

Upcoming Events



ALMA Special Session (<https://science.nrao.edu/science/aas/221/aas-special-session>)

Jan 8, 2013, 2:00 PM - 3:30 PM PST | Long Beach, CA



NRAO Town Hall (<https://science.nrao.edu/science/aas/221/aas-town-hall>)

Jan 8, 2013, 6:30 PM - 8:30 PM PST | Long Beach, CA



NRAO CASA Tutorial (<https://science.nrao.edu/science/aas/221/aas-221-casa-tutorial>)

Jan 9, 2013, 2:00 PM - 3:30 PM PST | Long Beach, CA



ALMA Data Reduction Tutorial (https://science.nrao.edu/facilities/alma/naasc-workshops/alma_dr)

Feb 28 - Mar 1, 2013 | Charlottesville, VA



Transformational Science with ALMA: From Dust to Rocks to Planets

(<http://www.cv.nrao.edu/rocks/>)

Apr 8-12, 2013 | Kona, Hawaii



Radio Astronomy in the LSST Era (<https://science.nrao.edu/science/event/RALSST2013>)

May 6 - 8, 2013 | Charlottesville, VA

The First Year of ALMA Science

Mark Adams and Al Wootten



Figure 1: Attendees at *The First Year of ALMA Science* conference in Puerto Varas, Chile. Photo courtesy Valeria Foncea (JAO).

Nearly 200 astronomers converged on Puerto Varas, Chile 12-15 December 2012 for a conference titled *The First Year of ALMA Science* that discussed the many cutting-edge results emerging from ALMA data. The conference Science Organizing Committee, chaired by Leonardo Testi, crafted a program that demonstrated the breadth of ALMA's impact on astrophysics and featured major oral presentation sessions on the evolution of galaxies, the interstellar medium and star formation, the high-redshift Universe, solar

system and protoplanetary disks, the local Universe, stellar evolution, and the future of ALMA science. Twice-daily poster sessions proved lively and helped maximize the conference's scientific impact. Ryohei Kawabe and Al Wootten chaired a discussion session on the future of ALMA development and science on the final afternoon, and Neal Evans wrapped up the conference with an excellent summary of the many presentations and posters. Though the conference focused on ALMA observational results, it also included presentations and discussions on related theory, as well as relevant complementary data from the VLA, VLBA, GBT, Herschel, CARMA, SMA, and IRAM.

The conference presentations will soon be available at the [conference website \(http://www.almasc.org/2012\)](http://www.almasc.org/2012), and an electronic conference proceedings volume will be available in 2013. Many of the scientific results from this conference have been, or will soon be, published in the literature.

Proposal Evaluation and Time Allocation for Semester 2013A

Tim Bastian and Joan Wrobel

The Observatory has completed the Semester 2013A [proposal evaluation and time allocation process \(https://science.nrao.edu/observing/proposal-types/peta\)](https://science.nrao.edu/observing/proposal-types/peta) for the [Very Large Array \(http://science.nrao.edu/facilities/vla\)](http://science.nrao.edu/facilities/vla), the [Very Long Baseline Array \(http://science.nrao.edu/facilities/vlba\)](http://science.nrao.edu/facilities/vlba), the [High Sensitivity Array \(https://science.nrao.edu/facilities/vlba/proposing/HSA\)](https://science.nrao.edu/facilities/vlba/proposing/HSA), and the [Green Bank Telescope \(http://science.nrao.edu/facilities/gbt\)](http://science.nrao.edu/facilities/gbt). A total of 420 proposals were received for the 1 August 2012 submission deadline. In aggregate, the proposals covered the broad spectrum of modern research in astronomy and astrophysics. A total of 1415 unique authors submitted proposals to the Observatory, with 966, 418, and 288 proposers competing for time on the VLA, GBT, and VLBA/HSA, respectively.

Proposals were evaluated on the basis of scientific merit by eight Science Review Panels (SRPs). The proposals were also reviewed for technical feasibility by NRAO staff. Reviews were completed in October and then reconciled by the Time Allocation Committee (TAC) during its 29-31 October 2012 meeting. The TAC consists of the SRP chairs and was charged with recommending a science program for Semester 2013A to the NRAO Director. The recommended program was [reviewed and approved \(https://science.nrao.edu/observing/proposal-types/directorsreview\)](https://science.nrao.edu/observing/proposal-types/directorsreview) 26 November.

A disposition letter was sent to the Principal Investigator and Co-Investigators of each proposal 29 November. A [TAC report \(http://www.aoc.nrao.edu/~schedsoc/tac2013a.shtml\)](http://www.aoc.nrao.edu/~schedsoc/tac2013a.shtml) containing information for proposers and observers, including statistics and telescope pressure plots, was released the same day. The [approved science program \(https://science.nrao.edu/science/science-program\)](https://science.nrao.edu/science/science-program) has been posted.

The Observatory welcomes community feedback on its process for proposal evaluation and time allocation. Please provide such feedback via the Proposal Review department of the Observatory's [Helpdesk \(http://help.nrao.edu\)](http://help.nrao.edu).

Third VLA Data Reduction Workshop

Gustaaf van Moorsel

This is to remind you of the 3rd Very Large Array (VLA) Data Reduction Workshop, which will take place 8-12 April 2013 at the Pete V. Domenici Science Operations Center in Socorro, NM.

The aim of the workshop is to assist observers with the challenges posed by the increased flexibility and complexity of the VLA, in particular the wide-band WIDAR correlator modes available to the observing community since 30 September 2011. Participants will be able to reduce their own data while expert local staff is standing by for consultation. For more extensive information, please see the announcement in the



November 2012 eNews

(http://science.nrao.edu/enews/5.12/index.shtml#data_reduction_workshop) .

There are still places available but registrations keep coming in at a steady rate. If you are interested in attending, please register **on-line** (**(<https://science.nrao.edu/facilities/vla/ctw/drw2013>)**) soon. Additional information and a preliminary program will be added as we get closer to the workshop dates.

This Month @ the NAASC

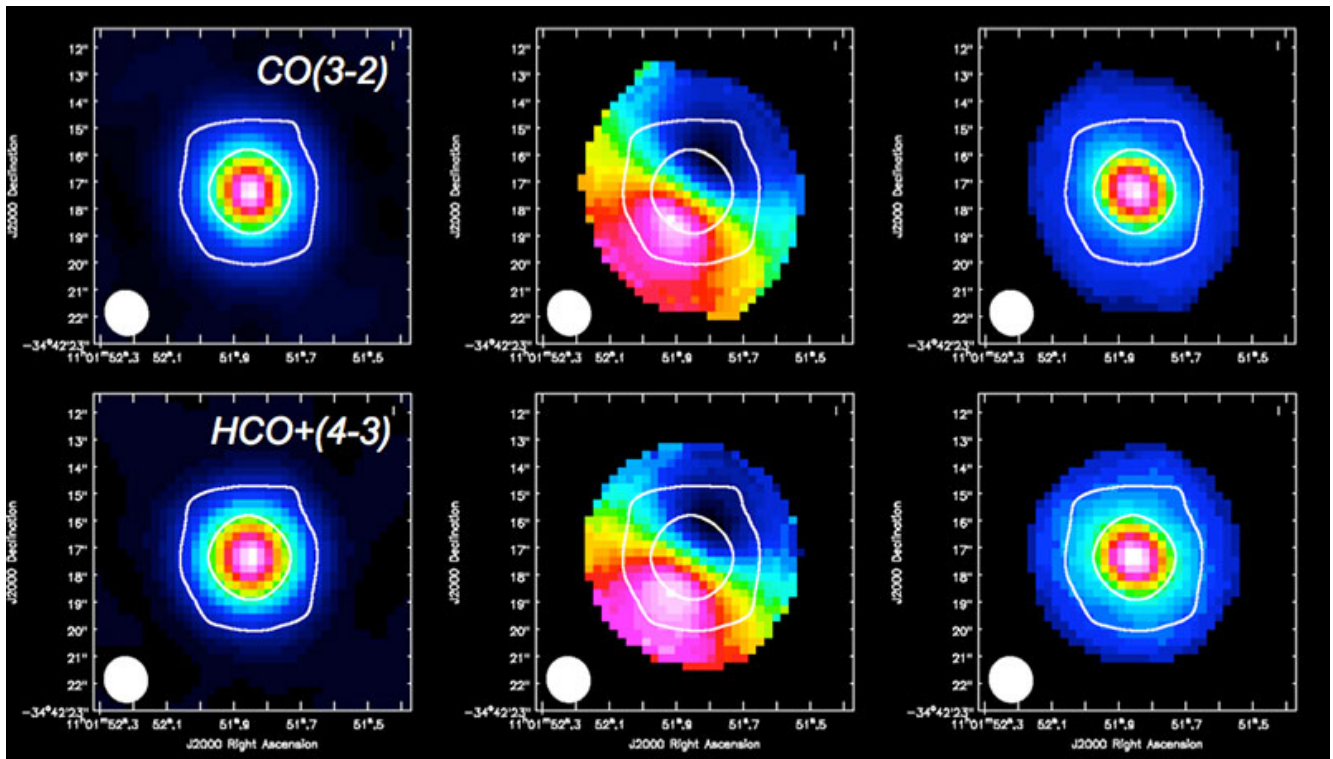
ALMA Data Reduction Workshop

Alison Peck

The NRAO North American ALMA Science Center (NAASC) is offering a two-day interactive ALMA Data Reduction workshop at NRAO Headquarters in Charlottesville, Virginia, on 28 February and 1 March 2013. The aim of this workshop is to assist interested observers in learning how to reprocess their ALMA data, and to allow new and potential ALMA users to become familiar with the data format and the tools available. The program includes a combination of lectures and hands-on sessions aimed at introducing the key concepts in interferometry data reduction and demonstrating their application in the Common Astronomy Software Applications (CASA) package. Hands-on examples will focus on real ALMA data obtained during recent Science Verification observations and emphasize key steps for ALMA Early Science data reduction. To gain the most from the workshop, interested participants may wish to work through one of the older Science Verification datasets available with an online tutorial at the **ALMA Science Portal** (**(<http://www.almascience.org/alma-data/science-verification>)**) .

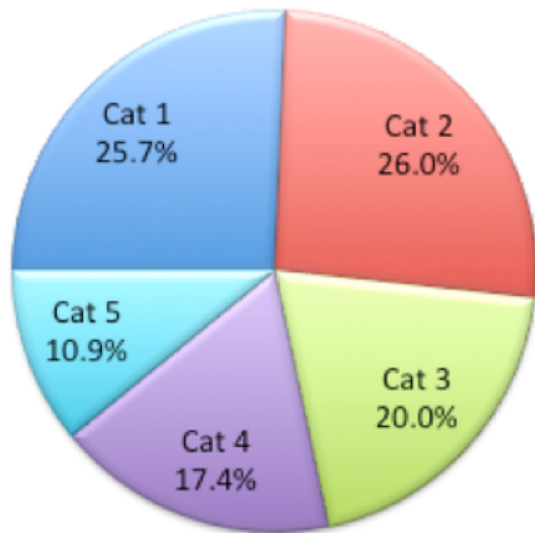
There will be a total of 30 desktops allowing at most 30 participants, so early registration is important. There is no registration fee, but we will not provide remote participation, so travel to Charlottesville is necessary. Information about the logistics of travel and lodging in Charlottesville will be available **here** (**(https://science.nrao.edu/facilities/alma/naasc-workshops/alma_dr/travel)**) .

The registration form can be found **here** (**(https://science.nrao.edu/php/alma/alma_dr/almadr_reg.php)**) , and the detailed program will be available soon. We look forward to seeing you!



Sample ALMA Science Verification data: TW Hya at Band 7

ALMA Early Science Cycle 1: Proposal Review Process Outcome



Distribution of the highest-priority projects across the ALMA science categories: [Cat 1] Cosmology and the high redshift Universe; [Cat 2] Galaxies and galactic nuclei; [Cat 3] ISM, star formation and astrochemistry; [Cat 4] Circumstellar disks, exoplanets and the solar system; [Cat 5] Stellar evolution and the Sun

The scientific assessment of the 1133 science proposals submitted for ALMA Early Science Cycle 1 has been completed. Seventy-eight science assessors from around the world have evaluated the expected scientific value of these proposals. As a result, the most promising proposals of each ALMA region have been selected as those most likely to be completed using the ALMA Cycle 1 capabilities, after their technical feasibility was confirmed by fifteen technical assessors from the Joint ALMA Observatory and the three ALMA Regional Centers.

Principal Investigators (PIs) were notified on 16 November of the outcome of the Proposal Review Process. The 196 highest-priority projects cover a wide range of science and are distributed across the five broad ALMA science categories as shown in Figure 1. A complete list of the highest priority Cycle 1 proposals is [on-line \(https://almascience.nrao.edu/news/alma-early-science-cycle-1-outcome-of-the-proposal-review-process\)](https://almascience.nrao.edu/news/alma-early-science-cycle-1-outcome-of-the-proposal-review-process).

Low Noise Amplifiers for the 4mm Band

Marian Pospieszalski and Eric Bryerton

The NRAO Central Development Laboratory (CDL) has developed and built several cryogenic low noise amplifiers (LNAs) for the 67-90 GHz frequency range near the practical noise limit using two different technologies: hybrid “chip-and-wire” and monolithic microwave integrated circuit (MMIC). Both types give less than 40K noise temperature over a large portion of the band. Four of the hybrid LNAs have been installed in the new Green Bank Telescope (GBT) 4mm receiver. This frequency band also corresponds to ALMA Band 2, currently the subject of a CDL design study.

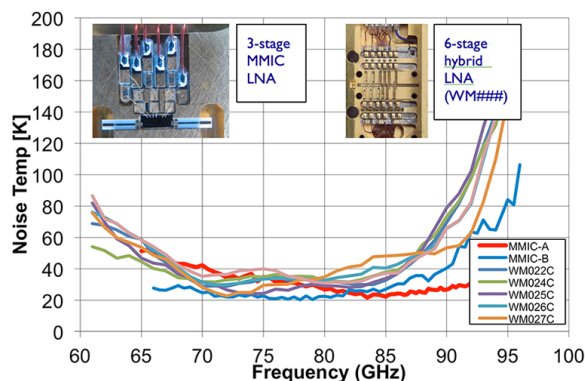


Figure 1. Measured noise temperature at 20K operating temperature of several packaged low noise amplifiers, including two different MMIC layouts (MMIC-A and MMIC-B) and six hybrid "chip-and-wire" amplifiers of identical design. The MMIC amplifiers have roughly 30dB gain across the band. The hybrid amplifiers have ~40dB gain across the band.



The CDL has developed low noise amplifiers for this band using two different approaches: (1) a six-stage hybrid "chip and wire" design using discrete 80nm gate length InP HEMTs from the "golden" cryo3 wafer run; and (2) MMIC three-stage designs using a recently developed 35nm gate length InP HEMT process from Northrop Grumman Corporation (NGC). Sample test results from both types are shown below.

The MMIC designs are slightly lower noise, roughly 5K lower on average from 67-90 GHz, but the improvement is less than one might initially predict from a greater than 50% reduction in gate length. Investigation of the performance limitations from gate length scaling is an ongoing research activity at the CDL. Also, the noise data from the MMICs are from a relatively small sample, and the repeatability of these results in future wafer runs is uncertain. In contrast, there is an existing supply of discrete 80nm InP HEMTs large enough to build hundreds of hybrid 67-90 GHz LNAs with the performance shown here.

The frequency space below 85 GHz is relatively unexplored since, historically, millimeter-wave observatories have targeted the fundamental transition of CO at 115 GHz for their instrument development. LNAs developed for this frequency band will enable transformational science in star formation, astrochemistry, and galaxy evolution. For example, the fundamental transitions of the deuterium analogs of common, abundant interstellar molecules are unique to this band, including DCO+, DCN, and N₂D+. Studies of these species are crucial to understanding the structure and physical properties of cold dense cores. This band will also be used for molecular spectroscopy of complex organic and pre-biotic molecules in the ISM and comets. In addition, redshifted CO and HCN emission, critical to understanding galaxy evolution, fall in this frequency band.

2012 New Mexico Symposium Report

Amy Mioduszewski

The 28th Annual New Mexico Symposium took place 30 November 2012 in Socorro, NM. The symposium is held every year in conjunction with the Jansky Lecture, and is intended to support a network of scientific research in the southwestern United States. This year's symposium hosted 94 registered participants from universities, observatories, and research laboratories in and around New Mexico, and was held in the auditorium of NRAO Domenici Science Operations Center in Socorro.

The oral program consisted of 18 contributed talks and the invited Jansky Lecture by Mark Reid (Smithsonian Astrophysical Observatory – Center for Astrophysics) titled *The Structure and Dynamics of the Milky Way from the BeSSeL Survey*. There were also 15 contributed posters. The program spanned a wide breadth of topics from near-Earth asteroids and super star cluster triggering to observations of gamma-ray bright quasars and the importance of spectroscopic redshifts. More information on the program, including copies of the talks, can be found [on-line](http://www.aoc.nrao.edu/events/nmsymposium/2012/index.html) (<http://www.aoc.nrao.edu/events/nmsymposium/2012/index.html>) .

Following the symposium there was a dinner at New Mexico Tech, followed by the public Jansky Lecture, on the campus of New Mexico Tech. Reid gave a lecture titled *Measuring the Cosmos* that was very well received by symposium participants and members of the local community alike.

2013 NRAO Summer Student Research Assistantship Program

Jeff Mangum



Figure 1. The participants in the 2012 NRAO Summer Student Research Assistantship program based in Charlottesville, VA.

 Zoom



Figure 2. The participants in the 2012 NRAO Summer Student Research Assistantship program based in Green Bank, WV.

 Zoom



Figure 31. The participants in the 2012 NRAO Summer Student Research Assistantship program based in Socorro, NM.

 Zoom

NRAO is now accepting applications for the 2013 NRAO Summer Student Research Assistantships program. Each summer student conducts research under the supervision of an NRAO staff member at one of the NRAO sites, on a project in the supervisor's area of expertise. The project may involve any aspect of astronomy, including original research, instrumentation, telescope design, or astronomical software development. Examples of past summer student research projects can be found on-line at the **Summer Student website** (<http://science.nrao.edu/opportunities/summerstudents.shtml>).

Supervisors choose their own student candidates from the received applications, and the site to which a summer student is assigned depends on the location of the NRAO supervisor who chose them. Students are encouraged to review the NRAO staff web pages to learn more about the types of research being conducted at the NRAO. On their application, students may request to work with a specific staff member, to work on a specific scientific topic, or to work at a specific site.

The program runs 10-12 weeks each summer, from early June through early August. At the end of the summer, participants present their research results at a student seminar and submit a written report. These projects often result in publications in scientific journals. Financial support is available for students to present their summer research at an American Astronomical Society meeting, generally at the winter meeting following their appointment. In addition to their research, students take part in other activities, including social events and excursions, and an extensive lecture series that covers many aspects of radio astronomy and astronomical research. Students also collaborate on their own observational projects using the VLA, VLBA, and/or GBT.

There are three types of Summer Student programs available at the NRAO. The *NRAO Research Experiences for Undergraduates (REU)* program is for undergraduates who are citizens or permanent residents of the United States or its possessions, and is funded by the National Science Foundation (NSF) Research Experiences for Undergraduates (REU) program.

The *NRAO Undergraduate Summer Student Research Assistantship* program is for undergraduate students or graduating college seniors who are U.S. citizens, are from an accredited U.S. Undergraduate Program, or are otherwise eligible to work in the U.S. This program primarily supports students or research projects that do not meet the REU guidelines, such as graduating college seniors, some foreign undergraduate students, or projects involving pure engineering or computer programming.

The *NRAO Graduate Summer Student Research Assistantship* program is for graduate students who are citizens or permanent residents of the United States or its possessions, enrolled in an accredited U.S. Graduate Program, or otherwise eligible to work in the U.S.

The stipends for the 2013 Summer Student Program will be \$647 per week for undergraduates and graduating seniors, and \$693 per week for graduate students. These stipends include an allowance for housing, since housing is not provided.

Students who are interested in Astronomy and have a background in Astronomy, Physics, Engineering, Computer Science, and/or Math are preferred. The same **[online application form and process](http://science.nrao.edu/opportunities/summerstudents.shtml)** (<http://science.nrao.edu/opportunities/summerstudents.shtml>) is used for all three programs. Required application materials include an on-line application form (including a statement of interest), transcripts, and three letters of recommendation. The deadline for receipt of all application materials is Tuesday, 1 February 2013.

2012 Summer Student Presentations at Long Beach AAS Meeting

Jeff Mangum

Fifteen of the 2012 NRAO Summer Student program participants will present the results of their research projects at the January 2013 American Astronomical Meeting in Long Beach, CA. The table lists these presentations along with session and schedule information. We encourage everyone to visit these student presentations and discover first-hand how impressive these promising young scientists are.

<i>Monday, 7 January</i>	
Elliptical and Spiral Galaxies	146.20. Plateau de Bure Arcsecond Whirlpool Survey (PAWS): Multiscale Analysis of the ISM in the Whirlpool Galaxy. S. Pardy; A.K. Leroy; E. Schinnerer, J. Pety; D. Colombo
Pulsars, Neutron Stars	154.11. A New Method for Measuring the Rotation Measures of Millisecond Pulsars in the Globular Cluster Terzan 5 A. Ho; S.M. Ransom; P. Demorest

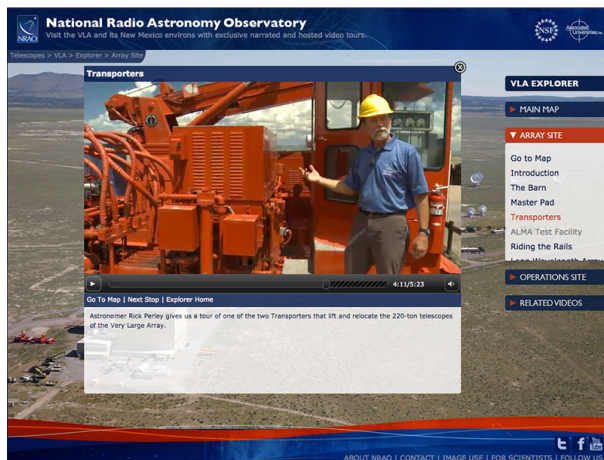
Starburst Galaxies	157.07. Imaging the Spatial Density Within Starburst Galaxies R. Smullen; J.G. Mangum; J.K. Darling; C. Henkel; K. Menten
<i>Tuesday, 8 January</i>	
Computation, Data Handling, Image Analysis	240.04 Polarization Monitoring Using the EVLA K. Weil; S.T. Myers
Dwarf and Irregular Galaxies	242.05. Inside Out: The Stellar Kinematics and HI Map of DDO 46 S. Wood; M.C. Johnson; D.A. Hunter
Star Formation	251.04. The Properties and Potential of XUV-Disks M. Gallagher; J. Munoz-Mateos; K. Sheth
	251.16. Modeling the Infall of Gas onto Class 0 Protostars A. Osler; J.J. Tobin
The Milky Way, The Galactic Center	254.07. The Survey of 44GHZ Methanol Masers and Star Formation Towards the Galactic Center A. Walker-LaFollette; L. Sjouwerman; Y. Pihlstrom
<i>Wednesday, 9 January</i>	
AGN, QSO, Blazars	339.35. ALMA and Jansky VLA Observations of Highly Luminous Obscured Quasars: Synchrotron Ages of Young Radio Jets R. Smith; C.J. Lonsdale; M. Lacy; J.J. Condon; A.E. Kimball
Instrumentation, Ground and Airborne	345.24. Radio and Optical Telescopes for School Students and Professional Astronomers L. Hosmer; G. Langston; S. Heatherly; A.P. Towner; J. Ford; R.S. Simon; S. White; K.L. O'Neil; J. Haipslip; D. Reichart
Molecular Clouds, HII Regions, Interstellar Medium	349.05. Physical Temperature Measurements of L1551 from NH₃ A.P. Towner; L. Hosmer; G. Langston
	349.11 Determining the X-Factor of M82 Z. Edwards; J. Ott; D.S. Meier
	349.21. Correlating Physical and Chemical Evolution in Starless Cores N. Brunetti; S. Schnee; R. Friesen
Surveys and Large Programs	352.10. Broadband Screening for Interstellar Species: Additional Laboratory Measurements and Interstellar Detection of Ethanamine (CH₃CHNH) in Sgr B2(N) Using GBT PRIMOS Survey Data R. Loomis; D. Zaleski; A. Steber; J. Neill; M.T. Muckle; B.J. Harris; N. Seifert; B. Pate; V. Lattanzi; O. Martinez; M.C. McCarthy; A.J. Remijan
<i>Thursday, 10 January</i>	
Radio Surveys of Galactic Clouds	413.02. The Green Bank Telescope H II Region Discovery Survey IV. Helium and Carbon Recombination Lines T. Wenger; T.M. Bania; D.S. Balser; L.D. Anderson

A Better Experience for the VLA's Public Visitors

John Stoke



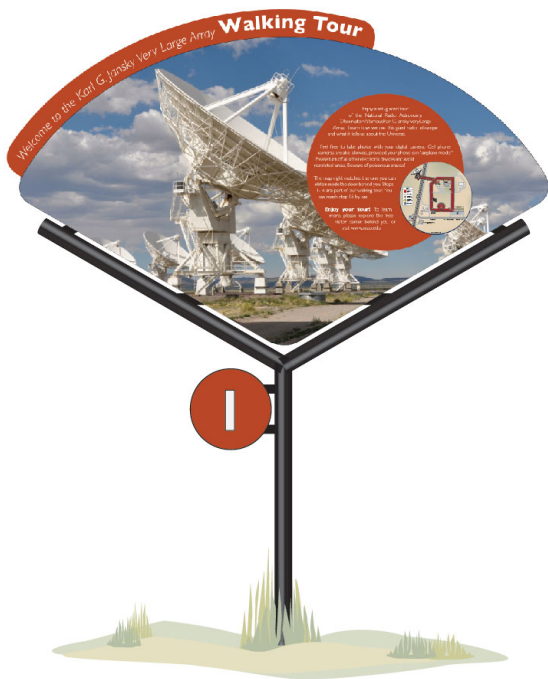
A “before and after” view of the Visitor Center, created in Photoshop prior to the actual improvements. It’s amazing what some paint and lettering can do!



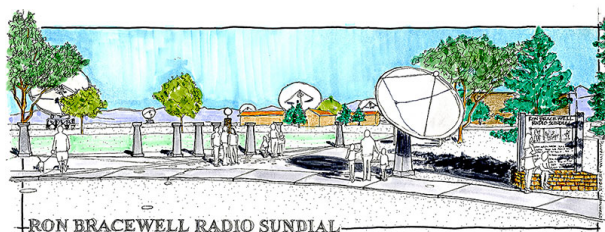
The *VLA Explorer*, a web-based virtual tour of the VLA hosted by EVLA Project Scientist Rick Perley, will be accessible via a trackball-controlled kiosk display in the visitor center.



NRAO scientist Amy Reines (far right) enjoys a “tour” of a VLA antenna hosted by VLA Operators Lead Gene Cole (far left, wearing blue helmet), as will thousands of visitors who will see the new film.



The expansive design of the new outdoor tour path signs suggests the arc of the sky, while the Y-shape of the posts mimic the layout of the array itself.



An artist's sketch of the "radio sundial" that will soon adorn a currently barren patch of ground outside the Visitor Center.

Astronomers don't visit the telescopes they use as much as they once did, but public enthusiasm for visiting them remains strong. Since 1983 the VLA has welcomed some 20,000 visitors annually, offering a small collection of indoor interpretive exhibits and a walking tour path that allows visitors to get up close to one of the array's 25 meter dish antennas.

In celebration of the completion of the VLA's \$93 million upgrade, and with the help of a residue of those funds provided by the EVLA construction project, the NRAO EPO office is carrying out a series of modest improvements to the VLA public "visitor experience."

Beginning with the Visitor Center itself, a humble structure destined never to win an award for architecture, the appeal of the building is being improved through new paint, lettering, ceiling tiles, and the replacement of a prison-like steel door with a welcoming glass door. New backlit transparencies of celestial objects observed by the VLA have been installed, and some new computer-fed displays are in the works. Much of the labor for these upgrades was provided by VLA site staff under the direction of VLA Engineering

Services Division Head Chris Langley.

An additional exhibit element is a huge mosaic of Landsat satellite images of the entire VLA site painstakingly assembled by NRAO media designer Jeff Hellerman. Printed out as a 6 x 6 foot graphic, this image will enable visitors to step back and see the array arms and configurations, and step close to see the antennas themselves.

In November, a film crew engaged by EPO spent a week in New Mexico filming for what will, early in 2013, become a new educational and interpretive high definition film for the Visitor Center's auditorium (and for the NRAO website). Few visitors to the VLA see anything much beyond the antennas themselves; this film will explain the purpose, functioning, and fruit of the VLA via scenes that include an antenna move, a P-Band install high at an antenna vertex, excited elementary school students on a tour, and scientist interviews. Both the VLA site staff and the scientific and support staffs in Socorro contributed of their time and patience to make this happen.

The interpretive and orienting value of these indoor upgrades notwithstanding, a visit to the VLA remains a quintessentially outdoor experience; as our Socorro-based Education Officer Judy Stanley says, visitors come to "commune with the dishes." To help them understand what they're seeing as they walk along the tour path, we are presently installing a series of large, colorful outdoor signs. These signs will be of a quality akin to what one sees in a national or state park. The signs were written by EPO science writer Tania Burchell, designed by Hellerman, illustrated by artist/ animator Bill Saxton, and reviewed by Stanley and public information officer Dave Finley.

The beautiful wye-shaped posts for the signs were sketched out by EPO, converted to 3D CAD by Greg Morris at the NRAO Central Development Laboratory, and fabricated by NRAO's machine shop in Green Bank, under the supervision of Dennis Egan and Mike Hedrick, and with the help of a local muffler pipe bender. They were painted at the VLA paint shop, and painstakingly set and cemented in place by Jon Thunborg and associates amidst frigid mid-December temperatures, the ground having not yet frozen. The VLA's metal shop fabricated additional posts for several large rectangular signs, and built a framework for a small gallery of celestial image signs that will be installed in an existing outdoor gazebo structure.

A large outdoor sundial spearheaded by NRAO's Miller Goss and designed by Woody Sullivan of the University of Washington, will feature gnomons made from historic Bracewell radio telescope dish piers, providing an additional enjoyable outdoor exhibit for visitors, one with some added historical significance in the form of astronomer names chiseled into the piers.

The VLA tour path is strategically designed to terminate at the Visitor Center gift shop, whose construction was inspired by Finley years ago and funded by revenue earned from the filming of the Hollywood feature *Contact*. In the gift shop, Stanley and sales clerk Laura Barich have been improving and diversifying both the merchandise offered and ways in which it is displayed, earning the VLA EPO effort needed revenue, and also providing visitors with informative and friendly human contact.

As these modest improvements – which also include the conversion of the VLA's old cafeteria into an educational activity space – wrap-up, EPO will begin focusing on a larger goal, that of securing the funding needed to design and build a new visitor center structure, one that complements the majesty of the scientific undertaking that is the VLA, and that exploits the growing interest, stimulated by endeavors such as Virgin Galactic's New Mexico-based Spaceport, in space-themed tourism.

Recent Press Releases

[\(http://www.nrao.edu/pr/2012/microquasar/\)](http://www.nrao.edu/pr/2012/microquasar/)



Microquasar Found in Neighbor Galaxy, Tantalizing Scientists

(<http://www.nrao.edu/pr/2012/microquasar/>)

12 Dec 2012

For the first time, astronomers have found a microquasar -- a black hole devouring material from a companion star -- in a galaxy beyond our own Milky Way. **Read More ...**

(<http://www.nrao.edu/pr/2012/microquasar/>)



(<http://www.nrao.edu/pr/2012/skynet/>)

Students Exploring the Universe with Radio Telescope

(<http://www.nrao.edu/pr/2012/skynet/>)

10 Dec 2012

A new program is giving middle-school-aged youth the chance to take remote control of a large, research-grade radio telescope and expand their cosmic explorations beyond what the eye can see.

Read More ... (<http://www.nrao.edu/pr/2012/skynet/>)



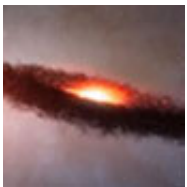
(<http://www.nrao.edu/pr/2012/youngsystem/>)

Astronomers Discover and "Weigh" Infant Solar System

(<http://www.nrao.edu/pr/2012/youngsystem/>)

5 Dec 2012

Astronomers have found the youngest still-forming solar system yet seen, an infant star surrounded by a swirling disk of dust and gas more than 450 light-years from Earth in the constellation Taurus. **Read More ... (<http://www.nrao.edu/pr/2012/youngsystem/>)**



(<http://www.nrao.edu/pr/2012/browndisks/>)

Brown Dwarfs May Grow Rocky Planets (<http://www.nrao.edu/pr/2012/browndisks/>)

30 Nov 2012

Astronomers using the **Atacama Large Millimeter/submillimeter Array (ALMA)** (**(<http://www.nrao.edu/index.php/about/facilities/alma>)**) have for the first time found that the outer region of a dusty disk encircling a brown dwarf contains millimeter-sized solid grains like those found in denser disks around newborn stars. The surprising finding challenges theories of how rocky, Earth-scale planets form, and suggests that rocky planets may be even more common in the Universe than expected. **Read More ... (<http://www.nrao.edu/pr/2012/browndisks/>)**



(<http://www.nrao.edu/pr/2012/herca/>)

Image Release: A Radio-Optical View of the Galaxy Hercules A

(<http://www.nrao.edu/pr/2012/herca/>)

29 Nov 2012

Spectacular jets powered by the gravitational energy of a supermassive black hole in the core of the elliptical galaxy Hercules A illustrate the combined imaging power of two of astronomy's cutting-edge tools, the Hubble Space Telescope's Wide Field Camera 3, and the recently upgraded Karl G. Jansky Very Large Array (VLA) radio telescope in west-central New Mexico.

Read More ... (<http://www.nrao.edu/pr/2012/herca/>)

Career Opportunities

New Postings

STEM Education Development Officer-AUI (<https://careers.nrao.edu/applicants/Central?quickFind=50843>) : Associated Universities Inc. (AUI), in Washington, DC is recruiting for a STEM Education Development Officer. The incumbent will be based at the National Radio Astronomy Observatory (NRAO) in Charlottesville, VA and work closely with the NRAO Education and Public Outreach (EPO) team, under the supervision of the Assistant Director for EPO. The STEM Education Development Officer will identify and implement opportunities for AUI to contribute to the advancement of STEM (science, technology, engineering, and math) education via partnerships, grants, and the leveraging of existing NRAO and other AUI assets, which include a large staff of scientists and engineers and a talented, geographically dispersed EPO staff.

ALMA Control System Java Developer (<https://careers.nrao.edu/applicants/Central?quickFind=50827>) : The NRAO in Socorro, NM is recruiting for an ALMA Control System Java Developer. The primary responsibility of this position is to maintain the high level layer of the Control subsystem, extending and improving the existing code, and debugging the problems found during operations.

Public Education Specialist: (<https://careers.nrao.edu/applicants/Central?quickFind=50847>) The NRAO in Green Bank, WV is accepting applications for a Public Education Specialist. The Education Specialist leads, develops, and actively participates in the K-12 education, public outreach, and visitor center programs. In addition, the Education Specialist collaborates with the Green Bank Education Officer, the Assistant Director for Education and Public Outreach (EPO), and all EPO staff to design, fund, implement the Observatory-wide formal and informal education program.

Public Information Officer (<https://careers.nrao.edu/applicants/Central?quickFind=50831>) : The NRAO in Charlottesville, VA invites applications for a Public Information Officer. He/she will be responsible for duties related to media relations, publicity, and, as directed, community relations, principally for the NRAO's newest telescope, the Atacama Large Millimeter/sub millimeter Array (ALMA). The Public Information Officer will be designated point of contact for inquiries and contacts with news media, the general public, community organizations, and other science research institutions with which NRAO may seek to generate joint publicity.

Systems Administrator I (<https://careers.nrao.edu/applicants/Central?quickFind=50828>) : The NRAO in Socorro, NM invites applications for a Systems Administrator. This position will support local technical and scientific staff Redhat Linux systems and assist in the development and maintenance of the EVLA and VLBA data archive, high performance computing systems.

AIP-CHP Grant Funds Archive Project

Ellen Bouton

The NRAO Archives is pleased to announce receipt of a grant from the American Institute of Physics, Center for the History of Physics (AIP-CHP). The \$10,000 grant will fund work on posting on the Internet the transcripts of interviews with many of the 255 radio astronomers interviewed between 1971 and 1988 by Prof. Woodruff T. Sullivan III. Sullivan has donated to the NRAO Archives the research materials,

including the 188 audiotapes of interviews, for his book *Cosmic Noise: A History of Early Radio Astronomy* (Cambridge University Press, 2009).

The 2011 Herbert C. Pollock Award from Dudley Observatory funded the digitization of the aging cassette tapes, and work has been ongoing to transcribe the digitized audio interviews. We are grateful to AIP-CHP for the grant, and have begun the design and formatting of the suite of transcript web pages. When completed, the Web transcripts will give researchers access to an unparalleled resource in the history of radio astronomy.

From the Archives

Ellen Bouton



About this month's photo: The 42-foot telescope on a flat car in Bartow WV, 27 July 1966. During planning for what became the Very Large Array (VLA), it seemed prudent to show that one could make observations with reasonable phase stability over baselines of 100,000 wavelengths. NRAO bought the 42-foot telescope to use at sites up to 35km from Green Bank with one element of the Green Bank Interferometer. The telescope could be transported on one semi-trailer and could be disassembled and re-erected in about two weeks without using a crane. Successful observations between the

85-foot Tatel telescope and the 42-foot, located on Spencer's Ridge 11km away, helped demonstrate proof-of-concept for the VLA. In this photo, George Grove is on the far right (with pipe); Tom Williams is second from right. If anyone can identify others in the photo, please contact ebouton@nrao.edu (#).

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 (#).

Contact the Editor ([mailto:mtadams@nrao.edu?subject=NRAO eNews Editor](mailto:mtadams@nrao.edu?subject=NRAO%20eNews%20Editor))



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