

December 2017 • Issue 51

## Currents

### In this Issue...

#### **NOAO at the January AAS Meeting**

Join us at the upcoming AAS Meeting, 7-12 January 2017 in Washington, DC for these NOAO-related events:

- [\*\*National Center for Optical-Infrared Astronomy \(NCOA\) Town Hall\*\*](#)  
Thursday, 11 January 2018, 12:45-2:00pm, Potomac Ballroom C
- [\*\*NOAO/Gemini Mini-Workshop: Target of Opportunity Observing in the LSST Era\*\*](#)  
Tuesday, 9 January 2018, 2:00-3:30pm, Chesapeake H
- [\*\*Thirty Meter Telescope Open House\*\*](#)  
Wednesday, 10 January 2018, 5:30-6:30 pm, National Harbor 2
- [\*\*CHARA Community Workshop: Designing and Implementing Observations with the CHARA Array Interferometer\*\*](#)  
Sunday, 7 January 2018, 10:00 am – 3:00 pm, Potomac Ballroom 6
- [\*\*Dark Energy Survey – Results and Data Release\*\*](#)  
Wednesday, 10 January 2018, 2:00-3:30 pm, Potomac Ballroom C
- [\*\*Triple Threat to Multi-Wavelength Observational Astronomy\*\*](#)  
Tuesday, 9 January 2018, 2:00-3:30pm, Maryland Ballroom A
- [\*\*NSF Town Hall\*\*](#)  
Tuesday, 9 January 2018, 12:45-2:00pm, Potomac Ballroom C
- [\*\*Gemini Open House\*\*](#)  
Tuesday, 9 January 2018, 5:30-6:30 pm, Chesapeake H
- [\*\*LSST Town Hall\*\*](#)  
Wednesday, 10 January 2018, 7:30-9:00pm, Potomac Ballroom D
- [\*\*National Academy of Sciences Town Hall: Astro2020 – The Next Decadal Survey of Astronomy and Astrophysics\*\*](#)  
Wednesday, 10 January 2018, 6:30-8:30 pm, Potomac Ballroom C

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#### **National Center for Optical-Infrared Astronomy (NCOA) Town Hall:**

A new organization will be formed from the combination of the current activities of Gemini Observatory and NOAO, with the planned activities of LSST Operations to be

added as they ramp up. Development plans will be described at a Town Hall at the AAS meeting. Following a brief presentation by David Silva (NCOA Project Director), representatives from all three organizations will field questions and comments from the audience. Please join us! [Read more...](#)

**NOAO and Gemini Target of Opportunity Observing in the LSST Era:** The US National Gemini Office will host a splinter session at the January AAS meeting on target of opportunity observing now and into the LSST era. Join in to hear about current experiences and anticipated changes in observing protocols in preparation for the LSST era. [Read more...](#)

**Dark Energy Survey's First Data Release Accessible via the NOAO Data Lab:** DES will issue its first data release on **10 January 2018** in conjunction with a special session at the January AAS meeting. The data will be available through the [NOAO Data Lab](#) and other portals. Drop by the NOAO booth at the AAS meeting to see a demonstration, using the DES data, of Data Lab's visualization and exploration capabilities. [Read more...](#)

**Join the TMT International Science Development Teams:** The annual call for new members of the Thirty Meter Telescope (TMT) International Science Development Teams (ISDTs) is now open. The ISDTs involve astronomers worldwide in scientific planning to help shape the observatory's capabilities, operations plan, and future directions. Membership is open to all PhD scientists. Applications are due **26 January 2018**. [Read more...](#)

**TMT Instrumentation White Papers Solicited:** Planning for first light instrumentation and adaptive optics (AO) at the Thirty Meter Telescope (TMT) International Observatory is well advanced, and the TMT science community has begun to develop ideas for future-generation capabilities. Researchers and instrumentalists are invited to submit white papers proposing design studies for new TMT instruments, AO systems, or other technical capabilities by **21 March 2018**. [Read more...](#)

**Registration Open – "DECam Community Science Workshop 2018: Science Highlights, Coming Opportunities, LSST Synergies":** Current, past, and prospective users of DECam and its archival data are invited to share their DECam science results and help identify and develop future DECam projects. Input received at the **21-22 May 2018** workshop will help NOAO optimize instrument and telescope operations. [Read more...](#)



**Registration Open – "NOAO Community Needs for Science in the 2020s":** What science will you do in the 2020s? Join us at a community planning workshop **20-21 February 2018** to discuss community needs for the science of the coming decade. The workshop discussion will flow into an integrated development program that NOAO will present to the Decadal Survey committee. Visit the [meeting website](#) to register and for further information. [Read more...](#)

**"Big Questions, Big Surveys, Big Data: Astronomy & Cosmology in the 2020s":** A community workshop, to be held **11-16 March 2018** in Snowbird, Utah, will examine the planning and resources needed to address major questions in

survey-scale and data-intensive astronomy and cosmology in preparation for the 2020 Decadal Survey in Astronomy and Astrophysics. [Read more...](#)

**Registration Open – “Shedding Light on the Dark Universe with Extremely Large Telescopes”:** This conference, to be held at the University of California Los Angeles, **2-6 April 2018**, is the second in a three-part conference series aimed at gathering input from the dark matter and dark energy communities to optimize the operations and instrumentation of future extremely large optical/infrared telescopes. Early registration closes 4 January 2018. [Read more...](#)

**Save the Date – “Science and Evolution of Gemini Observatory”:** The next Gemini community meeting will be held **22-26 July 2018** in San Francisco. Join the Gemini community in reviewing recent science highlights, identifying needs in the context of Gemini’s evolving capabilities, and developing strategies for the future. [Read more...](#)

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## **National Center for Optical-Infrared Astronomy (NCOA) Panel Discussion**

Thursday, 11 January 2018, 12:45-2:00pm, Potomac Ballroom C

*David Silva (NCOA Project Director), Beth Willman (LSST Project Deputy Director), Robert Blum (NOAO Deputy Director), Henry Roe (Gemini Deputy Director), and Adam Bolton (Associate Director for the NOAO’s Community Science and Data Center)*

In collaboration with the National Science Foundation (NSF), the Association of Universities for Research in Astronomy (AURA) has developed a plan for a National Center for Optical-Infrared Astronomy (NCOA) (working title). The AURA plan is currently under review by NSF for possible approval during FY18 and start during FY19. NCOA will be formed by combining the current activities of the Gemini Observatory and National Optical Astronomy Observatory (NOAO) into a single administrative organization and then adding the planned activities of LSST Operations as they ramp up. Strictly respecting the authority and autonomy of the LSST Operations and Gemini Observatory partners is a requirement. The resulting organization will be the preeminent U.S. national center for ground-based, nighttime, optical-infrared (OIR) astronomy, enabling discovery by providing access to state-of-the-art observational capabilities, survey data products, and data-intensive astronomy services. NCOA will be the foundational hub of the federal and non-federal U.S. OIR System in the era of LSST and data intensive science and positioned for a leadership role in international partnerships.

These developments will be described at the NCOA Town Hall in a brief presentation by David Silva (NCOA Project Director). A panel of representatives from all three organizations will then field questions and comments from the audience. Panelists include Beth Willman (LSST Project Deputy Director), Robert Blum (NOAO Deputy Director), Henry Roe (Gemini Deputy Director), and Adam Bolton (Associate Director for the NOAO’s Community Science and Data Center).

Please join us!

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## NOAO and Gemini Target of Opportunity Observing in the LSST Era

Tuesday, 9 January 2018, 2:00-3:30pm, Chesapeake H  
*Ken Hinkle (NOAO)*

The era of big data in astronomy is here! LSST is under construction, and when LSST operations begin in the early 2020s, millions of transient alerts will be issued each night. NOAO is actively working on tools to extract targets of interest from the flood of alerts. These developments are expected to lead to a huge increase in the demand for target of opportunity (ToO) observations to follow up transient events. To meet this challenge, NOAO and Gemini have begun planning for changes in observing protocols to accommodate the anticipated changes in telescope use.

At the January AAS meeting, the US National Gemini Office (US NGO) will host a splinter session on ToO observing, one in a series of mini-workshops sponsored by the US NGO. The speakers will be Andy Adamson (Gemini) on the past and current Gemini ToO program, Mansi Kasliwal (Caltech) on supernova results from ToO, Todd Boroson (LCO) on the ToO experience from the Las Cumbres Observatory network of telescopes, and Bob Blum (NOAO) on plans to network observatories, including SOAR, CTIO, and Gemini, for ToO response.

The splinter session will be held Tuesday, **9 January 2018** from 2:00-3:30 pm in the Chesapeake H room of the Gaylord National Convention Center. You must be registered at the AAS meeting to attend but no extra registration or fees are required to attend. The room will accommodate 50 and seating will be on a first come basis.

Whether or not you are currently a ToO observer, the scale of the LSST follow-up effort will be very large and all observers using the southern US national facilities will be affected. Spend an hour and a half with us on January 9 and start thinking about observational astronomy in the 2020s.



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## Dark Energy Survey's First Data Release Accessible via the NOAO Data Lab

Wednesday, 10 January 2018, 2:00-3:30 pm, Potomac Ballroom C  
Demo at the January AAS meeting, NOAO Booth  
*Knut Olsen and Joan Najita (NOAO)*

The Dark Energy Survey (DES), now in its final observing season, will issue its first data release on **10 January 2018** in conjunction with a special session at the January AAS meeting. The data will be available through the NOAO Data Lab (<http://datalab.noao.edu>) and other portals. Drop by the NOAO booth at the AAS meeting to see a demonstration, using the DES data, of Data Lab's current

visualization and exploration capabilities.

Currently being carried out with the Dark Energy Camera (DECam) on the CTIO 4-m Blanco telescope, DES is designed to probe the nature of dark energy by mapping hundreds of millions of galaxies, detecting thousands of supernovae, and searching for patterns of cosmic structure. Data included in the release cover the full DES footprint, spanning 5000 square degrees of the southern sky. Both images and catalogs will be available.

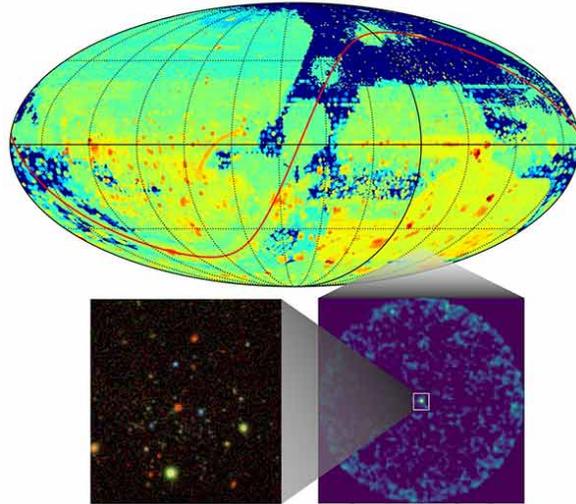
Although the 570-megapixel DECam was built to carry out the DES, it has also been actively used by the community for other science programs. Community use of DECam and other NOAO survey instruments have effectively contributed to a crowd-sourced survey of nearly the entire sky (see Figure). Survey data sets in the NOAO science archive now stand in excess of 2PB.

The goal of the NOAO Data Lab is to facilitate community re-use of these massive surveys by enabling visualization and exploration of their images and catalogs. The Data Lab hosts the catalogs provided by the survey teams (e.g., DES DR1 and Legacy Survey [DR3](#), [DR4](#), and [DR5](#) and [DECaPS](#)) and is producing its own nearly all-sky catalog, the NOAO Source Catalog, from the public images.

A demonstration of current Data Lab capabilities using DES data (DES DR1) will be featured at the NOAO booth. With Data Lab, users will be able to 1) explore the DES DR1 sky; 2) create a user account; 3) query the DES DR1 catalog query through the web, Python, command line, or TOPCAT; 4) retrieve DES DR1 image cutouts; 5) store results in virtual storage or a personal database; and 6) script analysis through Jupyter notebooks.

Stop by the NOAO booth in DC to see the demonstration!

Finding a Dwarf Galaxy in a Crowd-Sourced Survey of the Sky



[Finding a dwarf galaxy in a crowd-sourced survey of the sky](#). Map of total exposure time for all DECam and Mosaic images (2004 - 2017) on a log scale (top). A Data Lab query of the DES DR1 catalog for blue sources near the known dwarf galaxy Eri III, when spatially filtered, reveals the galaxy as an object density peak (lower right). A Data Lab image cutout of the region (lower left) shows a very low surface brightness collection of blue point sources, confirming that it is a dwarf galaxy.

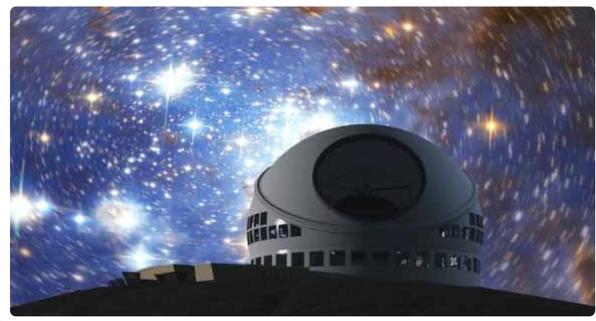
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## Thirty Meter Telescope (TMT) Open House

Wednesday 10 January, 5:30 – 6:30 pm,  
National Harbor 2  
*Mark Dickinson (NOAO)*

The Thirty Meter Telescope International Observatory (TIO) will host its annual Open House event at the January 2018 AAS meeting, featuring presentations, discussion, and complimentary refreshments!

With an order of magnitude more collecting area than today's largest optical/infrared telescopes, and nearly 5 times better angular resolution than the James Webb Space Telescope at similar infrared wavelengths, TMT will make transformational



discoveries in astronomy and astrophysics, from the solar system to cosmology.

The Open House will report on continuing telescope and instrumentation development, the status of the observatory site, and the ongoing role of the US astronomical community in planning the observatory and its future scientific programs. The TMT community is now discussing future-generation instrumentation and adaptive optics systems, and we will describe opportunities for the US community to join this planning process (see the [accompanying article on TMT instrumentation white papers](#)).

As part of a cooperative agreement with the National Science Foundation, the US TMT Science Working Group (SWG), organized by NOAO, has worked with the TMT project to develop a model for US national participation in TMT. This plan describes the scientific, technological, educational, and programmatic benefits of TMT participation for the US community, and considers choices that would maximize those benefits. Members of the US TMT SWG will attend this Open House, and there will be ample time for audience questions and discussion. You may also visit the TMT booth (#707) in the exhibit hall to chat with TMT project staff and US TMT SWG members.

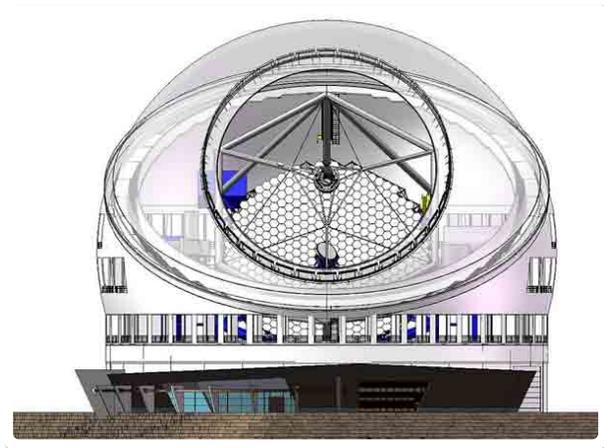
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## Call for New Membership in the TMT International Science Development Teams

*Mark Dickinson (NOAO)*

Applications for membership in the [Thirty Meter Telescope \(TMT\) International Science Development Teams \(ISDTs\)](#) will be accepted until **26 January 2018**. The ISDTs are research groups that provide scientific guidance and feedback to the TMT project, stimulate planning for future TMT observing programs, and build connections between TMT and the international astronomical community. They foster scientific collaboration across the TMT partnership and beyond, into the broader astronomical community. ISDT membership is open to all qualified PhD scientists.



ISDT members have contributed extensively to the [TMT Detailed Science Case](#) and written a set of concept studies for TMT Key Project observing programs. The ISDTs organize parallel topical sessions at the annual [TMT Science Forum](#). In addition, ISDT members are now [developing plans and priorities for future-generation TMT instrumentation and AO systems](#).

There are currently nine ISDTs, organized around the following science themes:

- Fundamental physics and cosmology
- Early universe, galaxy formation, and the intergalactic medium
- Supermassive black holes
- Milky Way and nearby galaxies
- Stars, stellar physics, and the interstellar medium
- Formation of stars and planets

- Exoplanets
- Our solar system
- Time domain science

Applicants may also propose to form new ISDTs to focus on science that does not fit well within the scope of the existing groups or on subtopics drawn from one or more of the existing ISDTs that merit additional emphasis within TMT planning.

Application instructions are available at the [TMT ISDT web site](#), where you can also find more detailed information about the ISDTs, their organizers, membership, and activities. ISDT membership entails a commitment of time and effort. Applications will be evaluated by the ISDT organizers and the TMT Science Advisory Committee based on the applicant's scientific qualifications, the activities the applicant proposes to carry out in support of the ISDT and TMT, and the level of effort to be invested in ISDT activities.

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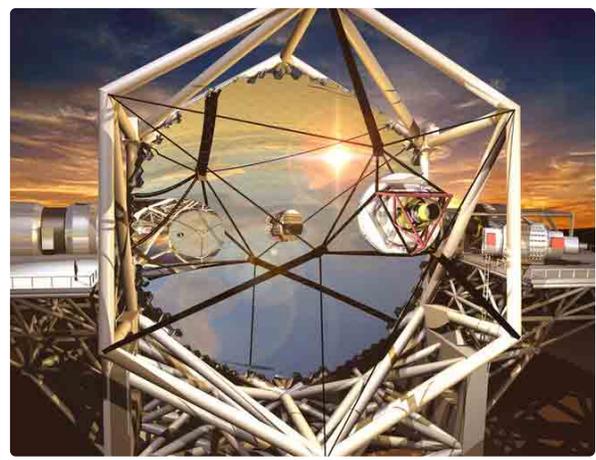
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## TMT Instrumentation White Papers

*Mark Dickinson (NOAO)*

The Thirty Meter Telescope (TMT) Project Office and Science Advisory Committee (SAC) have issued a call for white papers proposing design studies for new TMT instruments, adaptive optics (AO) systems, or other technical capabilities to enhance TMT's scientific capability beyond first light. AURA represents the US community as an associate member of the TMT International Observatory (TIO), and US astronomers and instrumentalists are welcome to submit white papers independently and/or in collaboration with others in the international TMT community.



TMT's first-light capabilities include a near-infrared multi-conjugate AO system (NFIRAOS), an Infrared Imaging Spectrometer (IRIS), and a Wide-Field Optical Spectrometer (WFOS). Proposals for new capabilities should consider these early TMT instruments, as well as the landscape of other ground- and space-based observatories that will be operating in the mid- to late-2020s. White papers may address, but are not limited to, capabilities previously identified as priorities for TMT, including high dispersion optical and near-infrared spectroscopy, multiplexed medium-resolution near-infrared spectroscopy, extreme/high contrast AO and coronagraphy, and thermal infrared imaging and spectroscopy. Novel ideas that fall outside or in between these existing concepts are also welcome.

The TMT SAC will review the submitted white papers and recommend a subset for feasibility studies to be funded by the TMT Project. Submitted white papers should provide a summary of the scientific benefits of the proposed development, a brief description of the work to be done, and should address the suitability of the team for conducting the proposed study.

White papers should be submitted to [whitepapers@tmt.org](mailto:whitepapers@tmt.org) no later than **21 March 2018**. [Detailed submission instructions and links to useful information](#) may be found

at the TMT web site. Please address any questions to [instruments@tmt.org](mailto:instruments@tmt.org).

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**Registration open for "DECAM Community Science Workshop 2018: Science Highlights, Coming Opportunities, LSST Synergies"**

*Tucson, Arizona, 21-22 May 2018*

<https://www.noao.edu/meetings/decam2018/>

Calling all past and prospective users of DECAM and its archival data!

The Dark Energy Camera (DECAM), in operation on the Blanco telescope at CTIO for just over 5 years, has been remarkably successful in carrying out the Dark Energy Survey (DES) as well as a multitude of community science projects, some of which are extensive surveys in their own right.

Science highlights from DECAM include a state-of-the-art map of the dark matter density of the local universe, study of optical counterparts to gravitational waves events, discovery of multiple satellite galaxies around the Milky Way and other galaxies, constraints on the size distribution of near earth objects, and evidence for the existence of a Planet Nine.

As it is now three years since the previous DECAM community science workshop, and DES will soon be completed, the time is ripe to highlight DECAM science results and discuss and plan future DECAM observing programs. We anticipate offering DECAM on the Blanco well into the era of LSST operations.

The aim of this workshop is to bring together past and future users of DECAM and its archival data to identify possible future projects and to foster collaborations. Input received at the workshop will help NOAO optimize instrument and telescope operations.

The meeting will showcase and discuss:

- Science applications of major DECAM data sets – DES, DECaLS, SMASH etc.
- The breadth of DECAM science, from NEOs to  $z = 7$  galaxies
- Near-future projects subsequent to DES and DECaLS
- Synergy with LSST, including parallel observations, follow-ups, and more
- Creative uses of DECAM, including remote observing, targets of opportunity, new filters, and non-sidereal observations.

[Registration](#) is now open.

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## Registration open for "NOAO Community Needs for Science in the 2020s"

*Tucson, Arizona, 20-21 February 2018*

<https://www.noao.edu/meetings/2020decadal/>

What science will you do in the 2020s?

What science opportunities and challenges lie ahead?

NOAO welcomes your input on the exciting scientific opportunities of the coming decade in areas in which NOAO can play a role in providing critical resources and/or areas that offer opportunities to strengthen the US ground-based OIR system.

Join us at a community workshop **20-21 February 2018** in Tucson to discuss community needs and to work toward an integrated development program that NOAO will present to the Decadal Survey committee. Input received online through the [NOAO Decadal Planning website](#) will inform the workshop discussion.

**Scope:** We welcome a broad range of science ideas that motivate the need for resources such as:

- Large science programs that use facilities at KPNO, CTIO, Gemini, and LSST
- Community access to observing time on non-NOAO facilities
- Community access to archival datasets not currently in the public domain
- Resources for the exploration and analysis of large datasets and the time domain
- New investigations and instrumentation at the mid-scale level (\$2M-\$100M)
- New observing facilities
- Other

The scientific opportunities may build on the science and resources described in the recent studies "[Optimizing the US Ground-based OIR Astronomy System](#)" (the Elmegreen report) and the report from the Kavli Futures Symposium "[Maximizing Science in the Era of LSST: A Community-based Study of Needed OIR Capabilities](#)", but they are by no means restricted to these. Concepts may include NOAO as a major or minor partner with universities and/or other federal agencies. An [updated "Dear Colleague" letter](#) provides additional details on the planning process.

**Format:** The workshop is aimed at identifying important science and technical directions for the coming decade. The first day of the meeting will focus on the science opportunities of the 2020s and the resources (facilities, software, archives, observing protocols, etc) needed to accomplish that science. The second day will focus on current and future implementation efforts that can deliver the needed resources. The workshop will conclude with recommendations for NOAO and planning for the next steps. A [block agenda](#) is available.

**Registration** is [now open](#). There is no registration fee for the meeting.

# SnowPAC 2018

## **SnowPAC 2018: "Big Questions, Big Surveys, Big Data: Astronomy and Cosmology in the 2020s"**

*Snowbird, Utah, 11-16 March 2018*

<http://www.physics.utah.edu/snowpac/>

The 2018 Snowbird Workshop on Particle Astrophysics, Astronomy, and Cosmology (SnowPAC), co-sponsored by NOAO and the University of Utah, will be held at Snowbird Ski Resort **11-16 March 2018**.

SnowPAC 2018 will be a participatory workshop focused on survey-scale and data-intensive priorities in astronomy and cosmology for the 2020s, with the goal of producing outlines and roadmaps of science-driven community whitepapers for submission to the upcoming Decadal Survey and [Particle Physics Project Prioritization Panel](#) (P5) processes.

Pre-registration has closed and the SOC is now developing the program. However space for additional participants is anticipated to be available. To learn more, please visit the above webpage.

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## **Registration open: "Shedding Light on the Dark Universe with Extremely Large Telescopes"**

*University of California Los Angeles, 2-6 April 2018*

<https://conferences.pa.ucla.edu/dark-universe/index.html>

Early registration deadline: **4 January 2018**

This will be the second installment of a three-part conference series aimed at gathering input from the dark matter and dark energy theory, phenomenology, and observational communities to optimize the operations and instrumentation at future extremely large 30-m class optical infrared telescopes. The conference aims to address the following questions:

- What are the most promising observations that will be enabled by giant telescopes? What capabilities are required?
- What are the key synergies between giant telescopes and other facilities? What are the areas and topics where a concerted effort will yield far superior results than the sum of all parts?
- What theoretical work is needed in preparation for first light? What are the limitations in our understanding that need to be overcome? What calculations

are required in order to make testable predictions and interpret the results of future astronomical observations?

The first meeting of the series was held in Lanzhou China, and the third and final one will be held at ICTP Trieste Italy, 2-6 July 2018



## **“Science and Evolution of Gemini Observatory”**

*Fisherman’s Wharf, San Francisco, 22-26 July 2018*

<https://www.gemini.edu/seg2018>

This meeting invites the Gemini community to review recent science highlights, identify needs in the context of Gemini’s evolving capabilities, and develop strategies for the future.

Please visit the conference webpage for news and updates on the scientific program and invited speakers as they develop. Registration will open on **4 January 2018**, and the deadline for abstract submission is **15 May 2018**. To receive updates, please subscribe at: [https://www.gemini.edu/seg2018#seg2018\\_signup](https://www.gemini.edu/seg2018#seg2018_signup).

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## **Contact Us**

We welcome your input on this issue of *Currents*. Please contact us at [currents@noao.edu](mailto:currents@noao.edu). We look forward to hearing from you!

*Currents* is a spark plug for communication between NOAO and our community. It provides updates—and solicits community input—on NOAO observing opportunities and NOAO programs and policies on a more rapid timescale than is possible with the *NOAO Newsletter*.

NOAO is the national center for ground-based nighttime astronomy in the United States and is operated by the Association of Universities for Research in Astronomy (AURA), Inc. under cooperative agreement with the National Science Foundation.

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