

First Light Lite

June 1, 2023

Jim Lynch – Editor

Message from the CCAS President

My apologies if this newsletter is a bit *longer* than most. Much has happened over the past month, and most of it has been good! So, even if my fingers get a bit tired from typing, putting out a little extra verbiage won't be a chore! Let me proceed to relate this good news, topic by topic.

New agreement signed with DYRSD

Perhaps our biggest news is that we have signed a new 20-year agreement with the Dennis Yarmouth Regional School District (DYRSD) to continue to operate the Werner Schmidt Observatory (WSO) and to interact with the District's schools. The negotiations for the new agreement actually started in 2019, but were derailed (as was much else) due to Covid until the winter and spring of 2023. As our old agreement was due to expire on May 4th of 2023, and since we had already done some significant groundwork, that tighter schedule was deemed adequate. During 2023 we worked with Dr. Paul Funk and Mr. David Flynn on the fine details and had an excellent working meeting with them both only a week before Dr. Funk's tragic passing. Despite the sadness of all concerned, we kept working and in the beginning of May signed the new agreement.

We have had an excellent collaboration with the DYRSD over the past twenty years and are looking forward to maintaining and expanding that relationship. As part of that, we are now working on improving and automating the WSO dome and scope to make it available for remote use by the participants, and concrete steps have already been taken in that direction. We would note that it is through the support and generosity of Werner Schmidt's family that we will be able to do so, and we owe them a very sincere *thank you* for this facility and its future upgrades.

Towards this, there has been discussion of an event sometime this summer to which we would invite the Schmidt family, the administration, the teachers and

staff of DYHS we've worked with over the years as well as presently, teachers from other schools we've worked with, and of course the club membership and friends. I like this idea and would like to hear input from any and all of you about what exactly we might do!

Main (dome) telescope mount upgrade installed

One of the slightly frustrating things about our new PlaneWave telescope was that it rode a little lower on its mount than the old 16" Meade scope that preceded it. To remedy this, plans had been in the works for a while to install a spacer to raise the elevation of the scope. As soon as we knew that we had a continuing agreement with DYRSD to stay at the Werner Schmidt Observatory, we went into action to install a spacer that would raise the telescope 16" higher and thus give us five degrees more of sky altitude to view. As our Observatory Director, Charlie Burke, spearheaded the effort, let me turn the narrative over to him!

"On Friday, May 26th, Gary Walker, Mike Hunter, Jim Lynch, Brian Twohig, Hank Ricci and I met at the Werner Schmidt Observatory for a work day. Gary Walker generously donated a steel spacer plate designed to raise the height of the PlaneWave telescope for better observing. The process involved disassembling the telescope and adding the spacer and then reconnecting all the components. Five and a half hours later we were done. Everything now works as it should. Next step is to polar align the scope and create a new pointing model before we can start photographing again. This is a 2 hour or so project on a clear night.

Below are photos detailing some of our efforts. The hardest part was attaching the optical tube to the top of the mount. It took four of us to do this. A 6-foot eleven-inch Celtics center would have come in handy for this task. Thanks again to all who helped on this difficult project. All reading this should please consider volunteering for future WSO projects."



Fig. 1 Our “taller in the saddle” PlaneWave scope in the Werner Schmidt Observatory dome. The blue piece on the bottom is the new spacer.



Figure 2. From L to R, Charlie Burke (bending), Brian Twohig, Gary Walker, and Hank Ricci work on the base of the PlaneWave telescope mount as part of installing the 16” spacer. The bars are not prison bars, but rather part of the railing leading up to the WSO dome. 😊

Star Parties

As anyone who has been reading this newsletter knows, we have changed our “modus operandi” as regards star parties from what it was pre-Covid. Rather than having 1-2 definite dates per month for a star party, which more often than not

were weathered out, we have gone to a six-day weather window centered around the New Moon, which gives us a reasonable chance of a dark, clear night. (And even with this, we've been weathered two out of four times this spring!) But by and large this is a more workable strategy.

We've also gone towards "binocular sky tour" and "smaller scope eyepiece viewing" outdoor activities, together with a "real time video image show" (through the main dome scope camera) in the lower level of WSO combined with a dome tour. This set of activities tends to give guests the best overall experience, and we will also continue to refine our format.

In May, we had as our weather window 15-20 May, which luckily gave us one promising night, May 18th. The skies were clear when we went there, but gradually a haze crept in and made observing with binoculars and small scopes next to impossible. But, luckily, viewing near the zenith was not quite as bad, and so the main dome scope was able to provide views of the spring galaxies, as Ursa Major and Leo were high in the sky. And seeing the main scope in operation is always a favorite with the public. So, despite the seeing being less than optimal, the star party was a success. As a bit of proof, two images from that evening, the Owl Nebula (M97) and two thirds of the "Leo Trio" (M65 and M66) are shown below. These are short-exposure images (as we try to show images quickly to star party attendees), and not nearly as good as what we could obtain with a longer session.



Fig 3. M65 and M66 in Leo.



Fig. 4. The Owl Nebula (M97)

CCAS and CCAF Elections

With the important task of negotiating a new agreement in front of us, and a busy schedule of events again materializing, our elections and “club processes” took a little bit of a back seat. But elections are supposed to be held in June and the new Officers/Board members seated in July, so that we will do a bit of adjustment to still get the job done.

Nominations for both all four CCAS officers and one CCAF Board member will be due via email by June 15th. The email(s) to use are: jlynch@whoi.edu and jlynchwhoi@gmail.com. The current CCAS officers are: Jim Lynch, President; Ashish Dutta, Vice-President; Ken Brink, Treasurer; and Jonathan Hatch, Secretary. These officers have agreed to stand again, but further nominations are always welcomed. The current CCAF Board is: Jim Lynch, acting Chair; Janice Marks, Treasurer; Jonathan Hatch, acting Secretary; Gary Walker, member; and George Silvis, member. Charlie Burke sits in ex-officio as Observatory Director. Janice Marks has been filling Gus Romano’s term (to 2023) as Treasurer, has done

a great job, and has signified her willingness to run for a full term (to 2028). There are other CCAS Board and CCAS Officers actions required, but these need not concern the general membership. For now, we need to elect CCAS Officers (with the four in place standing for re-election) and one CCAF Board member, with Janice Marks willing to stand to continue as a Board member. Overall, you can name anyone you wish for these positions, though they may demur if not interested.

Once we have a slate on the 15th of June, I will send it around for voting over the next two weeks, again by email to the same addresses. I will announce the winner at the July First Thursday meeting.

This is not as easy as it was in the pre-Covid era, when the club gathered at DYHS each month for our meeting, but hopefully it will work, and also can be improved somewhat.

Dues

During Covid, we did not require dues, and left them to be entirely voluntary at \$30 per family. This year, as we are resuming activities, we are requesting dues at a reduced flat rate of \$15 per family (or individual, if there is no family to consider.) Dues will be due July 1st. If you have sent our treasurer (Dr. Ken Brink) dues in the last year, you will be considered to have paid dues for this year. If not, we would ask you to submit them, as this money is used to support our activities with the schools and the public. (We don't buy equipment, as that is the Foundation's function.) Dues should be sent to: Dr. Ken Brink, 16 Greengate Rd., Falmouth, MA 02540. If you send your dues to the Observatory or DYHS, they will be delayed in their transmission to the CCAS Secretary.

I'd note that most CCAS activities will be available to those who do not pay dues, but when we eventually have remote observing online, that might be restricted to those who are dues paying members. It is a small amount, and it is hoped you can pay if you wish to be active in CCAS.

This Month's Speaker: Dr. Peter Plavchan, George Mason University

Date: June 1st, 2023 @ 7:30 PM Eastern

Title: TBA concerning exoplanets

Biography: Dr. Peter Plavchan is an Associate Professor of Physics and Astronomy at George Mason University, and the Director of the George Mason University Observatories. He earned his undergraduate degree in Physics at Caltech in 2001, his PhD from UCLA in 2006, and he has held appointments at the NASA Exoplanet Science Institute at Caltech, Missouri State University, and a visiting appointment at the University of Pennsylvania.

Dr. Plavchan is an observational exoplanet astronomer, with a focus on the formation and demographics of planets around cool dwarfs, utilizing the radial velocity and transit detection methods. He is the PI of a NASA Probe Mission concept called EarthFinder, is a Co-PI of the MINERVA-Australis telescope array, regularly uses the NASA Infrared Telescope Facility iSHELL spectrometer for precise radial velocities, has served as an Executive Committee member of the NASA Exoplanet Program Analysis Group (ExoPAG), and has received multiple NASA Group Honor Achievement Awards. His research is currently supported by NASA, NSF, and the Mt. Cuba Astronomical Foundation, and his work has appeared in numerous local and national publications.

Links to Dr. Plavchan's websites are found just below.

<https://nam02.safelinks.protection.outlook.com/?url=https%3A%2F%2Fscience.gmu.edu%2Fdirectory%2Fpeter-plavchan&data=05%7C01%7Cjlynch%40whoi.edu%7C3073d99cb2bf4eded1a608db572db962%7Cd44c5cc6d18c46cc8abd4fdf5b6e5944%7C0%7C0%7C638199626127716700%7CUnknown%7CTWFpbGZsb3d8eyJWIjoiMC4wLjAwMDAiLCJQIjoiV2luMzIiLCJBTiI6Ikk1haWwiLCJXVCI6Mn0%3D%7C3000%7C%7C%7C&sdata=mUOFYOSvdB27DUuTMTm1VzTlIrreQsAZY73ZCMiOJ8SE%3D&resvded=0>

<https://exoplanets.nasa.gov/news/1510/taking-the-astronomical-road-less-traveled/>

Our CCAS Zoom link for the June First Thursday Meeting on June 1st, 7:30 PM Eastern is just below here:

James Lynch is inviting you to a scheduled Zoom meeting.

Topic: CCAS First Thursday Talk and Meeting

Time: Jun 1, 2023 7:30 PM Eastern Time (US and Canada)

Join Zoom Meeting

<https://us06web.zoom.us/j/82772821079?pwd=SUpidXkzdVlVak1ReThONi9aMkpKdz09>

Meeting ID: 827 7282 1079

Passcode: 091643

One tap mobile

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+13092053325,,82772821079#,,,*091643# US

Dial by your location

+1 305 224 1968 US

+1 309 205 3325 US

+1 312 626 6799 US (Chicago)

+1 646 558 8656 US (New York)

+1 646 931 3860 US

+1 301 715 8592 US (Washington DC)

+1 689 278 1000 US

+1 719 359 4580 US

+1 720 707 2699 US (Denver)

+1 253 205 0468 US

+1 253 215 8782 US (Tacoma)

+1 346 248 7799 US (Houston)

+1 360 209 5623 US

+1 386 347 5053 US

+1 507 473 4847 US

+1 564 217 2000 US

+1 669 444 9171 US

Meeting ID: 827 7282 1079

Passcode: 091643

Find your local number: <https://us06web.zoom.us/j/kcOtAMBQX5>

Last Month's Speaker: Dr. Maura McLaughlin, West Virginia University

Title: The Hunt for Monster Black Holes with Pulsar Timing Arrays

Biography: Dr. Maura McLaughlin is the Eberly Distinguished Professor of Physics and Astronomy at West Virginia University and Director of the Center for Gravitational Waves and Cosmology. She graduated from Penn State with a degree in Astronomy and Astrophysics, received her PhD from Cornell University, was an NSF Distinguished Research Fellow at the Jodrell Bank Observatory. She studies exotic stars called pulsars using the world's largest radio telescopes. She is Co-Director of the NANOGrav Physics Frontiers Center, which aims to detect gravitational waves using high-precision timing observations of these cosmic clocks. She was the recipient of the Research Corporation's Cottrell Scholar Award and an Alfred P. Sloan Fellowship. She is also the co-founder of the Pulsar

Search Collaboratory program, which has involved over 2000 high-school students in pulsar searches over the past decade. You can find out more about her and her research at <https://gwac.wvu.edu/about/people/maura-mclaughlin>.

Precis: In 2023, detection of gravity waves has become “old news.” The LIGO detectors have registered upward of 100 events to date, and now the game for such events is “what do the statistics say?” Detecting gravitational waves in the region of 10-100 solar mass black holes (BH’s) is now “routine spectacular science.”

But there are bigger BH fish left to fry – specifically the supermassive black holes (SMBH’s) in the centers of galaxies. As we’ve seen in numerous photos, galaxies routinely collide and merge, and the BH’s in their centers eventually merge as well. (One of our past talks on x-ray astronomy showed multiple black holes in the center of the Andromeda Galaxy (M31), and in about four billion years the BH in the center of our galaxy might join them, as we will be colliding then!)

Unfortunately, we can’t make a galaxy sized LIGO detector, which we would need to see the low frequency gravitational waves SMBH collisions would create. If you scale a 4-kilometer LIGO array costing a billion dollars to the size of our galaxy, you can see that it probably would be a bit too expensive even if Musk, Bezos and Gates combined their resources. 😊 But serendipitously, Nature has already provided us with a much lower cost precision time-of-flight array, specifically millisecond pulsars.

Pulsars (originally called Little Green Men, but that is another story) are well known entities at this point in time. They are rapidly rotating neutron stars whose huge magnetic fields power a pair of very tight (also rotating) radiation beams. If one is in the direction of one of the beams, a remarkably regular series of flashes is observed. Pulsars with millisecond pulse periods provide particularly stable timing sources, as they are not prone to starquakes or accretion events.

Pulsars are also, from a stellar structure viewpoint, the compressed remnants of high mass stars, and are rather common in our galaxy and other galaxies. M1, the Crab Nebula and pulsar, was a nice example of this that Maura used in her talk.

Thus it is seen that we have a lot of precision sources lying around space that can be used as an array. What about the signal it wants to detect? Using a bit of grade school General Relativity (just kidding – it's high school), it can be shown that gravitational waves produced by merging SMBH's can advance or retard the periods of the pulsar's "flashes." When you combine a scattering of plentiful millisecond pulsar sources with a detectable (if not easily) signal from such gravitational waves, your array system is now complete. The way this array makes its detection is rather complicated in detail, and involves a General Relativity model, the statistics of galaxy mergers, and the spatial distribution of the millisecond pulsars, among other ingredients. It also requires patience, and Maura and her (~300) colleagues working on this problem are devoting a quarter of a century to making a verified detection of low frequency SMBH merger waves. But the preliminary results are promising, and we might remember that the LIGO array also took about a quarter of a century to produce results.

Though it would be better to have seen Maura's beautiful graphics and excellent talk, there is a fairly nice Wikipedia article on "Pulsar Timing Arrays" that will give you a bit more background on this topic. And there is also a very nice Wikipedia article on Dr. McLaughlin herself. 😊

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. **NOTE:** We are redoing the website, so that this information may become dated soon. We intend to move any currently useful information to our new website.

For meetings, drive in the south entrance road and go around behind the main building. Park in the lot about halfway 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. You can (and should) park on the grass there.

H&K directions

CCAS hosts a dinner gathering for the speaker (if available), members and friends on meeting nights (just before the meeting) at the South Yarmouth Hearth & Kettle restaurant at 5:45pm; (the meetings begin at 7:30 at D-Y.) Please join the group to dine and talk about all things interesting, especially astronomy, 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). **NOTE:** Since Covid, we have a mix of fully remote and hybrid in-person+ remote meetings. Check the newsletter and/or website to see what the format is each month! There are no dinners when the meeting is fully remote.