



May 2018 • Issue 53

Currents

Join us at the upcoming AAS Meeting, 3-7 June 2018 in Denver, CO for these NOAO-related events:

- **Data Lab Demos**
NOAO Booth, Plaza Exhibit/Foyer [Read more...](#)
- **Data-Oriented Astrophysics at NOAO: The Science Archive & The Data Lab**
(Stephanie Juneau) in Session 214: Astrophysics Archives in the 2020s
Tuesday, 5 June 2018, 2:50 – 4:20 pm, Governor’s Square 16
- **Local Middle and High School Education and Public Outreach Event – Hands on Activities with NOAO EPO at the NOAO Booth**
Tuesday, 5 June 2018, 12:00 – 2:00 pm, Plaza Exhibit/Foyer
- **Session 301: Decadal Survey Preparations: State of the Profession**
Wednesday, 6 June 2018, 10:40 – 12:10 pm, Governor’s Square 10 [Read more...](#)
- **NSF Town Hall**
Tuesday, 5 June 2018, 1:40 – 2:40 pm, Plaza Ballroom BE

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In this Issue...

Data Lab 2.0 Release at AAS Meeting: Version 2.0 of the NOAO Data Lab’s Science Platform will feature new datasets, including Legacy Survey DR6 and the 30 billion single-epoch measurements from the NOAO Source Catalog, as well as cross-matched tables between Gaia DR2 and all of our highest value catalogs, new web tools to access image cutouts and our virtual storage system, and more! Stop by the NOAO booth for a demo of some of the science opportunities offered by Data Lab 2.0. [Read more...](#)

NOAO Teams Up with Two Extremely Large Telescope Projects to Enhance US Leadership in Astronomy and Astrophysics: In concurrence with the Thirty Meter Telescope International Observatory and the Giant Magellan Telescope Organization, NOAO announces the joint development of a

US Extremely Large Telescope Program. The program will advocate for frontier research programs led by US community scientists that can achieve exceptional advancements in our understanding of the cosmos. [Read more...](#)

2020 Decadal Survey Planning – Presentations from “NOAO Community Needs for Science in the 2020s” available online: The NOAO community gathered in February 2018 to share their visions of science in the coming decade and the resources needed to accomplish that science. The science forecast is bright, with new discoveries and advances anticipated in our understanding of stars, exoplanets, Galactic structure and evolution, cosmology, the time domain Universe, and more! Resource needs are **diverse** and include, e.g., telescopes of modest aperture to large, creative use of existing facilities, mid-scale instrumentation, flexible observing options, archival data, data analysis methods, as well as new infrastructure. [Read more...](#)

News from SOAR – Goodman Spectrograph Data Reduction Pipeline and Flexible Observing Modes Available: The first release of the data reduction pipeline for the Goodman spectrograph on SOAR is now available. [Read more...](#)

SOAR also supports target of opportunity observations as well as a limited amount of service observing and encourages proposers to explore these options. [Read more...](#)

Registration Open – “Science and Evolution of Gemini Observatory”: Join us in San Francisco **22-26 July 2018** to review recent science highlights, identify needs in the context of Gemini’s evolving capabilities, and develop strategies for the future of the Observatory. Registration is now open. [Read more...](#)

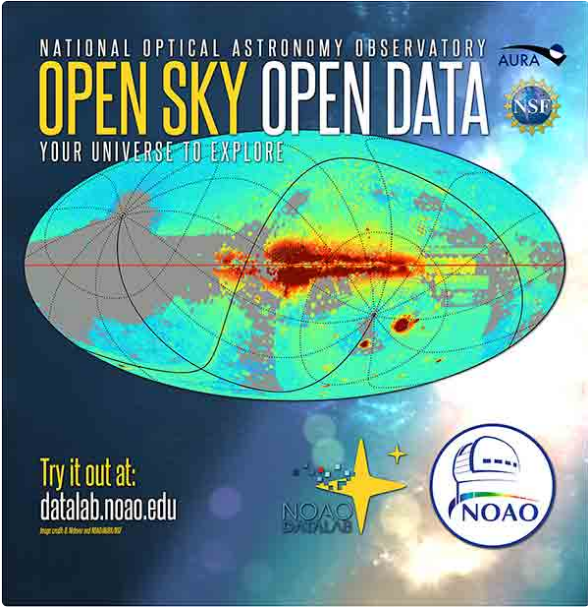
Registration Open – 2018 GMT Community Science Meeting: “Stars: Birth and Death”: The Sixth Annual GMT Community Science Meeting, to be held in Honolulu, Hawaii on **13-15 September 2018**, brings together experts in the fields of star formation and stellar disruptions, eruptions and explosions. The meeting will focus on key open questions that can be solved in the upcoming era of extremely large telescopes. The registration deadline is **6 August 2018**. [Read more...](#)

Data Lab 2.0 Release at Denver AAS Meeting

Knut Olsen (NOAO)

The [NOAO Data Lab](#) will release version 2.0 of its Science Platform at the 232nd Meeting of the Astronomical Society in Denver, Colorado **3-7 June 2018**. This release will feature new datasets, including 30 billion single-epoch measurements from the NOAO Source Catalog, the sixth data release of the Legacy Survey (DR6), a copy of Gaia DR2, and cross-matched tables between Gaia DR2 and all of our highest value catalogs. It will also feature new services, such as web tools to access image cutouts and our virtual storage system, a user command-line shell, and many new features and improvements to the underlying codebase.

Using Data Lab 2.0, users can browse and explore numerous large astronomical catalogs containing billions of objects, submit queries to the database containing the catalogs, retrieve image cutouts from archived images, store results on the Data Lab's servers, and perform scientific analysis and visualization of the results. All of these functions can be carried out within a web browser. Scientists can run Python code on our Jupyter Notebook server to interact with, analyze, and visualize the datasets without having to transfer large amounts of data or set up complex development environments. Data Lab datasets are also accessible through TOPCAT or through a downloadable command-line client. Documentation is available in the form of an online User Manual and a Helpdesk. Example Jupyter Notebooks are also provided for all new accounts.

A poster for 'Open Sky, Open Data' from the National Optical Astronomy Observatory (NOAO). The poster features a central image of a galaxy or star field with a color gradient from blue to red. Text at the top reads 'NATIONAL OPTICAL ASTRONOMY OBSERVATORY' and 'OPEN SKY OPEN DATA' in large yellow and white letters. Below that, it says 'YOUR UNIVERSE TO EXPLORE'. Logos for AURA, NSF, and NOAO are visible. At the bottom left, it says 'Try it out at: datalab.noao.edu'. At the bottom right, there is a NOAO logo and a star icon.

Open Sky, Open Data: try it out at datalab.noao.edu - it's your universe to explore!

To introduce some of the science opportunities are offered by Data Lab 2.0, demos at the NOAO AAS booth will explore science cases such as:

- Exploration of the Gaia DR2 dataset
- Time series retrieval from the nearly all-sky NOAO Source Catalog
- Star/galaxy/QSO classification
- Discovery of faint Milky Way dwarf companion galaxies
- Examination of large scale structure in the Legacy Survey and SDSS/BOSS surveys

Stop by the booth and give Data Lab a try!

Decadal Survey Preparations at the June AAS Meeting: State of the Profession


Dara Norman

The 2000 and 2010 Astronomy and Astrophysics Decadal Survey Reports included chapters on 'The State of the Profession'. These chapters include recommendations and findings that acknowledge concerns for the future of the astronomical workforce and that have led to actions to promote career direction initiatives by the federal agencies, for example, the inauguration of the NSF's Astronomy and Astrophysics Postdoctoral Fellowship Program. Over the past 3 years, there have been a number of meetings and workshops that focus on strengthening the astronomical workforce and promoting improved workplace climate. Groups and individuals involved in these meetings have produced draft white papers to be submitted to the 2020 Decadal Survey panel members that will contribute to the next 'The State of the Profession' chapter. In this session, members of the community leading white papers and

other advisory efforts will have the opportunity to present their activities to the larger community, build collaborations on topics of interest, and solicit additional signatories to their efforts. Join us to learn about and participate in these efforts!

NOAO and Two Extremely Large Telescope Projects Team Up to Enhance US Scientific Leadership in Astronomy and Astrophysics

A new research frontier in astronomy and astrophysics will open in the mid-2020s with the advent of ground-based extremely large optical-infrared telescopes (ELTs) with primary mirrors in the 20-m to 40-m range. US scientific leadership in astronomy and astrophysics will be significantly enhanced if the broad US community can take advantage of the power of these new ELTs.



[US Extremely Large Telescope \(US-ELT\) Program](#)

In that context, the National Science Foundation's (NSF) National Optical Astronomy Observatory (NOAO), the [Giant Magellan Telescope Organization](#) (GMTO), and the [Thirty Meter Telescope International Observatory](#) (TIO) have embarked on the joint development of a US Extremely Large Telescope (US-ELT) Program.

Our shared mission is to strengthen scientific leadership by the US community-at-large through access to extremely large telescopes in the Northern and Southern Hemispheres. This two-hemisphere model will provide the US science community with greater and more diverse research opportunities than can be achieved with a single telescope, and hence more opportunities for leadership.

Our immediate task is advocacy for frontier research programs led by US community scientists that can achieve exceptional advancements in humanity's understanding of the cosmos.

Our audience is the US research community as represented by the upcoming Decadal Survey of Astronomy and Astrophysics (an enterprise of the US National Academies).

As an essential part of that immediate task, we will work with the US research community to develop exemplar Key Science Programs (KSPs) within major research areas including the dark universe, first stars & first galaxies, exoplanet atmospheres, the surfaces of satellites and other small bodies throughout Solar System, and/or other topics to be proposed and prioritized by community-based working groups.

Key Science Programs are envisioned to be open collaborations that gather observers, theorists, and data scientists together to exploit significant investments of Thirty Meter Telescope (TMT) and Giant Magellan Telescope (GMT) observing time, from tens to hundreds of nights. Some of these collaborations are expected to be international in nature. If well-justified by KSP plans, we envisage that at least 25% of the observing time at each international observatory will be available for the US community.

The KSPs chosen for presentation to the Decadal Survey will not be the final programs. Astronomy and astrophysics will continue to evolve rapidly during construction of GMT and TMT, thanks to previous investments in ground- and space-based observatories, such as the NASA Transiting Exoplanet Survey Satellite (TESS), the NASA James Webb Space Telescope (JWST), and the Large Synoptic Survey Telescope (LSST). Actual KSPs will be selected by peer-review before the start of GMT and TMT science operations.

NOAO, TIO, and GMTO are committed to enabling diversity within KSP collaborations. We seek to empower the best minds, no matter their gender, ethnicity, sexual orientation, or institutional affiliation.

More information about the US ELT Program and how community scientists can join KSP development groups will be available after mid-June 2018.

Questions regarding this initiative may be directed to NOAO Director David Silva (dsilva@noao.edu).

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Presentations from NOAO's 2020 Decadal Survey Community Planning Workshop "NOAO Community Needs for Science in the 2020s" Available Online

The NOAO community gathered at the "[NOAO Community Needs for Science in the 2020s](#)" workshop 21-20 February 2018 in Tucson, AZ to share their visions of science in the coming decade and the resources needed to accomplish that science. The workshop was also an opportunity for the community to make recommendations to NOAO regarding their priorities as well as a way to facilitate community-led input to the Decadal Survey. Designed to complement the earlier community-based study "[Maximizing Science in the Era of LSST](#)," the workshop topics included studies of bright stars, exoplanets, complementarity with JWST, and ongoing time domain and spectroscopic experiments among the many topics covered.

Science Forecast: Bright with Thrilling Discoveries

Taken together, the workshop and the "Maximizing Science" study forecast a decade of thrilling new discoveries and significant advances in our understanding of stars, exoplanets, Galactic structure and evolution, cosmology, the solar system, the time domain Universe, and more!

The anticipated resource needs are **diverse** (rather than monolithic) and include, e.g., telescopes of modest aperture to large, creative use of existing facilities, mid-scale instrumentation, flexible observing options, archival data, data analysis methods, as well as new infrastructure. While major

investments will likely lead to ground-breaking advancements, participants also identified an array of modest investments that are expected to produce large scientific pay offs.

Presentations from the workshop, available online, include [high-level science overview presentations](#):

- Science with LSST (Keith Bechtol, LSST)
- JWST Science in the 2020s (Jen Lotz, STScI)
- Exoplanet Science in the 2020s (Courtney Dressing, UCB)
- High Angular Resolution Universe (Gail Schaefer, CHARA)
- Era of Bright (Star) Astronomy (Jim Fuller, Caltech)
- Galaxy Evolution and Stellar Pops (David Nidever, MSU/NOAO)
- Time Domain and Near-field Cosmology in 2020s (David Sand, UA)
- SDSS-V: Pioneering Panoptic Spectroscopy (Juna Kollmeier, Carnegie)
- Science with GSMTs (Megan Donahue, MSU)
- Maximizing Science Return from Large Surveys (Chad Schafer, CMU)
- Solar System Science in the Next Decade (Henry Hsieh, PSI)

reviews of [current implementation plans and possibilities](#):

- Gemini Observatory plans (Bryan Miller, Gemini)
- KPNO/CTIO + Time Domain Follow up (Lori Allen, NOAO)
- NOAO Data Group (Adam Bolton, NOAO)
- Wide-aperture Exoplanet Telescope (Ben Monreal, Case Western)
- Wide-field Spectroscopy Concepts (Jeff Newman, U. Pitt)
- GSMTs (Mark Dickinson, NOAO)

as well as [breakout sessions on science themes](#) and [needed capabilities](#):

- Bright Universe
- Faint Universe
- Science with Large Samples
- Time Domain Science
- GSMTs
- Wide-field Spectroscopy
- High Angular Resolution Science.

If you were unable to join us or would like to relive the experience, please visit the meeting website, where the presentations and summaries from the meeting [have been archived](#).

Goodman Spectrograph Data Reduction Pipeline Now Available at SOAR

Cesar Briceno, Simon Torres, & Bruno Quint (SOAR)

The first release of the data reduction pipeline for the Goodman spectrograph on SOAR is now available. The pipeline is a Python-based package developed by SOAR staff. The initial release supports the two most commonly used modes, with other modes to be added. The software can be downloaded and

installed, or run on a dedicated server at SOAR. The end result is one (or more) 1-dimensional point source spectra that have been wavelength calibrated and linearized. Flux calibration is not yet available. Further details can be found [at this website](#). We strongly encourage feedback from observers!

Flexible Observing Modes Available at SOAR

Jay Elias, SOAR Director

Beyond classical observing, both on-site and remote, SOAR offers two additional observing modes in order to accommodate programs that are not well matched to the classical format:

- **Target of opportunity observations.** The current policy is available at the SOAR webpage below. As we move into an era of large-scale surveys, we expect the SOAR policy to evolve, so please check for updates before proposing.
- A limited amount of **service observing** is also supported. Although this mode was announced for 2018B, no NOAO proposals requesting this mode were received. We encourage potential users to consult the SOAR webpage to see if their projects match the criteria.

Current SOAR policies can be found at the "[Proposing for SOAR](#)" webpage.



SOAR Telescope at Sunset. Credit: SOAR



The "Science and Evolution of Gemini Observatory"

22-26 July 2018, San Francisco

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

The Science and Evolution of Gemini Observatory conference invites the astronomical community to review recent science highlights, identify needs in the context of Gemini's evolving capabilities, and develop strategies for the future. Registration is now open. The scientific program includes a general session with selected science topics, instrument themes, and panel discussions. Several workshops are also planned (Data Reduction Workshop,

Speed Collaboration, and "Under the Hood" talks). For more information please see the Conference website, <https://www.gemini.edu/seg2018>.

The 2018 GMT Community Science Meeting: "Stars: Birth and Death"

13-15 September 2018, Waikiki, Hawai'i

<http://www.gmtconference.org>

Registration deadline: **6 August 2018**

The Sixth Annual GMT Community Science Meeting will be held at the Hilton Hawaiian Village Waikiki in Hawai'i on 13-15 September 2018. These annual conferences bring people together across the community to hear about the most exciting current research and to think about the next big questions in the field. This year's topic is Stars: Birth and Death.



While stars spend most of their lives as stable, fusion-powered objects, stellar birth and death involve some of the most dramatic and diverse physical processes known to astrophysicists. Stellar beginnings are shrouded in dust and difficult to observe, and the next generation of large telescopes will offer transformative opportunities to understand this first chapter of the star formation story. Stellar death is often explosive, and a burgeoning swell of data on transient objects offers great opportunities for advancing our understanding of the last chapter of the stellar story. This conference brings together experts in the fields of star formation and stellar disruptions, eruptions and explosions. We will focus on key open questions that can be solved in the upcoming era of extremely large telescopes.

An introduction and current status of the GMT will be presented to kick off the meeting.

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.

