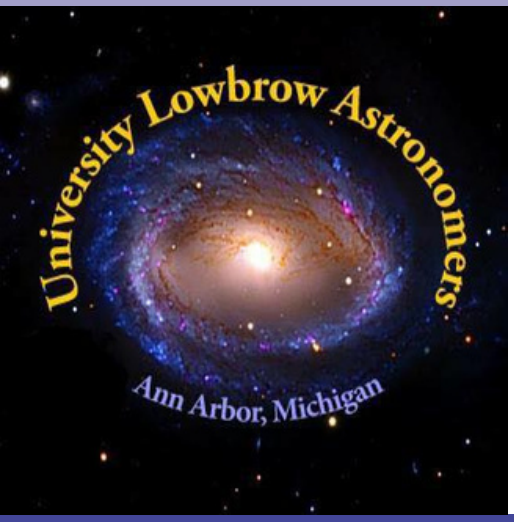
REFLECTIONS / REFRACTIONS

University Lowbrow Astronomers Monthly Newsletter

May 2021, Vol 45, Issue 5

Inside this issue:



M82 (CIGAR GALAXY) March 2, 2021

AWNI HAFEDH

On April 20, Awni emailed members: "This will be a three-episode series of the Cigar and Bode's galaxies field of view, and of course will start with the most beautiful one which is the Cigar Galaxy M82, a starburst galaxy [that] lies at a distance of about 12 million light-years from Earth and has an approximately 18,500 light-years radius.

This started as a project for OSC camera and L-Extreme filter but to be honest, I did not like the stacked image, so I recaptured it again, This was a stack of 179x300sec H-Alpha filter with ASI1600MM camera and 158x180sec Lum filter with ASI533MC camera with a total exposure of 22.81 hours, I mainly used PixInSight and Luminar 4 to process it and enhance the details within the galaxy. I hope you like it."

Equipment used: Celestron 9.25" with 0.7x reducer; ZWO ASI533MC and ASI1600MM Camera; Astronomik Lum and H-Alpha 12nm filter; iOptron CEM60 mount

3D PRINTED ASTRO CLOCK

BY CHUCK STEELE

I have had a long interest in astronomy and a fascination with mechanical clocks. A few years ago I brought a 3D printer that allows you to make all sorts of hard-to-find machine parts. So in January, I decided to design a clock that would show the Moon phases and have a 24-hour dial in which the hour hand would show the position of the Sun relative to the horizon. The hour hand has a golden Sun at the end of it. The Sun is in the top half of the dial in the daytime and in the bottom half during the night.

The heart of a clock is the gears that a 3D printer allows you to print. I found a free gear generating program online which allows you to define the number of teeth, the pitch, and its pressure angle.

The output is a DXF (2D) file which I import into my 3D Blender Program (free download) which I then turn into 3D gear parts. The gears are mounted on 1/8" rods that I bought at Lowes. And the ends of the rods are mounted into Plexiglass sheets so you can see the gears turning.

I used a spreadsheet to determine the gearing ratios to go from the Crown gear which rotates at 1 rpm, to the minute hand which rotates once per hour, and the hour hand that rotates once per day. A black half-sphere covers parts of the Moon indicating the phase of the Moon. This is geared for a 29.5-day cycle. I used some trial and error guessing to get the correct gear ratios for the Moon Phase. While you know the final gear ratios it is the intermediate combinations that take some guess-o-mating before you get the combination you need.

I decided to add a geared star chart that will indicate the constellations visible at all times. The gearing gets complex as the ratio between solar time and sidereal time is an irrational number.

Actual 3D-printed clock with gears mounted between 2 plexiglass sheets so you can see gears in motion.

I did find a clockmaker who had a set of 4 gears that made a close approximation of the correct ratio, however, the gears had a very large number of teeth on them which would make the gears too big to print on my printer at 10 pitch. I did come up with a simplified gearing in which I rotate the star field once a day and the horizon circle rotates once per year thus giving a sidereal rate. Much easier to gear.

I will add this star module later which will show the stars in the sky indicate sidereal time, the date and the day of the week.

The clock is a wall-hung, long pendulum (one swing per second), and weight driven.

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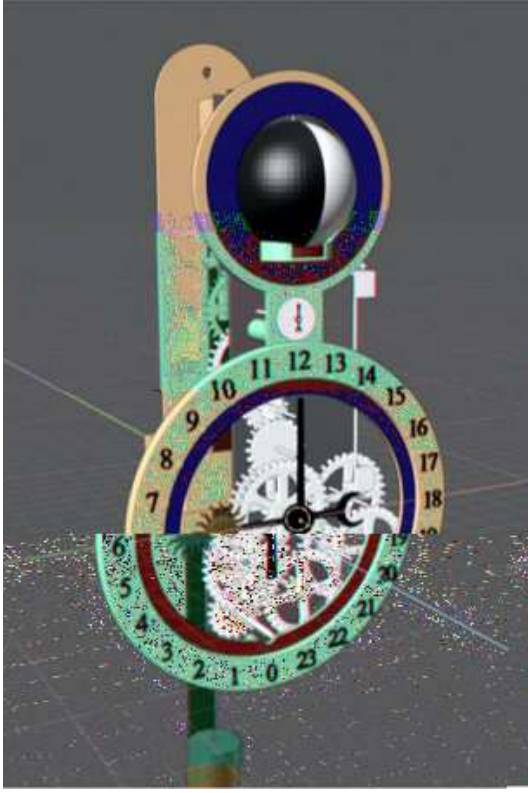
ASTRO CLOCK, cont...

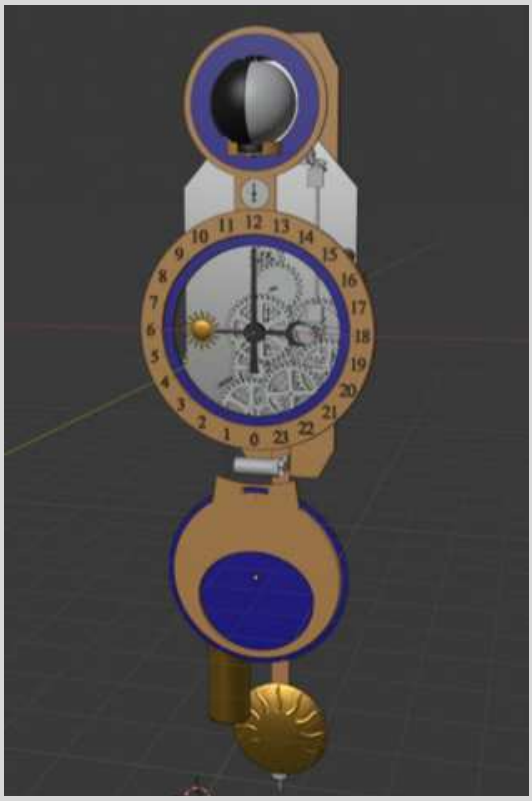
The Moon is made from a ball I got at the Dollar Tree and painted with the Lunar Seas. I also have indicated the Apollo Lunar Landing sites with red numbers.

A fine adjusting screw at the bottom of the pendulum allows the clock to be tuned to run fairly accurately within a minute per week. So when I rewind the clock once a week I reset the minute hand.

This has been a fun winter project when it is too cold and cloudy to enjoy the night sky.



Blender CAD picture of the clock during the design phase.

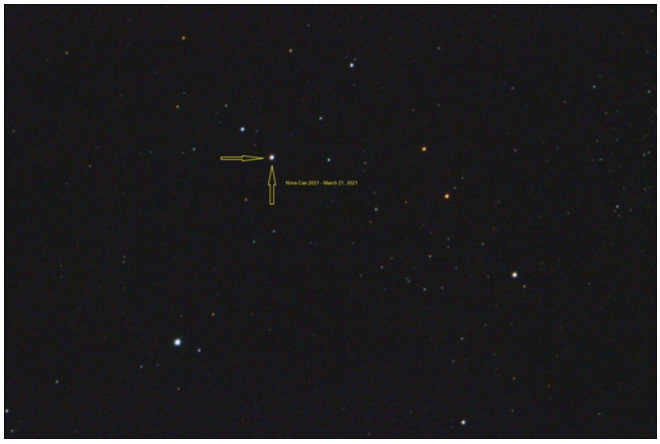


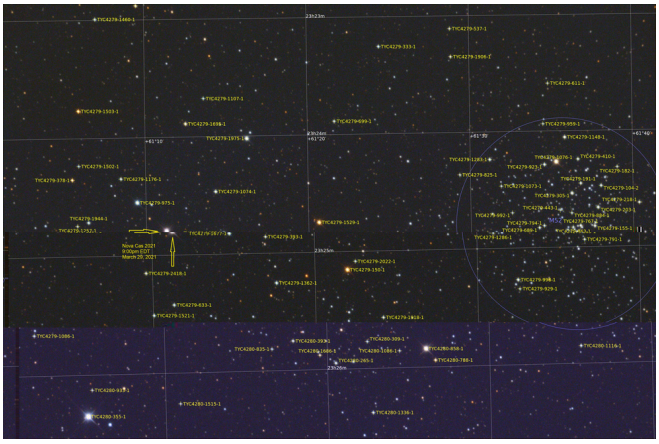
Clock design with added star chart and date module. (Intermediate design phase in progress.)

Moon at day 11 of the Lunar cycle. The rayed crater Copernicus on left side and the dark crater Plato at top.

NOVA V1405 Cas.

In late March and early April, Doug Bock and Awni Hafedh provided the following images of the nova that was discovered in Cassiopeia on March 18.





From Doug Bock: (March 29, 2021, 21:00 hrs)
"I managed to frame M 52 into this version tonight."
10" f/8 RC
ZWO asi071mc PRO camera @ gain 24, tempCC

From Awni Hafedh (April 13, 2021)
"April 3rd, 2021 - V1405 NOVA
This is more like a scientific image. Everyone heard about the new Nova that erupted in Cassiopeia, which is cool. I wanted to see how you can measure any star's magnitude.

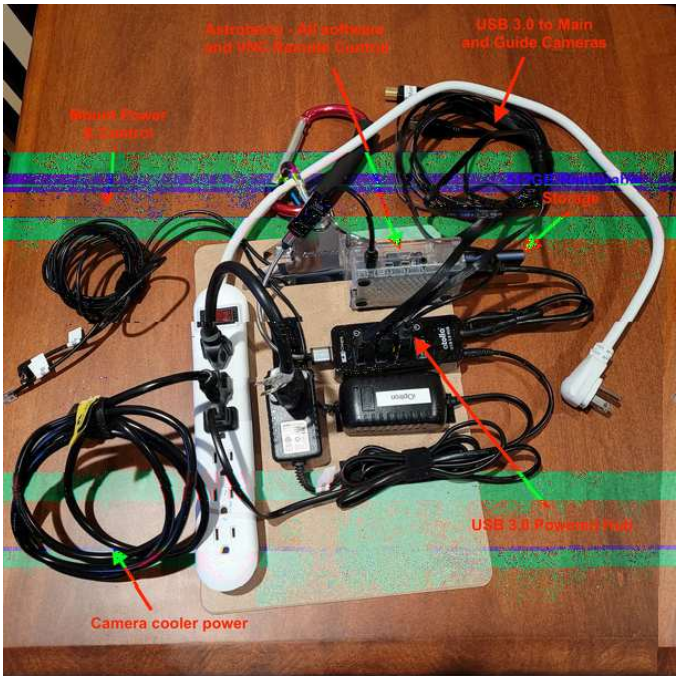
- **So the idea is to capture the FOV and make sure the stars are not saturated. In my case, I capture 19 subs with 5-sec exposure.**
- **Next, you find a star within the same FOV where its brightness is close to the star that you are trying to measure its magnitude. In my case, TYC4280-858-1 brightness was a hair brighter than the Nova.**
- **Next, you find out the magnitude of that star, and in my case, TYC4280-858-1 mag is 7.8 and because the Nova was a hair dimmer, I believe its mag was 7.9.**

FYI, the Nova is marked in the middle and the matching star is marked at the bottom."

ASTROBERRY CONTROL BOARD

JEFF KOPMANIS

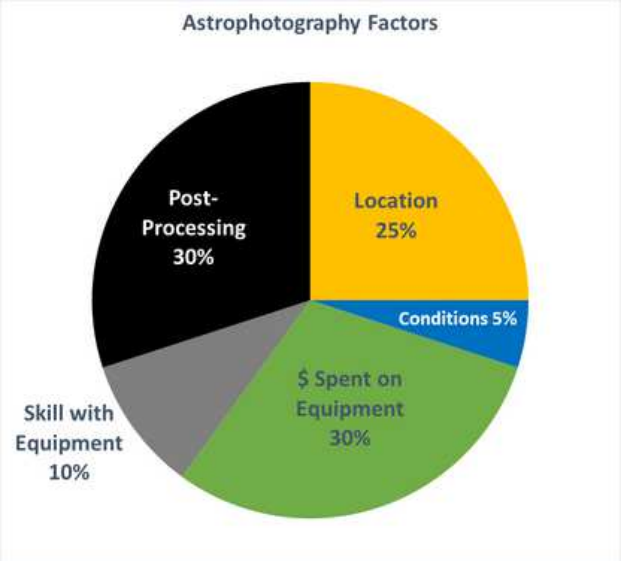
On April 5, Jeff emailed the group: "I've been getting off the ground with a Raspberry Pi Model 4B running the free Astroberry load (https://astroberry.io), and I've finally brought the craziness of the power and USB wiring under control by mounting the components on a clipboard and haningg it from the tripod. So far, it's saved a bit of time in setup and teardown, since my gear sits out on my driveway during my sessions, so I can't leave it setup. Plug into an extension cord, then plug in the USB to the cameras and mount and it's ready to roll! The Pi is powered from the charging port on the USB hub, which carries the 3 amps that the Pi needs...it saves one extra power brick, although with the 1 ft extension cords, I may just put it back on there. The camera cooler power supply doesn't have a long enough cord on its brick to mount the brick, as much as I'd like to."



ASTROPHOTOGRAPHY TIP OF THE MONTH

This month's tip is from Brian Ottum.

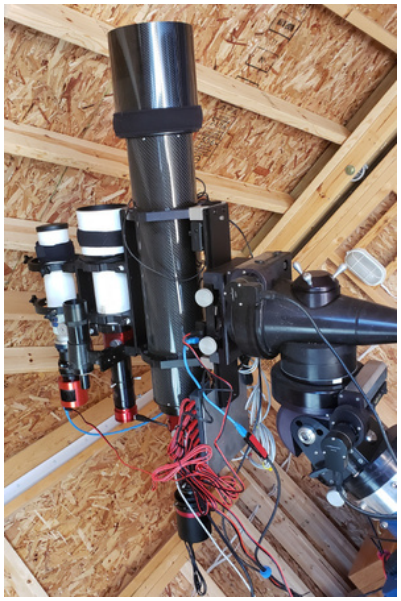
Many people assume it's primarily expensive equipment and skill with that equipment that counts most, but as you can see in this pie chart from Brian's presentation at our March meeting, a dark location and post-processing skills are crucial factors in producing a successful image.



NEW IMAGING STACK SETUP

BY CLAY KESSLER

On March 25, Clay emailed the group: "Last Saturday I took some time and re-arranged the scopes on my 'imaging stack' in my observatory. This had a dual purpose - I had some new equipment that I wanted to install for astrophotography use and I wanted to test the 'sideways stack' devices that Jeff [Kopmanis] and I came up with. My 'stack' to this point has consisted of my ES127 triplet 'Frankenscope' with carbon fiber tube, an ES 80mm tripled APO and a Takahashi FS60C, all stacked one atop the other."



The new arrangement contains both the 127 apo and the Takahashi. The ED80 triplet was replaced by a "new to me" William Optics FLT98. The device that I am testing consists of a pair of triangular adapters that bolt to the top of the tube rings on the lowest telescope.

Dovetail plates attach to both angled sides of the triangle and can accommodate the attachment of a telescope on each side.

The attachment plate includes a series of holes to "offset" the stack to account for balance side to side. As you can see in the following picture, I offset the large scope to the center by 2 inches and that worked very well.

I still need to tidy up some wiring but the result has worked out very well. My new "image stack" looks like this.

I really like having the dual carbon fiber scopes up there. I may have to look for a carbon fiber replacement for the Tak 60.

NATURAL VS MAN-MADE LIGHT POLLUTION

BY ADRIAN BRADLEY

The Moon: When at full light it can be tough to do any visual astronomy. However, the moon can be planned around, and its phases give us a chance to see dark skies when it's not in the sky or is not illuminated by the sun.

Photographers use the moon for photographing night scenes using settings that they can use in the daytime -- with the exception of longer shutter speeds. Thanks to the moon, I was able to corral its light for this shot at Pointe Aux Barques Lighthouse Park.

Of course taking pictures of the moon itself is always a go-to for astronomers and astrophotographers alike.

Zodiacal Light is annoying to visual astronomers in dark skies during the spring and fall solstices. Also known as false dawn, you have to see its shape to notice that you are looking at it. It was once thought to be dust leftover from the formation of the solar system, but now it's believed to be planetary dust.

This shot from Leslie Park in Ann Arbor shows the effect of man-made light pollution on the night skies.

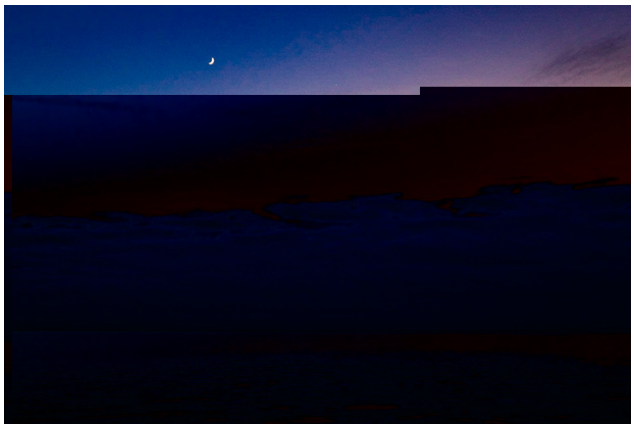
(continued, p8)

LIGHT POLLUTION, cont....

On occasion, man-made light pollution is turned into a thing of beauty when there are flat ice crystals in the sky, causing light to be refracted into a column. These have been called light pillars.

And finally, there is the sun. It's not considered light pollution since its light, heat, and other forms of energy are essential for our planet to sustain life. Also, it is our closest star to do science. However, if it's already nighttime and you are trying to get that perfect Milky Way shot over a lake, twilight will wash your shot out quickly. This was taken at the onset of twilight. The Milky Way that you see pictured here disappeared 5 minutes later. (NOTE: that is not the sun rising, it's the moon rising behind clouds an hour and a half ahead of the sun.)

Don't believe me? Well here is what things look like when the sun finally does come up as seen through a random ice-covered branch. Notice how there aren't any stars in the sky.



In conclusion, the fight for light pollution isn't just because we want dark skies for our hobby or passion to see the night sky. There are health and wellness implications surrounding the loss of natural darkness.

University Lowbrow Astronomers

Monthly Club Meeting Minutes

16 April 2021, 7:36 pm, Individual Live Connections via conferencing tools

After some chatter to allow for late arrivals, President Charlie Nielsen called the meeting to order and then introduced our speaker.

Speaker

Who

Dr. Brian Ottum

Subject

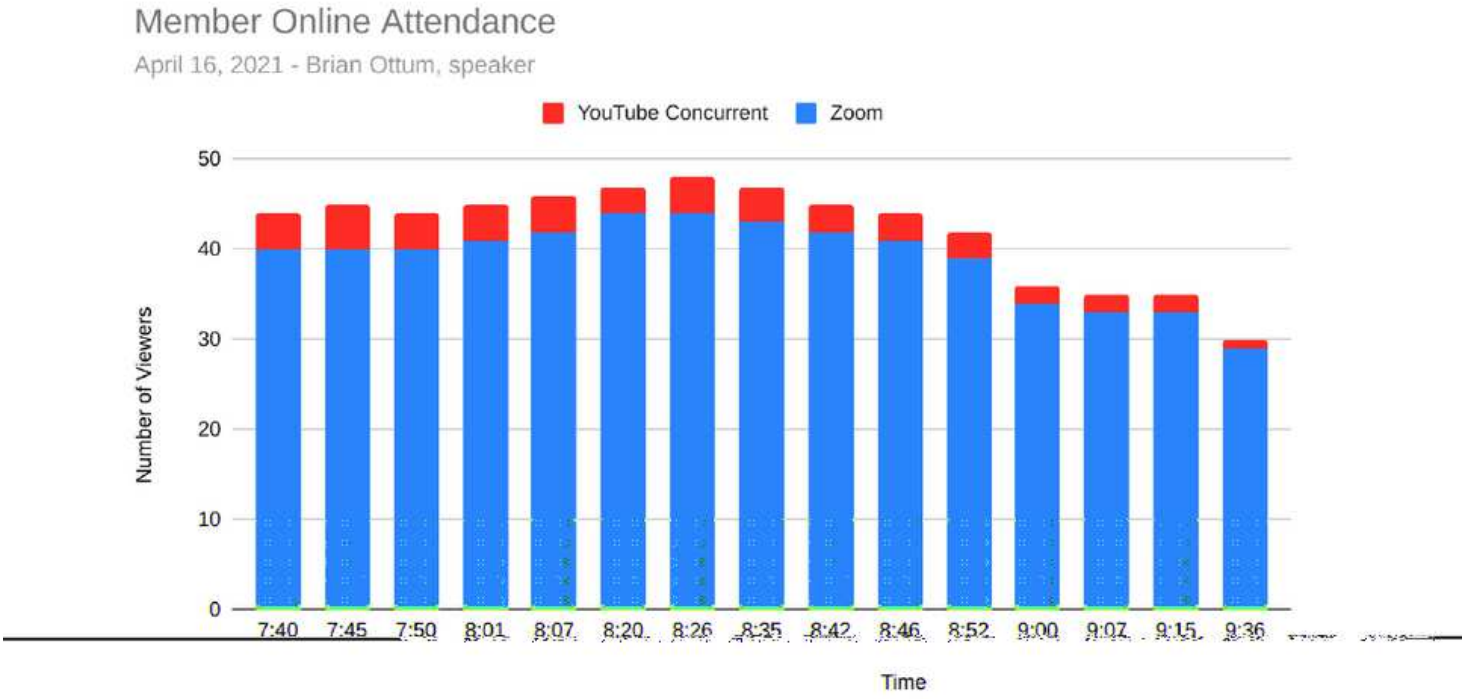
Astronomical Image Processing Overview

A Q&A session occurred afterward with audience members using multiple formats to ask questions. Charlie thanked our speaker for the presentation.

Business Meeting

Name	Topic
President Charlie Nielsen (1:36:30)	• Went over his earlier email of this year's candidates for officer elections and then motioned to open nominations for any position. After no nominations were declared, Kurt Hillig moved to close nominations. This was seconded. Then, Kurt Hillig motioned to elect by acclamation. A show of hands followed for "Yes" votes. There were no "No" votes. The motion carried, and the new term of officers was announced. • Also, Cromaine Library is requesting a daytime presentation on the Perseids Meteor Shower. So far, two individuals have expressed interest and will be kept in the loop as we get more communication. • Michigan Math & Science Scholars (MMSS) have reached out and are plan to do a virtual event this year. We do not have a date yet. We are looking for volunteers to host this, especially those members with observatories.
Kevin Dehne (1:44:21)	Great Lakes Star Gaze will be a go this September.
Treasurer Doug Scobel (1:45:00)	162 memberships $9963.02 in the treasury Major expenditures since the March meeting: $243.72 for 16 low-profile embroidered baseball caps $146.00 rental for our PO Box for the next year $60.00 sponsorship of the Peach Mountain Clear Sky Chart for the next year
Vice President Jim Forrester (1:48:37)	• Went to the PO Box this week and will mail the two items in it to the treasurer. • Looking for someone who lives closer to the mailbox (NE side of town) that could take over this task. Doug Warshow said he only lives a few blocks and agreed to do this.
Newsletter Editor Don Fohey (1:55:35)	• Has made indexes of the four years of information that he has been Newsletter Editor but needs help processing the six files into one.

	Jeff Kopmanis agreed to help with this as the University has the necessary tools. • He will submit expenses to the treasurer for reimbursement. • Has a folder for unpublished articles that he will forward to the new editor.
Online Coordinator Jeff Kopmanis (1:57:21)	• Tonight we had a max of 48 viewers. See "Member Online Attendance" graph at bottom. • After conferring with Krishna for available dates, it looks like the Communications Committee will be meeting on May 5th.
Observatory Director Jack Brisbin (1:58:48)	• The AT&T tower is still undecided. • A review of Dexter lighting ordinance, because... • The former Lakes Plaza building will now become LaFontaine Dexter Commercial Vehicle Sales. • A new 48 home residential neighborhood development will be built on 11677 N. Territorial Rd. • So far, both new development projects will comply with lighting codes.
Charlie Nielsen (2:25:55)	Wanted to congratulate Amy and Liz on becoming our newest officers.



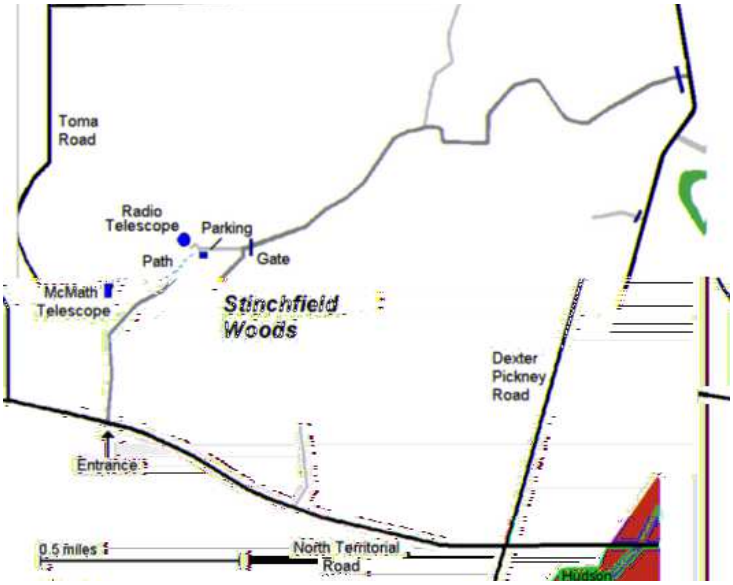
Adjourned
9:52 pm

Minutes were taken and transcribed by
Joy Poling

PLACES & TIMES

Monthly meetings of the University Lowbrow Astronomers are held the third Friday of each month at 7:30 p.m. The location is usually Angell Hall, ground floor, Room G115. Angell Hall is located on State Street on the University of Michigan Central Campus between North University and South University Streets. The building entrance nearest Room G115 is the east-facing door at the south end of Angell Hall.

Peach Mountain Observatory is the home of the University of Michigan's 25-meter radio telescope and McMath 24" telescope, which is maintained and operated by the Lowbrows. The entrance is addressed at 10280 North Territorial Road, Dexter MI, which is 1.1 miles west of Dexter-Pinckney Rd. A maize and blue sign marks the gate. Follow the gravel road to the top of the hill to a parking area south of the radiotelescope, then walk about 100 yards along the path west of the fence to reach the McMath Observatory.



PUBLIC OPEN HOUSE / STAR PARTIES

Public Open Houses / Star Parties are generally held on the Saturdays before and after the New Moon at the Peach Mt. Observatory but are usually canceled if the forecast is for clouds or temperatures below 10 degrees F. For the most up-to-date info on the Open House / Star Party status call: (734) 975-3248 after 4 pm. Many members bring their telescope to share with the public and visitors are welcome to do the same. Mosquitoes can be numerous, so be prepared with bug repellent. Evenings can be cold so dress accordingly.

MEMBERSHIP

Annual dues are $30 for individuals and families, $20 per year for students and seniors (age 55+) and $5 if you live outside of the Lower Peninsula. Membership entitles you online access to our monthly Newsletters and use of the 24" McMath telescope (after some training). A mailed copy of the newsletter can be obtained with an additional $18 annual fee to cover printing and postage. Dues can be paid by PayPal or by mailing a check. For information about dues or joining the Lowbrows, contact the club treasurer at: lowbrowdoug@gmail.com

Lowbrow members can obtain a discount on these magazine subscriptions:

Sky & Telescope - $32.95/year
or $65.90/2 years
Astronomy - $34.00/year, $60.00/2 years
or $83.00/3 years

Newsletter Contributions:
Members and non-members are encouraged to write about any astronomy-related topic. Contact the Newsletter Editor: Amy Cantu cantu.amy@gmail.com to discuss format. Announcements, article, and images are due by the 1st day of the month as publication is the 7th.

Telephone Numbers:

President:	Charlie Nielsen (734) 747-6585
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	Joy Poling
	Liz Calhoun
	Dave Jorgensen
Treasurer:	Doug Scobel (734) 277-7908
Observatory Director:	Jack Brisbin
Newsletter Editor:	Amy Cantu
Key-holders:	Jim Forrester
	Jack Brisbin
	Charlie Nielsen
Webmaster:	Krishna Rao
Online Coordinator	Jeff Kopmanis

A NOTE ON KEYS: The Club currently has three keys to the Observatory and the North Territorial Road gate to Peach Mountain. University policy limits possession of keys to those whom they are issued. If you desire access to the property at an unscheduled time, contact one of the key-holders. Lowbrow policy is to provide as much member access as possible.

Lowbrow's Home Page
http://www.umich.edu/~lowbrows/

Email to all members
Lowbrow-members@umich.edu

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STAMP