The Cosmic Distance Ladder

**Featured Speaker: Mark Fraser**

**TAAS General Meeting**

Saturday, February 11, 7:00 p.m.
Science and Math Learning Center,
UNM Campus

**FOLLOWING OUR General Meeting items, including the introduction of our 2017 Officers and Board, Mark Fraser will give a presentation on measuring astronomical distances.**

How do we really know the distance to astronomical objects? A variety of methods are used to measure distances for different realms of the universe. The techniques for objects within our solar system involve trigonometry and radar ranging, and then for stars and the nearest galaxies, we use stellar parallax, spectroscopic parallax, and variable stars. To go farther,

**continued on page 2 . . .**

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**School Star Party**

Griegos Elementary School

Tue., February 7

**ATM Meeting**

Wed., February 15

**Open Space Visitor Center Star Party**

Sat., March 4

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2–6...Perihelion Banquet 2017

7......Under the Dome

8......Astrophoto: Jellyfish Nebula

9......Letter of Thanks,
Telescope Loan Program Update

10......Astrophoto: Rosette Nebula

11......James Madison Middle School Star Party

12......Astrophoto: Sharpless SH2-108

13......Astrophoto: Thor’s Helmet

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15......TAAS Directors & Staff

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**The Sidereal Times**

February 2017

The Official Newsletter of The Albuquerque Astronomical Society

P.O. Box 50581, Albuquerque, New Mexico  87181-0581  www.TAAS.org

TAAS — 2011 WINNER OF ASTRONOMY MAGAZINE’S OUT-OF-THIS-WORLD AWARD FOR OUTSTANDING PUBLIC PROGRAMMING

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**Observe—Educate—Have Fun**

www.TAAS.org

**Newly-elected President Dale Murray accepts Presidential gavel from outgoing TAAS President Tom Graham.**

**Jim Greenhouse receives Dobson Award from Tom Graham.**

**Jim Fordice honored with Isengard Award.**

*BANQUET PHOTOS BY DAVID OLSON*

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**Next Astro 101 Explores Open Clusters**

**TAAS Astronomy 101**

**The Open Cluster Story**

Saturday, February 11,
6:00 p.m. Science and Math Learning Center,
UNM Campus

Presentation by
Phil Fleming,
TAAS Member

by Lynne Olson

AMATEUR ASTRONOMERS universally relish a few resplendent open clusters, such as the naked-eye standout, the Pleiades, or an eyepiece-filling bright view of the Wild Duck Cluster. But the majority of open clusters do not rouse much visual interest and

**continued on page 7 . . .**
On Saturday, January 14, beginning at 6:00 p.m., many TAAS members and guests gathered for our annual banquet at the Elegante Hotel to celebrate the end of a successful year of events and activities and to begin another with a record number of new members to add to the long-time ones.

It began with the arrival of over 130 guests, who were greeted by Trish Logan at the front door of the ballroom and checked in and given door prize tickets, name tags, and seating tags by Ahmad Jrad and Bob Shipley at the entry table.

...General Meeting continued from page 1...

we must use other techniques, like the Tully-Fisher relation and various standard candles, Cepheids and supernovae, and ultimately Hubble’s Law—each method has an applicable range which overlaps with other methods as we increase in scale.

This set of methods is called “The Cosmic Distance Ladder”—starting within our solar system and progressing to the stars, galaxies, and the edge of the observable universe!

His presentation is based on astronomy lectures and labs that Mark has taught to students at CNM and will include some sample data, equations, and calculations from the laboratory course.

MARK FRASER earned a Master’s Degree in Physics from the University of Missouri-Rolla, and a Bachelor of Science Degree in Engineering Physics/Mathematics from Southeast Missouri State University. He has over 30 years of experience in ballistic missile defense research, specializing in infrared signatures and image analysis, for various Army, Air Force, Department of Defense, and intelligence programs.

He flew as a civilian crew member on the USAF Argus C-135E aircraft based at Kirtland AFB, supporting infrared data collects of missile launches, re-entry experiments, and special foreign deployments; he modeled the performance of the SPIRIT sensor on the MSX satellite, which performed an infrared survey of the Milky Way’s galactic plane. Mark is a Senior Member of the AIAA and, as Public Policy Officer for the Albuquerque Section, travels to DC concerning issues in the aerospace community and to promote STEM education. Currently, he teaches astronomy at CNM.
...Perihelion Banquet continued from page 2

Dinner and Door Prizes
At 6:45, the buffet dinner was served. Once everyone was seated, the drawing began for the outstanding door prizes, which were assembled and arranged by Bruce Meyer and consisted of escalating gift certificate amounts, framed astrophotographs by TAAS members, and maps of the track of the August 2017 total solar eclipse. The winners were as follows:

- Chris Watts - 3rd prize
- Jim Seargeant - 2nd prize
- Diana Tapia - 1st prize
- John Briggs - Grand prize

Trivia Contest
Barry Spletzer presented a new take on the Trivia Contest with visual multiple-choice questions, complete with Jeopardy music and a timer. The winners, who each received a lanyard with a small red light and “TAAS Trivia Contest Winner,” created by Barry, were as follows:

- Top Group - Fordice Table
- Top Individual - Steve Snider

Guest Speaker
At 8:00 p.m., it was time for our eagerly-anticipated guest speaker, Dr. Robert Fugate, and his subject, “Breakthrough Starshot.” This is a work in progress, a bold and ambitious program to reach the nearest star via a chip containing technological marvels and transported by a light-sail. With a board consisting of Yuri Milner, Stephen Hawking, and Mark Zuckerberg. Dr. Fugate explained his part in this far off goal. He outlined the basic workings of the plan with a beautiful screen presentation and a prototype of said chip, which was passed around to all. We thanked him sincerely for his preparation and the Q&A that followed and presented him with a TAAS ball cap.

Astronomical League Certificates
After a short break, the Awards section began with Becky Ramotowski, our Astronomical League coordinator, presenting Observing Certificates to the following members:

- Kevin McKeown
- Becky Ramotowski
- John Laning
- Becky Ramotowski

continued on page 4...
The program continued with the following special TAAS awards:

**Service Awards**
Gary Cooper, TAAS Newsletter Editor
Fernando Torres, UNM Observatory Coordinator and contributor to Outreach
Jim Seargeant, ATM Team Member
Sigrid Monaghan, Board Member and Astronomy 101 coordinator
Tom Grzybowski, Educational Outreach
Barry Spletzer, Webmaster and too many contributions to name!

**TAAS Outstanding Service Awards**
Martin Hilario - Supernova Award for new member involved with everything!
Jim Fordice - The Isengard Award for service as GNTO Director and Loaner Telescope Program Director
Jim Greenhouse - Dobson Award for service to the Educational Outreach program and coordination with Natural History Museum events

**Election of Officers**
Dee Friesen, head of the Nominating Committee, conducted the election of new officers for 2017 by calling for each nominee for office to stand and be voted on by hand and by proxy. These officers were elected by the membership for the coming year:
- President - Dale Murray
- Vice President - John Miller
- Treasurer - Doug LeGrand
- Secretary - Bob Shipley

In conclusion, Tom Graham, our outgoing President, gave his final remarks thanking everyone for their contributions and help and congratulating all on a year well done. He turned over the President’s gavel with a smile and a handshake, and the brand-new President, Dale Murray, gave his first address to the assembled members. Dale stated that the society is in excellent shape and will move forward in 2017 with more...
innovations and that ideas from the membership are always welcomed by the President and officers.

Farewell until next year and we hope you had an enjoyable evening—now get out there and....

Observe - Educate - Have Fun!

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Barry Spletzer, Tom Graham

Tom Graham, Martin Hilario

Christine and Treasurer Doug LeGrand

Dee Friesen, Nominating Committee

Dale Murray, New TAAS President

John Miller, Vice President

Bob Shipley, Secretary

...Perihelion Banquet continued from page 4

photos continued on page 6 . . .
...Perihelion Banquet continued from page 5

Alan Scott

Bob and Georgia Hufnagel

Becky Watts

Bob Anderson

Andy House

Jon and Margie Schuchardt

Carol Mitchell

Bob Havlen, David Frizzell

Charlie Mullen and Margo

Diane Murray

Lynne Olson, Lynda Torres

BANQUET PHOTOS BY DAVID OLSON
Too much turbulence per Jim. That didn’t affect my viewing of open clusters on the Herschel 400 list in Puppis and Pyxis. Viola left about 9:00 p.m. Martin stayed until about 1:00 a.m. Jim and I spent the night. We were up at 6:00 a.m. and I closed the site at about 6:35 a.m. All-in-all a good useful night of observing.

**GNTO 25th Anniversary Celebration and Annual Picnic:**
The GNTO Committee will be hosting a celebration of GNTO’s 25th anniversary on May 27 in conjunction with the annual picnic. GNTO was dedicated on August 8, 1992. Please mark your calendar and plan to attend this memorable milestone event for our dark sky site.

**Upcoming Events:**
- February 18: 3rd Quarter Moon Observing
- February 25: New Moon Observing
- March 18: 3rd Quarter Moon Observing
- March 24: Messier Marathon
- March 25: Messier Marathon and New Moon Observing
- March 26: Messier Marathon

Don’t forget that the GNTO Observing Field is available for use by TAAS members anytime. Check the TAAS website for the procedure to follow. Contact me if you have any questions.

As always, check TAAS_Talk and the TAAS website for last-minute changes and updates. GNTO events are open to all TAAS members and their guests.

**GNTO Director:** GNTO@TAAS.org or 505-803-3640.

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This presentation is formulated to give the amateur observer an enduring appreciation of open clusters that make them target-worthy and perhaps encourage a few to go for the rarely-given Open Cluster pin of the Astronomical League.

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Astronomy 101

continued from page 1

...Astronomy 101

continued from page 1

The Pleiades, photo by Vance Ley
Jellyfish Nebula IC 443 is a supernova remnant in the constellation Gemini that is about 5,000 light-years from Earth. The nebula is thought to have formed between 3,000 and 30,000 years ago. The supernova created a neutron star. Images were taken January 24 and 25, 2017, using an AT65EDQ telescope and a QSI 660 camera. A total of 15 hours of data was collected using Ha, SII, and OIII filters.

Images were stacked in PixInsight and processed in Photoshop CC.

—Dwight Talley
Telescope Loan Program Update

by Jim Fordice

This month I acquired a set of eyepieces for the Orion SpaceProbe 130ST EQ Reflector that was donated last month. The SpaceProbe is now available for loan. You can see its description and picture on the TAAS website.

Also acquired this month was an Explore Scientific 12” Truss Tube Dobsonian and a set of eyepieces for it. Barry Spletzer is building a cover for the mirror. Once I have the package fully assembled I will post a picture and description on the TAAS website. I am accepting reservations for this very nice and portable telescope. Contact me if you are interested in borrowing it.

I have assembled all the equipment needed for the Astrophotography package and am now writing assembly instructions. When the instructions are complete Vance Ley is going to give the package a “test ride.” Soon after Vance is done the package will be available for borrowing. Since astrophotography is challenging and to give each borrower sufficient time to learn the system, find some good skies for taking pictures, and process the pictures, I plan to put this package on two-month loans. I am accepting reservations. Contact me if you are interested in borrowing it.

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As of: 1/22/17

In addition to telescopes the loan program also has many accessories that include filter sets, collimators, barlows, star charts, planispheres, a green laser pointer, a sky quality meter, and a large selection of premium eyepieces. Contact me at telescope_loans@taas.org if you are interested in borrowing one of these items.

I wanted to thank everyone very much for the John Dobson award that I received at the banquet in January. I’m glad to be helping the club’s educational programs, but I also genuinely enjoy presenting shows in the portable planetarium. The planetarium at the natural history museum is great for creating virtual environments, but that formal setting makes it hard to get reactions from audiences. The club’s portable planetarium is best used when interacting with the viewers, and that makes shows fun for the visitors and the presenter!

I want to let you all know that the school outreach programs really are having an impact on students. Since I started participating in the school visits, I noticed some schools scheduling field trips to the museum’s planetarium soon after the outreach. More than that, children visiting the museum began coming up to me and saying “I remember you from when you came to my school!” There seems to be a surge in families coming to learn more about astronomy after their experience at the outreach, and that’s a testament to the success of our efforts. So, in addition to thanking the club for the honor of the award, I also appreciate everyone who helps with educational programs and for allowing me to be a part of them!

Jim Greenhouse
Space Science Director
New Mexico Museum of Natural History & Science

Observe – Educate – Have Fun
The “Rosette Nebula” and its associated open cluster NGC 2244, located approximately 5,200 light-years away in the direction of the constellation Monoceros. The image was captured on November 23, 2016, at GNTO. A total of 12 x 10-minute subframes were made with an SBIG 4000XCM camera mounted on an AT 65 apochromatic refractor operating at 420 mm focal length and f/6.5. The camera’s 15.2-mm square chip yields a crop factor of 2.01, so that the effective focal length, compared with a 35-mm camera, is 845 mm. The mount was a Losmandy G11. Processing was done in Pixinsight, Photoshop CS2, and Lightroom.

This is the first image that I’ve processed using Pixinsight that I’ve been satisfied enough with to share. The software has an abundance of valuable features. Presently, I’m only comfortable with a fairly small subset. The relatively wide field of view of the OTA-camera combination used—2° x 2°—is prone to gradients. Pixinsight has two different gradient removal tools that appear to work quite well. Additionally, it has a background neutralization feature and an “agnostic” color calibration tool that is described as using all stars, rather than just GV2 stars, to establish “realistic” color in deep-space objects. I’m not yet certain what I think of it, but if it actually works it would save me a lot of agonizing over what colors objects are supposed to be.

—Vance Ley
Sharpless Sh2-108 is also known as the Sadr Nebula but is far from the F8Isg 2nd magnitude star. Sadr is about 1,500 light-years from us but Sh2-108 is over 5,000 light-years from us. It is a very large nebula over 200 light-years in diameter which results in 180’ in size. My image only shows about half of it. Of course it is located in the middle of Cygnus the swan.

No ionizing star is given but is probably from OB stars in the nebula which is also cataloged as IC 1318.

Equipment: ES ED127CF f/7.5, iOptron CEM60 mount, SBIG ST8300M and FW5 CCD camera, guided with SBIG SG-4 on an AT72ED f/6.

Software: CCDSoft v5.210, ImagesPlus v5.25a, Photoshop Elements v9 with AstronomyTools plug-in (false color)

Exposure: 24 x 5 minutes for 2-hour total, Hydrogen Alpha filter at 656 nm with a 7-nm passband.

Location: 3 miles north of Oak Flat on my backyard patio, December 5, 2016, 7:00 p.m. MST.

—John Laning
Thor's Helmet or Duck Nebula, NGC2359

THIS UNUSUAL LOOKING NEBULA surrounds a Wolf-Rayet star near Sirius. A Wolf-Rayet star is a very large hot star in the stage just before it ends in a supernova. It has blown some of its atmosphere into the surrounding molecular cloud.

It produces a surprising amount of OIII light, which I captured using an OIII filter and rendered in blue and green, and also some hydrogen which I captured using an H-alpha filter and rendered in red. About five hours of exposure time all together, using my Officina Stellare RH-200 astrograph, which is an F/3 telescope with 600-mm focal length and 200-mm aperture.

This is actually a tiny object for my telescope, so I used a sub frame mode of my FLI ML16803 camera, taking a 1024 x 1024 pixel image instead of the usual 4096 x 4096. I used the technique of dithering, which moves the image a small amount between sub frames, so a star that would otherwise fall always on a single pixel gets moved around to multiple pixels during the exposure. That reduces “fixed pattern noise” of the sensor and actually increases the resolution of the picture, when it is processed using the “drizzle” alignment algorithm in PixInsight. The resulting picture is about 2048 x 2048 pixels.

—Rick Thurmond

Need help with your Telescope?

Attend the ATM meeting and receive assistance.

First and third Wednesday of the month.

Manzano Mesa Multi-Gen Center
501 Elizabeth St SE, Albuquerque, NM

map is available at www.TAAS.org

TAAS General Meeting

Saturday, February 11, 7:00 P.M.
UNM Science and Math Learning Center

The Cosmic Distance Ladder

Mark Fraser
FEATURED SPEAKER

6:00 P.M. ASTRONOMY 101: THE OPEN CLUSTER STORY
Welcome to New or Returning TAAS Members

Edward Ade•Edward Allison
Martin Arrambide•Cynthia Garza
Royal Harrison•Yvette Harrison
Jasmine Jackson
Will Jaremko-Wright
Brook Jilek•Evie Jilek
Elijah Jilek•Jeremiah Jilek
Miriam Jilek•Frederick Kline
Susan Kline•Jonathan Leibowitz
Maiya Leibowitz
Samuel Leibowitz
Timothy Martinez•Robert McNeill
Adam Miller-Short
Emily Miller-Short
Larry Miller-Short
Melanie Miller-Short
Corilia Ortega
Francois-Marie Patorni
Raymond Thompson
James Timberlake•Eric Toops

Donations to TAAS

Timothy Martinez
Jerry Holkestad

The Albuquerque Astronomical Society is a 501(c)(3) organization. Donations are deductible as charitable contributions on the donor's federal income tax return.

Explanation of Dues and Membership Renewal Date

NEW MEMBERSHIPS are registered immediately if you pay online. If you pay by check, your membership is registered when your check is received by the treasurer.

Renewal notices will be sent out via e-mail beginning 60 days before your membership expires. If your membership is renewed before it expires or with in 90 days after it expires, your new expiration date will be advanced one year from the previous expiration date and your membership will be continuous.

If dues payment is received more than 90 days after the expiration date, you will be reinstated as a member with an expiration date set as one year from the receipt of payment.

Monthly Membership Report

January 2017

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Editor's Note

The deadline for the next issue of The Sidereal Times is Friday, February 24. The newsletter editor's e-mail address is editor@TAAS.org.

Location, Location, Location

- Chaco Canyon
  6185' elevation
  Latitude  Longitude
  36° 01' 50"N  107° 54' 36"W
  36.03'  -107.91'
  36° 1.83'  -107° 54.60'

- Oak Flat
  7680' elevation
  Latitude  Longitude
  34° 59' 48"N  106° 19' 17"W
  34.99'  -106.32'
  34° 59.80'  -106° 19.28'

- UNM Campus Observatory
  5180' elevation
  Latitude  Longitude
  35° 5' 29"N  106° 37' 17"W
  35.09'  -106.62'
  35° 5.48'  -106° 37.29'

For security reasons, GNTO location is available by request only, so please contact Jim Fordice, GNTO Director, for GNTO information, e-mail GNTO@TAAS.org.

Membership Services

for:
- Membership Inquiries
- Events Information
- Volunteer Opportunities

Contact Bob Anderson at membership@TAAS.org

for:
- Membership Dues
- Address/e-mail changes

Contact Doug LeGrand at treasurer@TAAS.org

TAAS
P.O. Box 50581
Albuquerque, NM 87181
Please note: Any further changes to Board of Directors for 2017 to be announced after next BOD meeting.
MEMBERSHIP

You can join TAAS or renew your membership online. Just go to www.taas.org and select "Join Us!" or "Renew Your Membership" from the main menu on the left side. Annual dues are $30 for a regular membership, $15 for educators and active military, and $5 for students. Only regular members are eligible to vote in society matters. Our new member information packet can be viewed or downloaded from the same location on the website. You can pay your dues online through PayPal, by Visa, MasterCard, or American Express. To pay by check, mail your check to TAAS, P.O. Box 50581, Albuquerque, NM 87181-0581 or give it to the treasurer at one of our meetings.

ARTICLES/ADVERTISEMENTS

Articles, personal astronomical classified advertisements and advertisements for businesses related to astronomy must be submitted by the deadline shown on the Society calendar (generally the Friday near the new Moon). Rates for commercial ads (per issue) are $120 per page, $60 per half page, $30 per quarter page, $7 for business card size. The newsletter editor reserves the right to include and/or edit any article or advertisement. E-mail attachments in Microsoft Word or compatible word processor format; ASCII and RTF are acceptable. One space between paragraphs is preferred. One column is approximately 350 words. Contact the Newsletter Editor at editor@TAAS.org for more information.

Note that the Sidereal Times is no longer mailed. It is posted on the TAAS website, www.TAAS.org.

Send submissions or correspondence to editor@TAAS.org.

TAAS ONLINE

TAAS website: http://www.TAAS.org

The TAAS website includes:

- Programs . . .
- TAAS 200
- TAAS Fabulous Fifty
- Educational Outreach: School Star Parties, Solar Astronomy Outreach
- Equipment Trader
- Telescope Loaner Program
- Telescope Making and Maintenance . . . And more
- Online Sidereal Times
- Calendar of TAAS Events
- Members’ Guide
- Links to Astronomy Resources and Members’ Blogs

E-mail: TAAS@TAAS.org

Members’ Google Group: TAAS_talk@googlegroups.com

TAAS is honored to receive an "OUT-OF-THIS-WORLD" AWARD 2011 from Astronomy Magazine for Outstanding Public Programming.

TAAS is honored to receive an "EDITOR’S PICK 2013 BEST OF THE CITY" award from Albuquerque Magazine.

BEST PLACE TO STARGAZE
CELESTIAL EDITION

MAGAZINES

TAAS no longer offers magazine subscriptions.