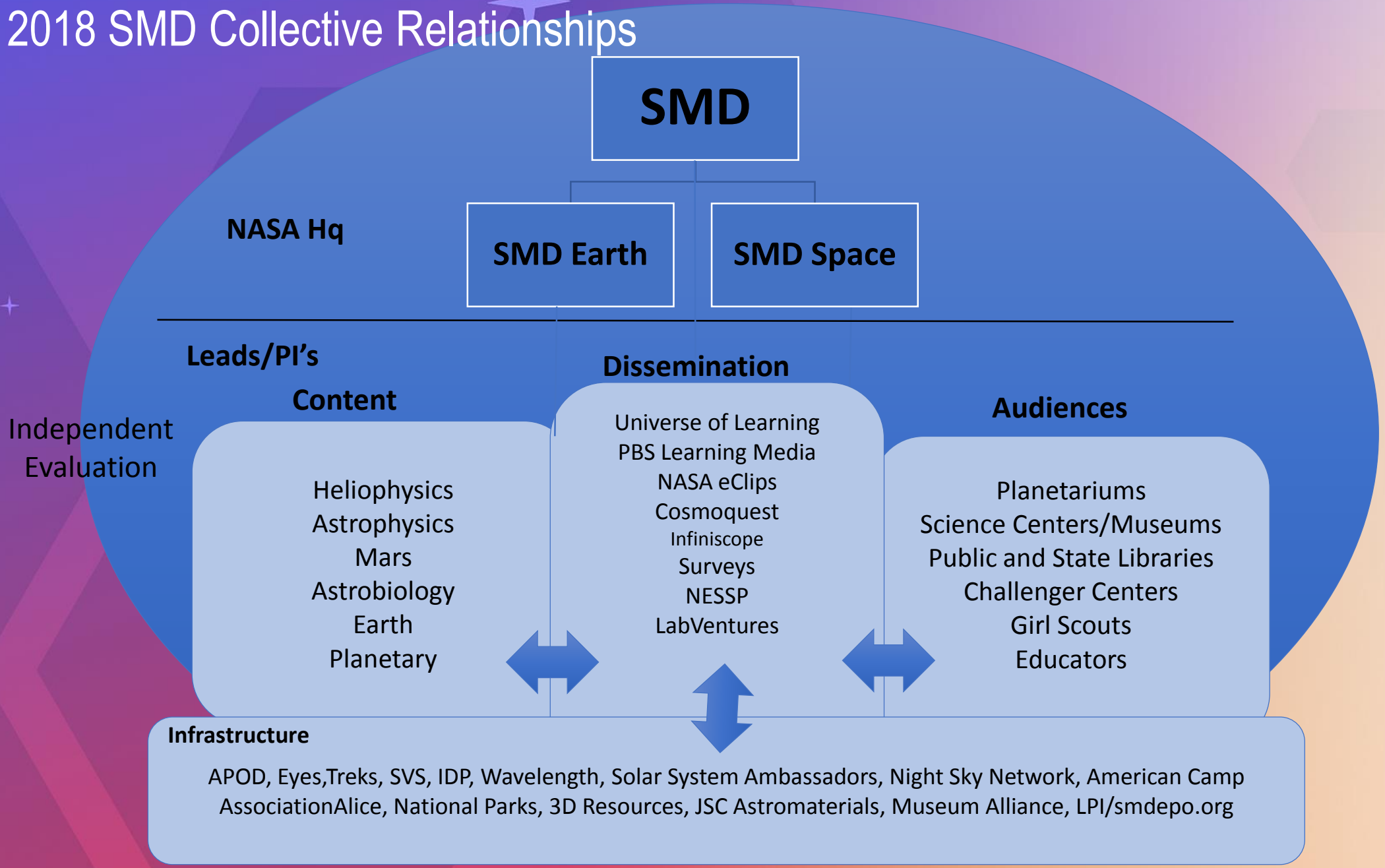


SMD Science Activation Model

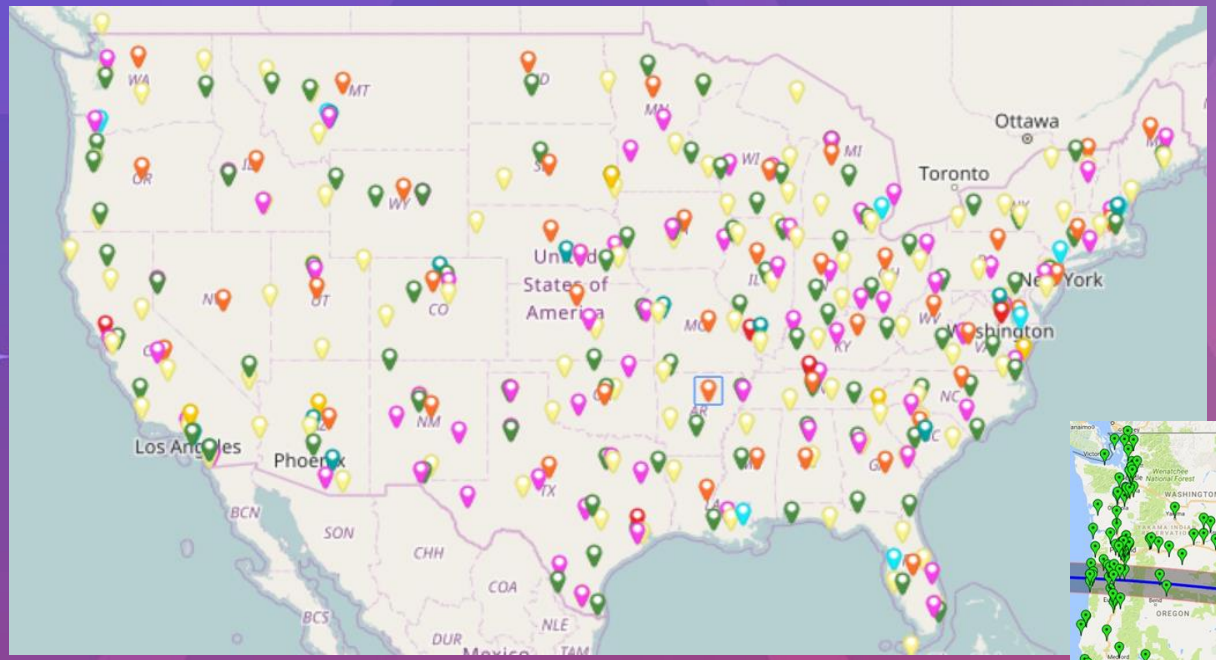


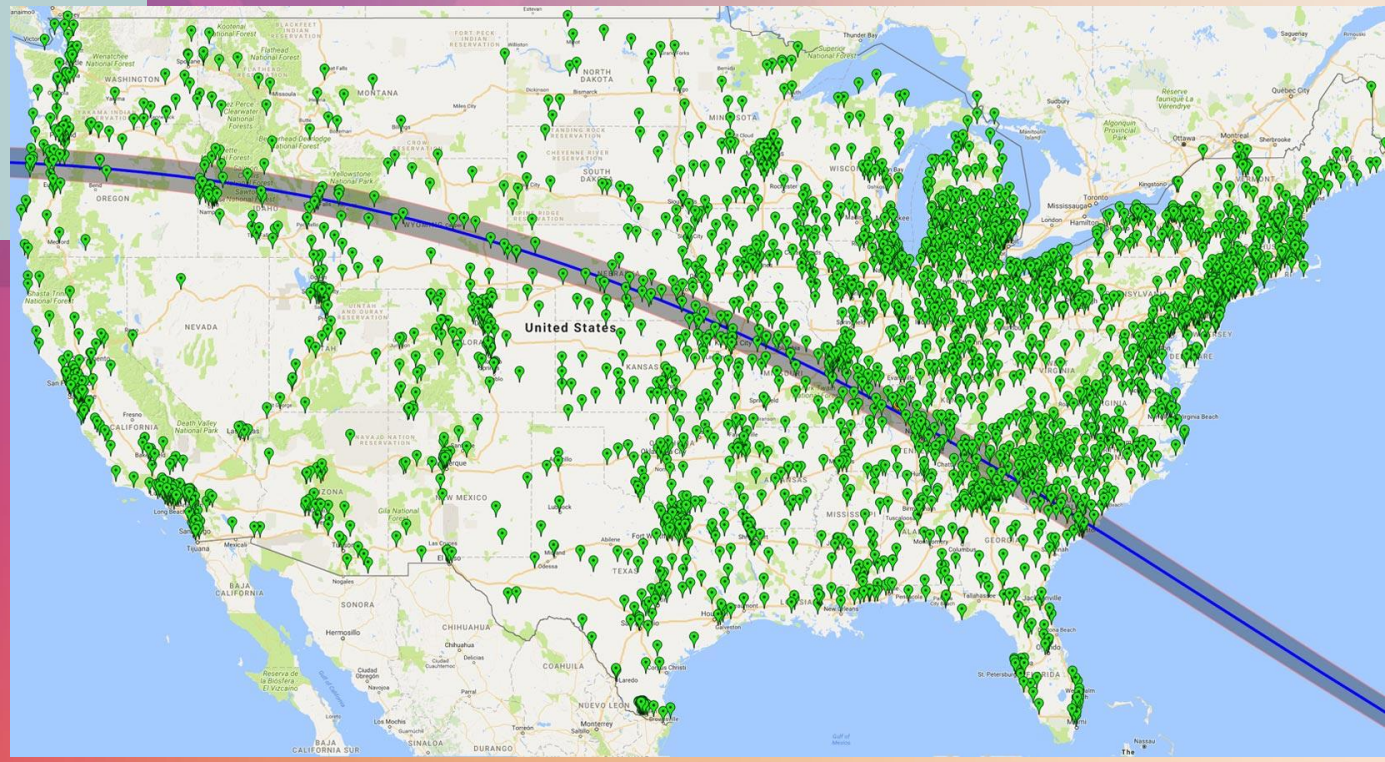
* Divisions responsible for science content datasets), SME selection, and enabling flight opportunities

2018 SMD Collective Relationships



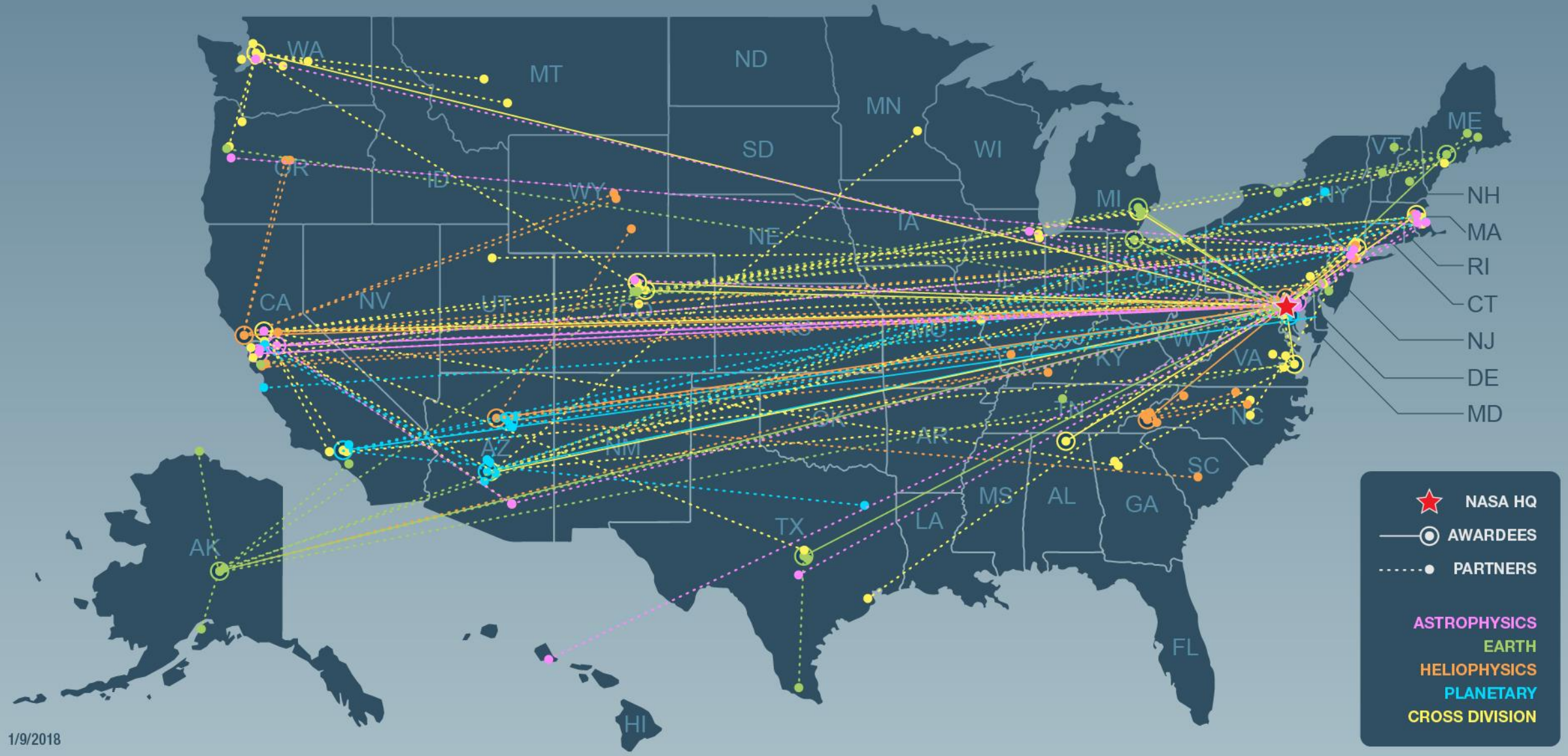
2016 “Reach”





2017 Reach: Eclipse Libraries

SMD Science Activation 2017 Partnership Map



NASA's Universe of Learning

An Integrated Astrophysics STEM Learning and Literacy Program

Contact PI/Dr. Denise Smith for Free Resources and how to get involved: dsmith@stsci.edu

SONOMA STATE UNIVERSITY

CHANDRA X-RAY OBSERVATORY

STScI | SPACE TELESCOPE SCIENCE INSTITUTE

ipac

JPL Jet Propulsion Laboratory California Institute of Technology

NASA's Universe of Learning

An Integrated Astrophysics STEM Learning and Literacy Program

Direct Connection to NASA Content


LETTER

Seven temperate terrestrial planets around the nearby ultracool dwarf star TRAPPIST-1

New Science Results

Subject Matter Experts

Our Program Elements

Data Tools & Participatory Experiences

Multimedia & Immersive Experiences

Exhibits & Community Programs

Professional Learning Experiences

NASA'S UNIVERSE OF LEARNING

Our program is designed to advance SMD Objectives:

- Enable STEM learning
- Improve scientific literacy
- Advance National Education Goals
- Leverage through Partnerships

STScI | SPACE TELESCOPE SCIENCE INSTITUTE

ipac

JPL Jet Propulsion Laboratory California Institute of Technology

Smithsonian Astrophysical Observatory

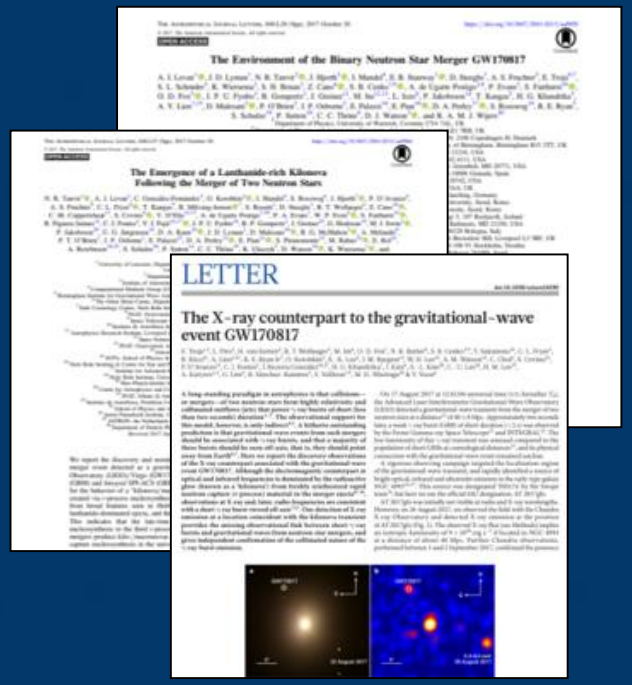
SONOMA STATE UNIVERSITY

External Evaluation

GRG Goodman Research Group, Inc

CORNERSTONE EVALUATION ASSOCIATES

Direct Connection to the Science Enables Rapid Response



October 16 & 20, 2017:
Neutron Star-Neutron Star Merger results published

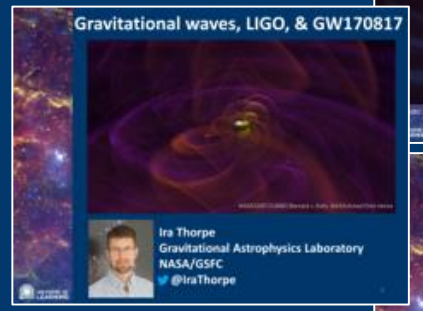
Multimedia

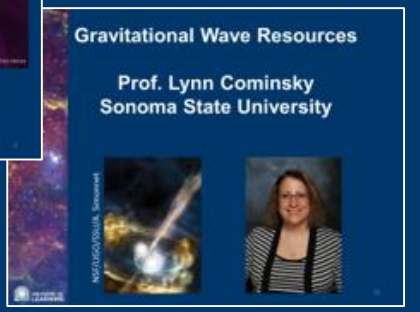
November 1, 2017

ViewSpace show disseminated to over 200 venues

November 2, 2017

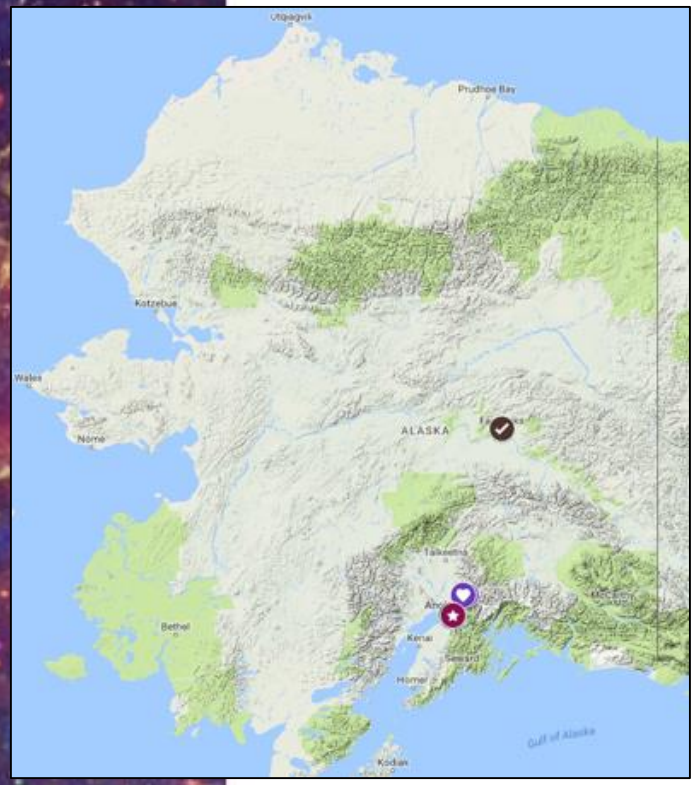
Informal Educator Professional Learning

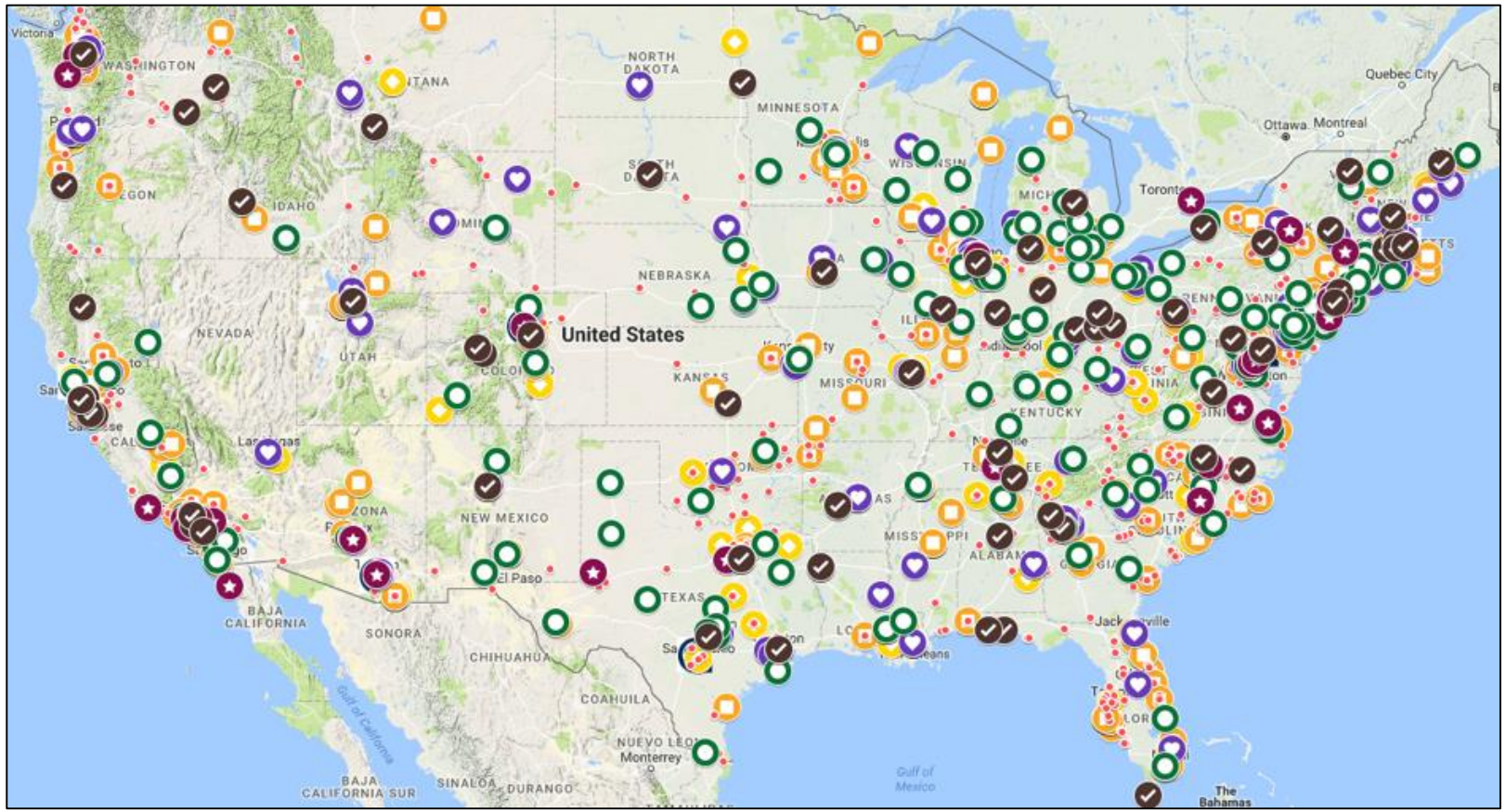




Science Briefing with NASA SMEs

NASA's Universe of Learning Reach Map





UoL Institutions & Partners

MicroObservatory

ViewSpace

AstroViz

Science Olympiad

Girls STEAM Ahead with NASA

Informal Learning Network

Science Briefing

SCIENCE RESOURCES

https://science.nasa.gov/toolkits/nasa-science-resources

Upcoming Opportunities

AGU 100 ADVANCING EARTH AND SPACE SCIENCE | FALL MEETING
Washington, D.C. | 10–14 Dec 2018

EXPLORE SCIENCE
Earth & Space

- **Announcement 100th AGU in DC** – Over 20 sessions including many led by SciAct team members. https://agu.confex.com/agu/fm18/prelim.cgi/Program/1694 **Abstracts are due by August 1, 2018. Astro welcome!**
- Cinespace video contest, **applications due August 1, 2018,** https://www.nasa.gov/press-release/cinespace-short-film-competition-returns-for-2018
- NASA Headquarters Office of Education invites organizations to apply to attend the **Space STEM Forum** to be held September 19, 2018 in Washington, D.C. at NASA Headquarters. The purpose of the Forum is to identify collaborative opportunities and leverage our individual STEM engagement efforts to maximize impact on students across the U.S. regarding space exploration as part of the upcoming 50th anniversary of the first Apollo moon landing. **Abstracts are due by August 11, 2018**. https://www.fbo.gov/notices/3074c52c312b6de4e621a889bae576ab
- The Girl Scouts' Daisy, Brownie and Junior Space Science Badge Requirement Booklets **available mid-August** https://www.gsnorcal.org/en/about-girl-scouts/stem/space-science.html
- WGBH PBS Learning Media release of Universe Learning Modules on **August 15, 2018,** to its 1.9M educator subscribers
- **Earth and Space 2019 Toolkits** - Includes activities designed for use in children's museums, science centers and museums, public planetariums and observatories, and NASA visitor centers in the U.S. Activities are designed for family audiences with a range of experiences appropriate for visitors ages 4 through adult. **Applications are due November 1, 2019.** Learn more about 2019 toolkit and how to apply

HIGHLIGHTS

AstroViz 2018

Held at Caltech/IPAC June 13-15

Bring together visualization experts (providers and consumers) to re-energize a community of practice

GOALS

Explore the current and future state of astrovisualizations

Credit: Astroviz 2018 / NASA's Universe of Learning

Initial Outcomes

Broader engagement than in previous astrovisualization workshops

- **Who:** 67 attendees and 64 web-based participants from around the world including scientists, visualization experts, educators, and software developers.
- **Roles in Viz Community:**
  - content providers,
  - educators who use/adapt content for their audiences,
  - developers who enable new tools for content creation and dissemination, and
  - disseminators who provide wider distribution.

Facilitated opportunities for new collaborations

- Brought together multiple communities to build new partnerships.
- Discussions held:
  - tools,
  - asset sharing,
  - immersive technologies,
  - audience-driven needs,
  - best practices, and
  - visual storytelling.

Inform the NASA Sci-Act Visualization Working Group

- Input from the workshop will inform the NASA Sci-Act Visualization Working Group white paper.

Attendee Evaluation Results

- 93% of respondents agreed: the workshop "helped re-establish a community of practice"
- Majority of respondents are highly likely to:
  - further a research topic discussed at the workshop (75%),
  - adopt a new strategy or practice presented at the workshop (65%),
  - share resources with a colleague who did not attend (63%)

Black Girls Code with NASA

- On April 14, 2018, Dr. Kimberly Arcand (Chandra/Smithsonian Astrophysical Observatory-SAO) organized with the Black Girls Code (BGC) New York Chapter, an all day workshop in Brooklyn, NY on "Coding the Universe with NASA"
- 40 students ages 9-13 worked with astronomers to use computers to create images of our Universe in 2D and 3D formats with hands-on activities
- Working with data from Chandra, Spitzer, Hubble and other telescopes, students experienced real world applications of science, technology and art, ending the day delivering presentations on their accomplishments to their families
- Speakers included Andrea Razzaghi Deputy Director of Astrophysics Division at NASA Headquarters, Jessica Harris STEAM Education Program Development Officer at National Radio Astronomy Observatory (NRAO), Scientist Emma Marcucci from the Space Telescope Science Institute, and volunteers from Chandra/SAO Kristin DiVona, Kayren Phillips and Aldo Solares
- Black Girls Code is a not-for-profit organization founded in 2011 by Kimberly Bryant that focuses on providing technology education for African-American girls

Jessica Harris, Dr. Kimberly Arcand and Andrea Razzaghi

May 24, 2018

Dr. Kimberly Arcand Chandra X-ray Center kkowal@cfa.harvard.edu

Project PANOPTES

Project PANOPTES is a beta project – our question:
Can members of the public participate in the discovery of transiting exoplanets using robotic telescopes they build themselves from store-bought components?

Yes they can! So far units have been used to observe transiting exoplanets, take astrophotography images, and observe solar system objects.

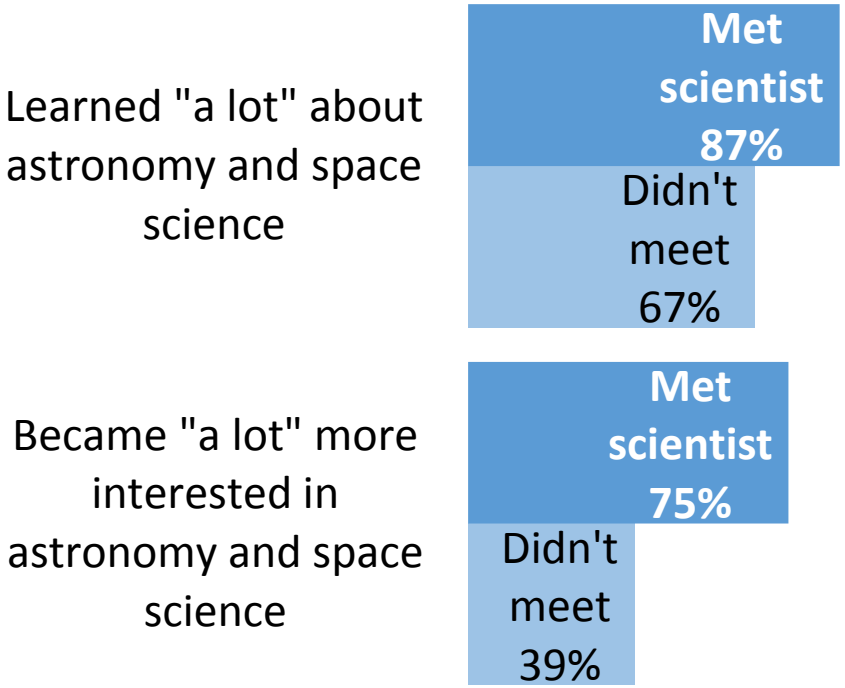
SME Partnership: NASA's Universe of Learning made a strategic decision to partner with MacArthur genius grant winning SME Dr. Olivier Guyon on his existing project (PANOPTES) to achieve SMD level goals

2017 STEM Science Activation Meeting
Evidence (Data) of Results/Impact
NNX16AC65A, NASA's Universe of Learning, Denise Smith (PI) and Goodman Research Group, Inc. (Lead Evaluator)

Girls STEAM Ahead With NASA

- Initial results of participant surveys show those who recalled meeting a scientist or engineer were more likely to report learning a lot and becoming a lot more interested in astronomy and space science.

Impact is greatest for those who meet a scientist/engineer.



QUESTIONS?

“Education is not the filling of a pail, but the lighting of a fire…and NASA is the spark”