



STAR FIELDS

Newsletter of the
Amateur Telescope Makers of Boston
Including the Bond Astronomical Club
Established in 1934
In the Interest of Telescope Making & Using

Vol. 31, No. 1 January 2019

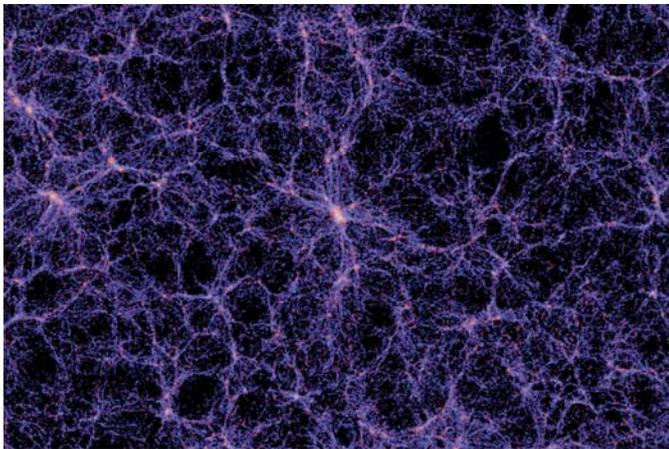
This Month's Meeting . . .

Thursday, January 10th, 2019 at 8:00 PM
Phillips Auditorium

Harvard-Smithsonian Center for Astrophysics

Parking at the CfA is allowed for the duration of the meeting

Galaxies: From Observations to Simulations



Max-Planck-Institute for Astrophysics. Credit: Springel et al. (2004)

Our guest speaker for the January meeting will be Kelly Blumenthal. Kelly will talk about the history of our understanding of galaxies, from early observations of "spiral nebulae" to creating galaxies in large-scale simulations of the Universe.

Kelly Blumenthal is a fifth year PhD student. She is a visiting scholar at the Harvard-Smithsonian Center for Astrophysics, and a National Science Foundation Graduate Research Fellow. She earned her undergraduate degree in astronomy and physics (with a minor in saxophone performance) from Boston University. In 2016, Kelly received her master's degree in astronomy from the University of Hawai'i at Mānoa, and moved back to Cambridge, Massachusetts to finish her doctorate. In addition to her research

work, Kelly has been heavily involved in outreach programs in Hawai'i, and just published an educational book for high school students, *Cosmic Inflation: Explained*.

Please join us for a pre-meeting dinner discussion at House of Chang, 282 Concord Ave., Cambridge, MA. at 6:00 pm before the meeting.

President's Message . . .

It is my hope that this note finds you happy and healthy at the start of and during this New Year. Following up on my theme from last month, I can say I have much to be grateful for. The holiday season for me does not go by without my receiving an astronomy themed book as a gift. The list of books has grown over the years.

A favorite of mine is *The Peterson Field Guide to the Stars and Planets* written by Donald Menzel. My copy is certainly getting long in the tooth. The *Peterson Field Guide* has been in print since 1964. The monthly sky charts and photographic plates are only second to being under the open clear skies.

The *Pocket Sky Atlas*, written by long time past ATMOB member Rodger Sinnott, is a new addition as I try to master the art of star hopping with black stars on a white background, which makes red light referencing easier for my ever aging eyes.

As star atlases go, I can really appreciate Harvard Pennington's *The Year Round Messier Marathon Field Guide*. This guide describes the history of the Messier objects as cataloged by Messier and his colleagues, such that they might not confuse them with the holy grail of discovery of the time - comets! The *Guide* teaches the process of learning the night sky and using a finder and telescope.

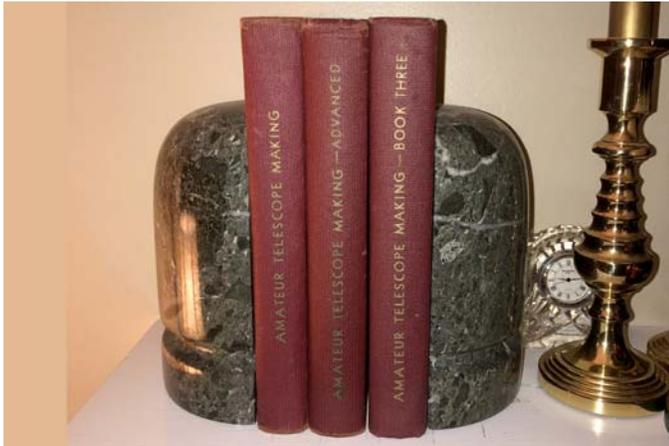
As a companion, I have really enjoyed referencing Stephen James O'Meara's *Deep Sky Companions: The Messier Objects*. The volume is well written, and describes the historical and scientific significance of these objects. It has excellent finder charts, photos and hand drawn images of what one might expect to see through the eyepiece of a moderate telescope.

Moving toward the more technical aspects of amateur photography, I greatly value Michael A. Covington's *Astrophotography for the Amateur*. Even with the focus on film photography, the treatment of the topic of recording images of the night sky remains relevant even in today's electronic era.

When it comes to a comprehensive overview of astronomical CCD astrophotography, few books cover the plethora of topics as Ron Wodaski does. *The New CCD Astrophotography* softcover is a tour de force for budding imagers. Pick up this reference for an in-depth treatise of the electronic astroimaging process.

Practical Astronomy, A User-Friendly Handbook for Sky Watchers by H. Robert Mills, and *Amateur Telescope Making* by Stephen F. Tonkin, cover the finer aspects of understanding the mechanics of the night sky, and astronomical telescopes and their

use. One of my favorite articles in Stephen Tonkin's book is instructions for the making of an improved barn door tracker for wide field astrophotography. It's a simple design that could be produced in our workshop as a group project if there is interest.



Amateur Telescope Making Series. Image by Tom McDonagh

Last but certainly not least is my mantle piece collection. *The Amateur Telescope Making Series*, published by Scientific American, *Books One* through *Three*. *Book One* is a fourth edition, 15th printing of the 1935 copyright. *Book Two* and *Book Three* are even earlier editions. Dr. Harlow Shapley, a founder of ATMoB, authored the forward for *Book One*. Someday I hope to reference these texts during my mirror making endeavor with our soon to be renovated mirror making facility at the Clubhouse.

These gifts really are priceless and continue to give knowledge. With the New Year upon us, I believe it is fitting to note, as historical fiction writer Nanette L. Avery did, that "Time flies but books are timeless..." Do you have a favorite astronomy book? Feel free to share atmob.discuss@atmob.org.

Clear skies in 2019.

~ Tom McDonagh – President ~

December Meeting Minutes . . .



Stella Kafka *

Minutes of the 915th ATMoB meeting held December 13, 2018 at the Harvard-Smithsonian Center for Astrophysics in the

Phillips Auditorium. Club Vice President Richard Nugent presided and called the meeting to order at 8:01 pm.

- Secretary John Harrington read the minutes of the club's November meeting.
- Treasurer Eileen Myers presented the Treasurer's Report.
- Membership Secretary Chris Elledge presented the Membership Report, showing 292 total memberships covering 371 club members. New member Scott Drown introduced himself and was welcomed.
- Bruce Berger spoke about the club's receipt on December 3rd of the new Software Bisque MX mount. The mount has now been carefully polar aligned on 50 stars using T-Point software. Some cabling work remains to be done before shakedown testing begins.
- Glenn Chaple gave the observing report, covering the recent Uranus/Neptune conjunction, the Geminid meteor shower and the upcoming Quadrantid shower. He then presented this month's Observer's Challenge, which is the spiral galaxy NGC 1003 in Perseus.

- Steve Clougherty gave the Clubhouse report, noting that 20 club members participated in the November 21st work party. The staining of the barn was completed. Steve announced that the December 22nd work party was cancelled and would be combined with the scheduled December 29th work party. He stated that increased emphasis would be placed on mirror-making activities at the club in the near future. Finally, Steve thanked Al Takeda for inventorying recent donations to the club.

Paul Varella spoke briefly on the history of the Mirror-o-Matic grinding machine.

- Vice President Nugent invited all club members to attend the New Year's Eve party. He announced that the Vining Elementary School and Center School star parties have both been postponed.
- Old Business:
Eileen Myers announced that extra 2019 *Astronomy* magazine calendars and 2019 *Royal Astronomical Society of Canada (RASC) Handbooks* are available.
- New Business:

Vice President Nugent discussed the suggestion by Roger Ivester that Sue and Alan French be given honorary memberships to the club. This proposal was unanimously approved by the club members present on a voice vote.

Vice President Nugent then introduced Dr. Stella Kafka, Executive Director of the American Association of Variable Star Observers (AAVSO). Dr. Kafka spoke on the topic of variable stars and the AAVSO. She stated that the AAVSO's goal is to

“enable anyone anywhere to participate in scientific discovery through variable star astronomy.” The AAVSO was founded at Harvard and now counts some 4,000 members. The first variable star detected was Algol, which was discovered 3,000 years ago by the ancient Egyptians.

Dr. Kafka divided her presentation into three phases: The Good, the Bad and the Explosive Variable Stars. She described the difference between “intrinsic” variables (such as pulsating variables like Cepheids and RR Lyrae stars) and “extrinsic” variables (stars which have large star spots or undergo eclipses by a companion). Henrietta Leavitt famously determined that Cepheid variables (stars which have a tight period-luminosity relationship) could be used as the long-sought “standard candle” to determine astronomical distances. On the other hand, star ages can be determined through extrinsic characteristics, i.e. by careful measurement of star rotation periods through photometry (older stars tend to spin down).

Cataclysmic variables run the gamut from novae to powerful gamma ray bursts (GRBs), and even more powerful gravitational wave events. Novae occur when white dwarf stars “eat too fast”. The white dwarf detonates hydrogen gas accreted from its companion star, and the white dwarf survives. Type IA supernovae occur when a white dwarf accretes so much matter than it exceeds the Chandrasekhar Limit on mass (1.4 solar masses) and explodes. Such events destroy the star, but can be used as a form of standard candle since their luminosities are relatively consistent. GRBs are believed to occur when dense neutron stars collide, or as a result of extremely massive stars dying as “hypernovae.” Finally, gravitational waves are ripples in space-time and have only recently been detected by the Laser Interferometry Gravitational Wave Observatory (LIGO). They are created when extremely dense objects, such as neutron stars or black holes, merge.

Dr. Kafka concluded her presentation by inviting all present to consider joining the AAVSO.

Vice President Nugent thanked Mike Hill for providing the refreshments and adjourned the meeting at 9:49 pm.

~ *John Harrington, Secretary* ~

Meeting Recordings . . .

The recording of ATMob meeting #915 is available on YouTube: <https://youtu.be/RITVUSwAW5w>

I would like to thank Dr. Stella Kafka for giving her presentation and allowing us to record it.

This link is to the publicly available cut of the meeting recording. To view the original version of the meetings, please see the Announce Forum on the ATMob Website <https://www.atmob.org>

~ *Chris Elledge – Membership Secretary* ~

Membership Report . . .

I am pleased to welcome our newest members: Jacob LeBlanc; Mark, Beth, Jackson, and Sophia Lundberg; Marie Martin; Lawrence, Paul, and Sean Narkewich; Joshua and Charles Pressey; and Norm Tripp.

As of January 1st, 2019 we have 303 memberships covering 392 members. This is broken down as follows:

- 138 Regular Members
- 103 Senior Members
- 7 Student Members
- 51 Family Memberships covering 140 Members

The membership elected Sue and Alan French as honorary ATMob Members.

~ *Chris Elledge – Membership Secretary* ~

Meeting Refreshment Assignment . . . 2019

Jan. – John Harrington
Feb. – Eileen Myers
Mar. – Glenn Chaple
Apr. – Chris Elledge
May – Al Takeda
Jun. – Bruce Berger
July – TBD

Clubhouse Report . . .



Nkosi Muhangi decorating the Clubhouse for the New Year's Eve Party *

Our monthly Clubhouse work session took place on Saturday, December 20th. We were fortunate to have a total of 23 members and friends of the ATMob available to assist with the New Year's Eve set up. Under the direction of Eileen Myers, Al Takeda and Julie Kaufmann the entire Clubhouse was cleaned and tables and chairs were set up in the front room and mirror grinding room for the upcoming party. Decorations were hung all over the place, and by day's end the place looked fantastic! Many thanks to Eileen and Al along with the others who helped organize this effort.

Other work included moving some grinding equipment to the upper barn and rearranging the grinding room, polishing room and old evaporator room to make way for our new clean rooms. Barry Jansen and Tom McDonagh are taking on the new Mirror-o-Matic grinding/polishing machine project which will use many of the existing components from our old grinding machine. Dave Prowten, Rich Nugent and Steve Clougherty are working on the new clean rooms, which will involve re-purposing the existing polishing and evaporator rooms. We envision sectioning off those areas from the rest of the downstairs by way of installing lab quality clear plastic sheeting as a barrier from pedestrian traffic. Volunteers will be needed during upcoming winter work parties to help us with the cleaning, organizing and construction of these rooms.

Thanks to Eileen Myers, Terry Manning and Art Swedlow for preparing lunch for the work crew.

We would like to thank the following members for all of their help at December's work session: John Bishop, Paul Cicchetti, Steve Clougherty, Nina Craven, Barry Jensen, Eric Johansson, Julie Kaufmann, Dick Koolish, Bruno Leung, Tom McDonagh, John Maher, Terry Manning, Vladislav Mlch, Nkosi Murhage, Eileen Myers, Dave Prowten, John Reed, Phil Rounseville, Art Swedlow, Bob Toop, Al Takeda and Joe Wolfe.

Our next Clubhouse work session will take place on Saturday, January 19th.

Important Notice: Please check your email on the ATMob-ANNOUNCE list for mirror making sessions. A revised schedule will be released soon.

Clubhouse Saturday Schedule		
January 5	Steve Clougherty	Joe Henry
January 12	Paul Cicchetti	John Reed
January 19	WORK PARTY # 1 ** NO DUTY	
January 26	Phil Rounseville	Joe Wolfe
February 2	John Stodieck	Al Takeda
February 9	Jim Gettys	John Panaswich
February 16	WORK PARTY # 2 ** NO DUTY	

** Closing time for the Clubhouse is determined by the work crew

Clubhouse Evening Schedule	
Friday Night Educational Videos	7:00 pm - 10:30 pm #
Saturday Afternoon Mirror Making	ATMoB-Announce
Saturday Night Observing	7:00 pm - ##
# Closing time is determined by the organizers	
## Closing time is determined by the "A" members on duty.	

~ Clubhouse Committee Chairs ~
~ Steve Clougherty, John Reed and Dave Prowten ~

Groton Astronomy Class . . .

In December 2017, ATMob received a plea for observing help from Groton's Tim Leonard, who would teach an adult introductory astronomy course. Chris Elledge passed the opportunity to the membership, and I responded. For six weeks in Spring, I assisted in the classroom and on the field behind the Prescott School Community Center. John Stodieck brought a club Dobsonian (Dob) telescope, and we had good weather. We also included one visit to the ATMob Clubhouse observatories. One week Rich Nugent gave his satellite presentation.

Last fall I taught a seven week observing class at Prescott. We had just two clear nights - the cloudiest November in Massachusetts since 1951. John Stodieck assisted, again bringing a Dob to augment my two scopes. The real star of this class was Corey Mooney, who demonstrated his Electronically Assisted Astronomy (EAA) gear for three nights. He began with an altitude-azimuth mount that he 3D-printed. It holds a CMOS color webcam, a short-focus camera lens and a laser pointer. This camera integrates binocular field of view sub-frames, feeding them to a tablet computer running SharpCap. The program continuously stacks frames producing images in near-real time. Corey uses a small video projector to form a large display on the ground so that several people can watch. We saw the Double Cluster, Heart & Soul Nebulae, M31 and M1, live and in color. The students and I were wowed!

In early December, Corey placed the camera in his 114-mm f/3.95 reflector on a Vixen Super Polaris GEM to which he fitted modern stepper motors and a DIY OnStep Arduino controller with a Wi-Fi link to his tablet computer. Polar alignment was done with the video camera. With this rig we saw M77 and its supernova. The next night, Corey captured an hour of images of Comet Wirtanen (46P) and then made a time-lapse video.

This is a beautiful example of the joys of ATMob.

~ Submitted by Bob Toop ~

Sky Object of the Month . . .

January 2019

Courtesy LVAS Observer's Challenge***

NGC 1514 – Planetary Nebula in Taurus

Magnitude: 10.9

Size: 2.3' X 2.0'



1514 (left) visible light, (right) infrared Images NASA/JPL-Caltech/UCLA/DSS

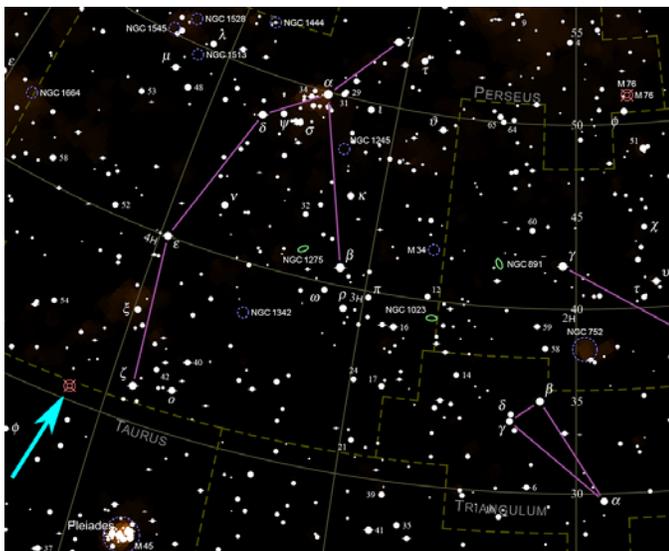
This month's Observer's Challenge changed William Herschel's idea about the construction of the universe. Early in his astronomical career, he considered all nebulae to be unresolved masses of stars, just like the Milky Way when viewed with the unaided eye. This idea changed on the evening of November 13, 1790, when his systematic survey of the heavens brought him face-to-face [with "a most singular phenomenon: a star of 8th magnitude with a faint luminous atmosphere of circular form."](#) He added "Our judgment, I may venture to say, will be, that the nebosity about the star is not of a starry nature". He catalogued it as H IV-69, his 69th Class IV (Planetary Nebulae) object.

Herschel's find, better known by the New General Catalog designation NGC 1514 or its nick-name, the "Crystal Ball Nebula", lies in the northwest corner of Taurus. The finder chart shows its location about 3 degrees east and slightly south of the 3rd magnitude star zeta (ζ) Persei.

In the case of a typical planetary nebula like the Ring Nebula (M57), a faint central star is hidden by the surrounding nebosity. NGC 1514 presents the opposite situation – its 9th magnitude central star overshadows the faint enveloping gaseous shell. To capture this planetary you'll need dark skies, a 6-inch scope or larger (the Crystal Ball has been viewed with smaller apertures by experienced observers), and high magnification (100X and up). A nebula filter like an OIII will help.

NGC 1514 is bracketed to its northwest and south-southeast by a pair of 8th magnitude stars. If their images appear sharply focused while NGC 1514's central star seems somewhat fuzzy, you've hit the jackpot.

The Crystal Ball Nebula's central star is actually binary - a stellar pair with a period of over 9 years - exceptionally long for a planetary nebula. It lies an estimated 2,200 light years away.



www.utopia-photography.ch/universe

***The purpose of the LVAS Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone who is interested, and if you are able to contribute notes, drawings, or photographs, the LVAS will be happy to include them in their monthly summary. If you would like to contribute material, submit your observing notes, sketches, and/or images to either Roger Ivester

(rogerivester@me.com) or Fred Rayworth (fred@fredrayworth.com). To find out more, click on the following links: [LVAS Observer's Challenge past reports](#) and/or visit the [Las Vegas Astronomical Society website](#).

~ Glenn Chaple for the LVAS ~

New Year's Eve Party 2019...



Cory and Keira Mooney. Image by Debra Cicchetti.

The weather forecast of freezing rain, followed by heavy rain, made the attendance about half its usual number. But, at the party were about 30 merrymakers, who talked, laughed, ate, danced, sang and generally enjoyed themselves. It provided the opportunity to learn more about our friends whose voices we hear in the dark, or talk to for a few minutes at meetings, but don't get a chance to really know through lengthy conversations. A rowdy group welcomed 2019 as it crossed each time zone.

Thanks go to the work party volunteers who cleaned and decorated, to Julie Kaufmann who led us in line dancing, to Ed Los who played Scottish tunes on his fiddle, and to Al Takeda who created a dance space with a rotating mirror ball and color changing lights. Thanks go to everyone for the food, and to Art Swedlow, John Stodieck, Al and Eileen who cleaned up the next day.

~ Coordinators Eileen Myers, Al Takeda and Julie Kaufmann ~

Editor: * Photos by Al Takeda unless otherwise noted.

February Star Fields DEADLINE
Sunday, January 27th

Email articles to Al Takeda at
newsletter@atmob.org

Articles from members are always welcome.

POSTMASTER NOTE: First Class Postage Mailed January 6, 2019

Amateur Telescope Makers of Boston, Inc.
c/o Chris Elledge, Membership Secretary
99 College Ave
Arlington, MA 02474
FIRST CLASS

EXECUTIVE BOARD 2018-2019

PRESIDENT: Tom McDonagh (617) 966-5221

VICE PRES: Rich Nugent

SECRETARY: John Harrington

MEMBERSHIP: Chris Elledge (781) 325-3772

TREASURER: Eileen Myers (978) 456-3937

MEMBERS AT LARGE: Maria Batista (617) 347-3730

Alan Sliski

Al Takeda (508) 494-7877

PAST PRESIDENTS:

2015 - 18 Glenn Chaple (978) 597-8465

2012 - 14 Mike Hill (508) 485-0230

COMMITTEES

CLUBHOUSE: John Reed (781) 861-8031

Steve Clougherty (781) 784-3024

David Prowten (978) 369-1596

OBSERVING: Bruce Berger (978) 387-4189

NEWSLETTER Al Takeda newsletter@atmob.org

PUBLIC OUTREACH

COMMITTEE CHAIR: Rich Nugent starparty@atmob.org

STAR PARTIES: Bernie Kosicki

Laura Sailor

John Harrington

How to Find Us...

Web Page www.atmob.org

MEETINGS: Held the second Thursday of each month (September to July) at 8:00PM in the Phillips Auditorium, Harvard-Smithsonian Center for Astrophysics, 60 Garden St., Cambridge MA. For INCLEMENT WEATHER CANCELLATION see www.atmob.org and check your email on the ATMOB-ANNOUNCE list.

CLUBHOUSE: Latitude 42° 36.5' N Longitude 71° 29.8' W

The Tom Britton Clubhouse is open every Saturday from 7 p.m. to late evening. It is the white farmhouse on the grounds of MIT's Haystack Observatory in Westford, MA. Take Rt. 3 North from Rt. 128 or Rt. 495 to Exit 33 and proceed West on Rt. 40 for five miles. Turn right at the MIT Lincoln Lab, Haystack Observatory at the Groton town line. Proceed to the farmhouse on left side of the road. Clubhouse attendance varies with the weather. It is wise to call in advance: (978) 692-8708.

Heads Up For The Month . . .

To calculate Eastern Standard Time (EST) from Universal Time (UT) subtract 5 from UT.

Jan 5 New Moon, Venus at greatest western morning elongation (47 deg)

Jan 14 First Quarter Moon (Moonset at midnight)

Jan 21 Full Moon, Total Lunar Eclipse

Jan 27 Last Quarter Moon (Moonrise at midnight)

Feb 4 New Moon

Feb 12 First Quarter Moon (Moonset at midnight)

Feb 18 Venus 1.1 degree North of Saturn

Feb 19 Full Moon