



Upcoming Events



[Metrology and Control of Large Telescopes \(http://go.nrao.edu/metconf\)](http://go.nrao.edu/metconf)

Sep 19 - 24, 2016 | Green Bank, WV



[Half a Decade of ALMA: Cosmic Dawns Transformed \(http://go.nrao.edu/alma5years\)](http://go.nrao.edu/alma5years)

Sep 20 - 23, 2016 | Indian Wells, CA



[Breakthrough Listen North American Community Workshop](http://go.nrao.edu/breakthrough_listen)

[\(http://go.nrao.edu/breakthrough_listen\)](http://go.nrao.edu/breakthrough_listen)

Oct 5 - 6, 2016 | Green Bank, WV



[Coexisting with Radio Frequency Interference \(http://go.nrao.edu/rfi2016\)](http://go.nrao.edu/rfi2016)

Oct 17 - 20, 2016 | Socorro, NM



[2016 Jansky Lecture \(https://science.nrao.edu/science/jansky-lecture/speakers/jacqueline-van-gorkom\)](https://science.nrao.edu/science/jansky-lecture/speakers/jacqueline-van-gorkom)

Oct 27, 2016 | Charlottesville, VA



[2016 Jansky Lecture \(https://science.nrao.edu/science/jansky-lecture/speakers/jacqueline-van-gorkom\)](https://science.nrao.edu/science/jansky-lecture/speakers/jacqueline-van-gorkom)

Nov 4, 2016 | Socorro, NM



[NRAO Town Hall at the Jan 2017 AAS Meeting](https://science.nrao.edu/science/meetings/2017/aas-229/townhall)

[\(https://science.nrao.edu/science/meetings/2017/aas-229/townhall\)](https://science.nrao.edu/science/meetings/2017/aas-229/townhall)

Jan 6, 2017 | Grapevine, TX

2017 Jansky Fellow Program Announcement



The National Radio Astronomy Observatory (NRAO) announces the 2017 Jansky Fellowship Program which provides outstanding postdoctoral opportunities for research in astronomy. Jansky Fellows formulate and carry out investigations either independently or in collaboration with others within the wide framework of interests of the Observatory. Prior radio experience is not required and multi-wavelength projects leading to a synergy

with NRAO instruments are encouraged. The NRAO also encourages applications from candidates with interest in radio astronomy instrumentation, computation, and theory.

Appointments may be made for positions at either of the NRAO sites: Socorro, New Mexico or Charlottesville, Virginia. In compelling cases, non-resident Jansky Fellowships may be offered for appointments that are hosted at a university within the United States. Non-resident Jansky Fellows are strongly encouraged to make frequent and/or long term visits to NRAO sites. Split Fellowships with time spent at NRAO and a university within the U.S. are permitted.

The starting salary will be \$65,000 per year for an appointment of two year's duration, with possible renewal for a third year. A research budget of up to \$10,000 per year is provided for travel and computing equipment. Fellows are eligible for page charge support, vacation accrual, health insurance coverage, and a moving allowance. In addition, up to \$3,000 per year is provided to non-NRAO institutions hosting Jansky Fellows to defray local institutional costs. Appointments of more than one Jansky Fellow at a single external institution at a given time are strongly discouraged. A list of blocked institutions for 2017 can be found on our website.

The primary purpose of the Jansky Fellowship Program is to provide an opportunity for early career scientists to establish themselves as independent researchers using NRAO facilities, and participate in observatory operations so that they may more effectively compete for permanent positions in academe, national centers, or commerce. Jansky Fellows are encouraged to develop research collaborations both within the NRAO research community and with researchers in the astronomical community at-large. To help foster research between Jansky Fellows and the NRAO scientific community the NRAO Postdoctoral Symposium is held annually to ensure close contact among all Observatory Jansky Fellows and the NRAO.

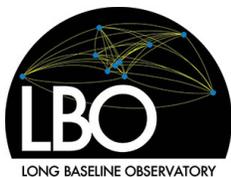
Candidates must receive their Ph.D prior to beginning a Jansky Fellowship appointment. The deadline for applications and letters of reference is Tuesday, 1 November 2016. Award offers will be made by 15 February 2017, with the Fellowships normally expected to begin in September 2017.

For further information and to apply, please visit our [Careers Page \(https://cw.na1.hgnccloud.com/nrao/index.do\)](https://cw.na1.hgnccloud.com/nrao/index.do). Please combine into one PDF file and attach to your NRAO application a cover letter, curriculum vitae, publications list, summary of previous and current research, and a research proposal.

The NRAO is an equal opportunity employer (M/F/D/V).

Long Baseline Observatory Launch

Walter Briskin (LBO Director)



On 1 October 2016, the Very Long Baseline Array (VLBA) will be separated from the NRAO facilities suite and placed into the Long Baseline Observatory (LBO). This transition will financially separate the VLBA from the Very Large Array (VLA), though the LBO will continue to work closely with NRAO to ensure continuity of services and efficient operations. To avoid confusion, the research facility will continue to be called the VLBA, but the VLBA will be managed and operated by the LBO. This article describes some of the implications of this separation. Additional background on the formation of the LBO was provided in a [previous NRAO eNews article \(https://science.nrao.edu/enews/9.3/index.shtml#gbo_lbo\)](https://science.nrao.edu/enews/9.3/index.shtml#gbo_lbo).

A key goal in the creation of the LBO, and migration of the VLBA into the LBO, has been minimal change to the user experience. Users saw the first impact of the separation at the 1 August 2016 Call for Proposals, where

VLBA proposals were solicited separately from those for VLA and the Green Bank Telescope (GBT). As time progresses, other changes will become apparent, including the creation of a new Internet domain, <https://www.lbo.us>). VLBA web content will soon migrate to this url, and users will soon see email addresses ending with "@lbo.us", though old NRAO equivalent email addresses will continue to function.

Perhaps the largest changes to the VLBA as part of its transition into the LBO are new opportunities for technical improvements, such as the installation of new receivers, and further increasing the system bandwidth through new electronics and data transmission equipment. We hope to move forward with these initiatives in the near future.

A necessary consequence of the new partnerships that are enabling continued VLBA science operations is a reduction in time openly available to the VLBA community. The magnitude of impact is not yet precisely known, though a reduction of up to 50% is possible. Available VLBA science operations time will continue to be awarded under an Open Skies policy: the highest-rated science observing proposals will continue to be awarded time, regardless of proposer affiliation. The High Sensitivity Array, a Very Long Baseline Interferometry (VLBI) array consisting of the VLBA antennas, the phased Jansky VLA, the GBT, Arecibo, and Effelsberg, will continue to be offered at upcoming calls for proposals with the same Open Skies policy, as will global VLBI with the European VLBI Network and the Global Millimeter VLBI Array (GMVA). The LBO looks forward to a continued stream of innovative proposals yielding high-impact science.

Questions about the LBO or changes to the VLBA should be addressed:

- To the [NRAO helpdesk \(https://help.nrao.edu/\)](https://help.nrao.edu/) under "VLBA General Queries"
- To the [LBO Frequently Asked Questions page \(https://www.lbo.us/faq\)](https://www.lbo.us/faq), or
- By visiting the LBO exhibit at the [January 2017 American Astronomical Society meeting \(https://aas.org/meetings/aas229\)](https://aas.org/meetings/aas229).

Finally, this will be the last VLBA article distributed via the NRAO eNews. A new LBO electronic newsletter will debut in the near future, with quarterly issues.

Green Bank Observatory Launch

Karen O'Neil (GBO Director)



On 1 October 2016, the NRAO Green Bank facilities, including the 100m Green Bank Telescope (GBT), will be moved out of the NRAO facility suite and into a new organization – the Green Bank Observatory (GBO). The transition will result in changes in the GBO financial and staffing structure, as well as a new website, and more. However, GBO and NRAO staff will work throughout the process to ensure a seamless transition for visitors and scientists using the GBO instruments and facilities.

One of the most visible changes for those familiar with the Green Bank facility will be the [new GBO website \(http://www.greenbankobservatory.org/\)](http://www.greenbankobservatory.org/) which will launch 7 October 2016. All GBO information will be migrated to this new website, including information about visitor programs, site visits, telescope information, and links to the GBT proposal submission tool. In addition, over the next year the GBO will launch a new visitor reservations website and tool for anyone wishing to stay at the facility.

One of the most significant changes for most scientists will be in the National Science Foundation (NSF) funded Open Skies access to the GBT. As NSF funding for Open Skies science on the GBT decreases, the GBT

observing time available for Open Skies proposals will also decrease. Additionally, over the next year we will be carefully considering the available GBT instrument suite to ensure it matches the needs of all GBT users while also fitting within the GBO budget and resources.

Information specific to scientists wishing to use the GBT will be migrated to the new website over the coming year, and links on the NRAO and GBO science websites will be updated. To keep the process as straightforward as possible for the scientific community, and thanks to agreements put in place between the NRAO and GBO, scientists interested in applying for the NSF funded Open Skies time on the GBT will continue to apply through the [NRAO Proposal Submission Tool \(http://my.nrao.edu/\)](http://my.nrao.edu/).

A celebration of the launching of the GBO will take place in Green Bank, West Virginia on 8 October 2016. Seating and housing is limited for this event, but anyone interested in attending is encouraged to contact [Sue Shears \(mailto:sshears@nrao.edu?subject=GBO%20Launch%20Celebration\)](mailto:sshears@nrao.edu?subject=GBO%20Launch%20Celebration) to inquire about space availability.

Finally, with the separation of GBO from NRAO, this is the last time the GBO will be discussed in the NRAO eNews. After 1 October, GBO will launch a separate, quarterly newsletter with information specific to the site's instruments, facilities, and events.

While change can always be a source of concern, the transition to the Green Bank Observatory is an excellent opportunity to solidify the financial base for the facility and for growing the GBO in new and exciting directions. We look forward to entering this new era of scientific discovery and education as the GBO!

Breakthrough Listen Workshop

Ryan Lynch



The Breakthrough Listen Project and the Green Bank Observatory (GBO) are sponsoring the Breakthrough Listen North American Community Workshop to be held 5-6 October 2016 at the GBO in Green Bank, West Virginia, USA.

The Breakthrough Listen Initiative was launched 20 July 2015 at the Royal Society in London, U.K., with a charge to conduct the most comprehensive and sensitive search for advanced life in humanity's history. Observations are currently being conducted at radio and optical wavelengths, in part using the Green Bank Telescope from 0.3 - 100 GHz. The Breakthrough Listen North American Community Workshop will discuss the goals, strategies and capabilities of the Breakthrough Listen Project, including commensal and ancillary science opportunities, and broadly explore the search for extraterrestrial intelligence in the modern era.

To attend, please visit the [Breakthrough Listen Workshop website \(http://go.nrao.edu/breakthrough_listen\)](http://go.nrao.edu/breakthrough_listen) and register by 30 September 2016. We look forward to seeing you in Green Bank!

The GBT Observing Tool Astrid

Jay Lockman



Almost all Green Bank Telescope (GBT) users interact with the telescope through the software tool Astrid. We are currently evaluating the need to make changes to the tool to improve its reliability and stability and would appreciate receiving comments about any problems you have encountered with Astrid, or suggestions for features that would improve its functionality for your research. Your response will help us set priorities.

Please send comments to Mark Whitehead: mwhitehe@nrao.edu (<mailto:mwhitehe@nrao.edu>).

ALMA Program News

Al Wootten



Credit: ESO, B. Tafreshi.

The Milky Way above ALMA, including Eta Carinae.

ALMA Science Observing

ALMA enters its final month of Cycle 3 observing in a configuration providing a 100 GHz resolution of 0.3 arcsec, suitable for imaging objects with largest angular size of 4.8 arcsec or less at 100 GHz. Generally, 40 or more of the ALMA 12m antennas are being used in this C40-6 configuration. Cycle 4 begins in early October with the array in the same configuration, and Configuration C40-7 will not be visited in October 2016 as indicated in the Cycle 4 Proposer's Guide. [This change](#)

<https://almascience.nrao.edu/news/updated-alma-configuration-schedule-for-cycle-4>) was required to optimize the completion of the high-ranked projects from the Cycle 4 review process. The order of the remaining configurations in Cycle 4 as listed in the Proposer's Guide remains unchanged. The ALMA array configuration will continue until mid-October, and will then offer smaller configurations through the end of austral autumn and into austral winter.

Half a Decade of ALMA: Cosmic Dawns Transformed

This major international science conference – [Half a Decade of ALMA: Cosmic Dawns Transformed](#) (<http://go.nrao.edu/ALMA5Years>) – will be held 20-23 September 2016 at the Renaissance Indian Wells Resort in Indian Wells, California, USA and has been crafted from the 205 submitted abstracts. This conference will highlight exciting results from the over 445 refereed ALMA papers which have produced over 5000 citations and will include presentations from the first Principal Investigator Long Baseline campaign, the first ALMA observations of the Hubble Ultra Deep Field, and more. The conference will bring together researchers from around the world to present and discuss ALMA's transformative science, to motivate collaborations for ALMA Cycle 5, and to discuss ALMA science sustainability over the coming years.

The *Half a Decade of ALMA* conference will be followed on 24-25 September by an [ALMA postdoc symposium](#) (http://go.nrao.edu/ALMA5Years_Postdoc) at the same venue that will feature presentations of early career researchers.

New ALMA Data Releases

[ALMA observations of the Galactic Center](#) (<https://almascience.nrao.edu/news/release-of-alma-observations-of-the-galactic-center>) obtained 12 & 18 July 2016 are now available in the ALMA archive. The ALMA data were obtained using Director's Discretionary Time under project code 2015.A.00021.S (Principal Investigator Gunther Witzel) and are being made available to the community with no proprietary period.

These ALMA observations consist of Band 6 spectral line ^{13}CO J=2-1 and H_3O^+ and continuum observations. Data were obtained for ~ 5 hours each night. The timing of the observations coincides with a [Spitzer and Chandra monitoring campaign](#) (<https://www.cfa.harvard.edu/irac/gc>) of the Galactic Center.

A new installment of [Science Verification data \(https://almascience.nrao.edu/alma-data/science-verification\)](https://almascience.nrao.edu/alma-data/science-verification) is also available. These data include observations of quasars obtained during the long baseline campaigns in 2012, 2013, and 2014. The data were taken to study the stability of the relative amplitude and phase of the system and the atmosphere.

The [ALMA Science Verification web page \(http://almascience.org/alma-data/science-verification\)](http://almascience.org/alma-data/science-verification) contains two files that describe the available data. Because these data were taken as commissioning test data, the normal calibration observations for ALMA data were not obtained and no general data reduction script is available.

ALMA Future Science Development Program Workshop

ALMA has delivered over 1,000 datasets that have resulted in 435 refereed publications that have garnered over 5000 citations. The ALMA Development Program sustains the pace of ALMA science through community-led studies and implementations of improvements to ALMA hardware, software, and techniques. Development Workshops have recently been held in [Europe \(http://www.chalmers.se/en/centres/GoCAS/Events/ALMA-Developers-Workshop/Pages/default.aspx\)](http://www.chalmers.se/en/centres/GoCAS/Events/ALMA-Developers-Workshop/Pages/default.aspx), in [East Asia \(http://alma-intweb.mtk.nao.ac.jp/~diono/meetings/NRO_ALMA_2016/program.html\)](http://alma-intweb.mtk.nao.ac.jp/~diono/meetings/NRO_ALMA_2016/program.html) and in [North America \(https://science.nrao.edu/science/meetings/2016/na-alma-dev-program-workshop\)](https://science.nrao.edu/science/meetings/2016/na-alma-dev-program-workshop). The most recent was held at the North American ALMA Science Center in Charlottesville, Virginia on 24-25 August 2016, and was attended by five dozen people in the NRAO auditorium and at remote sites on three continents via WebEx. Twenty-seven presentations covered all areas of current ALMA development efforts across the world.

NRAO expects to issue a new Call for Proposals for Development Projects on 10 October 2016. Please see the [presentation here \(https://science.nrao.edu/science/meetings/2016/na-alma-dev-program-workshop/presentation/06%20Randolph%20NA%20ALMA%20Future%20Science%20Workshop%20-%2024%20Aug%2016.pdf\)](https://science.nrao.edu/science/meetings/2016/na-alma-dev-program-workshop/presentation/06%20Randolph%20NA%20ALMA%20Future%20Science%20Workshop%20-%2024%20Aug%2016.pdf) for further information. The deadline for proposals will be at the end of January 2017.

Recent Media Releases



[Black Hole Hidden Within Its Own Exhaust](https://public.nrao.edu/news/pressreleases/2016-smbh-exhaust)

<https://public.nrao.edu/news/pressreleases/2016-smbh-exhaust>

15 Sep 2016



[HERA, the 'Cosmic Dawn' Telescope, Receives Major NSF Support](https://public.nrao.edu/news/pressreleases/2016-hera-grant)

<https://public.nrao.edu/news/pressreleases/2016-hera-grant>

14 Sep 2016



[ALMA & VLA Join Host of Other Telescopes to Study Galaxy Cluster](https://public.nrao.edu/news/announcements/galaxy-cluster-2016)

<https://public.nrao.edu/news/announcements/galaxy-cluster-2016>

30 Aug 2016



[ALMA Finds Unexpected Trove of Gas Around Larger Stars](https://public.nrao.edu/news/pressreleases/2016-alma-ob-disk)

<https://public.nrao.edu/news/pressreleases/2016-alma-ob-disk>

25 Aug 2016



[ALMA Cycle 4 Proposals Show Increased Demand](https://public.nrao.edu/news/announcements/alma-cycle-4)

<https://public.nrao.edu/news/announcements/alma-cycle-4>

23 Aug 2016



[ALMA Sees Transition from Atomic to Molecular Gas in Orion](https://public.nrao.edu/news/announcements/alma-image-orion)

<https://public.nrao.edu/news/announcements/alma-image-orion>

15 Aug 2016

Career Opportunities

Jansky Fellowship: (<https://cw.na1.hgncloud.com/nrao/loadJobPostingDetails.do?jobPostingID=103080&source=jobList>)

The primary purpose of the Jansky Fellowship Program is to provide an opportunity for early career scientists to establish themselves as independent researchers so that they may more effectively compete for permanent positions. Jansky Fellows are encouraged to develop research collaborations both within the NRAO research community and with researchers in the astronomical community-at-large. To help foster research between Jansky Fellows and the NRAO scientific community, the NRAO Postdoctoral Symposium is held annually to ensure close contact among all Observatory Fellows and the NRAO. The Fellowship will be assigned to the following NRAO sites: Socorro, New Mexico or Charlottesville, Virginia. In compelling cases, non-resident Jansky Fellowships may be offered for appointments that are hosted at a university within the United States. Non-resident Jansky Fellows are strongly encouraged to make frequent and/or long term visits to NRAO sites. Split Fellowships with time spent at NRAO and a university within the U.S. are permitted.

Assistant Scientist: (<https://cw.na1.hgncloud.com/nrao/loadJobPostingDetails.do?jobPostingID=102900&source=jobList>)

The NRAO is actively seeking an Assistant Scientist to work with the NRAO Algorithms R&D Group and the Common Astronomy Software Applications (CASA) group and will be expected to carry out research in developing algorithms relevant to the NRAO telescopes and their implementation, and provide support and maintenance for the CASA package delivered to the users. The successful candidate will contribute to CASA development and maintenance as part of the CASA team. Work will require advanced programming in C++ and Python, use of the CASA package, and high performance computing. The position will be based in either Charlottesville, Virginia on the grounds of [University of Virginia](http://www.virginia.edu/) (<http://www.virginia.edu/>) or in Socorro, New Mexico on the campus of [New Mexico Tech](http://www.nmt.edu/) (<http://www.nmt.edu/>).

Research Engineer in Millimeter and Submillimeter Wavelength Electronics:

(<https://cw.na1.hgncloud.com/nrao/loadJobPostingDetails.do?jobPostingID=102480&source=jobList>) The NRAO in Charlottesville, Virginia invites applicants who are research engineers with expertise in millimeter/sub millimeter wavelength electronics. The successful candidate will be a member of the NRAO scientific staff and will join the millimeter/submillimeter receiver group in the Central Development Laboratory (CDL) in Charlottesville. She/he will play a leading role in a program of design and development of low-noise millimeter/submillimeter wavelength instrumentation for astrophysical observation. This has been identified by NRAO as a key technology area for the next generation of radio telescope instrumentation.

Assistant Scientist: (<https://cw.na1.hgncloud.com/nrao/loadJobPostingDetails.do?jobPostingID=102841&source=jobList>)

The NRAO is actively seeking an Assistant Scientist (CASA liaison) to work as an active partner in working to increase communication between the Common Astronomy Software Applications (CASA) development team and the user community. The CASA package is the primary data reduction package for the Karl G. Jansky Very Large Array (VLA) and Atacama Large Millimeter/submillimeter Array (ALMA), in addition to being used at other radio observatories around the world. It is expected that the successful candidate will conduct research using the CASA package. The position will be based in either Charlottesville, Virginia on the grounds of the [University of Virginia](http://www.virginia.edu/) (<http://www.virginia.edu/>) or in Socorro, New Mexico on the campus of [New Mexico Tech](http://www.nmt.edu/) (<http://www.nmt.edu/>).

For additional information on these openings and other NRAO career opportunities, please visit the [NRAO – Career Opportunities web pages \(https://cw.na1.hgncloud.com/nrao/index.do\)](https://cw.na1.hgncloud.com/nrao/index.do).

From the Archives

Ellen Bouton



About this month's photograph: Before the advent of Google Docs, Dropbox, SharePoint, and other digital collaborative tools, researchers used the time-honored method of crouching around unfurled Calcomp printer plots. In this photo from September 1977, Pat Crane, Barry Geldzahler, and Dave Shaffer consider data as displayed on the floor of the Jansky Lab in Green Bank. In reality, the photo was posed, part of an 80-photo sequence taken for use in the Green Bank Tourist Trailer to illustrate an observer at work. Photos show the observer, Dave Shaffer, loading his suitcase into the back of the shuttle, driving one of the diesel Checkers, in the telescope control room, in the cafeteria line, talking with colleagues in Green Bank and Charlottesville, etc., and examining data. Dave Shaffer says he is relieved to know the photo was posed, because he has no idea why they would have been looking at that particular data!

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 \(#\)](#).

Contact the Editor (<mailto:mtadams@nrao.edu?subject=NRAO eNews Editor>)



The National Radio Astronomy Observatory is a facility of the National Science Foundation operated under cooperative agreement by Associated Universities, Inc.