Upcoming Events

**American Astronomical Society meeting – Boston**
(http://aas.org/files/resources/aas224_block_schedule.pdf)
**Jun 1 - 5, 2014** | Boston, MA

**69th International Symposium on Molecular Spectroscopy**
(http://isms.illinois.edu/)
**Jun 16 - 20, 2014** | Champaign-Urbana, IL

**Transformational Science in the ALMA Era: Multi-Wavelength Studies of Galaxy Evolution**
(https://science.nrao.edu/facilities/alma/naasc-workshops/alma2014)
**Aug 04 - 07, 2014** | Charlottesville, VA

**The Filamentary Structure in Molecular Clouds**
(https://science.nrao.edu/enews/7.6/index.shtml#clouds)
**Oct 10 - 11, 2014** | Charlottesville, VA

**Revolution in Astronomy with ALMA - The Third Year**
(http://www.almasc2014.jp/)
**Dec 08 - 11, 2014** | Tokyo, Japan

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**Bi-static Radar Imaging with the GBT and Arecibo**

In this 70 cm wavelength, same-sense circular polarization radar image of Mare Serenitatis, the resolution is 200m per pixel. This is a cylindrical projection, with north toward the top.

Bi-static radar imaging of central and northern Mare Serenitatis – conducted with the Arecibo Observatory transmitting and the GBT receiving – has improved our ability to discriminate our Moon’s volcanic complexes, tectonic features, and regolith properties. The Arecibo-GBT radar images acquired and described by Campbell et al. in their paper reveal flow-unit boundaries, channels, and lobes unseen via other remote sensing methods. Comparison of the 12.6 cm and 70 cm radar data implies a rough or block transition zone between the mare regolith and the intact bedrock, and an average regolith thickness of 10m, with a TiO₂ content of 2-3%. A localized pyroclastic deposit associated with Rima Calippus has been identified based on its low radar echo strength. A 250 km east-west trending feature in northern Mare Serenitatis suggests a large graben flooded by late-stage mare flows.

**Reference:**

Bruce A. Campbell (Smithsonian Institution), B. Ray Hawke (Hawai'i-Manoa), Gareth A. Morgan (Smithsonian Institution), Lynn M. Carter (NASA-Goddard), Donald B. Campbell (Cornell), and Michael

Telescope Time Allocation for Semester 2014B

The Observatory has completed the Semester 2014B time allocation process (https://science.nrao.edu/observing/proposal-types/peta) for the Very Large Array (https://science.nrao.edu/facilities/vla), the Very Long Baseline Array (http://science.nrao.edu/facilities/vlba), High Sensitivity Array (https://science.nrao.edu/facilities/vlba/proposing/HSA), and the Green Bank Telescope (https://science.nrao.edu/facilities/gbt). A total of 350 new proposals were received for the 3 February 2014 submission deadline and a total of 1425 unique authors submitted proposals to the Observatory, with 987, 474 and 288 proposers competing for time on the VLA, GBT and VLBA/HSA, respectively. In aggregate, the proposals covered the broad spectrum of modern research in astronomy and astrophysics.

Eight Science Review Panels (SRPs) reviewed the proposals for scientific merit. NRAO staff reviewed the proposals for technical feasibility. Reviews were completed in March and then cross-reconciled by the Time Allocation Committee (https://science.nrao.edu/observing/proposal-types/time-allocation-committee) (TAC) during a telecon on 11 April 2014 and a face-to-face meeting on 22-23 April 2014 at NRAO in Socorro, NM. The TAC consists of the SRP chairs and was charged with recommending a science program for Semester 2014B to the NRAO Director. The recommended program (https://science.nrao.edu/observing/proposal-types/directorsreview) was reviewed and approved on 2 May 2014.

A disposition letter was sent to the principal investigator and co-investigators of each proposal on 14 May 2014. A TAC report (http://www.aoc.nrao.edu/~schedsoc/tac2014b.shtml) containing information for proposers and observers, including statistics and telescope pressure plots, was released the same day. The approved science program (https://science.nrao.edu/science/science-program) will be posted soon to the NRAO science website. For each approved proposal (http://library.nrao.edu/proposals) in the science program, the Proposal Finder Tool will have access to its authors, title, abstract, and approved hours.

The Observatory welcomes community feedback on its telescope time allocation process (https://science.nrao.edu/observing/proposal-types/peta). Please provide such feedback via the Proposal Review department of the Observatory's Helpdesk (http://help.nrao.edu/).

2nd Circular: Revolution in Astronomy with ALMA - The Third Year
The Atacama Large Millimeter/submillimeter Array (ALMA) has been producing a growing number of impressive and scientifically compelling results as the most powerful mm/submm interferometer in the world. Held in central Tokyo, the aim of this four day conference is to highlight the most recent science results from ALMA obtained during the first three years of science operations, and to motivate future collaboration among researchers around the world. The science topic includes all fields of astronomy; cosmology and galaxies in the distant universe, nearby galaxies and the Galactic Center, ISM and star formation in our own galaxy, astrochemistry, circumstellar disks, exoplanets, solar system, stellar evolution and the Sun. Recent results using the ALMA Archive are also welcome. This four day conference will feature invited/contributed talks and poster sessions. Young researchers and students are particularly encouraged to attend the meeting.

Registration is now available online. Please visit our webpage for more information (http://www.almasc2014.jp).

Conference timeline:

- 1st circular: February 24, 2014
- 2nd circular (registration begins): May 26, 2014
- Deadline for registration for oral contribution: August 20, 2014 (UT 3:00)
- Deadline for registration (poster contribution/attendance only), and payment: October 15, 2014 (UT 3:00)
- Public Talk: December 7
- Conference: December 8-11

Questions and comments should be sent to: info@almasc2014.jp

SOC Chair; Ken Tatematsu (NAOJ)
LOC Chair; Daisuke Iono (NAOJ)

The Filamentary Structure in Molecular Clouds

A North America ALMA Science Center (NAASC) Workshop
10-11 October 2014
Charlottesville, VA, USA
1st Announcement

Filamentary structure in molecular clouds has been observed dating back many years. However, recent Herschel observations of nearby dust clouds have highlighted that the dense gas is distributed
predominantly in filaments. It has been suggested that such filamentary structure may be ubiquitous in the internal structure of all molecular clouds and may be preferential formation sites of dense cores that eventually collapse to form stars.

If such filamentary structures were universal in all molecular clouds of low mass and high mass star formation, then the whole paradigm of cloud formation and evolution leading to star formation would be placed on a more definitive framework that centers on cloud condensation into filaments and filament fragmentation into cores. This framework would focus the theoretical and observational studies of star formation in molecular clouds on the origin and evolution of dense filaments as one of the fundamental steps.

This NAASC Workshop aims to bring together experts, postdoctoral fellows, and students, to discuss the current evidence for such a picture and to help formulate future projects on ALMA and other facilities – CARMA, SMA, SMT, GBT, VLA, JCMT, LMT, CCAT, etc. – and theoretical investigations to verify whether such filamentary structure is universal in molecular clouds in different environments and to study the physical conditions of such structures.

A sample of outstanding issues to be addressed include:

1. Is filamentary structure in molecular clouds universal?
2. What are the kinematic characteristics of filaments and their local environment that would inform us on their origins? Do the filaments we observe arise from converging, super-Alfvenic gas flows, stretching and shearing of pre-existing features, or sub-Alfvenic flows along magnetic fields, and self-gravity?
3. How important is filamentary structure for star formation? Would the IMF be different if filaments were different?
4. What is the connection between the filamentary structure in molecular clouds and the shell-like structure of the HI medium? And, what is the relationship to the ionized regions?
5. What further observations would be needed to fully characterize the internal (filamentary) structure of molecular clouds in various environments?
6. The viability of similar studies of molecular clouds in the Magellanic Clouds, nearby Local Group galaxies and perhaps the nearest starburst galaxies, such as NGC253.

Through this focused workshop, it is hoped that interested members of the community can formulate key projects on ALMA and other telescopes that will further define the internal structure of molecular clouds in various environments in the Galaxy. The workshop will take at NRAO in Charlottesville from 10-11 October 2014. Attendance will be limited to 60 participants.

The Workshop website will be available soon with additional program and registration information through the NRAO science website, [http://science.nrao.edu](http://science.nrao.edu).

*Science Organizing Committee:*
Fred Lo, Chair (NRAO)
Neal Evans (Texas)
James di Francesco (HIA)
Paul Goldsmith (JPL/Caltech)
ALMA Project Status

All Cycle 0 Early Science data has been delivered. As one-year proprietary periods end, the data is made available through the ALMA archive. The first Cycle 1 data, including DDT datasets, have now appeared in the ALMA archive. Eighteen of 69 NA high priority Cycle 1 projects have now been fully delivered; some data has been delivered for 32 NA projects.

A report on the [outcome of the ALMA Early Science Cycle 2 Proposal Review Process](https://almascience.nrao.edu/news/almasearch/almasearch-news) has been published on the ALMA Science Portal. A more detailed report will appear on the portal shortly. The 353 highest-priority Cycle 2 projects – 117 from North America, 115 from Europe, 83 from East Asia, 34 from Chile, and 4 Other – will have precedence for observing, followed by the highest priority Cycle 1 observations which have not yet been taken. The array is in a higher resolution configuration, C32-5, and will cycle through the two larger configurations as the austral winter progresses.

Examination of the list of North American Principal Investigators for the ensemble of submitted proposals shows that just over half of those who proposed for the NRAO telescopes submitted an ALMA proposal. Those NRAO proposers who also proposed for ALMA comprised just under 10% of all ALMA proposers. As with previous cycles, ALMA has increased the community of proposers to all NRAO instruments by about a factor of six.

During May, one new Director’s Discretionary Time project was received, reviewed and approved. ALMA is also planning [Science Verification](https://wikis.alma.cl/bin/view/ScienceVerification/ScienceVerificationNoticeboard) observations of 3C286 to confirm polarization performance.

**Transitions:** Serge Guniat has been appointed Head of the ALMA Department of Engineering. He will start his position 1 July. Serge was Head of the Mechanical Group at the ESO Very Large Telescope for the past eight years, then Head of the Paranal Engineering Department and Project Manager of several projects.
4th VLA Data Reduction Workshop

Gustaaf van Moorsel

Registration is now open for the fourth Very Large Array (VLA) Data Reduction Workshop, which will take place 27-31 October 2014 at the NRAO New Mexico Array Science Center (NMASC), in Socorro. The aim of the workshop is to assist observers with the data reduction challenges posed by the increased flexibility and complexity of the VLA.

During this workshop observers will be able to reduce their own VLA data using hardware provided by NRAO and with NRAO staff experts present for consultation. There will also be presentations by local staff covering the Common Astronomy Software Applications (CASA) software package and the latest developments in data reduction techniques.

This is an advanced workshop, and unlike our summer Synthesis Imaging Workshops, is not intended for those who are new to radio interferometry. Prior experience with AIPS, CASA, or MIRIAD is required. As we will be using CASA as our main data reduction package, a working knowledge of it would be helpful: we strongly recommend those new to CASA to go through one or more of our tutorials (http://casaguides.nrao.edu/index.php?title=EVLA_Tutorials) prior to attending the workshop.

As we have 30 workstations available, we have to limit the number of participants to approximately 30. In a limited number of cases, two participants working on the same data may share a machine; this can be requested during registration. To register please visit the Workshop website (https://science.nrao.edu/science/meetings/2014/vla-data-reduction), the contents of which will be further updated as we get closer to the actual dates.

We look forward to welcoming you to Socorro.

New Hydrogen Maser Installed at the Large Millimeter Telescope for High Sensitivity mm-wave Very Long Baseline Interferometry

Shep Doeleman (MIT Haystack Observatory & Smithsonian Astrophysical Observatory)

A US-Mexican team of astronomers has just installed a hydrogen maser frequency standard at the Large Millimeter Telescope Alfonso Serrano (LMT) on the summit of Volcán Sierra Negra at an elevation of 4600m. The new maser will enable a range of Very Long Baseline Interferometry (VLBI) experiments that rely on the LMT’s large collecting area (currently 32m diameter) and high altitude site. These include determining the distance to the Galactic Center by measuring the parallax of SgrA* (the 4 million solar mass black hole at the heart of the Milky Way) with 3mm wavelength VLBI. At 1.3mm wavelength, the LMT will join other telescopes worldwide in the Event Horizon Telescope array to image the event horizons of SgrA* and the supermassive black hole at the center of the nearby elliptical galaxy M87.
The team drove the maser from the Instituto Nacional de Astrofísica Óptica y Electrónica (INAOE) campus near Puebla, Mexico, to the LMT on 24 April. Over the next several days, the maser was (gingerly) installed in a temperature stable area and integrated with VLBI instrumentation and the Redshift Search Receiver at the telescope. On 29 April, 3mm wavelength observations with the VLBA and LMT, at a recorded data rate of 2 Gb/s, yielded clear VLBI fringes on the quasar 1633+382. These detections were obtained on 20 seconds of data (5GBytes) sent over the Internet from the LMT, the Mauna Kea VLBA station, and the Pie Town VLBA station to MIT Haystack Observatory for correlation.

The international team included scientists and students from INAOE, the University of Massachusetts (Amherst), NRAO, the Centro de Radioastronomía y Astrofísica (CRyA) of the Universidad Nacional Autónoma de México (UNAM), MIT Haystack Observatory, and the Smithsonian Astrophysical Observatory (SAO).

Recent Media Releases

**Failed Dwarf Galaxy Survives Galactic Collision Thanks to Full Dark-Matter Jacket**
[j](https://public.nrao.edu/news/pressreleases/smith-cloud-dark-matter)
**23 May 2014**

Like a bullet wrapped in a full metal jacket, a high-velocity hydrogen cloud hurtling toward the Milky Way appears to be encased in a shell of dark matter, according to a new analysis of GBT data. [Read more...](https://public.nrao.edu/news/pressreleases/smith-cloud-dark-matter)

**NRAO Astronomer Kenneth Kellermann to Receive ASP’s Prestigious Catherine Wolfe Bruce Gold Medal**
[j](https://public.nrao.edu/news/announcements/kellermann-bruce-gold-medal)
**15 May 2014**

Kenneth Kellermann, Ph.D., senior scientist at the NRAO in Charlottesville, VA, is the recipient of the Astronomical Society of the Pacific’s (ASP) 2014 Catherine Wolfe Bruce Gold Medal, the society’s highest honor. [Read more...](https://public.nrao.edu/news/announcements/kellermann-bruce-gold-medal)

**New Radar Images Uncover Remarkable Features below the Surface of the Moon**
[j](https://public.nrao.edu/news/pressreleases/moon-gbt-arecibo)
**14 May 2014**

New images of Earth’s Moon reveal more than can be seen with the naked eye, thanks to the combined efforts of the two largest radio telescopes of their kind -- the GBT and the Arecibo Observatory. [Read more...](https://public.nrao.edu/news/pressreleases/moon-gbt-arecibo)

**NRAO Media Tipsheet**
[j](https://public.nrao.edu/news/tip-sheets/may-2014-tip-sheet)
**10 May 2014**

- Green Bank Telescope Makes Arecibo Connection to Image Asteroid
Career Opportunities

**New Postings**

**Mechanical Engineer II** (https://cw.halogensoftware.com/nrao/index.do) : The NRAO in Socorro, NM is now accepting applications for a Mechanical Engineer II position. The candidate will be responsible for the carrying out and assisting in engineering analysis, design, and general execution of a project or whole system. Responsibilities include recommendations, coordination and assisting in decisions on such aspects as design, procurement, manufacture, erection, test and some degree of initial operation.

**Systems Administrator I** (https://cw.halogensoftware.com/nrao/index.do) : The NRAO is now accepting applications for a Systems Administrator I position (location to be determined). The purpose and primary responsibility is development, maintain, and support of the Associated Universities, Inc. (AUI)/National Radio Astronomy Observatory (NRAO) business software, Oracle J.D. Edwards EnterpriseOne (JDE E1).

From the Archives

**Ellen Bouton**

*About this month's photo:* Throughout its history, NRAO has shipped state-of-the-art electronics for use in observatories around the world. In March 1968, NRAO loaned to CSIRO a 6 cm front-end containing a cooled parametric amplifier, to be used for joint observations on CSIRO's 210-foot radio telescope in Parkes, Australia. The components were assembled and tested on the 140-foot telescope in Green Bank, with Frank Gardner from CSIRO visiting NRAO to learn the system, and Peter Mezger from NRAO visiting CSIRO to work with staff there. The loan necessitated extensive correspondence between Sandy Weinreb at NRAO, John Bolton, Brian Cooper, and Frank Gardner of CSIRO, and, of course, various embassy attachés and customs officials. In this photo, sent by Cooper as one of a set showing the receiver's installation on the 210-foot dish, the package has been loaded into the tripod lift before being raised to the aerial cabin.

*From the Archives* is an ongoing series illustrating NRAO and U.S. radio astronomy history via images selected from our collections of individuals' and institutional papers. If readers have images they believe would be of interest to the Archives, please contact Ellen Bouton, ebouton@nrao.edu (#).