

First Light Lite

August 3, 2022

Jim Lynch – Editor

Message from the CCAS President

Cape Cod Astronomical Society (CCAS) was back “live” *yet again*

Last month, we celebrated our *third* “live, in-person” CCAS meeting at our basecamp location at the Dennis-Yarmouth HS Library. We also had our traditional H&K pre-talk dinner with our guest speaker, Dr. Antony Stark. We used a Zoom link as well as having a live talk, as we did the previous two months. Though things went reasonably well, we continue to learn, and we will be looking into how to make this hybrid approach a bit slicker, using a separate webcam and clip-on microphone.

But, alas, an in-person event won’t happen this month (August), as our speaker, CCAS member Violet Zitola, came down ill recently and is currently recuperating from a surgical procedure at Cape Cod Hospital. Let us all wish Violet well, and a speedy recovery. Violet was preparing a talk on SETI (always a fun topic) and we are hoping that he will be able to give it sometime in the coming months.

As a bit of an aside, Violet is a DYHS graduate from the 1990’s and was a CCAS club member in the days when WSO was just being built. At the dinner before the last talk he said that his interaction with CCAS inspired him to a STEM career. It also steered him to Caltech, which made for great dinner conversation with our guest speaker and his wife Ellen, who are also Caltech alums. The world can be a bit small some days!

BUT, since Violet’s talk is delayed, and we don’t have an alternate guest speaker lined up on such short notice, our Plan B will be to hold a short (an hour at most) Zoom meeting tomorrow at 7:00 PM Eastern, which is open to all who wish to attend. The link will be provided below. The agenda will be to chat about the club’s plans for the fall, including (but not limited to): star parties, school interactions, guest speakers, and how we can get some time on the JWST (the last one was just to see if you’re awake and still reading! 😊)

Star Parties (as per last month)

As we've signed a one-year extension of the existing contract between the Cape Cod Astronomical Foundation (CCAF, our non-profit organization legal component) and the Dennis-Yarmouth Regional School District (DYRSD), in order to allow time for long-term negotiations, we will have use of the Werner Schmidt Observatory (WSO) this coming year, and so will be planning star parties there in the near future (read "this fall.") We still are talking about safety rules and logistics, as well as tuning and testing some equipment, but once we have those details ironed out...well, ` the sun sets sooner in fall, and we're eager to be back outside and doing a little observing!

School Projects and Activities

With our contract extension in place, we took the next step of talking to the DYHS teachers about projects with their students for next fall. The talks on June 22nd were very productive, and we will be maintaining contact with the teachers through the summer. During the first part of September, DYHS will have STEM Week type activities, which we hope to participate in. We also have invited the science teachers to tour WSO, and hopefully become users of our facility.

We also are continuing efforts to coordinate with other Cape Cod schools, especially Upper Cape Tech, with whom we are discussing interaction with their adult education program and also their astronomy course.

There are also other Cape schools we'd like to continue interactions with, and we will pursue those possibilities during the fall.

Elections

We are pleased to announce that George Silvis was elected to the at-large position on the CCAF Board during our last meeting.

Jim Lynch (President), Ashish Dutta (Vice-President), and Ken Brink (Treasurer) were re-elected to those positions for the coming year. Jonathan Hatch

has volunteered to see if the CCAS Secretary position is a good fit for him, and will “try it on for size” this coming September. If it works out, we can move to a formal election.

Dues

Our dues have traditionally been \$30 for members (including families), \$15 for college students, and free for high school and younger. Due to Covid curtailing our activities, we have made dues voluntary for the past two years, though we’ve still gotten a good response. This year, we will reinstate dues, as we get back to full activities. The CCAS dues go to undertakings that benefit students and the general public, so we hope you can sign on. However, if you can’t afford dues, please know that most all of our activities will still be open to you – our bottom line is that we are here to share our enthusiasm for the skies.

If you have already paid your dues during this calendar year, thanks! You are up to date. If you are not sure, please check with Ken (kbrink@whoi.edu). To send dues, please mail to: Ken Brink, 16 Greengate Rd., Falmouth, MA 02540.

JBCC Event

As many of you know, we also have occasional star parties at locations remote from DYHS and WSO. One such event was held at Camp Edwards on July 13th. This event included a lecture about amateur astronomy (the content of which should be rather familiar to those receiving this newsletter), followed by a one-hour star party. The star party was held on the night of a full moon (actually the “Buck Moon” supermoon) , and so our binocular sky tour and 8” Dobsonian were pretty much dominated by our erstwhile satellite. We did get to show people the summer constellations as well, which was fun, but any deep sky objects were completely masked by the Moon and a slight haze. We attracted some new faces at this limited attendance event, and also received a few nice messages afterwards. Overall, the event was a success, but we *will* follow our usual policy of steering away from the Moon at future star parties – it hogs the show!

One additional note from this event was that the advertising in the local newspapers was wildly successful, and we received far more inquiries about attending than we expected. That is a good sign for the future.

Speakers

Last Month's Speaker

Dr. Antony Stark, HSCfA

July 7th, 2022

Title: Astronomy's Final Frontier: The Dark Ages at High Redshift

Abstract: Between the emission of the Cosmic Microwave Background 380,000 years after the Big Bang and the galaxies a billion years later are the Dark Ages when the first stars were born. We can see what came before, and what came after this epoch, but there are mysteries to be cleared up. How did the first stars form, and what were they like? How did the black holes in the center of galaxies get so large so fast? But these observations are very hard: it's far away, highly redshifted, and faint. These are the targets for the newly-launched James Web Space Telescope, the new generation of giant optical telescopes, and the Atacama Large Millimeter Array. Gravitational lensing helps magnify the earliest, tiny galaxies.

Precis: Tony started out with some astronomy history: the 1920 debate over whether “spiral nebulae” were just nebulae inside our own galaxy, or whether they were galaxies external to our galaxy. Heber Curtis (outside) and Harlow Shapley (inside) had a classic debate over this, and it had the attention of the giants of astronomy at the time. But it was a humble Harvard woman “computer,” Henrietta Swan Leavitt, who provided the tool that eventually settled this debate – the period/luminosity relationship for Cepheid variables. Using this tool, Edwin Hubble discovered in 1924 that a Cepheid variable he spotted in the Andromeda Galaxy (our giant neighbor) indicated that Andromeda was at a distance of 220,000 parsecs, far outside our own galaxy. (Later distance estimates put Andromeda at 780,000 parsecs.)

This tremendous discovery was made using the most powerful telescope in the world at that time, the 100" Hooker telescope on Mount Wilson. As a fun aside, Tony showed a very nice astrophotograph of Andromeda made recently with a 12" scope (like ours at WSO) and a standard amateur CCD camera. In it was the Cepheid that Hubble had to use the world's best equipment to see a century ago!

Next Tony showed the "standard slide" of the evolution of the universe from the Big Bang to today. At the far end ("today") were inserted images of WMAP, Planck, BICEP2 and the SPT (South Pole Telescope), which were designed to look back at the Cosmic Microwave Background (CMB). These instruments are survey instruments designed to look at large swaths of sky at the CMB microwave frequencies. But they have some sensitivity at the shorter infrared frequencies as well, and therein lies some of our tale.

Before returning to the SPT, Tony showed how optical telescopes that look at very small areas of the sky can see deeper in z , with the poster children being the Hubble Deep Field and Ultra Deep Field. But even these don't give more than faint smudges for images, and it will only be the next generation of giant telescopes that will give spectra for these early galaxies.

As far as large area, high z galaxy *surveys* are concerned, that is in the future. But the CMB instruments like Planck and the SPT already provide some high z redshift data over large areas, especially in spots where massive foreground objects like galaxy clusters gravitationally lens more distant objects. Tony (very proudly, I would think) pointed out that the current SPT survey sees redshifted objects 30 times deeper than the Planck survey over 1/10 of the sky.

These CMB instrument redshift observations can also be augmented greatly by further observations by high resolution instruments at selected spots, and Tony showed some high-resolution augmentation of SPT lensed galaxy observations by the Atacama Large Millimeter Array (ALMA) system.

Besides his SPT work, Tony also has worked on the PISCO imaging system for the Giant Magellan Telescope. Asked by a friend at the University of Chicago to send an image of a high z , lensed galaxy for his undergraduate class to use, Tony managed to obtain an "Einstein Ring" type image of what is the brightest object found so far at $z > 5$. The image of this object will be further examined at various wavelengths with the JWST, ALMA and Chandra. This is a nice example

of how “survey astronomy” meets “high resolution and broad bandwidth further investigation astronomy.”

Tony’s next-to-last slide dealt with just how much open data exists from the current large area survey instruments, which we all can use (if we know what to do with it!)

And his last slide was a rather nice list of “huge questions in astronomy.” So, feel free to use all that open data and a modicum of ingenuity and answer a couple! Just invite us to your Nobel Prize banquet when you do!

This Month’s Speaker

YOU!!!!

ZOOM Link for this month’s CCAS Meeting

James Lynch is inviting you to a scheduled Zoom meeting.

Topic: August CCAS Zoom Meeting

Time: Aug 4, 2022 07:00 PM Eastern Time (US and Canada)

Join Zoom Meeting

<https://us06web.zoom.us/j/87414473457?pwd=WWRKWDBVZUdCRTQydSt2Q2ZPcy8zZz09>

Meeting ID: 874 1447 3457

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