



December 2018 • Issue 56

Currents

In this Issue...

NOAO at the January AAS Meeting

Join us in Seattle, WA for these NOAO-related events:

- **NOAO Town Hall: NOAO into the 2020s and Beyond**
Wednesday, 9 January 2019, 1:00-2:00 pm; Room 6B
- **[Workshop: NEID – the New Precision Radial Velocity Spectrograph on WIYN](#)**
Monday, 7 January 2019, 2:00-3:30 pm, Room 305
- **[Workshop: The Hitch-Hiker’s Guide to LEDs – Practical Solutions for Dark Sky Preservation in the LED Era](#)**
Monday, 7 January 2019, 11:00 am–1:00 pm, Room 401
- **[Movies of the Early History of KPNO and CTIO](#)**
Monday, 7 January 2019, 5:30-6:30pm, Room 4A
- **[The US Extremely Large Telescope \(ELT\) Program Session](#)**
Monday, 7 January 2019, 9:30-11:30 am; Room 4C-4
- **[US ELT Program: GMT & TMT Open House](#)**
Monday, 7 January 2019, 7:30-9:00 pm, Room 4C-2
- **[NOAO Mini-Workshop: Resurgence of High Resolution Spectroscopy at Gemini](#)**
Tuesday, 8 January 2019, 2:00-3:30 pm; Room 305
- **NOAO Data Lab’s “Resources for Large Surveys” in the session on Astrophysics Archives in the 2020s**
Tuesday, January 8 2019, 10:00 - 11:30 AM, Room 606
- **NOAO EPO Student Event: Einstein Schools activity on gravity and general relativity**
Wednesday, 9 January 2019, 12:00-2:00 pm; NOAO Booth
- **Gemini Observatory Open House**
Tuesday, 8 January 2019, 5:30-6:30 pm, Room 305
- **LSST Town Hall**
Wednesday, 9 January 2019, 7:30-8:30 pm, Room 6C
- **NSF Town Hall**
Tuesday, 8 January 2019, 1:00-2:00 pm, Room 6B

In this Issue

- [NEID Workshop](#)
- [Gemini Workshop](#)
- [Dark Skies Workshop](#)
- [US ELT Program Updates](#)
- [Early film of KPNO & CTIO](#)
- [TMT ISDTs](#)
- [“Big Eyes” Meeting](#)
- [MSE Meeting](#)
- [NOAO in the News](#)
- [Contact Us](#)



Workshop: NEID – the New Precision Radial Velocity Spectrograph on

WIYN: A state-of-the-art spectrograph dedicated to high-precision Doppler observations of exoplanets around nearby stars, NEID (NN-EXPLORE Exoplanet Investigations with Doppler Spectroscopy) will be commissioned on the WIYN 3.5m telescope in early 2019 and will be available for community use beginning in the 2019B semester. A session at the AAS meeting on **7 January 2019** will describe the status and science capabilities of NEID, its queue, pipeline, archive, and utilization policies, and the NASA-NSF Exoplanet Observational Research (NN-EXPLORE) partnership.

NOAO Mini-Workshop – “Resurgence of High-Resolution Spectroscopy at

Gemini”: The US National Gemini Office (US NGO) will host a mini-workshop on Gemini high-resolution spectroscopy at the AAS meeting on **8 January 2019**. The session will focus on the science opportunities made available by spectrographs spanning the optical to mid-infrared, including the visitor instruments GRACES, IGRINS, and Maroon-X, as well as the new facility optical spectrograph GHOST. [Read more...](#)

US ELT Program News and Activities: The US Extremely Large Telescope (ELT) Program aims to provide the US community with open access to significant observing time on both the Thirty Meter Telescope and the Giant Magellan Telescope. On **7 January 2019** at the AAS Meeting, the Program will host a session on US ELT Program Science and a GMT & TMT Joint Open House. [Read more...](#)

Community members recently gathered in Tucson to develop and polish their TMT+GMT Key Science Program (KSP) concepts for submission in mid-December. Highlights of KSP development will be presented at the January AAS session on US ELT Program Science. [Read more...](#)

The Hitch-Hiker’s Guide to LEDs – Practical Solutions for Dark Sky

Preservation in the LED Era: With communities around the world switching to light emitting diode (LED) fixtures for outdoor lighting, commonly-adopted white LEDs will increase sky glow by a factor of 2 to 4 over the widely-used high pressure sodium (HPS) standard. In this **7 January 2019** workshop, members of the AAS Committee on Light Pollution, Radio Interference, and Space Debris will share practical information you can use to advocate for dark-sky friendly LED solutions in your community. [Read more...](#)

Early History of KPNO and CTIO on Film: At the January AAS meeting, John Glaspey (NOAO) and Sharon Hunt (NOAO) will present an iPoster describing several movies made in the 1970s that highlight the Kitt Peak and Cerro Tololo observatories. The movies were made by John Lutnes of KPNO, with the longest movie running just under 30 minutes. The iPoster will link to a mini version made from clips taken from the movies. Links to the full-length version will eventually be added to the NOAO Library web site. The featured titles include *Skies of the*



A scene from *Skies of the Andes* showing the 36-inch telescope being set up outside before its dome was completed. The telescope was used for several weeks like this!

Andes, Stars, Galaxies and the Southern Skies, and Journey Into Light.

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 by **8 February 2019**. [Read more...](#)

Meeting Announcement – “Extremely Big Eyes on the Early Universe”: Registration is now open for the second of a three-part international conference series that will review the current state of the art in studying the high redshift universe and discuss how to best use giant telescopes to go beyond. The **25-29 March 2019** event, to be held at the Kavli Institute for the Physics and Mathematics of the Universe in Tokyo, has a registration deadline of **31 December 2018**. [Read more...](#)



The logo for the Maunakea Spectroscopic Explorer (MSE) features a stylized, multi-colored wave or spectrum. The wave starts with a red-to-orange gradient on the left, transitions through yellow and green in the middle, and ends with a blue-to-purple gradient on the right. Below the wave, the text "Maunakea Spectroscopic Explorer" is written in a clean, sans-serif font.

Maunakea Spectroscopic Explorer

Meeting Announcement – “Massively multiplexed spectroscopy with MSE: Science, Project and Vision”: The US community is invited to a meeting on the Maunakea Spectroscopic Explorer (MSE), a proposed 11.5-m wide-field spectroscopic survey telescope that is beginning its Preliminary Design phase. The meeting, to be held in Tucson **26-28 Feb 2019**, is hosted by NOAO in collaboration with the MSE Project and the Canada-France-Hawaii Telescope (CFHT). Interested astronomers are encouraged to help define the MSE Design Reference Surveys and to explore the ability of MSE to address 2020 Decadal science priorities. [Visit the meeting web page](#) for more information, and to register.

NOAO in the News:

NSF Funds “Windows on the Universe Center for Astronomy Outreach” at KPNO:

A new \$4.5 million grant from the National Science Foundation (NSF) will fund the development of a new center for astronomy outreach at Kitt Peak National Observatory. Located in the McMath-Pierce Solar Telescope facility, an iconic structure that was once the world's largest solar observatory, the center will provide the



public with a new way to experience the cutting-edge research being carried out at Kitt Peak and NSF's other astronomy facilities around the globe, including ground-based optical, radio, solar, and gravitational wave facilities.

[View the Trailer Video](#) and read more in the [NOAO Press Release](#).



NOAO Mini-Workshop at January AAS Meeting: "The Resurgence of High-Resolution Spectroscopy at Gemini"

Tuesday, 8 January 2019, 2:00-3:30 pm; Room 305

The US National Gemini Office (US NGO) will host a mini-workshop on Gemini high-resolution spectroscopy at the January AAS meeting.

Over the last few years, a variety of high-resolution spectroscopic capabilities have been available at Gemini through its visitor instrument program. Both long- and short-slit spectrographs have been offered, with capabilities spanning the optical to mid-infrared. Gemini is now building a new high-sensitivity, high-resolution optical spectrograph for the Gemini South telescope.

The AAS splinter session will focus on the science opportunities made available by these instruments:

- The session will begin with an overview from Verne Smith (NOAO) of science results from the high-resolution spectrographs offered at Gemini.
- Jeff Carlin (LSST) will then discuss science from the optical spectrograph GRACES.
- Hwhiyn Kim (Gemini) will describe results from the 1.5-2.5 micron near-infrared spectrograph IGRINS, a visitor instrument that was recently scheduled at Gemini South. She will also discuss plans for the return to Gemini of IGRINS or its clone.
- Jacob Bean (Chicago) will update us on the status of the planet hunting high-precision radial velocity spectrograph Maroon-X, which should be available at Gemini North in 2019.
- Finally, Steve Margheim (Gemini) will discuss the status of the new facility optical spectrograph GHOST.

If high spectral resolution is your interest, and if you will be at the AAS meeting, then make this session a priority. Admission is free to anyone attending the AAS.

3

The US Extremely Large Telescope (ELT) Program at the January AAS Meeting in Seattle

On Monday, 7 January 2019, the US Extremely Large Telescope Program will hold two events at the AAS Meeting in Seattle.

US ELT Program Science

Monday, 7 January, at 9:30 – 11:30 AM, Room 4C-4

A new research frontier will open in the late 2020s with the advent of ground-based extremely large optical-infrared telescopes (ELTs). US scientific leadership in astrophysics will be significantly enhanced if the whole research community can take full advantage of the power of these new ELTs.

Toward this end, the National Science Foundation's (NSF) National Optical Astronomy Observatory (NOAO), the Thirty Meter Telescope (TMT) International Observatory, and the Giant Magellan Telescope (GMT) Organization are working collaboratively to develop a US Extremely Large Telescope (US-ELT) Program to provide open access to significant shares of observing time for both GMT and TMT. This two-hemisphere model will provide the US science community with greater and more diverse observatory capabilities and all-sky access, enabling integrated science programs that go beyond the reach of a single telescope.

This session will feature discussion of the objectives and structure of the US ELT Program. There will be presentations of Key Science Program (KSP) concepts that are being developed by community-based teams as a core component of the US ELT Program. KSPs will address questions of fundamental scientific importance that require tens to hundreds of GMT and TMT nights, and will follow open collaboration models that encourage broad, diverse participation by scientists throughout the US research community. The session will include ample opportunity for audience discussion.

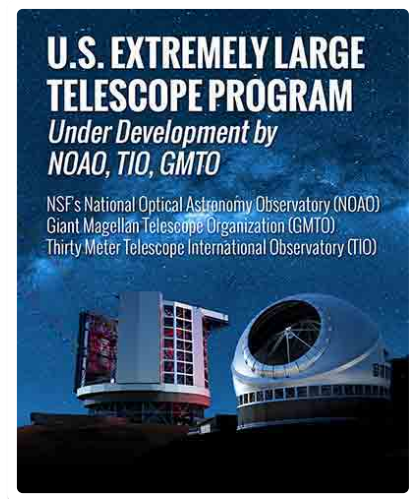
Session agenda:

- The U.S. ELT Program – David Silva (NOAO)
- U.S. ELT Key Science Programs:
 - Extrasolar Planets: Formation, Discovery & Characterization – Quinn Konopacky (UC San Diego)
 - The First Stars and the Origin of the Elements – Ian Roederer (University of Michigan)
 - Origins and Fundamental Physics of Supermassive Black Holes – Jenny Greene (Princeton University)
 - Dissecting Galaxy Assembly at Cosmic Noon from 1 Mpc to 100 pc Scales – Rachael Bezanson (University of Pittsburgh)
 - The Nature of Dark Matter – Josh Simon (Carnegie Observatories)
 - The Violent Universe: Multi-Messenger Astrophysics – Raffaella Margutti (Northwestern University)
- Q&A / panel discussion

US ELT Program – GMT & TMT Joint Open House

Monday, 7 January, 7:30 – 9:00 PM, Room 4C-2

The Giant Magellan Telescope and the Thirty Meter Telescope are the next generation Extremely Large Telescopes with significant US participation. These observatories are expected to reach first light within the next decade and are working together to develop a plan for broad access to the completed facilities by the US community in coordination with NOAO's US ELT Program.



At this Open House, TMT and GMT scientists will present brief updates on project status. Open discussion of the US ELT Program will follow, and all members of the community are encouraged to participate. There will also be an opportunity for attendees to meet socially with key organizational, technical and scientific leadership of GMT, TMT, and NOAO. Complimentary snacks and refreshments will be provided.

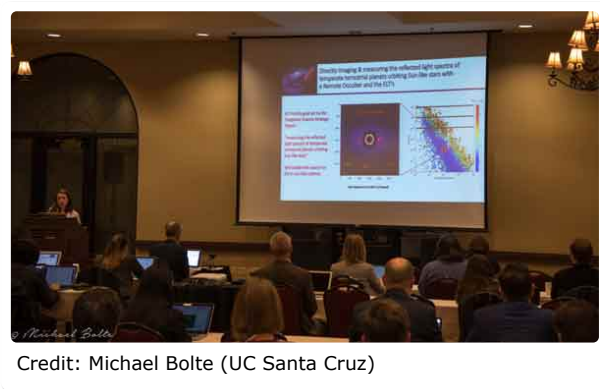
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The US Extremely Large Telescope Key Science Program Development Workshop

Mark Dickinson, NOAO

NOAO, the [Giant Magellan Telescope \(GMT\) Organization](#), and the [Thirty Meter Telescope \(TMT\) International Observatory](#), continue their joint effort to develop a [US Extremely Large Telescope \(ELT\) Program](#). Our primary goal is to enable forefront research by the entire US astronomical community via open access to significant shares of observing time with both TMT and GMT.

This past November, 88 astronomers gathered for a US ELT Key Science Program development workshop at the Westward Look Resort in Tucson. [Key Science Programs \(KSPs\)](#), a core component of the US ELT Program, will address questions of fundamental scientific importance that require tens to hundreds of observing nights with GMT, TMT, or both observatories working in concert, taking advantage of their combined view of the full sky and their complementary instrumental capabilities.



Credit: Michael Bolte (UC Santa Cruz)

The Tucson workshop featured presentations about the US ELT Program and extensive group discussion about the nature and purpose of Key Science Programs, open collaboration models for KSP teams, and science user support for US community astronomers using GMT and TMT, including archiving and data management. There were status presentations from the TMT and GMT projects, and a series of breakout sessions with experts on early- and future-generation instruments for both projects. Most importantly, there was ample working time for the KSP teams, who have been developing their concepts for submission and review in mid-December.

Highlights of KSP development will be presented at the US ELT Program session on Monday morning at 9:30-11:30 am, **7 January 2019** at the AAS meeting.

3

The Hitch-Hiker's Guide to LEDs – Practical Solutions for Dark Sky Preservation in the LED Era

Monday, 7 January 2019, 11:00 am–1:00 pm, Room 401

Jeffrey Hall (Lowell Observatory), Lori Allen (NOAO), and Connie Walker (NOAO)

With communities around the world switching to light emitting diode (LED) fixtures for outdoor lighting, the commonly-adopted white LED solution will increase sky

glow by a factor of 2 to 4 over the widely-used high pressure sodium (HPS) standard. In this workshop, members of the AAS Committee on Light Pollution, Radio Interference, and Space Debris will share practical information you can use to advocate for dark-sky friendly LED solutions in your community.

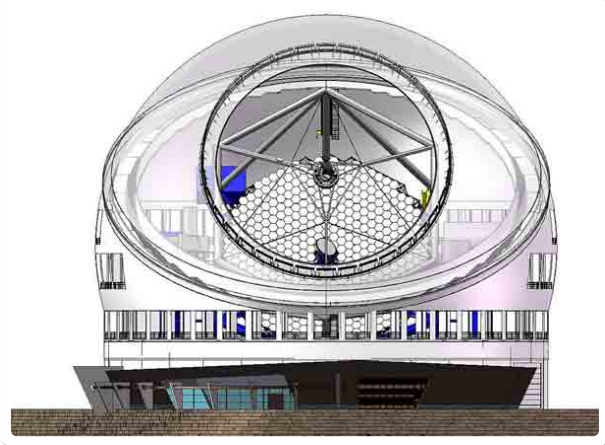
We will discuss the various types of LED lighting available and the relative impact on sky glow of these LEDs relative to current systems. We will explore success stories from cities and towns that have found better answers than the very high-temperature, blue-white LEDs popping up in so many locations. We will look at ways communities have engaged with citizens, city staff, and elected officials to make progress. Participants will have a chance to ask committee members questions and develop ideas for dark-sky LED solutions in your community. Participants will leave the workshop with a better perspective on this new lighting technology, as well as with a set of concrete takeaways that can be used to advocate for best dark-sky practices in your area.



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 **8 February 2019**. 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 contributed extensively to the [TMT Detailed Science Case](#), and have written a set of concept studies for TMT Key Project observing programs. They have developed plans and priorities for future-generation TMT instrumentation and AO systems. The ISDTs organize parallel topical sessions at the annual [TMT Science Forum](#).

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

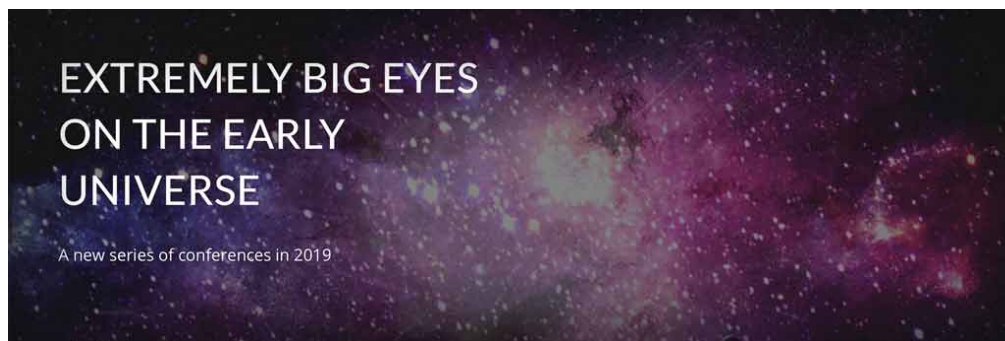
- Fundamental physics and cosmology
- Early universe, galaxy formation and the intergalactic medium
- Supermassive black holes
- Milky Way and nearby galaxies
- Stars, stellar physics and the interstellar medium

- 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 candidate's scientific qualifications, the activities that he or she proposes to carry out in support of the ISDT and TMT, and the level of effort that she or he can commit to investing in ISDT activities.

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Extremely Big Eyes on the Early Universe II: Tokyo

Registration for the Tokyo edition of "[Extremely Big Eyes on the Early Universe](#)" is open until the end of the year. This is the second installment of a three-part international conference series:

1. University of California, Los Angeles, USA, **28 January – 1 February 2019**
2. Kavli Institute for the Physics and Mathematics of the Universe, Tokyo, Japan, **25-29 March 2019**
3. Accademia dei Lincei, Rome, Italy, **9-13 September 2019**

Tokyo: [Registration is now open](#); the abstract submission deadline is **31 December**.

In the next decade, the commissioning of Extremely Large Telescopes (20-40m class) will allow us to see the high redshift universe using new eyes of unprecedented power. By themselves or in combination with other facilities, these new eyes will have the potential to transform our understanding of the formation and early evolution of galaxies and black holes, first light and cosmic reionization, as well as the evolution of the intergalactic and circumgalactic media.

The Big Eyes conferences will bring together an international group of experts to review the current state of the art in the study of the high redshift universe and to

discuss how best to use giant telescopes to learn about it. These meetings will address the following questions:

- What potentially transformative observations 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 or observational 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?

It is important to consider these questions now, while the plans for giant telescopes can still be influenced, and there is still sufficient time to carry out preparatory theoretical and observational work that will be needed to make the most of the large investments in these facilities.

For more information and registration, please visit:

<https://conferences.pa.ucla.edu/early-universe-2019/>

Contact Us

We welcome your input on this issue of *Currents*. Please contact us at 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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