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NCRAL CHAIR'S MESSAGE

Over the past several weeks I've been working with the NCRAL Regional Council to address three motions so that our annual business meeting at NCRAL 2019 doesn't run long. Recently, following comments and discussion, we voted on the following motions called for by your Regional Chair, motioned by Tim Stone of the *Twin City Amateur Astronomers*, and seconded by both Roy A. Gustafson of the *Popular Astronomy Club* and Jerry Maynard of the *Northwest Suburban Astronomers*:

1. A motion that the Regional Council approve spending \$99 per year (or whatever it takes at a minimum - prices do rise with time) to keep our NCRAL website free from advertising.
2. A motion that the Regional Council formalize via standing rule that we allocate \$250 annually for both the NCRAL President and NCRAL Rep to the AL to attend national meetings (for a total of \$500).
3. A motion that the Regional Council formalize the guidelines for sharing of expenses and profits between the Region and our convention hosts. (See the specific section for which approval is asked under "Expectations, indemnification, and profit sharing" on page 8 of NCRAL's Convention Planning Guidelines that can be found through the following URL: <http://bit.ly/2SXcLv1>).

The ensuing discussion consisted of four comments and four responses by the Regional Chair. After a discussion

period of two weeks, the Chair called the vote with the following results:

- Motion 1: 100% Yes, 0% No
- Motion 2: 80% Yes, 10% No, 10% abstaining
- Motion 3: 80% Yes, 20% No

All motions were approved and will take effect immediately. Our Secretary-Treasurer Roy Gustafson is now working the Webmaster Jeff Setzer to remove the unwanted ads from the NCRAL website (<http://ncral.wordpress.com/>).

There will be additional votes and motions to come before the membership at the annual business meeting at NCRAL 2019. As this newsletter goes to press, the Regional Chair will call for motions in relation to the following topics:

- A: to establish four seasonal Messier Marathons along with requirements for earning an NCRAL observing certificate.
- B: to establish an Astronomical Bucket List observing program based on a draft outline proposed by the NCRAL Chair.

Of primary importance at the annual business meeting will be elections of Regional Chair and Vice Chairs (2-year terms) and Regional Representative to the AL National Council (3-year term). Chair Carl Wenning and Regional Rep. William Davidson are both willing to stand for election for a second term, but Vice Chair John Attewell has indicated that he prefers not to do so for his position and will be stepping down at the end of his term. Secretary-Treasurer Roy A. Gustafson, who was appointed by the executive officers last year, still has 2 years to serve in a 3-year term.

It is imperative that we get members who are willing to stand for election of open officer positions. Without a candidate, the Vice Chair position could go unfilled. If you are at all willing to run for any open office, please let me know. I have asked several people who I thought might be interested in running for office, but they were either not willing or unable to do so for a number of good reasons. I previously also asked via this newsletter for members of assist with the formation of a nominations committee as called for in the Region's Bylaws but heard from no one. I will call for nominations from the floor at the annual meeting but will not tarry long if no names are put forth. We must not place anyone under duress to serve in an open position. Any position for which there is no candidate merely will be left



unfilled if no one is willing to stand for election to that position. Along with the absence of an officer, the associated duties simply will not get done. This could have serious repercussions for the membership such as the following: no awards, no grants, and no certificates. See the article about nominations later in this issue of *Northern Lights* about the duties associated with each officer position.

At the annual business meeting we will accept proposals to host future meetings. We have openings for 2022 and 2024 and beyond. Also, there was some talk following the NCRAL 2018 business meeting that several members were going to suggest amendments to the NCRAL Bylaws to clarify them. To date I as Regional Chair have not heard of any action in this area. I'm awaiting any input members are willing to submit for consideration. Otherwise, this will not be an agenda item.

Lastly, be certain to review the minutes of the 2018 NCRAL business meeting. We will vote to approve the 2018 minutes at the NCRAL 2019 business meeting without a public reading in an effort to expedite the process and keep the meeting short.

Outside of the annual business meeting, there will be a vote to select the most preferred draft for the new NCRAL logo. There was a tie for both first place and second place winners during the online vote, so convention participants will have a choice of four drafts from which to choose a winner. See the article about these logos later in this issue of *Northern Lights*.

At the annual banquet, the leadership will announce winners of the 2018 and 2019 NCRAL *Region Award* and the inaugural *Newsletter Editor Award*. We also will announce winners of the Region's two mini grants if any. If you have not made your nominations or submitted your mini grant applications, do so immediately.

Minutes of the prior meeting and details about nominations and mini grants can be found in this an prior newsletters at: <https://ncral.wordpress.com/newsletter-archive/>

Lastly, I hope that you are all looking ahead to attending NCRAL 2019 hosted by Popular Astronomy Club May 3-5 in Moline, Illinois. They have quite an innovative program lined up for us based in large part upon the results of last year's post-convention survey and a member preferences survey conducted after that. You'll not want to miss this most excellent event.

I'm looking forward to seeing everyone at NCRAL 2019. I hope that we have a large turnout. Please feel free to communicate your wants, needs, and questions to me either before or during the meeting.

Clear skies!

Carl J. Wenning
NCRAL Chair (2017-2019)
carlwenning@gmail.com

NCRAL 2019 CONVENTION: JUST A LITTLE OVER A MONTH AWAY!

First, the thank you: For those that have registered for NCRAL 2019 *Astronomical Voyages of Discovery: Past, Present and Future*, thank you. We look forward to networking with you in May. If you haven't taken advantage of the room block at Stoney Creek, pay attention to the 31 March deadline.

Second, the obligatory appeal: If you have not yet registered for NCRAL 2019, why not? Drop me a note at 2019NCRALInfo@gmail.com and let me know why.... OR.... better yet, go to www.NCRAL2019.org and register! Don't make your fellow astronomers ask "where's (fill in your name)".

Finally, your checklist of things to do:

- ☐ Register if you haven't.
- ☐ Make reservations at Stoney Creek before 31 March.
- ☐ Plan to arrive Thursday evening and take advantage of pre-convention activities.
- ☐ Assemble your Club Trivia Competition Team (there are currently attendees from 12 different organizations) and brush up on what you think our Trivia Master thinks is important.
- ☐ Decide what DIY projects you are going to bring to show off Friday evening.
- ☐ Pull together some notes for the Best Practices in Outreach seminar.
- ☐ Pump yourself up to win some great prizes.

See you in May!

Mike Gacioch
Chairman, NCRAL 2019



NCRAL 2019

Astronomical Voyages of Discovery: Past, Present and Future

Day 1	Time	Friday, May 3rd, 2019
Pre-convention Activities	9:00 - 16:00	John Deere Pavilion - Visit the John Deere Pavilion and JD Store
	10:00 - 11:30	John Deere Harvester Works - Factory Tour
	12:00 - 16:00	Rock Island Arsenal - Arsenal Gun Museum Tour
Registration Open	12:00 - 18:00	Pick up packets and get questions answered
Set-up	12:00 - 16:00	Participants bring DIY creations to show, Vendor set-ups
Solar Observing	13:00 - 15:30	Tours of the PACMO & solar viewing
Seminars		<i>Best Practices for Community Outreach</i>
	13:00 - 14:00	PAC Member and attendees
		<i>Astrophotography 101</i>
	14:00 - 16:00	Dino Milani, Terry Dufek, Rusty Case
Kick-off	16:15 - 16:45	<i>Welcome</i>
		Mike Gacioch
		Give Away #1
		<i>Brief History of Popular Astronomy Club</i>
		Roy Gustafson
DIY Fair/Networking	16:45 - 18:00	Mingle, visit vendors, discuss DIY projects over dinner and cash bar
Dinner	16:45 - 18:00	Heavy Hors d'oeuvres and Cash Bar
Trivia Competition	18:00 - 18:30	Inter-club competition
Presentations 1 and 2		<i>A Relativistic Century: Eddington, Einstein, and the Great Eclipse</i>
	18:45 - 19:45	Lee Carkner (Augustana College)
		<i>Voyages of Discovery</i>
	19:45 - 20:30	Carl Wenning
Drive to Augustana College	20:30 - 21:00	Caravan and gather at John Deere Planetarium
At Augustana College	21:00 - 22:30	Tour John Deere Planetarium and Gamble Observatory
After-hours Activities	21:00 - ?	Dark Sky Observing (Menke Observatory visit, Moon sets ~ 18:46)

Continued next page.



Day 2		Saturday, May 4th, 2019
Registration Open	7:30 - 12:00	Pick up packets and get questions answered
Breakfast/Networking	7:30 - 9:30	Continental Breakfast and networking
NCRAL Business Meeting	8:00 - 9:00	Give Away #2
		Carl Wenning, NCRAL Chair
Brief Day Overview	9:15 - 9:30	Mike Gacioch and Alan Sheidler
		Give Away #3
Presentations 3 and 4	9:45 - 10:45	<i>A Discussion of Historical Tests of General Relativity</i> Robert Mutel, University of Iowa
	10:45 - 11:45	<i>Meteorites: Messengers from Space and Time</i> Paul Sipiera, Planetary Studies Foundation
Group Photo	11:45 - 12:15	Meet at PACMO for Group Photo
Lunch/Networking	12:15 - 13:00	Soup, Salad, Sandwich Buffet
		Give Away #4
Presentations 5 and 6	13:00 - 14:00	<i>Voyages of Discovery in Radio Astronomy</i> Esteban Araya, Western Illinois University
	14:00 - 15:00	<i>Gravitational Waves</i> Robert Mitchell, Saint Ambrose University
Break/Networking	15:00 - 15:30	Stretch break
Presentations 7, 8 and 9	15:30 - 17:00	<i>Our Coolest Stellar Neighbors: the Role of M Dwarf Stars in the Search for Earth 2.0</i> Katie Melbourne, student, Yale University
		<i>Tweeting to the stars with the Burke-Gaffney Observatory and learning about galaxy evolution using simulations</i> Tiffany Fields, student, St. Mary's University, Nova Scotia
		<i>Asteroid Research at the Monmouth College Adolphson Observatory</i> Bridgette Davey, student, Monmouth College
Networking	17:00 - 17:30	Cash Bar
Banquet	17:30 - 18:45	3-Entree Dinner Buffet

Continued next page.



Awards	19:00 - 19:15	Give Away #5
		Astro League awards and introduction of keynote speaker
Keynote	19:15 - 20:15	<i>Different Views of the Sky; American Indian Views of Astronomy (and a look at where we are going in the future)</i> Steven Spangler, University of Iowa
Closing Remarks	20:15 - 20:30	Mike Gacioch and Alan Sheidler
After Hours Activities	20:30 - 12:00	Evening Observing Session with PACMO (Sunset is 8:02, new moon)
	21:00 - ??	Dark Sky Observing (Menke Observatory visit, Moon sets ~ 19:50)

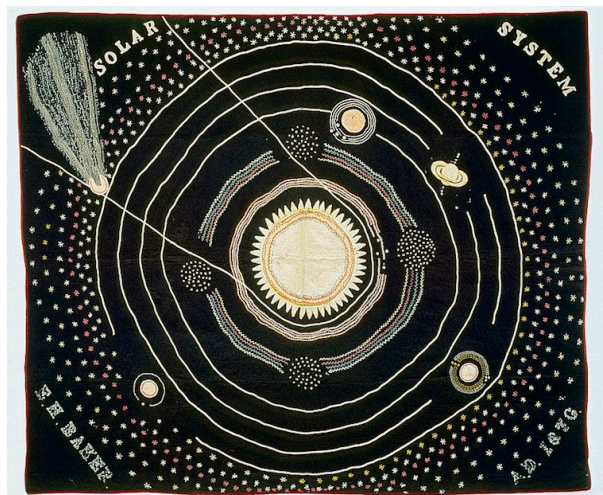
Day 3 (morning)		Sunday, May 5th, 2019
At Bettendorf High School	9:00 - 10:00	<i>Panel Discussion: Involving Students in Astronomy</i> Ian Spangenberg, Chris Like, Alan Sheidler and students
		Give Away #6
At Bettendorf High School	10:00 - 11:00	Tour Bettendorf HS planetarium Chris Like

The convention planning team has been very busy in the last couple of months to finalize everything. They have created and now announce a website for on-line registration and program information. It can be accessed at www.ncral2019.org. Here you will find the speaker bios, presentation summaries, pricing and other information. Please note the early-bird registration deadline of March 15th. Registration after this date will be more expensive. Register today to save help with planning.

QUILT SHOW CONCURRENT WITH NCRAL 2019

Family members often travel with convention participants. Some don't attend more than convention meals to hear the keynote address. As a result, it is nice to know that there are other activities in the surrounding areas that take place concurrently with other convention events. Please note that concurrent with NCRAL 2019 the Sinnissippi Quilters, a quilting guild in Rockford, IL, (about 120 miles from Moline, IL) will be holding Quilt Show 2019 May 4 and 5 with the theme "Out of This World."

The Quilters note, "The theme quilt category for our show will be sun, moon, stars, skies, spaceships, and space travel of all kinds. Possibilities are endless! Many of us remember the first moon landing in July 1969, and 2019 will be the 50th anniversary of that historic event. One of the Special Exhibits at our show will be a portion of the "Fly Me to the Moon" quilt collection that honors the moon landings and all space travel. We will exhibit about 50 of the 179 quilts." For more information, visit <https://sinnissippiquilters.org/>.

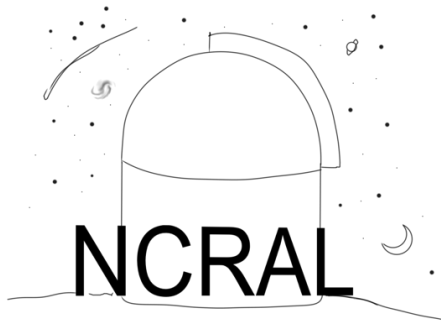




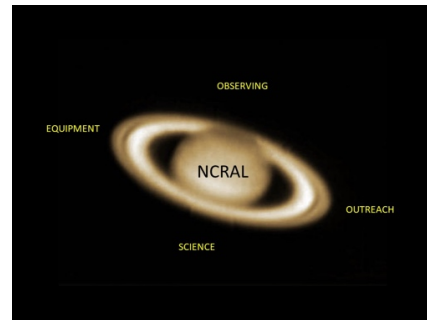
NCRAL LOGO CONTEST ENTRIES

An online vote for the most desirable NCRAL draft logo was conducted from early-January through mid-February following an announcement in this newsletter. There were two ties. Two draft logos tied for first place and two tied for second place. Four draft logos will therefore be set before the membership at the May 3-5 NCRAL 2019 meeting for selection. There will be a vote for the first-place winner using a printed ballot. The draft logos are presented below in random order.

Up to \$350 was authorized at the NCRAL 2018 meeting to bring the selected logo up to professional standards if deemed necessary by the NCRAL officers.



SUBMISSION #1 (ABOVE)



SUBMISSION #2 (ABOVE)



SUBMISSION #3 (ABOVE)



Submission #4 (Above)

ADD YOUR EMAIL ADDRESS TO THE NCRAL MEMBER DATABASE

Add your email address to the NCRAL member database so you can get direct mailings of *Northern Lights* and important and timely announcements about Regional conventions, star parties, and so forth. Your email address will never be shared with or sold to outside entities. Only blind addressing (Bcc:) will ever be used with this email list so that others will not see your email address.

No one will add your email address to this list for you, so you'll need to do it yourself. Sign-up takes only about a minute. You'll need to provide your name, email address, astronomy club affiliation (or indicate at-large membership) and let us know if you hold specific positions within your club. Go to the following case-sensitive URL to add your information to our database: <https://goo.gl/gS8SF>

Following a start-of-September email "blast" as a reminder, our numbers recently have grown. Thus far only 365 members have signed up to receive direct communication – about 20% of the approximately 1,850 members in the Region – despite a September 2018 email solicitation that went out to some 1,400 members for whom the Regional Chair has emails.



CALL FOR NOMINATIONS:

EXECUTIVE OFFICERS – CHAIR, VICE CHAIR, REGIONAL REP TO THE AL NATIONAL COUNCIL, NCRAL REGION AWARD, NCRAL NEWSLETTER EDITOR AWARD

It's never too early to start thinking about the nominations process for this spring's **Executive Officer** elections. Assembling a slate of officer candidates last minute can be difficult, if not impossible, as seen at the business meetings at Lanesboro, MN, and Sturgeon Bay, WI. In the first case, only prolonged and repeated calls for nominations resulted in candidates for some offices. In the second case, no nominations were received, and the selection of a new secretary-treasurer was handed off to the Region's Executive Officers. According to NCRAL Bylaws, in 2019 we must elect both Regional Chair and Vice Chair to two-year terms. We need to elect a Regional Representative to the AL to a 3-year term. (The current Secretary-Treasurer is in the first year of his 3-year term.) Duties for each Regional officer position are roughly as follows:

- **Chair:** Provides leadership for the Region and serves as a member of the AL National Council. This includes setting agendas for and conducting annual business meetings during Regional conventions as well as making suggestions for activities to enhance the offerings of the Region. The Chair provides an annual Regional report to the Astronomical League before the AL National Council Meeting, and maintains contact with the officers of the Astronomical League. The Chair attends the National Council Meeting which occurs on the day before AL national meetings. As an executive officer, the Chair heads Regional Council and has a tie-breaking vote in the affairs of that body.
- **Vice Chair:** Serves as an advisor to the Chair and provides assistance to the Chair in the discharge of his or her duties. Currently in charge of running awards programs such as Region Award, Newsletter Editor Award, and overseeing two NCRAL mini-grants programs. Future duties might include providing certificates for any observing programs the Region approves. As an executive officer, has a vote in the affairs of the Executive and Regional Councils.
- **Representative to the AL:** Represents NCRAL as one of two voting members of the AL National Council. As an executive officer, has a vote in the affairs of the Executive and Regional Councils.

See **Article II, Officers**, in the Region's Bylaws for a formal declaration of duties. (<https://ncral.wordpress.com/bylaws/>)

In addition, it's not too late to make nominations for the **NCRAL Region Award**. Do you know someone who has dedicated his or her time and energy to promoting astronomy? Wouldn't you like to let them know they are appreciated for their hard work? This is your chance! This award recognizes exceptional individual effort and meritorious service to amateur astronomy through the member's local astronomy club, public outreach, the NCRAL, or the Astronomical League.

The Regional is now calling for nominations for both the 2018 and 2019 Region Awards. Unfortunately, a call for 2018 nominations was not sent out. In addition, there was one nomination that was carried over from the previous year that should have been considered, but the current leadership did not find out about it until a chance conversation revealed it after NCRAL 2018.

Using the guidelines and submission forms below, we have made it easier than ever to nominate someone you feel deserves this award. The 2018 and 2019 Region Awards will be presented in a special ceremony concluding the dinner banquet, of the NCRAL 2019 convention to be held at Moline, IL, Friday/Sunday, May 3-5.

The Rules for nomination are now set as follows:

1. The individual must be a member in good standing, either through an AL/NCRAL-affiliated society or as a current member-at-large in the North Central Region.
2. The three current regional officers and the regional representative are NOT eligible for this award. Past winners are also ineligible for this award.
3. The regional officers and the regional representative are the voters and will base their decision on the information provided. Each member votes independently and will use his/her best judgment. All decisions are final.
4. The winner will be contacted not less than 30 days in advance of the NCRAL meeting at which the award will be presented. The winner will not be publicly revealed until the time of the presentation. Those not selected, will not be revealed.
5. All non-winning nominations will be kept on file for two years after initial submission. After such time, a new nomination needs to be competed.



There are many deserving candidates within NCRAL. It is our hope to have at least one nomination from each society of the Region. We look forward to receiving your nominations by the date of the March equinox. If there are any questions, please contact Vice Chair John Attewell via phone or email using the contact information found on the Submission Form below.

Submission Format for the NCRAL Region Award

Candidate's name (as it will appear on plaque) _____

Shipping Address _____

City _____ State _____ Zip _____

Club Affiliation _____

Nominator's name _____ Club affiliation _____

Address _____ City _____ State _____ Zip _____

Phone _____ E-mail _____

Submission Guidelines:

Prepare a statement of the nominee's accomplishments in one or more of the areas listed under criteria. This statement should not exceed 3 double-spaced pages (1,000 words). Length does not necessarily equal strength. The statement should include number of years in office or committee membership and dates of said membership. The statement should also include length of time participating in public education, number of presentations, etc.

Supporting data; please include any relevant newspaper clippings, photos, and other articles that support the nomination. For service to groups such as schools, scouts, etc., it would help the committee if you could obtain a brief statement from the teacher, leader, chair etc. on the usefulness of the presentation.

Region Awards nominations must be received by **March 31st**. (Note that this is an extension of the current deadline.) Any nominations received after this date will be kept on file for 2020. All nominations must be sent via email to John Attewell, NCRAL Vice Chair, at john_attewell@hotmail.com. For additional information you may contact John at Mobile: (507) 398-4492 or Home: (507) 282-3120.

Let's not forget about the **NCRAL Newsletter Editor Award** which is new this year. It is expected that the inaugural award will be conferred at the NCRAL 2019 meeting. Submission Guidelines: The president of the club/society/association should email a copy of the designated issue of the associated newsletter in Adobe Acrobat pdf file format to NCRAL Vice Chair John Attewell (john_attewell@hotmail.com), along with a cover letter of recommendation in the same file format. In addition, complete contact information of the editor must be included. A photo of the newsletter editor, preferably in an astronomical-type setting, must be received electronically in jpg format to the same email address by **March 31st**. (Note that this is an extension of the current deadline.)

Also, let's not forget about the two **NCRAL mini grants**. A mini-grant will be awarded following a successful written proposal originating with the president of an NCRAL affiliate. The focus of a mini-grant must be oriented to an increase in either: (1) an affiliate's membership whose mini-grant proposal must focus on both recruitment and retention (Member Recruitment & Retention Mini Grant), or (2) an increase in the number of A.L.-affiliated clubs, societies, or associations within the North Central Region (Non-affiliate Recruitment Mini Grant). A unified online mini-grant application must be completed by the deadline noted below. The application link may be found at the following URL: <http://bit.ly/2W2pdeA> Deadline: The application deadline for all mini-grants is **March 31st**. The first mini-grants, if approved, will be announced at NCRAL 2019.

MEMBER DOES NCRAL PROUD

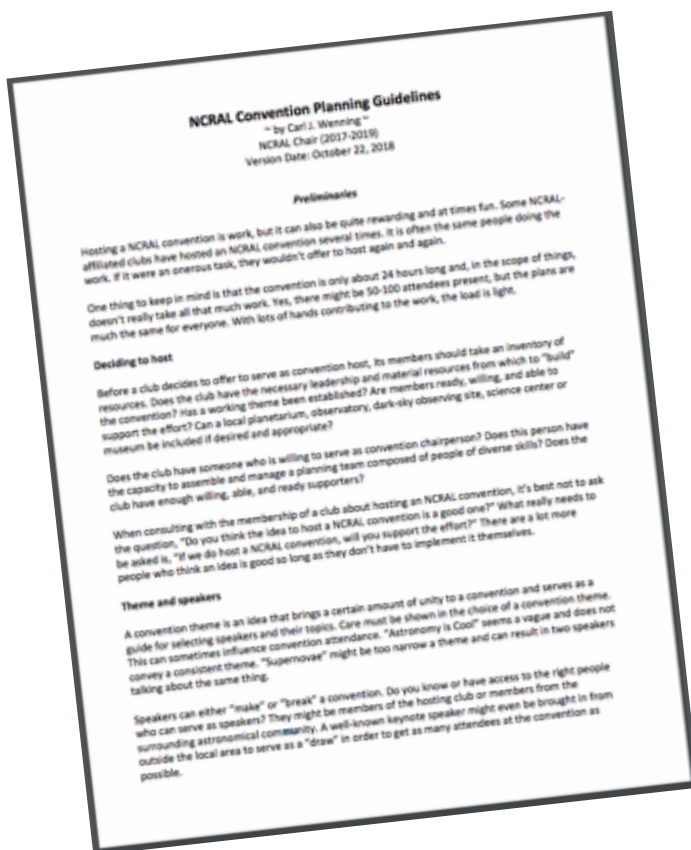
Once again, an NCRAL member has graced the pages of the Astronomical League's **Reflector** magazine. The March 2019 issue featured a 4-page article by Jamey Jenkins of the Twin City Amateur Astronomers. Jamey wrote about *Basic Small-Scope Lunar Imaging*. The article can be found starting on page 14. See the article at <https://www.astroleague.org/reflector>.



FUTURE NCRAL REGIONAL CONVENTIONS

Each year at NCRAL's annual business meeting, the Region receives offers for hosting upcoming meetings. The following affiliates have agreed to hosting future conventions. We are still in need for additional hosts, but especially for 2022, 2024, and the years beyond. It's never too early to start planning to host.

- 2020 Port Washington, WI: Northern Cross Science Foundation (confirmed)
- 2021 Green Bay, WI: Neville Public Museum Astronomical Society (confirmed)
- 2022 OPEN
- 2023 Bloomington-Normal, IL: Twin City Amateur Astronomers (confirmed)
- 2024 OPEN



If your club has never hosted an NCRAL Regional convention, please consider doing so. While it is a considerable amount of work, it can be quite rewarding – even fun. It provides an opportunity to showcase your group's facilities and accomplishments, build club camaraderie, and to get to personally know interesting guest speakers. You can also use such an event to grow your club's membership.

Remember, NCRAL now has its own convention planning guidelines. The guide was developed by experienced hosts of NCRAL conventions in conjunction with one future host who asked lots of excellent questions. Significant contributions were made by Alan Sheidler (Popular Astronomy Club) and John Beck (Door Peninsula Astronomical Society). NCRAL Chair Carl Wenning, served as contributor and lead author.

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The **NCRAL Convention Planning Guide** has three sections. Section 1 deals with the "preliminaries" of what it takes to host a Regional convention. Section 2 deals with

programming information. Section 3 deals with budgeting information.

The guide is considered a "living document" that will be updated as new survey information becomes available. The recent NCRAL 2018 post-convention survey was included in the document. Results from the NCRAL Convention Preferences Survey are now included. The goal is to increase the benefits of convention attendance, thereby increasing attendance at our Region's conventions.

To download and review the planning guide, you may access it through the NCRAL website the following URL: <https://ncral.wordpress.com/conventions/>. Look for the link at the bottom of the page.

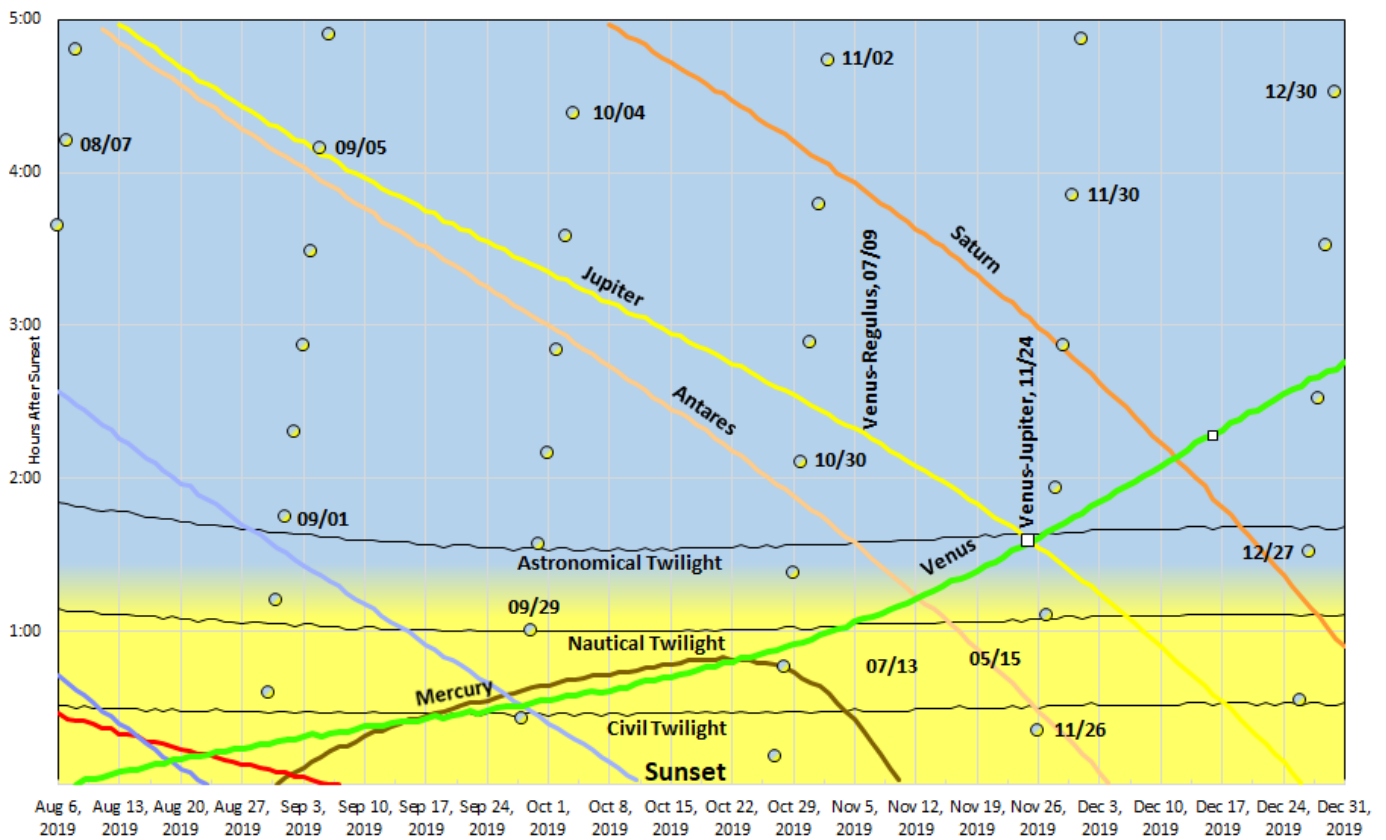
Please contact NCRAL Chair Carl Wenning at carlwenning@gmail.com should you have any questions or wish to toss your hat into the ring for hosting a future NCRAL convention.



JUPITER 2019: RETROGRADE UNTIL CONJUNCTION

~ by Jeffrey L. Hunt ~

Jupiter in the Evening Sky, 2019 Chicago, Illinois



This chart displays the setting of Jupiter and bright objects near the ecliptic beginning in early August 2019 and ending at the end of the year. The chart shows the difference in time between sunset and the setting of the stars, planets and the moon (circles), along with the three phases of twilight. When two objects set at the same time, they can appear close together in the sky. On September 5, the moon and Jupiter set at nearly the same time; they are 4° apart. The white box indicates the conjunction of Venus and Jupiter. Notice how the setting time difference for Jupiter moves away from Antares and toward Saturn. Data from the U.S. Naval Observatory for Chicago, Illinois.

Bright Jupiter shines from the dim stars of southern Ophiuchus during its 2019 appearance. This summary notes easily viewed motions of the planet against the starry background and predictions for the appearance of the Great Red Spot while Jupiter is retrograding. Late in the apparition, Jupiter has a conjunction with Venus. It is heading toward a Great Conjunction with Saturn in late 2020. The description for the first part of this apparition appeared in the Fall 2018 issue of *Northern Lights*.

In his classic work, *Celestial Objects for Common Telescopes*, Rev. T. W. Webb noted Jupiter's appearance, "This

magnificent planet is an excellent object, in view for months together, and for some part of every year, shining with the brilliancy which near opposition casts shadows in a darkened room, ...[E]ven a very modest telescope will show one of the most diversified scenes in the heavens" (p. 180).

Webb's description, first published in 1859, is better today with modern amateur telescopes, whether with the light reflected by a carefully crafted mirror made at home or the light collected by a commercial telescope of modest aperture. Through that telescope, Jupiter is magnificent. At first look, its brightness may overwhelm the eye. Then clearly,



its salmon and gray-white clouds, whipped parallel to the equator by the planet's rapid rotation, dazzle the view. If the Great Red Spot is present, the view is heightened by its size and proportions. With some inspection, the eye notes that the planet is not a perfectly-shaped ball. With a little more notice, any number of its four largest moons are seen nearly in the plane of the planet's zones and belts, found on either side of the planet or hiding behind its massive girth. For the beginner, an exit pupil around 2 mm (about 100x in an 8-inch Schmidt-Cassegrain) provides an outstanding view. At higher magnifications, the Great Red Spot might be revealed.

Mixed in with the summary, that follows, are predictions when the Great Red Spot crosses Jupiter's central meridian while the planet is retrograding. Since the Red Spot is a weather phenomenon and it changes its longitude, the accuracy of the predictions can be off by several minutes. The projections are from projectpluto.com and are consistent with those made in the planets section of *Sky & Telescope* magazine. Make an observation at the indicated time and then adjust accordingly.

The planet spins at 9 hours, 55 minutes, so either two or 3 Red Spot passages occur each day. And, of course, some of those occur during the daytime. Once you see a central passing of the Great Red Spot, add two days and 98 minutes for the next passing that is visible. Eventually the cycle disappears into the morning sun. During the 4 months of retrograde, the length of a "lighted sky" (daylight plus twilight) increases and the length of darkness, from the end of evening twilight to the beginning of morning twilight, decreases substantially. Additionally, since Jupiter's appearance somewhat matches the westward march of the seasonal constellations, events like the planet's rising and setting retreat by 2 hours each month. When Jupiter rises after 1 a.m. on April 1, it rises at sunset in mid-June due to Earth's revolution around the sun. Sometimes there's a Red Spot passage visible in our region in the morning and then again that evening, two Jupiter rotations later. As August occurs, Jupiter sets before 1 a.m., only giving a three-hour window, in a dark sky, for a Red Spot appearance. In some cases, the notes below indicate that the Great Red Spot passage occurs during early morning or late evening twilight. Jupiter is bright enough to see the clouds and satellites during these times. If a Galilean satellite is present during the Red Spot's appearance, its location is noted as well.

Let's continue with Jupiter's appearance beginning in April 2019.

At the beginning of April 2019, Jupiter ($m = -2.2$) rises in the southeast after 1 a.m. CDT, appearing 25° up in the south-southeast at the beginning of morning twilight. Jupiter is

about 26° to the upper right of Saturn ($m = 0.5$), and 15° to the upper left of Antares ($m = 1.0$).

- **Apr 10:** Jupiter ($m = -2.3$), rises in the southeast at 12:35 a.m. CDT. At the beginning of morning twilight, Jupiter is 25° up in the south. It is about 7° to the upper right of the Lagoon Nebula (M8, NGC 6523). Jupiter begins to retrograde. Great Red Spot, 5:14 a.m. CDT, about 30 minutes after the beginning of morning twilight.
- **Apr 11:** GRS, 1:04 a.m. CDT. Io is north of the spot in front of the North Equatorial Belt.
- **Apr 13:** GRS, 2:42 a.m. CDT.
- **Apr 15:** GRS, 4:21 a.m. CDT.
- **Apr 18:** 1:50 a.m. CDT. Io is on the eastern portion of the North Equatorial Belt and its shadow is on the same belt, north of the GRS.
- **Apr 19:** Jupiter now rises before midnight.
- **Apr 20:** GRS, 3:28 a.m. CDT.
- **Apr 23:** GRS, 12:57 a.m. CDT. Ganymede appears in front of the North Polar Region near the west limb. The moon (18.0 days old, 83% illuminated) is 1° to the upper right of Jupiter ($m = -2.4$).
- **Apr 25:** GRS, 2:35 a.m. CDT.
- **Apr 27:** GRS, 4:13 a.m. CDT, 5 minutes after the beginning of morning twilight.
- **Apr 28:** GRS, 12:04 a.m. CDT.
- **Apr 29:** Saturn begins to retrograde, nearly 27° east of Jupiter.
- **Apr 30:** GRS, 1:42 a.m. CDT. Jupiter passes 1.3° north of 51 Ophiuchi (51 Oph, $m = 4.8$).

In early May, Jupiter rises at about 11 p.m. CDT. At the beginning of morning twilight, it is 25° up in the south.

- **May 2:** GRS, 3:20 a.m. CDT.
- **May 5:** GRS, 12:50 a.m. CDT.
- **May 7:** GRS, 2:28 a.m. CDT.
- **May 9:** GRS, 4:05 a.m., 20 minutes after the beginning of morning twilight. GRS, 11:57 p.m.
- **May 12:** GRS, 1:35 a.m. CDT.
- **May 14:** GRS, 3:12 a.m. CDT and 11:05 p.m. CDT.
- **May 15:** Jupiter ($m = -2.5$) passes 1.6° north of 44 Ophiuchi (44 Oph, $m = 4.2$).
- **May 17:** GRS, 12:42 a.m. CDT.
- **May 19:** GRS, 2:19 a.m. CDT and 10:11 p.m. CDT. Io is on the eastern side of the planet in front of the North Equatorial Belt. Its shadow is nearly north of the GRS.



- **May 20:** The moon (15.4d, 98%) is 4.6° to the right of Jupiter.
- **May 21:** GRS, 3:57 a.m. CDT, about 30 minutes after the beginning of morning twilight. GRS, 11:49 p.m. CDT.
- **May 24:** GRS, 1:26 a.m. CDT. Jupiter passes 2° north of Theta Ophiuchi (θ Oph, $m = 3.2$).
- **May 26:** GRS, 3:04 a.m., about 15 minutes before the beginning of morning twilight. GRS, 10:56 p.m. CDT.
- **May 28:** Jupiter passes 1.4° south of Xi Ophiuchi (ξ Oph, $m = 4.4$).
- **May 29:** GRS, 12:33 a.m. CDT.
- **May 31:** GRS, 2:11 a.m. CDT; 10:02 p.m., 23 minutes after the end of twilight. Jupiter is only 9° up in the southeast.

At the beginning of June, Jupiter is 22° up in the southwest at the beginning of morning twilight. It rises in the southeast at about 9 p.m. CDT. **Jun 2:** GRS, 11:40 p.m. CDT.

- **Jun 3:** Jupiter passes 1.6° north of Omicron Ophiuchi (\omicron Oph, $m = 5.1$).
- **Jun 5:** GRS, 1:18 a.m. CDT.
- **Jun 7:** GRS, 2:56 a.m. CDT; 10:47 p.m. CDT.
- **Jun 10:** GRS, 12:25 a.m. CDT. Jupiter ($m = -2.6$) is at opposition, 4.28 Astronomical Units from Earth.
- **Jun 12:** GRS, 2:03 a.m. CDT.
- **Jun 14:** GRS, 3:41 a.m. CDT; 11:32 p.m. CDT.
- **Jun 16:** The moon (13.7d, 99%) is 4.6° to the left of Jupiter.
- **Jun 17:** GRS, 1:10 a.m. CDT.
- **Jun 19:** GRS, 2:48 a.m. CDT. Ganymede is silhouetted against the Northern Polar Region. The moon's shadow is east of Ganymede, nearly north of the GRS. GRS, 10:40 p.m. CDT.
- **Jun 22:** GRS, 12:18 a.m. CDT. Europa is cross in front of Jupiter's North North Temperate Zone. The moon's shadow is visible north of the GRS.
- **Jun 24:** GRS, 1:56 a.m. CDT.
- **Jun 26:** GRS, 3:34 a.m. CDT, about 30 minutes after the beginning of morning twilight; GRS, 11:25 p.m. CDT.
- **Jun 29:** GRS, 1:03 a.m. CDT. Ganymede transiting on north polar region on the eastern part of the planet.

On July 1, Jupiter sets in the southwest about an hour before sunrise; while in the evening sky the planet is over 20° up in the south-southeast at mid-twilight, about 65 minutes after sunset. GRS, 2:41 a.m. CDT. Jupiter is only 10° up in the southwest. GRS, 10:32 p.m. CDT.

- **Jul 4:** 12:10 a.m. CDT.

- **Jul 6:** GRS, 1:49 a.m. CDT.
- **Jul 8:** 11:18 p.m. CDT.
- **Jul 9:** Saturn ($m = 0.1$), near Pi Sagittari ($m = 2.8$) reaches opposition, 31° east of Jupiter.
- **Jul 11:** GRS, 12:56 a.m. CDT.
- **Jul 13:** The moon (11.3d, 92%) is 3.8° to the left of Jupiter ($m = -2.5$). GRS, 10:26 p.m. CDT.
- **Jul 16:** GRS, 12:04 a.m. CDT.
- **Jul 18:** GRS, 1:42 a.m. CDT.
- **Jul 20:** GRS, 11:12 p.m. CDT.
- **Jul 23:** GRS, 12:50 a.m. CDT.
- **Jul 25:** GRS, 10:20 p.m. CDT.
- **Jul 27:** GRS, 11:58 P.M. CDT.
- **Jul 30:** GRS, 1:37 a.m. CDT. GRS, 9:28 p.m. CDT. This is 35 minutes before the end of evening twilight. Jupiter is 26° up in the south.

At the beginning of August, Jupiter sets about 1:30 a.m. CDT. It is 26° up in the south at mid-twilight.

- **Aug 1:** GRS, 3:15 a.m. CDT; GRS, 11:07 p.m. CDT.
- **Aug 4:** GRS, 12:45 a.m. CDT; GRS.
- **Aug 6:** GRS, 10:15 p.m. CDT.
- **Aug 8:** GRS, 11:54 p.m. CDT. Jupiter ($m = -2.4$) is 11° up in the southwest.
- **Aug 9:** The moon (9.0d, 74%) is 2.1° to the upper left of Jupiter.
- **Aug 11:** Jupiter's retrograde ends, 7° to the upper left of Antares and over 30° to the upper right of Saturn ($m = 0.2$). Jupiter has retrograded 9.8° along the ecliptic. GRS, 9:24 p.m. CDT. This is about 25 minutes before the end of evening twilight.
- **Aug 14:** Venus is at its superior conjunction and begins its evening apparition that takes it to the second conjunction with Jupiter during the Giant Planet's apparition.

On September 1, Jupiter is 23° up in the south-southwest at evening's mid-twilight; it sets before midnight.

- **Sep 5:** The moon (6.6d, 49%) is 4° to the right of the moon.
- **Sep 8:** Jupiter ($m = -2.3$) is 90° east of the sun, at its eastern quadrature. Jupiter is in the south at about 6:30 p.m. CDT, 26° up.
- **Sep 17:** Saturn's retrograde ends, over 27° east of Jupiter.

At the beginning of October, Jupiter is 20° up in the south-southwest at evening's mid-twilight, setting before 10 p.m. CDT.



- **Oct 3:** The moon (5.2d, 33%) is 1.8° to the upper right of Jupiter.
- **Oct 16:** Jupiter passes 1.4° north of Omicron Ophiuchi.
- **Oct 19:** The planet is 1.8° south of Xi Ophiuchi.
- **Oct 22:** Jupiter passes 2° north of Theta Ophiuchi.
- **Oct 27:** Jupiter is 1.2° north of 44 Ophiuchi.
- **Oct 31:** The moon (3.8d, 18%) is 4.5° to the upper left of Jupiter.

Venus – Jupiter Conjunction

The second conjunction with Venus occurs on **November 24**. The month begins with brilliant Venus ($m = -3.8$) only 4.5° up in the southwest, 30 minutes after sunset. Jupiter is over 23° to the upper left of Venus and over 17° to the lower right of the moon (4.8d, 26%). Venus sets nearly an hour after sunset. It sets about a minute later each night.

- **Nov 4:** The Venus – Jupiter gap is 20°.
- **Nov 5:** Venus sets later than Nautical Twilight, when the sun is 12° below the horizon.
- **Nov 9:** The gap between the planets is 15°. Thirty minutes after sunset, Jupiter is 15° up in the southwest with Venus, 6° up in the southwest, 15° to Jupiter's lower right.
- **Nov 15:** The V – J gap is 10°.
- **Nov 19:** V – J, 4.4°.
- **Nov 20:** V – J, 3.9°.
- **Nov 21:** V – J, 2.8°.
- **Nov 22:** The V – J gap is 2.1° with Jupiter to the upper left of Venus.
- **Nov 23:** The V – J gap is 1.5° with Jupiter above Venus.
- **Nov 24:** Conjunction evening; the planets are 1.4° apart, with Jupiter to the upper right of Venus. Jupiter sets at the end of twilight, nearly 100 minutes after sunset.
- **Nov 25:** The planets are 2° apart this evening. Jupiter is to the right of Venus.

- **Nov 26:** The V – J gap is 2.8°. Jupiter is to the right of Venus.
- **Nov 27:** This evening the crescent moon (1.3d, 2%) joins the scene. The moon is 7.4° to the lower right of Jupiter. The planets are 3.8° apart. Jupiter is to the lower right of Venus.
- **Nov 28:** This evening the moon (2.3d, 6%) is 5.8° to the upper left of Jupiter. The V – J gap has widened to 4.7° with Jupiter to the lower right of Venus.

Jupiter Moves Toward Conjunction

In December Jupiter is in a slow slide into the sun's glare as it heads towards its solar conjunction. What is the last date you see Jupiter without optical assistance? Through a binocular or telescope?

- **Dec 3:** The V – J gap is nearly 10°.
- **Dec 6:** Jupiter sets at Nautical Twilight, nearly 70 minutes after sunset. The Jupiter – Saturn gap is nearly 18°.
- **Dec 8:** The V – J gap, 15°.
- **Dec 13:** The gap between Venus and Jupiter is nearly 20°.
- **Dec 17:** Jupiter sets at Civil Twilight, about 30 minutes after sunset.
- **Dec 27:** Jupiter is at its solar conjunction at 12:26 p.m. CST.

The next Venus – Jupiter conjunction is February 11, 2021, in the morning when the planets are 26' apart. This pairing is very difficult to see in the eastern sky as the planets rise in bright twilight just 25 minutes before sunrise.

Jupiter concludes an exciting apparition. While in the depths of the ecliptic, it has two conjunctions with Venus. The star field is without bright stars, but Antares provides a reasonable guidepost to note its general movement. Track the Great Red Spot to determine whether you can predict its appearances from the times noted here. The apparition ends nearly one year before 2020's Great Conjunction, when Jupiter and Saturn are 0.1° apart! Happy observing.



Dr. Jeffrey L. Hunt

About the Author: Jeffrey Hunt has had a life-long interest in astronomy and astronomy education. He has taught astronomy at all levels from preschool students to university courses. Jeff is a former director of the Waubonsie Valley High School Planetarium in Aurora, Illinois. Dr. Hunt holds several degrees including a master's degree in planetarium education from Michigan State University. He writes an astronomy blog (jeffreylhunt.wordpress.com) showing easily-seen sky events. Currently he is retired with his wife and cat in Northern Illinois.



NCRAL & AL ON FACEBOOK

Did you know that NCRAL now has a Facebook page for sharing information about your Region's AL-affiliated clubs? This is also a great way share observations, notes, images, and any other things you think the NCRAL membership or AL members-at-large living in our region would enjoy. Check us out at: <https://www.facebook.com/northcentralregionastronomicalleague/> Also, did you also know that the Astronomical League is on Facebook? It's an active site with lots of good information. Check it out at: <https://www.facebook.com/search/top/?q=astronomical%20league>

NCRAL WEBSITE

~ by Jeff Setzer ~

Did you know that NCRAL has its own website? It's true! Point your browser to ncral.wordpress.com and you'll see a central repository for information about our Region and constituent clubs, the Region's Bylaws, as well as back issues of **Northern Lights**.

As Webmaster, I maintain the information on the website, but the original idea was — and still is — to publish contributions from members. As part of that mission, we will be hosting the emailed newsletters at the website, so people can easily access back issues.

Will the website progress from an occasionally used reference to something more? That's entirely up to you, dear reader. If you have ideas or submissions, contact me at astrosetz@hotmail.com

REGIONAL OFFICER & LEADER CONTACT INFORMATION

Chair: Carl Wenning (2-year term expires Spring 2019, in first term)

Bio: Carl has been an amateur astronomer since being introduced to the sky by his grandfather during July 1957. Today he is an AL Master observer. He has been a member of the Twin City Astronomers of Bloomington-Normal (Illinois) since 1979. He serves as the club's secretary, historian, and editor of **The OBSERVER** newsletter for which he received the AL's 2017 Mabel Sterns Newsletter Editor Award. Carl is a former planetarium director and physics teacher educator who remains actively involved in both astronomy and physics education as well as public outreach event.

Contact: carlwenning@gmail.com

Vice Chair: John Attewell (2-year term expires Spring 2019, in first term)

Bio: John is a statistical analyst by day and amateur astronomer by night. He is particularly interested in the history of astronomy, especially how early astronomers used mathematics to explain their observations. John is a member of the Rochester Astronomy Club (Minnesota) and was the planning chairman for the 2017 NCRAL convention held at the Eagle Bluff campus near Lanesboro, MN.

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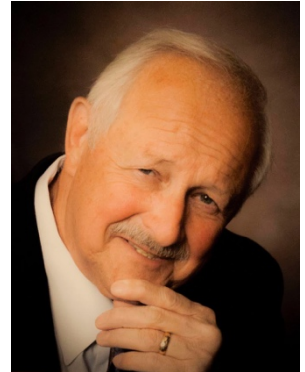




Secretary-Treasurer: Roy Gustafson (2-year term expires Spring 2020, in first term)

Bio: Roy got interested in astronomy when visiting the Adler Planetarium in Chicago when he was in 2nd Grade. The stars projected by the Zeiss Projector hooked him and started him on the path of astronomy. He has been active in outreach and has presented astronomy programs to over 20,000 people. He was awarded the Master Outreach award from the Astronomical League. Roy travels with his telescopes and has observed both Transits of Venus and last year the Total Solar Eclipse. Roy also taught astronomy at Black Hawk Junior College in Moline, IL. Roy retired from John Deere & Company after 32 years of service.

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Representative: Bill Davidson (3-year term expires Spring 2019, completing unfinished term)

Bio: In the days of the Apollo missions, Bill first observed the moon (and sunspots!) with a 50x, 60mm JC Penny's refractor telescope. Not discouraged, 40 years later, he built and observes with a 6.25-inch achromatic doublet objective, f/10, 1600 mm focal length refracting telescope. He recently retired as a college mathematics instructor, has been a member of the Rochester Astronomy Club (Minnesota) for 20 years, and serves as editor of the club's newsletter *RochesterSkies*.

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NCRAL Webmaster: Jeff Setzer (appointed)

Bio: Jeff has been an amateur astronomer since 1984 and has been part of the Northern Cross Science Foundation (Wisconsin) since that time. He is a longtime member of their Board of Directors, has held several office positions, and is currently their President. He has completed several Astronomical League observing programs, made his own telescopes and optics, and is a self-described telescope nut. You will often find him at star parties with his 22" Starmaster and TeleVue 85 telescopes.

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Northern Lights Editor-in-Chief: Jim Gibbs (appointed)

Bio: Jim has been observing the starry skies since he was 10 years old and on and off ever since. His primary affiliation is with the Twin City Amateur Astronomers (Illinois) where he has been a member for 5 years. He is also a member of the Fox Valley Astronomical Society where he has held several leadership positions. He is an avid amateur astronomer who enjoys observing and especially imaging around the TCAA dark sites and travelling around finding other dark sites. He is a software engineer and currently is concentrating in growing his small consulting business.

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