

# Star Dust

National Capital Astronomers, Inc.

September 2008

Volume 67, Issue 1

<http://capitalastronomers.org>

## Next Meeting

**When:** Sat. Sept. 13, 2008

**Time:** 7:30

**Where:** UM Observatory

**Speaker:** Joseph Lazio, NRL

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## New Editor

I am glad to be your Star Dust editor for 2008-2009. My fellow NCA members have been supportive in helping me prepare this, my first issue.

Michael Chesnes

[m.chesnes@verizon.net](mailto:m.chesnes@verizon.net)

## Directions to Dinner/Meeting

Members and guests are invited to join us for dinner at the Garden Restaurant located in the UMUC Inn & Conference Center, 3501 University Blvd E. The meeting is held at the UM Astronomy Observatory on Metzert Rd about halfway between Adelphi and University Blvd.

## Sept. 2008: Dr. Joseph Lazio, Naval Research Laboratory A Lunar Telescope to Probe into the Dark Ages

**Abstract:** Although the night sky is filled with stars, these stars did not form instantaneously after the Big Bang. There was an interval, now called the "Dark Ages," in which the Universe was unlit by any star. The most abundant element in the Universe, and the raw material from which stars, planets, and people are formed, is hydrogen. Fortunately, the hydrogen atom can produce a signal in the radio-wavelength part of the spectrum, at 21 cm; a wavelength far longer than what the human eye can detect. Astronomers expect that, during the Dark Ages, hydrogen atoms could still produce a signal. If these first signals from hydrogen atoms in the Dark Ages can be detected, astronomers can essentially probe how the first stars, the first galaxies, and ultimately the modern Universe evolved.

Because the Universe is expanding, the signals from these distant hydrogen atoms will be stretched (or redshifted) to much longer wavelengths, as large as several meters. While astronomical observations at radio wavelengths have a long history, this portion of the electromagnetic spectrum (the HF and VHF bands) is now heavily used for various civil and military transmissions, all of which are millions of times brighter than the hydrogen signal that astronomers seek to detect. Additionally, the upper layers of the Earth's atmosphere are ionized (the ionosphere), and distort astronomical signals as they pass through on their way to telescopes on the ground.

The far side of the Moon has no atmosphere and is well shielded from radio chatter from the Earth, making it nearly ideal as a location for a sensitive Dark Ages telescope. In this talk, Dr. Joseph Lazio describes how such a telescope might be constructed.

**Biography:** Dr. Joseph Lazio is a radio astronomer at the Naval Research Laboratory. He obtained his Ph.D. in astronomy from Cornell University, followed by a Research Associateship position with the National Research Council, before assuming a staff position at the NRL. He is the Principal Investigator of two NASA studies in which lunar radio telescopes are being designed and routinely uses major ground-based radio observatories such as the Arecibo Observatory, the Very Large Array, and the Very Long Baseline Array. He has also served as the moderator for the MadSci Network and keeper of the FAQ for the sci.astro newsgroup.

**Need a Ride?**

Please contact Jay Miller, 240-401-8693, if you need a ride from the metro to dinner or to the meeting at the observatory. Please try to let him know in advance by e-mail at [rigel1@starpower.net](mailto:rigel1@starpower.net).

**Observing after the Meeting**

Following the meeting, members and guests are welcome to tour through the Observatory. Weather-permitting, several of the telescopes will also be set up for viewing.

**Star Dust** is published ten times yearly September through June, by the National Capital Astronomers, Inc. (NCA).

Editor: Michael Chesnes

Editorial Advisors:

Elizabeth Warner  
Jeffrey Norman  
Wayne Warren  
Harold Williams  
John D. Gaffey, Jr.

PDF Distributor: Jay Miller

**Please Get Star Dust Electronically**

NCA members able to receive Star Dust, the newsletter of the NCA, via e-mail as a PDF file attachment, instead of hardcopy via U.S. Mail, can save NCA a considerable amount of money on the printing and postage in the production of Star Dust (the NCA's single largest expense) and also save some trees. If you can switch from paper to digital, please contact Michael L. Brabanski, the NCA Sec-Treasurer, at [mlbrabanski@verizon.net](mailto:mlbrabanski@verizon.net) or 301-649-4328 (h).

Thank you!

**NCA Committees... Working as a team!**

Hi! I'm Elizabeth Warner, your president for 2008-2009. One of my goals is to get more of our members participating in a variety of ways in the society's activities. We do not have a small club. It is growing! Yet many activities are done by the same few people. This has resulted in lots of work being done by a few people and them then getting burned out and frustrated. In order to get the members of our society more involved, I am proposing forming committees to help the various officers and appointed volunteers in getting activities done. Here are some of the committees I would like to form with the names of the officer or appointed volunteer who is chairing the committee along with names of some others who have already expressed an interest in being on the committee:

- **WEBSITE:** to maintain the society's website, find ways of improving it
  - Harold (Chair)
  - Elizabeth
- **NEWSLETTER:** produce the digital and hardcopy of the society newsletter Star Dust
  - Mike Chesnes (editor)
  - Elizabeth (print and mail hardcopies)
  - proofreaders: ???
- **MEMBERSHIP:** to maintain the membership database, welcome new members, follow up with dropped members...
- **ARCHIVING Star Dust:** to scan (digitize) past issues of Star Dust, concatenate already scanned pages into issues
  - Wayne (Chair)
  - Elizabeth (posting finished issues to website)
  - Scanners and page file organizers needed
- **OUTREACH:** coordinate members' participation in invited/requested outreach events
  - Guy Brandenburg (Chair)
  - Need members who would like to assist with events
- **EXPLORING THE SKY:** support and continue NCA's long time participation with this popular program
  - Joe Morris (Chair)
  - Need members who would like to assist with events

## 2008-2009 Officers

### President:

Elizabeth Warner  
[warnerem@astro.umd.edu](mailto:warnerem@astro.umd.edu)  
 301-405-6555 (w)

### Vice-President:

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### Asst. V.P.:

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### Secretary-Treasurer:

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### Asst. Secretary-Treasurer:

Jeffrey B. Norman  
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### Trustees:

- Benson Simon (2009)
- Jeffrey Norman (2010)
- Dr. Wayne Warren (2011)
- Dr. Walter Faust (2012)

### Appointed Officers and Committee Heads:

*Exploring the Sky*  
 Joseph C. Morris

*Telescope Making*  
 Guy Brandenburg

*NCA Webmaster*  
 Dr. Harold Williams  
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*Star Dust Editor*  
 Michael Chesnes  
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 (301) 317-0937

- **SCIENCE FAIRS:** to train and coordinate members to serve as judges at the science fairs that NCA supports
  - Jay (Chair)
- **TELESCOPE MAKING:**
  - Guy Brandenburg (Chair)
- **KIESS TELESCOPE:** clean, restore, test the telescope and develop short and long term plans for its use
  - Bron Gervais (Chair)
  - Guy
- **NCA14":** develop short and long term plans for its use
  - ??? (Chair)
  - Jeff Guerber
- **PUBLICITY:** to disseminate information about the society and its activities to the public and media
  - Walt Nissen – ISS
  - Weekends @ MD – Benson
  - Starwatch (WashPost) – Jay
  - Dateline Goddard -- Jeff G
  - NCA website – Harold
- Ideas for other committees?? (observing site?..)

I would invite all members to sign up and participate on at least one committee and hopefully more than one ;-)! Some of the committees simply require access to a computer. Others may need your physical presence. But I strongly feel that every member can help in some small way, we just need to find the right niche!

We (the NCA Board) are still developing the idea and defining the goals of each committee, although it should be pretty clear in most instances. Basically, we do have individuals who have volunteered to spearhead many of these, but they need help to accomplish their goal. So by having a committee, they know whom to contact to get help. This is also a great way for new members to get involved in the society and meeting other members.

I will have signup sheets at the meetings and you can always email me and/or the chairs to let them know you would like to help.

Clear Skies!

*Elizabeth Warner*

[warnerem@astro.umd.edu](mailto:warnerem@astro.umd.edu)  
 NCA president, 2008-2009

## **Review**

June 2008: Dr. Harold Williams, Montgomery College,  
*Stellar EVOLUTION from 0.08 to 100 Solar Masses:  
What Everybody Should Know; & Quasistars*

*Harold Williams*

After an introduction by Wayne Warren, which was very complimentary to the speaker, the talk explained that mass was the most important parameter in stellar evolution. The small difference in the chemical composition of stars beyond hydrogen and helium is of secondary importance, but it does control opacity and does determine the low mass star cut off. In the early universe, which was composed mostly of hydrogen and helium with a little lithium and beryllium, only very high-mass stars, so-called Population III stars, could form. The most massive star that can be formed is around 100 solar masses before its "Eddington Luminosity" limit is exceeded and its outer mass is blown away because of luminous light pressure.

Population III stars have never been observed directly, and the most massive star that has been currently measured is around 60 solar masses. These stars burn very brightly (up to  $10^8$  times brighter than our Sun), but do not live very long (only a few million years on the main sequence where they fuse hydrogen into helium in their cores); they end their lives as supernovas, expelling their material of highly enriched heavy elements into the interstellar void to form later Population I and II stars; because of the heavier elements, lower-mass star formation is then possible. The heavier elements provide opacity and cooling during formation, so the low-mass stars are also much more numerous than the high-mass stars, and these low-mass stars live for a very long time. 0.1 solar mass stars can burn on the main sequence for approximately  $10^{13}$  years, and the universe is only around  $14 \times 10^9$  years old.

Numerous Hertzsprung-Russell diagrams were shown summarizing stellar evolutionary tracks of stars of different mass. Isochrones, equal time evolutions, were mentioned, and some attempt was made to explain the different widely varying time scales, which to first order depend only upon stellar mass. The equations of stellar structure written in their 1D spherically symmetric form were shared with the audience. Although spherical symmetry can't describe star formation, after the gas cloud becomes a star, burning hydrogen into helium in its core via nuclear fusion, spherical symmetry can explain everything to first order, ignoring rotation, and modeling convection by using the adiabatic exponent.

Just as mass determines the rate at which stars evolve, it also determines how they end their lives after they are no longer on the main sequence. The most massive stars end their lives as black holes, with intermediate stars ending as neutron stars, and most of the rest of the stars, including our Sun, end their lives as White Dwarfs. At the very end of the talk quasi-stars were briefly mentioned. They use the same equations as 1D stellar evolution, but they are surrounded by a huge cloud of gas, and they keep accreting mass in such a way as to avoid the 100 solar mass "Eddington Luminosity" limit. Quasistars have never been observed (maybe the James Webb telescope will find them), but they are needed to explain the large several million solar mass black holes found in the center of our Galaxy and the gigantic black holes observed in AGNs, Active Galactic Nuclei.

The PowerPoint presentation and some simulation files run during the lecture can be found at the NCA web site at URL: <http://capitalastronomers.org/EvolutionOfStarsEverybody/EvolutionStars.ppt>

On June 14, 2008, Harold Williams spoke about stellar evolution. Harold Williams is a long time NCA member and former vice-president, president, and trustee of NCA; he still serves as NCA's web site master.

## StarryTelling Festival

*Jay Miller*

On Friday, Saturday and Sunday, 18, 19 and 20 July there was a unique astronomy-themed storytelling festival at the town hall of Kensington, MD. The festival was organized by Elizabeth Forbes Wallace, who was a student in one of Harold Williams' astronomy classes at Montgomery College. In addition to a number of exhibitors during the main event on Saturday, Elizabeth asked NCA to participate. NCA was well represented by Dr. Williams, who presented one of the talks and was at one of the booths, the Kuehns with a Coronado PST H-alpha telescope, Paul Hueper with a reflector, Alan Bromborsky with a binocular telescope, and myself with a refractor and a white light filter. Also present were Greg Piepol with a 90mm Coronado H-alpha and Gary Hand with a Coronado PST and a booth with astronomy supplies. NCA members Tom Corbin and Michael Chesnes volunteered at the festival as well, and I think there may have been one other person with a telescope. At night, in addition to many of the above telescopes, we were treated to a 25" Dobsonian. We looked at Jupiter and other objects. Although I was busy throughout the entire day, it looked as though it was a success with many attendees and lots of kids. Stay tuned for future StarryTelling events in Maryland.

## Dues Change for NCA Members

*Jeff Norman, Assistant Secretary/Treasurer*

In the summer of 2006, the NCA Board of Directors lowered the basic dues for regular members from \$27 to \$10, as an experiment to see if that reduction would bring in new members, and to return to current members some money from our reserve fund (which some Board members felt was too large). At the time, we knew that the lower dues would result in a deficit; but we had enough money in the bank so that we could safely run a deficit for a few years. Despite the drastic reduction in dues, NCA had a net increase of only 12 members in our last fiscal year (July, 2007 - June, 2008).

Last year, NCA had income of \$3106, expenses of \$4082 and a deficit of \$976 or almost 24%; and our reserve fund is dwindling. Our newsletter goes out to every member. However, it costs NCA approximately \$10 per member per year (printing and postage) to produce the paper copies of "Star Dust," but costs us nothing (other than volunteer time to put it together) to send out electronic copies. Fortunately, more than half of our members receive electronic copies of "Star Dust." NCA members who are new subscribers to "Sky & Telescope" magazine pay an extra \$33 fee which is passed through NCA to the Sky Publishing Corp., and therefore, that expense is not part of NCA's basic expenses which are covered by the dues. All of NCA's other expenses put together cost about \$12 per member per year. The largest other expense is \$5 per member per year for membership in the Astronomical League. Other large expenses include insurance and speakers' dinners. (For more details, please review NCA's annual Treasurer's Report, which is published every September in "Star Dust.")

At the NCA Board of Directors meeting on July 27, 2008, the Board voted to raise dues starting in September, 2008 for only those members who wish to get paper copies of "Star Dust." The new standard dues for those who get the paper copies will be \$20 per year, but they will remain at \$10 for those members who agree to receive it exclusively by email. We think that this is more than fair because many organizations now charge their members more if they get paper copies of their newsletters. Not only that, \$20 is still less than the annual standard dues of \$27 that we charged all NCA members for many years; and it is also less than the \$30 annual standard dues charged by the Northern Virginia Astronomy Club, the other large astronomy group in the metropolitan Washington area.

## Open House & Star Party at Hopewell Observatory

*Jeff Guerber*

Saturday Evening, September 27  
NCA members, families, and friends, are invited to an Open House and Star Party at Hopewell Astronomical Observatory on SATURDAY EVENING, SEPT. 27, 2008, weather permitting. Hopewell Observatory is a private, independent observatory association, located atop a ridge in the Bull Run Mountains, about 6 miles northwest of Haymarket, Virginia.

We will open the observatory around sunset, and remain open until everyone leaves; come whenever you like, and stay as late as you want.

Telescopes permanently installed at Hopewell include a 12" homemade Wright-Newtonian, a 14" Celestron Schmidt-Cassegrain, and a 6" Jaegers refractor. If you have a scope, by all means bring it along! There is a grassy field with plenty of room to set up, and electricity is available (bring your own extension cord). You are welcome to bring a picnic dinner or snacks (but bring your own water, and sanitary facilities are primitive); we will provide hot water, coffee, tea, and cocoa. Dress warmly, since it can get significantly chillier than in town. The site is a clearing in the woods, so sturdy shoes are recommended. The event will be canceled only in the event of pervasive, hopeless cloudiness.

We hope to see you there. Feel free to pass this invitation along.

Clear skies!

## PG Area Science Fair Winner to Present at September Meeting

*Wayne H. Warren, Jr.*

Julie Walker of Hollywood, Maryland, the winner of an NCA science fair award for 2008, will attend the September NCA meeting with her parents. Julie attends Leonardtown Regional High School and is the winner of previous NCA science fair awards. Her project for this year was entitled "What a MES: Martian Environmental Simulator II." Julie won an award for her project at the Intel International Science and Engineering Fair held in Atlanta, Georgia in May 2008. To see a video of her project as it was set up in Atlanta, go to <http://intelpr.feedroom.com/>. Just below the video that comes up automatically, you will see a window with the word "Channels" at the top. At the bottom of the window, there is a search box called "Video Search." Type **Walker** into the box, click on "Search," and then click on the image that appears in the right window.

Come to the NCA meeting in September to meet Julie and to see and hear her describe her Mars simulator project.

## NASA Goddard's LaunchFest Community Day, Sept. 13

*Jeff Guerber*

To celebrate 15 major missions launched in 2008, with 8 managed by Goddard, and NASA's 50th Anniversary, the NASA Goddard Space Flight Center will be opening its gates to the public on Saturday, September 13, for LaunchFest!

This **FREE** event will include awesome exhibits, interactive activities for all ages, tours of the Center, live entertainment, local food vendors, and much more. LaunchFest will run from 10:00am to 4:30pm. NASA Goddard is on Greenbelt Rd. (Rt. 193) in Greenbelt, MD; free off-site parking with shuttle buses will be provided, or take Metro to the Greenbelt station. To learn more about LaunchFest, see <http://www.nasa.gov/centers/goddard/events/launchfest.html> (please be sure to read the security notice!), or call 301-286-NEWS.

## Meeting Videos

Those who attend the meetings have probably noticed that Jay Miller records the talks. While the main purpose is to produce a DVD to assist the reviewer of the talk, he also makes several extra copies. While he claims not to be Spielberg, if there is a lecture you've missed or one you want to look at again, members can contact Jay to borrow a copy. [rigel1@starpower.net](mailto:rigel1@starpower.net)

### Magellanic Puzzle

From an article in [June 2008 #94 NOAO Newsletter](#)  
by Jason Harris

The gravity of the Milky Way has pulled a stream of gas from the Magellanic Clouds to the Milky Way, the Magellanic stream. There is also a bridge of gas between the two clouds. No stars have been found in the stream. The few stars in the bridge are much younger than most of the stars in the clouds so cannot be a result of mutual gravitation between the clouds. Gravity should have attracted the stars as well as the gas. Thus the lack of stars that have been pulled from the clouds is puzzling.

### Calendar of Events

**NCA Mirror- and Telescope-making Classes:** Fridays, Sept. 12, 19, and 26, 6:30 to 9:30pm at the Chevy Chase Community Center, at the northeast corner of the intersection of McKinley Street and Connecticut Avenue, N.W. Contact instructor Guy Brandenburg at 202-635-1860 or email him at [gfbrandenburg@yahoo.com](mailto:gfbrandenburg@yahoo.com). In case there is snow, call (202) 282-2204 to see if the CCCC is open.

**Open house talks and observing** at the University of Maryland Observatory in College Park on the 5th and 20th of every month at 8:00pm (Nov-Apr) or 9:00pm (May-Oct). There is telescope viewing afterward if the sky is clear.

**Dinner:** Saturday, Sept. 13 at 5:30pm, preceding the meeting, at the [Garden Restaurant](#) in the University of Maryland University College Inn and Conference Center.

**Upcoming NCA Meetings** at the University of Maryland Observatory

Sept. 13, 2008  
Dr. Joseph Lazio, NRL,  
*A Lunar Telescope to Probe into the Dark Ages*

Oct 11, 2008  
Dr. John Grant, NASM,  
*What the Mars Exploration Rovers Found*

### Yes, I'd like to join NATIONAL CAPITAL ASTRONOMERS!

Name: ..... Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Street address: .....

City/State/ZIP: .....

Telephone: \_\_\_\_ - \_\_\_\_ - \_\_\_\_ E-mail: .....

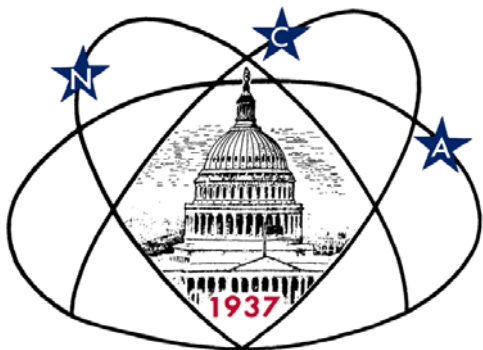
Would you prefer to get Star Dust by e-mail? \_\_\_\_\_

#### MEMBERSHIP CATEGORIES AND ANNUAL DUES RATES

All members receive Star Dust, the monthly newsletter announcing NCA activities. The basic dues cover an electronic copy of Star Dust; paper copies are \$10 extra. You may also choose to get Sky & Telescope magazine at the discounted rate of \$33.

Student Membership .....	\$ 5
Paper copy of Star Dust.....	\$10
Sky & Telescope .....	\$33
Total.....	_____
Individual/Family Membership.....	\$10
Paper copy of Star Dust.....	\$10
Sky & Telescope .....	\$33
Total.....	_____

Please mail this form with your check payable to National Capital Astronomers to:  
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**First Class**  
**Dated Material**

Next NCA Mtg:

**Sept. 13**

**7:30pm**

**@ UM Obs**

**Dr. Joseph Lazio**

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