

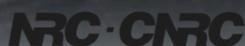
GEMMA

Gemini in the Era of Multi-Messenger Astronomy

Public Information and Outreach

Annual Report FY2019

Cooperative Support Agreement 1839225
Submitted September 30, 2019



Summary

The Public Information and Outreach (PIO) effort within the Gemini in the Era of Multi-Messenger Astronomy (GEMMA) program expands on Gemini's legacy of broader societal impacts with ambitious initiatives inspired by the scientific and technical developments supported through this program. The focus is on multi-messenger and time-domain astronomy and the role of Gemini and other ground-based facilities within this vast new discovery space. Ultimately, the story told through this work is of a New Era in scientific exploration, enabled by cutting-edge technologies and instrumentation supported by focused National Science Foundation (NSF) funding.

PIO will deliver products designed to communicate the concepts of multi-messenger astronomy (MMA) and time-domain astronomy (TDA) in an accessible manner while conveying the thrill of scientific discovery to media, journalists, and lay audiences.

During the entirety of this project, the goals of the GEMMA PIO efforts include the successful execution and/or delivery of the following:

- 1) MMA/TDA Communications Summit (MTCS), November 7-8, 2019 and final report and recommendations (road map)
- 2) MMA/TDA media workshop (MTMW), planned for the January 2021 meeting of the American Astronomical Society
- 3) Staff media training for staff in both Hawai'i and Chile
- 4) MMA/TDA planetarium programming modules
- 5) MMA/TDA internships (4- 6-month positions)

Collectively, these efforts will reach multiple and diverse audiences with sustaining impact extending well beyond the period of this grant.

Major Goals

During the period of this report work focused primarily on planning and development of the MMA-TDA Communications Summit.

Major Activities Accomplished Under these Goals

The primary activities include:

- Participant selection/confirmation (~30) - See Appendix for full participant list with bios
- Participant logistics (travel, accommodations, biographical compilation document etc.)
- Facility coordination
 - Selected Space Telescope Science Institute (STScI) as the venue for the Summit after considerable effort to use NSF facilities. As an AURA center, STScI provides a content-relevant site with necessary amenities and is centrally located for easy access by the majority of participants
 - Catering, technology and security all coordinated with STScI

- Solicited and contracted with Summit professional facilitator (Janesse Brewer)
- Developed and execution of participant survey (for agenda development)
- MMA/TDA Communications Summit agenda development initiated

The GEMMA Internship program began during the period of this report and the first of four intern positions began as of Sept. 3, 2019. This first intern, Chance Spencer developed plans to create a series of interview-based videos on MMA/TDA (among other initiatives) and will participate in the MMA/TDA Communications Summit in November.

Project management effectively monitored the GEMMA PIO program elements, developed Project Execution Plans, and tracked labor and non-labor budgets.

The MMA/TDA Communications Summit (MTCS) will convene science communicators, educators and scientists over a two-day period with the primary goal of developing a roadmap to advance the cause of effectively communicating the concepts of MMA & TDA to non-scientists.

The Summit will also assess the current landscape in MMA/TDA communications and identify primary challenges, opportunities, potential networks, and existing and new resources that will inform the future of MMA/TDA communications.

Concurrently, GEMMA interns will develop and evaluate educational content and materials for formal and informal science educational environments and assist in other communications initiatives which support the overall GEMMA program. The educational materials being developed will focus on MMA/TDA through the lens of NGSS (Next Generation Science Standards).

The initiation of the GEMMA internship program is beginning to provide unique opportunities for young career STEM professionals in education and communications. While begun late in the period of this report, the establishment of this program over the next two years will have a profound impact on these four individuals as indicated by the experience of our first intern.

Additionally, a 0.5 FTE young STEM career professional was hired in August to perform many of the reporting and logistical functions necessary to keep the program elements on track. Jameeka wrote the following statement regarding the impact of this work on her professional training: "I'm grateful for the opportunity to be a part of the GEMMA program. Working on the PIO team will deepens my understanding of multi-messenger and time-domain astronomy as well as providing invaluable education and outreach experience that will benefit me throughout my career. Not only is science education and outreach an important component of my current astronomy degree program, but it is also vital to increasing the general public's scientific literacy level which can lead to an improved understanding of the societal benefits of scientific research."

Results from the MMA/TDA Communications Summit will be disseminated after the Summit is completed; during the period of this report, there were no results to disseminate. Development of the MMA/TDA Communications Summit is raising awareness of the communications challenges

inherent in this new era in astronomical research. Many initial discussions have already been initiated during the planning phases that have identified issues, concerns and effective methodologies in MMA/TDA communications. This bodes well for the Summit which has generated a significant amount of discussions on topics related to MMA/TDA communications.

Project Management

Cost Management

Current overall budget, actual expenditures and open commitments as of August 31, 2019 are shown below in table 1. Payroll for September will increase the total expenditures for FY19. The negative percentage remaining is caused by open commitments for services that span multiple fiscal years. Carry forward of unspent funds will likely be minimal and will be finalized when FY19 is closed by CAS accounting.

Table 1. Budget and Expenditures

PIO, Publications, Education					
	Approved Budget	Total Expense FYTD	Current Open Commits	-Spend Remaining	-% Remaining
TOTAL WAGE & BENEFITS	51,073	39,283	0	11,790	23.08%
TOTAL TRAVEL	0	6,744	13,199	(19,943)	0.00%
TOTAL OTHER DIRECT COSTS	13,500	0	14,642	(1,142)	-8.46%
TOTAL EXPENSE	64,573	46,027	27,841	(9,295)	-14.39%
GRAND TOTAL	64,573	46,027	27,841	(9,295)	-14.39%

The PIO project financial report shows commitments for travel and contracted services. These were encumbered during FY19 for support of the MTCS summit and will be paid out at the conclusion of the summit in November.

Resource Management

See section on Risks and Issues

Milestones and Schedule

Table 2. Milestones

PIO	Completion Date	Revised Completion Date
MMA-TDA Communications Summit (MTCS) Milestones	12/30/19	
Development of MTCS key objectives and outcomes	8/30/19	Completed
MMA/TDA Internships	11/30/21	
Initiate hiring process for MMA-TDA internships	5/10/19	Completed
Intern #1 recruitment process	8/30/19	Completed

Risks and issues

While risks to the GEMMA PIO program elements remain minimal, availability of existing staff has been limited due to issues like TMT protests in Hawai'i and efforts to transition into a unified organizational structure including Gemini, NOAO, CTIO and LSST. We expect this transition will provide benefits as we enter the second year of this program and provide a net gain to the GEMMA PIO program. In Q4, Jameeka Marshal was hired for a 12-month position to assist in staff resources needed to implement logistics, documentation and communications for the GEMMA PIO program.

The Risk Register is currently maintained via google sheets. In Q1 2020, the manual use of spreadsheets for risk tracking will be discontinued in order to track risk and issues in Jira. Jira is software currently used by Gemini to manage Telescope Fault Reporting, ITS helpdesk, and Software Issue tracking. For the GEMMA program, Jira will be used to support project management and will organize, track and monitor risks and issues as well as providing document configuration management and change control.

The main Jira advantages to list are:

- visibility and traceability of all information associated with an issue (risk/issue/change)
- easy to sort and display information about issues i.e. searches/tables/reports
- easy to customize/tailor to suit the project's needs
- Gemini has established experience with the tool

Next Reporting Period Plan

For the next reporting period from 10-1-19 through 9-30-20:

- Execution of MMA-TDA Communications Summit and release of summary report and roadmap document
- Continuation of the GEMMA internship program with completion (and written summary) of first internship position, start (and completion) of second position, and solicitation and initiation of third position

- Planning for the January 2021 MMA/TDA media workshop will be undertaken during the next reporting period, which will include selecting panelists, securing a venue, coordinating travel for panelists, developing agenda and content focal points.
- Production on planetarium programming will begin in the middle of 2020 which will include consultation with planetarium professionals in formative evaluation of content, format and delivery schema. It is expected that a production house will be selected near the end of the next review period (although this might not be formalized until the next reporting period).

Multi Messenger Time Domain Astronomy Summit -- Participant Bios



John Blakeslee
Chief Scientist
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John Blakeslee is the Chief Scientist at Gemini Observatory. Previously, he worked as an Astronomer at the National Research Council of Canada's Herzberg Institute of Astrophysics. He also spent five years as a Research Scientist at Johns Hopkins University working with the Hubble Space Telescope's Advanced Camera for Surveys project. John received his PhD from MIT in 1997 and held postdoctoral positions at the California Institute of Technology and Durham University in the UK. John's research background is in extragalactic astronomy and cosmology, but since joining Gemini, he has authored articles on topics ranging from solar system objects to distant quasars. He led the development of Gemini's recently completed Strategic Scientific Plan for the 2020s.

Janesse Brewer



Joshua Chamot
Public Affairs Specialist
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Josh Chamot rejoined the U.S. National Science Foundation (NSF) as a Public Affairs Specialist in 2018, having previously served the agency from 2001 to 2013. He has helped lead several of NSF's MMA outreach efforts, including for the 2017 LIGO MMA announcement, the 2018 Ice Cube MMA announcement, and the 2019 EHT announcement. He currently oversees external communications and media relations for astronomy, physics, mathematics, materials science and chemistry, but throughout his tenure has worked with nearly every discipline NSF supports, from engineering to biosciences to polar programs. In addition to NSF, Chamot has held communications positions at the Smithsonian National Museum of Natural History and DOE's ARPA-E, was founding editor of the Expert Voices op-ed and features platform for Space.com/LiveScience.com, was content manager for Rockefeller Philanthropic's Nexus Media News, and wrote freelance science and medical content from 1998 through 2017. He received his M.S. in Geosciences from the University of Tennessee at Knoxville in 2000 and his B.S. in Geology from The College of William and Mary in 1998.



Lars Lindberg Christensen
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Lars is an award-winning astronomer and science communicator. He has authored a dozen popular science books translated into more than ten languages. Lars has directed more than 10 documentaries and planetarium movies that have received critical acclaim around the world. He is responsible for the communication, outreach and education for the combined US ground-based optical telescope system. He has managed the communication for some of the world's largest and most famous telescopes such as the Hubble Space Telescope (for ESA), and ESO's Extremely Large Telescope. He has produced for a multitude of different media from planetarium shows, laser shows, to web, social media, print, TV and radio. Lars has more than 200 publications to his credit, most of them in popular science communication and its theory. Lars received the Tycho Brahe Medal in 2005 for his achievements in science communication and has been credited with leading the most successful outreach efforts in ESO's history.



Whitney Clavin
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Whitney Clavin has been working in media relations and science writing at Caltech since 2016 (her formal title is Senior Content and Media Strategist). Her "beat" includes astronomy, physics, LIGO, math, humanities, and social sciences. Before coming to Caltech, Whitney worked at JPL for 13 years in a similar role, covering many of JPL's astrophysics missions, including Spitzer, WISE, and Kepler before it launched. Perhaps her biggest "claim to fame" in this field is organizing the first LIGO news conference in Washington DC, which announced the first direct detection of gravitational waves. She continues to cover LIGO today, working together with many of its partners, including MIT, NSF, and Virgo. Whitney's hobbies include roller skate dance, painting, and reading science fiction.



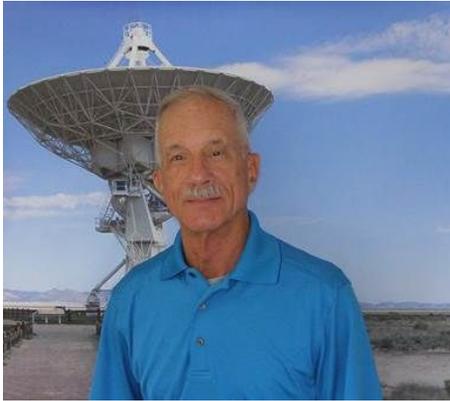
Chris Davis
National Science Foundation
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Dr. Chris Davis is a professional astronomer currently working for the National Science Foundation, Division of Astronomical Sciences, in Alexandria, Virginia. His main role is to provide oversight of the Gemini Observatory and the National Optical Astronomy Observatory (NOAO). Gemini comprises two of the largest and most advanced telescopes on earth, and is used by astronomers from the US, Canada, Chile, Brazil, Argentina, and Korea to study all manner of astronomical objects. NOAO operates a range of mid-sized telescopes in Arizona and Chile and supports US community access to data holdings and services. Prior to his move to the metropolitan D.C. area, Davis spent three years in England where he acted as Astronomer-in-Charge of the Liverpool Telescope, a fully-robotic 2-m telescope in the Canary Islands that specializes in time-domain astronomy. He also taught practical astronomy to undergraduates from the University of Liverpool, and was involved with the National Schools' Observatory, an initiative aimed at introducing practical astronomy to school children across the UK and Ireland. In 2011-2012 Davis was based at NASA Headquarters in Washington D.C. where he acted as Discipline Scientist for infrared astronomy and Program Scientist for SOFIA, an infrared telescope that flies on board a Boeing 747 jet aircraft. Before this he spent almost 14 years in Hawaii, where he was employed as a Support Astronomer at the United Kingdom Infra-Red Telescope.



Rick Fienberg
AAS Press Officer
American Astronomical Society
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Dr. Rick Fienberg is the American Astronomical Society's Press Officer. From 1986 to 2008 he served in a variety of editorial and management positions at Sky & Telescope magazine, including eight years as Editor in Chief. He spent the 2008-2009 academic year as Visiting Scientist in Astronomy & Astrophysics at Phillips Academy, the prestigious college-preparatory school in Andover, Massachusetts. Though trained as a professional astronomer, Rick remains an amateur at heart, observing the sky and taking astrophotos from his private observatory in central New Hampshire. An inveterate traveler, often in pursuit of total solar eclipses, Rick has visited all seven continents and the North and South Poles.



Dave Finley
Public Information Officer
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Dave Finley is Public Information Officer for the National Radio Astronomy Observatory in Socorro, New Mexico. A former science/medicine editor for The Miami Herald, he has taught astronomy and geology at the college level, and led technical documentation efforts at two supercomputer centers. He has served as a volunteer public affairs officer for astronomy clubs, amateur-radio organizations, and the Civil Air Patrol.

Pamela Gay
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Ranpal Gill
Head of Communications Office
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Ranpal K. Gill is the Head of Communications Office for the Large Synoptic Survey Telescope where she leads the Communication Team efforts for LSST, assists the Director's Office with project-wide coordination, communication and reporting tasks. She holds a B.Sc. in Computer Science, has an MBA, is a Prince2 registered practitioner and a certified Project Management Professional (PMP). Ranpal has 24 years of experience and prior to joining LSST in March of 2017 Ranpal worked across a range of sectors for companies such as the European Space Agency, Honda, Lloyds Bank and IBM. At LSST, she continues her mission of convincing scientists and engineers that planning is good for them.



Janice Harvey

Community Outreach and
Education Programs Leader
Gemini Observatory
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Janice Harvey is the Community Outreach and Education Programs Lead at Gemini Observatory and serves as the director of the nationally recognized Journey through the Universe Program on the Big Island. Janice is the PIO coordinator for the GEMMA NSF funded award, the National Team Site Leader for the Family Astro/Project Astro program in Hawaii as well as a StarLab Portable Planetarium instructor and trainer. In 2010 she was awarded the Outstanding Individual in Business award by the Rotary Club of Hilo. Janice has a BS in mathematics attained through a music scholarship, and went back for her associate degree in astronomy in 2000 at UHH. She has lived on the Big Island for 48 years and has worked as the Mayor's Executive Assistant, owned and managed Sylvan Learning Centers and travel agencies in both Honolulu and Hilo. Janice's passion is bringing science and astronomy into the local classrooms.



Martin Hendry

Head of School of Physics and
Astronomy
University of Glasgow
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Martin Hendry is Professor of Gravitational Astrophysics and Cosmology at the University of Glasgow, where he is currently Head of the School of Physics and Astronomy. He is a senior member of the LIGO Scientific Collaboration (LSC), serving on the LSC Management Team and chairing the LSC Education and Public Outreach Group. Since 2015 he has played a leading role in planning and supporting the major LIGO and Virgo press announcements and press conferences about gravitational-wave discoveries, as well as managing the LSC's various social media platforms.

Before moving into gravitational-wave astronomy, Martin's early research work was mainly in galaxy surveys and the cosmic distance scale – with the common theme of developing new and powerful Bayesian analysis methods. His main current research interests are in multi-messenger cosmology using “standard sirens”. He is a Fellow of the Institute of Physics and the Royal Society of Edinburgh.



Robert Hurt
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Dr. Robert Hurt is an astronomer and “AstroVizicist” at Caltech-IPAC with a research background in star formation and galaxies. He specializes in data visualization and the development of illustrations and video to communicate science. He has been the imaging lead for for a variety of NASA missions spanning the spectrum of light including the Spitzer Space Telescope, WISE, GALEX, and NuSTAR; ground-based mission support includes LIGO and ZTF. He also produces science-based illustrations and animations; his work has recently appeared on the cover of Nature, and his illustrations of exoplanets, black holes, and the Milky Way are widely used by the news and science media.



Hussein Jirdeh
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As the head of the office of public outreach, Dr. Hussein Jirdeh leads the institute’s communications and public engagement programs, which inform and inspire the public about the discoveries of the Hubble Space Telescope as well as the James Webb Space Telescope. In this role, Dr. Jirdeh develops and oversees communication strategies, informal education activities, community outreach programs, news releases, media outreach, as well as product and service development and implementation, which provide cutting-edge science to the nation. Before joining the institute in 2012, Dr. Jirdeh served as the director of university relations at the Universities Space Research Association (USRA). He is a current member of the National Optical Astronomy Observatory’s Education and Public Outreach Advisory committee. He has served as a board member on the Maryland Space Business Roundtable and as a reviewer for NASA and the National Science Foundation.

Lisa Joy



Amanda Kocz
Director of Communications
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Amanda Kocz is the Director of Communications for the Giant Magellan Telescope project. In this role she manages a small internal team in Pasadena and Chile, and an external PR team, to bring the news and progress of the GMT construction to the project's stakeholders – such as the astronomy community, the general public, and the GMT project's 12 founder institutions. She works closely with the GMT project's Development team to produce materials for fundraising and plays a key role in fundraising event planning and execution – e.g. for the 2019 eclipse in Chile. Amanda has a BSc in Physics from the University of Queensland, Australia, an Honors degree in Astronomy from the Australian National University, and an MSc in Science Communication from the ANU.



Elizabeth Landau
Senior Storyteller
Public Engagement Department
Jet Propulsion Laboratory
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Elizabeth Landau is an award-winning journalist and science communicator. She is Senior Storyteller in the Public Engagement department at NASA's Jet Propulsion Laboratory, on detail at NASA Headquarters as a public affairs officer for NASA's Science Mission Directorate as well as a freelance writer for magazines and science news websites in her spare time. She holds a bachelor's degree in anthropology from Princeton University and a master's in journalism from Columbia University. In 2014, Liz was selected to participate in the Atlantik-Brücke Young Leaders Conference near Munich, Germany.

Shari Lifson
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Jennifer Lotz
Director
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Dr. Lotz received her PhD in astrophysics from Johns Hopkins University in 2003. Prior to her appointment at Gemini, she held a tenured associate astronomer position at STScI and a joint appointment as a research scientist at Johns Hopkins University. Previously, she was a Leo Goldberg Fellow at the National Optical Astronomy Observatory, and a postdoctoral fellow at U.C. Santa Cruz. She is a leading expert in the field of galaxy mergers, and makes use of both ground-based and space telescopes to track the growth of galaxies over cosmic time.



Peter Michaud
Public Information and Outreach
Manager
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Peter D. Michaud, Gemini's Public Information and Outreach Manager, has pursued a career that has provided a broad set of experiences in education, media relations and photography. These have ranged from the initiation and management of many informal science education programs to the authoring of a monthly newspaper column on astronomy. Prior to moving to Honolulu in 1989 to manage the Bishop Museum Planetarium, Peter obtained his Bachelor's Degree in Atmospheric Physics and certification in Physical Science Education in 1985. This led to his selection for the highly competitive annual planetarium education internship at the Strasenburg Planetarium in Rochester N.Y. in 1985 - 86. During almost a decade at the Bishop Museum Planetarium, Peter worked closely with local educators as well as the Mauna Kea astronomical community and initiated many new projects that included a NASA-funded project to produce a nationally distributed planetarium program about Mauna Kea. In June 1998, Peter accepted his current position at the Gemini Observatory in Hilo. Since arriving here, Peter has been involved in a variety of projects that have included the management of multiple outreach, education and media relations initiatives. An example of the innovative products produced by his office is the Gemini Observatory Virtual Tour CD-ROM/Kiosk which is currently being translated into multiple languages and has been installed in a variety of public facilities around the world.



Iris Nijman
Science Writer
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Iris Nijman is a science writer from the Netherlands, currently living in Charlottesville, Virginia. It is her passion to actively involve non-scientists in science, and to make complicated topics intelligible and exciting for the general public. Iris has been working in the field of astronomy communication since 2011. She has done science communication and outreach for the Netherlands Institute for Radio Astronomy (ASTRON), project management for global education programs like Universe Awareness and IAU100 Einstein Schools, and freelance writing for Leiden University and the National Radio Astronomy Observatory (NRAO), among others. Currently, Iris is Public Information Specialist for the National Optical Astronomy Observatory (NOAO).



Christine Pulliam
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Christine Pulliam is News Director at the Space Telescope Science Institute. She leads the efforts to disseminate the discoveries and images of the Hubble Space Telescope. As JWST News Chief, she also publicizes the scientific capabilities of the upcoming James Webb Space Telescope.

Christine has traveled to observatories in Texas, Arizona, Hawaii, Chile, and Russia. She has witnessed two total solar eclipses. Christine is a published author with articles in *Sky & Telescope* magazine. She was a contributing writer for the National Geographic book *Planets, Stars & Galaxies*. Christine also is a licensed private pilot.

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Ethan Siegel
Freelance Science

Ethan Siegel was born in New York, majored in three different subjects as an undergrad, and earned his Ph.D. in theoretical physics. After postdoctoral research focusing on dark matter and cosmic structure formation and a number of teaching stints, he became a physics professor at Lewis & Clark College and a professional science communicator. He now focuses on writing and speaking full-time, has authored two books, and is perhaps best known for his blog, *Starts With A Bang*, currently on Forbes.

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Gordon Squires
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Gordon Squires is the VP for External Relations for TMT, and leads the international workforce development, education, public outreach and communications (WEPOC) efforts for the project. His team – the IPAC Communications and Education team – is co-located at Caltech/IPAC and provides WEPOC support for a number of astronomy- and physics-related projects including TMT, NASA’s Spitzer Space Telescope, WFIRST, Euclid, the Herschel Space Observatory, the Wide-field Infrared Survey Explorer, Galaxy Evolution Explorer, Kepler, LIGO & the IPAC archives. Gordon is a co-investigator in NASA’s SMD Science Activation program “Universe of Learning.”

Gordon received his Ph.D. in astrophysics 1995 from the University of Toronto. For his thesis, he was awarded the Doctoral Prize by the Natural Sciences and Engineering Research Council as the most outstanding Ph.D. thesis in Canada in 1995, and the Plaskett Medal by the Canadian Astronomical Society for the most outstanding thesis in astronomy in 1995. His research explores the old, distant universe – understanding how galaxies formed and evolved billions of years ago, and probing the nature of the dark matter via weak gravitational lensing.

Gordon was a postdoctoral fellow at the University of California - Berkeley from 1995-1998, and a Hubble Fellow at Caltech from 1998-2001. Since 2001, Gordon has been with Caltech/IPAC, and with TMT since 2011. In 2008, Gordon was awarded the NASA Exceptional Public Service Medal for "exceptional contributions to the mission of NASA."



Swati has worked at the National Science Foundation since 2018, in the Directorate for Mathematical and Physical Sciences. Her role at NSF includes strategic communications, administrative support for MMA activities, and support for oversight of large facilities. Prior to joining NSF, Swati was in the U.K. for graduate study, completing master’s degrees in biotechnology policy and environmental governance at the Universities of Edinburgh and Oxford. Her primary research focus

<p>Swati Sureka Science Assistant National Science Foundation ssureka@nsf.gov</p>	<p>was on the politics of public sector research systems in postcolonial states. She holds an undergraduate degree in chemistry and biology from Cornell University, where her research focused on synthetic biology and DNA-based materials.</p>
<div data-bbox="225 449 628 894" data-label="Image"> </div> <p>Richard Terrile Astronomer Jet Propulsion Lab Project Manager of the Nuclear Spectroscopic Telescope Array (NuSTAR) X-ray observatory richard.j.terrile@jpl.nasa.gov</p>	<p>Dr. Rich Terrile is an astronomer at NASA's Jet Propulsion Laboratory and Project Manager of the Nuclear Spectroscopic Telescope Array (NuSTAR) X-ray observatory. He has BS degrees in Physics and Astronomy from the State University of New York at Stony Brook and an MS and Ph.D in Planetary Science from the California Institute of Technology. Over his nearly 40-year career at JPL he has over 225 publications over a wide range of science and technology areas. Dr. Terrile is the discoverer of four moons around Saturn, Uranus and Neptune and took the first pictures of another solar system around the nearby star Beta Pictoris. He has designed and built ground-based coronagraphs and instrumentation, co-designed the coronagraph for the Hubble Space Telescope NICMOS instrument and is a member of the NICMOS and Voyager science teams. In 1988 he was awarded the NASA Exceptional Scientific Achievement Medal ("For the discovery of the Beta Pictoris disk and the innovative design of the enabling coronagraph. This work led to the establishment of a new field of direct imaging of extra-solar planetary systems."). He has been the Principal Investigator and Project Scientist of the JPL Circumstellar Imaging Telescope and for the Astrometric Imaging Telescope Programs. He was also the creator and director of a Science and Technology Center of Excellence (Center for Evolutionary Computation and Automated Design - CECAD), Chief Scientist for the Outer Planets and Solar Probe Program and Project Scientist of the Pluto Express Mission. He has run programs in Astronomy and Astrophysics, Planetary Atmospheres, Planetary Geology, Ring Science, Instrument Development (PIPPD), Technology Development and Laboratory Innovation.</p> <p>Dr. Terrile is a private pilot, a SCUBA and ski instructor, a rock climber a caver, and was an astronaut candidate. He has interests in fiction writing, photography, cinematography and movies, and works as a technical advisor on several major motion pictures, including work</p>

	<p>with Academy Award winning directors James Cameron and Steven Soderbergh. Dr. Terrile was featured in several science shows and has been a regular performer at the Ice House and the Comedy Store in the "Improv Inferno" improvisation group.</p>
<p>Ray Villard villard@stsci.edu</p>	
 <p>Megan Watzke Press Officer Chandra X-ray Observatory mwatzke@cfa.harvard.edu</p>	<p>Megan Watzke is the press officer for the Chandra X-ray Observatory, a NASA space-based telescope that is the sister mission to the Hubble Space Telescope. Her responsibilities for Chandra include the dissemination of exciting science of X-ray astrophysics, which includes black holes, exploding stars, dark matter, dark energy, and much more. Her role includes writing, editing, and developing everything from press releases to blog posts to video scripts, and many things in between.</p> <p>Ms. Watzke helped create the “public science” model that brings scientific content into the everyday experiences such as in public parks, subway stations, libraries, etc. These projects have included “From Earth to the Universe,” “Here, There, and Everywhere,” and “Light: Beyond the Bulb.” Ms. Watzke was a co-recipient of the Mani Bhaumik Prize for Excellence in Astronomy Education and Public Outreach in 2010 as well the Pirelli International science communication awards for physics. Ms. Watzke is a member of the Northwest Science Writers Association and the National Association of Science Writers. She has co-authored five non-fiction books: “Your Ticket to the Universe”, “Light: The Visible Spectrum and Beyond”, “Coloring the Universe: An Insider’s Guide to Making Spectacular Images of Space”, “Magnitude: The Scale of the Universe”, and the upcoming “Light From the Void: Twenty Years of Discovery with NASA’s Chandra X-ray Observatory”.</p>

PIO Risk Register A - PIO - 005

PIO Risk Register A - PIO - 005																
Part I. Risk Identification					Part II. Risk Analysis for Existing Controls				Part III. Risk Response							
Name	Project Risk Category	Risk Description (ignoring controls)	Impact 1-5 (ignoring controls)	Likelihood 1-5 (ignoring controls)	Total Risk Score = 1 - 8 Low = 9 - 16 Med = 17 - 25 High	What Controls (if any) are currently in place?	Control Effectiveness 1-5	Residual Risk Score Low = 1 - 8 Med = 9 - 16 High = 17 - 25	Control or Risk Mitigation Strategy	Control effectiveness based on mitigation strategy 1-5	Residual Mitigated Risk Low = 1 - 8 Med = 9 - 16 High = 17 - 25	Contingency Plan	Cost of contingency plan	Owner	Review Due Date	Status
TMT Demonstrations	Schedule	If the demonstrations continue and Peter and Janice are unable to work on GEMMA the schedule may slip.	3	5	15	Some reassignment of current PIO staff	5									
TMT Demonstrations	Cost	If the demonstrations continue and Peter and Janice are unable to work on GEMMA the PIO will continue to be underspent.	4	4	16	Some reassignment of current PIO staff	5									
Limited MTCS Participant Availability	Quality	If key Summit participants are unavailable or unable to participate then the quality of the summit's results will be adversely impacted.	4	1	4	n/a	0	8	Early communications and commitments with desired participants and providing travel expenses	4	3	Select from back-up candidates	Additional staff time ~\$5,000	PM	July 2019	Open
Venue Availability for MTMW	Quality	If first choice of venue (AAS January 2021) is not available for workshop an alternate, less optimal venue will need to be selected.	4	2	8	n/a	5	11	Early communications with AAS Press Office and engagement with AAS as partner in workshop	2	6	Pay for venue	~\$2000	PM	July 2020	Open
MMA/TDA Planetarium Program Production Costs	Scope	If contractors cannot deliver planetarium program with all scripted elements within existing budget program's scope will have to be reduced.	4.5	2.5	11.25	n/a	5	11	Develop program script to utilize known existing and partnership resources wherever possible.	3	6	Expand partnerships to share production costs for animations related to featured facilities (LSST, LIGO etc.)	Up to 6-month delay with increased staff time required ~\$20k	PM	June 2020	Open
Limited Staff Resources	Resources	If one or more existing staff leave the project because of illness, turnover or internal opportunities then the project will be impacted.	4	4	16	n/a	5	16	1) Monitor staff employment situations 2) Offer monetary incentive to keep staff	2	4	1) Execute contract for temp employees 2) Execute staff monetary incentive	Hourly rates and incentives TBD ~\$5,000	PM	Quarterly	Open