

First Light Lite

August 1st, 2017

Jim Lynch, Mike Hunter, Gus Romano - Interim Editors

Website Committee

To repeat last month's message: our new website is coming along like gangbusters, and there is a wealth of information on it. Indeed, it will soon become our primary instrument for Society communications. In your browser, bring up www.capecodastronomy.org. The Website Ad Hoc committee continues to work hard and is making significant progress towards a finished product. We will continue to get updates from them at each monthly meeting.

Communications Committee

After being dormant for a few months, our Communications Committee restarted its efforts with a conference call on July 26th. Initial efforts will center on posters for our meeting speakers, star parties, and the important event on August 21st - the solar eclipse. A PowerPoint example of a "simple poster" is attached, which advertises our next speaker, Dr. Tony Stark of HSCfA. Ed Swiniarski has an even prettier poster, which he is disseminating via his town contacts. We could use help in distributing these posters before events in libraries, churches, schools, and other venues that will permit their posting. If you are willing to do so (and take them down afterward!), please let Jim Lynch know at jlynch@whoi.edu.

Joel Burnett is also designing a new "business card" that members can distribute to visitors, guests and friends. Also in the works is a new, updated brochure for CCAS.

Internet, public media, and social media were also mentioned, and will be pursued more heavily in the near future.

If you are interested in joining in these efforts (which do not require great amounts of time), again, please email Jim Lynch. You can join in our (half-hourish) conference calls for free, and see if there is some facet of this work you would like to help with!

July CCAS Meeting Speaker

We'd like to thank Jim Lynch of the CCAS for his presentation on "The Drake Equation, with emphasis on the 7th term." A description of his talk can be found in our meeting minutes from the last meeting.

Upcoming Speakers and Topics

August - Dr. Tony Stark, Harvard Smithsonian Center for Astrophysics.

"Star Formation in the Milky Way and Beyond"

There is an "ecology" of star formation, where matter that has been processed in the core of stars is ejected into interstellar space when the star dies, only to be swept up in a new cycle of star and planet formation. The atoms in our own bodies have cycled through this process several times.

The stages of this process can now be observed, although detecting some of the necessary wavelengths requires extreme instrumentation, such as balloon-borne telescopes launched from Antarctica. We are beginning to detect star formation and death even in galaxies billions of light years away, galaxies in formation in the very beginning of the Universe.

September – Katie Sisson, CCAS.

"Stellar Evolution and Structure"

What is a star? In this talk we will explore the life of a star from birth, to main sequence, to death. Stars are born in giant molecular clouds of gas and dust called nebulae. Under the force of gravity the center of these clouds will attract more and more matter in towards the center. As matter coalesces, temperature rises and a protostar begins to form. Orbiting around the protostar is a protoplanetary disk. Dynamic interactions between the cloud, the disk, and the protostar result in a slow deposition of matter onto the protostar until stability is reached in the form of a star. This stage of life is called the main sequence. A main sequence star is steadily converting hydrogen into helium by the process of nuclear fusion. Stars remain stable so long as the inward force of gravity is balanced by the outward force of gas pressure. When the fuel for fusion runs out, the star is no longer stable and begins to die. Stellar death can be one of the most violent physical phenomenon in the universe resulting in black holes with unimaginably high density, or it can be a gradual fading out process leaving behind nothing but its dense core shining with just the faintest of stored thermal energy.

October – George Silva, Bernie Young, and Paul Fucile. Topics TBD.

November - Dr. Larry Marschall, Gettysburg College. "Tiny bit of shakin' going on: Gravitational waves and the universe."

On September 14, 2015, two unusual observatories, one in Louisiana and another in Washington State, recorded the near-simultaneous arrival of gravitational waves. This was the first time these subtle distortions of space had been detected, though their existence was predicted by Albert Einstein a century earlier. The discovery, perhaps the most remarkable and challenging astronomical measurement of the century, opened up a new way for astronomers to study the universe. We'll give some background on the nature of these odd ripples in the cosmos, and explain how, by observing changes on the earth's surface that are smaller than the nucleus of an atom, astronomers are now able to study some of the most powerful events in the universe-- the collisions of black holes millions of light years away.

December - Dr. Kenneth Brink, WHOI. Title TBD.

January – Dr. Frank Primini, HSCfA. Title TBD.

July CCAS Meeting minutes (Including Main Speaker talk precis)

Cape Cod Astronomical Society - Minutes of the July 6, 2017 meeting

Attendance: 23 members

The meeting was held at the Dennis-Yarmouth High School Library.

Jim Lynch, President of CCAS, was our first speaker. Dr. Lynch is Scientist Emeritus, Department of Applied Ocean Physics and Engineering, Woods Hole Oceanographic Institution. His topic: "Drake's Equation. Are We Alone in the Universe? (The 7th term). "

- The Drake Equation is used to arrive at the number of active, communicative civilizations in our galaxy.

- The number of civilizations, N , is assumed to be equal to the product of: the average number of star formations; the fraction of those stars having planets; of those planets, the average number that can support life; the fraction of those that develop life; the fraction of those planets with intelligent life and civilizations; the fraction of those civilizations that develop communications technologies that could be detected in space; and, finally, the length of time such civilizations release detectable signals (i.e., the length of the civilization itself).

- Cocconi and Morrison in 1959 published an article stating that radio telescopes had gotten sensitive enough to detect possible alien signals using the 21 cm spectral line of neutral hydrogen. Drake then used the 26 meter Green Bank dish to observe Tau Ceti and Epsilon Eridani near the 21 cm line, with negative results.

- Drake hosted the first SETI conference in 1961, and prior to the conference came up with the Drake Equation. The group included Drake, Carl Sagan, Phillip Morrison, Otto Struve, and John Lilly.

- The terms of the DE are difficult to estimate, particularly those dealing with our understanding of the evolution of life, intelligence and civilization...not the physics side of things. But the DE is useful in defining the concepts that scientists must deal with when considering life elsewhere.
 - Average rate of star formation = 1.5 to 3 per year (best guess)
 - Most stars have planets so fraction = 1
 - Average planets per star that might support life = 0.4
 - Fraction that develop life = difficult since we have a sample of one (possible Martian life could reinforce this as a viable result?)
 - Fraction of the above that develop intelligent life = likely very rare given only one intelligent species on earth and that was the result of more than a few accidents
 - Fraction of the above revealing themselves via radio communication = two possible cases: accidental vs. deliberate
 - Lifetime of such civilizations = uncertain because, like several of these terms, we have only ourselves as an example. So how do we determine

how long civilizations last? Shermer estimates 304 years for modern civilizations looking at 28 civilizations more recent than the Roman Empire. So we are at 117 years and counting (i.e., starting with Marconi's transatlantic radio signal in 1901)

- Possible reasons for civilizations destruction: nuclear war; over population; rise of artificial intelligence; asteroid strike
- Solution might be peaceful cooperation but, barring that, establishing a colony on Mars is a possible answer to ensuring our civilization survives

After Jim's presentation, we had our annual election of officers: Jim Lynch was re-elected President; Mike Hunter for Treasurer; and Kate Sisson for Secretary. If someone is interested in the Vice President office (which was not filled), please contact one of the Society officers before the next meeting.

Bernie Young then provided a brief look at some of his work using a point-and-shoot Canon camera and software to photograph the night sky with excellent results, demonstrating how multiple exposures and stacking software can remove noise and enhance the final image.

The meeting was adjourned at 9:00pm.

Respectfully submitted,

Gus Romano, CCAS Secretary

Star Parties

Winter season once per month "QUARTER MOON SATURDAY STAR PARTIES", **all open to the public**, begins September 23rd, 8:30-10:30PM.

From September thru June, we will have one regularly scheduled Star Party each month taking place at 8:30-10:30pm on the Saturday closest to the date of First Quarter Moon (about 7 days old).

From July through August, we will have three or four regularly scheduled Star Parties each month taking place on Thursdays at 8:30-10:30pm.

When the moon is near its First Quarter, the terminator (the line dividing light from dark) is favorable for viewing sunlight or shadow on the sides of craters. This time is also favorable for observing the dark side of the moon occult (visually cover) stars in the sky as the moon moves in its orbit. Depending upon the calendar, we may also be able to observe planets and other celestial objects.

Here is the remaining schedule for "Star Parties" through December, 2017; **the public is invited:**

Thursdays, August 10, 17, 24, 31

Saturday, September 23

Saturday, October 28

Saturday, November 25

Saturday, December 23

POSSIBLE CANCELLATIONS for Star Parties: Cancellations will be very rare since we have lots to do "inside" as well as outside. Even if the forecast is "iffy"; the Staff Leader for the night may elect not to cancel in spite of possible clouds. If clouds arrive after staff and guests have convened, a virtual Star Party will usually take place indoors to include overviews of the sky for that night using computer simulations with our big screen TV, videos of interesting sky events recorded previously, demonstrations and/or training on the use of scopes and other equipment, and consultation/discussions on things astronomical, etc.

However, sometimes a solid forecast for overcast or rain or a storm will result in cancellation of a given Star Party. **IF IN DOUBT ABOUT THE WEATHER AND THE STATUS OF A STAR PARTY, CALL THE OBSERVATORY AT 508-398-4765 AFTER 7:45 pm.** No answer means the event has been cancelled.

Directions to Dennis Yarmouth HS and Schmidt Observatory

For information on the location of our Dome behind Dennis-Yarmouth High School, click on the purple button "Old Website" and once there, click on "Meeting Location" viewing the two maps that are there: external for the Dome, and internal to locate the high school library where meetings are held.

For meetings, drive in the south entrance road and go around behind the main building. Park in the lot about half way down the building and go in the back door and turn down the hall to your left to find the library.

For Star Parties at the Dome, drive in the north entrance road all the way past the north side of the main high school building, through a gate, and on to park near our Dome.

H&K directions

Please be reminded that Gus Romano or his delegate “host” a dutch-treat dinner gathering for members and friends each CCAS meeting night (before the meeting) at the South Yarmouth Hearth & Kettle restaurant at 5:45pm; (the meetings begin at 7:30 at D-Y.) The speaker for each meeting is always invited. Please join the group to dine and talk about all things interesting, including astronomy, each month before our meeting. The H&K is at 1196 Rt 28, South Yarmouth, about a half mile west of the Station Avenue/Main Street intersection with Rt 28 (stop light).