

Saskatoon Skies

The Newsletter of the Saskatoon Centre of the Royal Astronomical Society of Canada

Volume 55, Number 10

November 2024



Royal Astronomical Society of Canada
Saskatoon Centre Incorporated
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To view *Saskatoon Skies* digitally, see our website:
<https://saskatoon.rasc.ca/newsletters.html>

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MEMBERSHIP? JOIN TODAY!

Regular: \$111.00 /year

Youth: \$61.10 /year

Family: \$105.50 + \$42.90/additional adult + \$22.20/additional youth

The Saskatoon Centre operates on a one-year revolving membership. You will be a member for the next 12 months no matter when in the year you join. Members are encouraged to renew early to avoid disruption in publications. Renew through the National Office at <http://www.rasc.ca/join>.

Benefits of Membership in the Saskatoon Centre

- knowledgeable & friendly amateur astronomers
- use of the Sleaford Observatory
- use of the U of S Observatory (after training)
- Saskatoon Skies Newsletter
- Observer's Handbook
- borrow the Centre's projector to give astronomy outreach presentations – contact Les Dickson at astrochem@sasktel.net
- rent the Centre's Telescopes <https://saskatoon.rasc.ca/telescopes.html>
- use of the Centre library
- Journal of the RASC (electronic format)

SASKATOON CENTRE'S MAIN OFFICERS:

President – Brent Burlingham

Vice-President – John Takala

Secretary – Lorie Tedford

Treasurer – Les Dickson

National Council Rep – Joelle Sheard-Patrick

Canadian Tire money - Darrell Chatfield

If you cannot attend a meeting but would like to donate your old Canadian Tire money please to assist with club purchases, email Darrell at novachat@sasktel.net.

NEWSLETTER & U OF S OBSERVATORY INFO

Newsletter Editor – Colin Chatfield

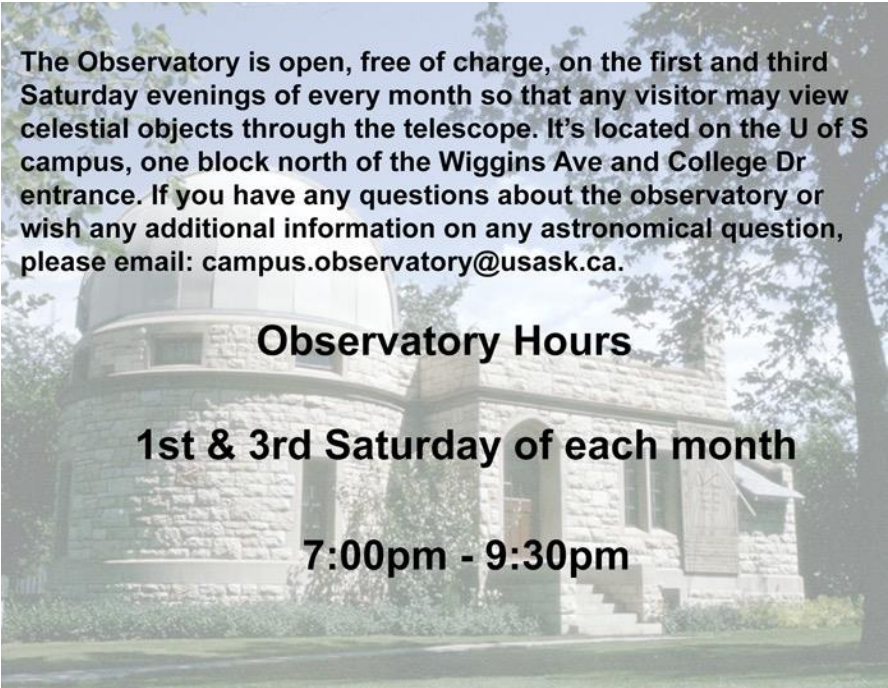
Copy & Collate – Les & Ellen Dickson

Labels & Temps – Mark de Jong

Web Posting/Content Editor – Tenho Tuomi/Andrew Kostiuk/Brent Burlingham

Saskatoon Skies is published monthly by the Saskatoon Centre of the RASC. Distribution is approximately 80 copies per issue. Saskatoon Skies welcomes unsolicited articles, sketches, photographs, cartoons, and other astronomy or space science material. Submissions should be sent by e-mail to the editor at colcha@gmail.com in MS Word or text format. Images (new or old): any format, less than 30MB, sent by e-mail as attached files. Send any articles of interest to the night sky or astronomy. **Deadline for submission of all articles for an upcoming issue is the first Friday of each month!**

Saskatoon Skies is also posted on our Saskatoon Centre homepage as a .pdf file and can be downloaded free-of-charge. Members may choose to receive the newsletter by regular mail or via the Internet. Articles may be reprinted from Saskatoon Skies without expressed permission (unless otherwise indicated), provided that proper source credit is given. Saskatoon Skies accepts commercial advertising. Please email the editor at colcha@gmail.com for rates. Members can advertise non-commercial items for free.



The Observatory is open, free of charge, on the first and third Saturday evenings of every month so that any visitor may view celestial objects through the telescope. It's located on the U of S campus, one block north of the Wiggins Ave and College Dr entrance. If you have any questions about the observatory or wish any additional information on any astronomical question, please email: campus.observatory@usask.ca.

Observatory Hours

1st & 3rd Saturday of each month

7:00pm - 9:30pm

Hours subject to change, so check below for more info -

Website - <https://artsandscience.usask.ca/physics/facilities/observatory.php>

Facebook - <https://www.facebook.com/usaskobservatory/>

RASC CALENDAR OF EVENTS & MEETING INFO

Nov 18	RASC Saskatoon Centre General Meeting	Brent Burlingham
Nov 29	Christmas Social - Great West Brewing	Lorie Tedford
Nov 30	Observer's Group - Sleaford Observatory	Brent Burlingham

Observer's group viewing starts at dusk at the Sleaford Observatory dark site. Get there early and set up for a great night of observing! Members and their guests only.

For a complete list of club events, please visit: <https://saskatoon.rasc.ca/activities.html>

November RASC General Meeting

for all members and guests

Join us on November 18th, 2024 at 8:00PM (Executive meeting at 7:00pm)

Webinar (info below)

***Please note:** the meeting will be at the U of S Observatory at 108 Wiggins Ave (on the U of S Campus)*

7:00pm - **RASC Executive Meeting** (Members may attend the executive meeting as observers if they wish)

A Zoom registration link and phone-in numbers will be emailed to Members. After that, the procedure to register and join the meeting is the same as for the webinar (explained below).

NOTE: links to register to attend the webinar will be emailed out as well so we know who is planning to attend. After registering, an email invitation will be sent with a link to join via computer or a number to phone in. When joining via computer, participants will have to first download and install the Zoom app, if they have not done so already.

8:15pm - **Main Program -**

“What’s Up This Month?” – Colin Chatfield

“Everyone always gives a bad explanation of the twin paradox” - Daryl Janzen

“PANP aurora workshop” - Tim Yaworski

BOOKS AND EQUIPMENT FOR SALE

All books are in either new, or like new condition. Retail price in brackets. Please email at novachat@sasktel.net or text/call 306-222-0515 if you want a particular book to make arrangements. All books being sold by Darrell Chatfield.

“Deep-Sky Observers Handbook” Volume 1-5 Enslow-Lutterworth	\$40.00
“International Encyclopedia of Astronomy” 1987 Patrick Moore Color	\$10.00
“Backyard Astronomers Guide” T. Dickinson & Alan Dyer 2008 Color	\$25.00
“Atlas of Deep Sky Splendors” 1978 H. Verhenberg B & W	\$22.00
“Amateur Astronomers Catalog of 500 Deep Sky Objects” Vol 1 1980 B & W R. Morales	\$15.00
“Observing the Constellations” 1989 J. Sanford Color charts	\$10.00

Please email me if you want to see any items - novachat@sasktel.net. Darrell Chatfield

- **2 - 1.25” rack and pinion focusers** for refractor type telescopes. Brand new. Never used. Inset diameter is 57mm. Heavy duty type with metal knurled knobs. All have boxes. \$20.00 each.

- **Original Celestron orange tube C5” scope** with tangent arm. Fork arms. SCOPE ONLY. No tripod or wedge. 5 x 30 finder, 1.25” visual back, diagonal, eyepiece, lens cap, metal case. Was used as a spotter scope. Not a mark on the tube. Clean looking. \$250.00

- 1 1.25” eyepiece extender - 3” long \$20.00
- 1 1.25” Celestron off axis guider c/w 12.5mm ep. Can be illuminated. New. \$45.00
- 1 Celestron 1.25” reticle. Can be illuminated \$20.00
- 1 3.5” long 1.25” tele-extender \$20.00
- 3 1.25” visual backs new \$10.00 each
- 1 1.25” to 0.965’ visual back \$10.00
- 1 Camera to visual back adapter Lightly used \$10.00
- 1 Threaded visual back to 16mm male threads camera adapter \$10.00

PRINTED NEWSLETTERS

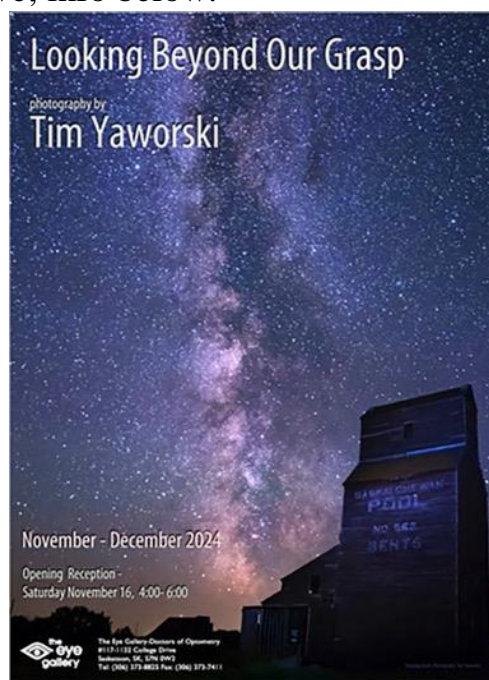
Please note that after the December 2024 newsletter is sent out, printed newsletters will not be mailed any longer.

NOVEMBER MEETING SPEAKER INFO

Darryl Janzen

Albert Einstein's special and general theories of relativity are a cornerstone of modern physics, and their predictions have been tested with incredible accuracy, in a variety of ways over more than a century. Gravitational lensing, first observed during a 1919 solar eclipse, is now regularly observed in quasar and galaxy cluster images. General relativity is the basis of modern cosmology, the science that has taught us we live in a universe that began expanding from a Big Bang nearly 14 billion years ago, which is now accelerating in its expansion at a rate that depends primarily on the presence of invisible dark matter and dark energy. Without accounting for both special and general relativistic effects, GPS errors would balloon by several kilometres per day and their signals would be totally useless. Yet despite the importance of relativity, in applications ranging from technologies we use every day to our understanding of the universe we live in, the theories and even their basic predictions are generally not commonly understood, partly due to bad communication. In this talk, I'll give a basic conceptual introduction to special relativity, starting from the basic principles of the theory. Eventually, I will focus on one of the better-known predictions of the theory, the twin paradox. I'll discuss examples of several incorrect explanations that have been suggested over the years, along with the correct resolution of the paradox, and will discuss why this simple consequence of special relativity theory has been so poorly understood.

Also, Tim Yaworski will be discussing his recent aurora workshop at PANP. Plus he has an upcoming gallery showing with a reception November 16th from 4:00-6:00pm at the Eye Gallery on College Drive; info below.



RENTAL SCOPES & IMAGING GROUP UPDATES

Jeff Swick

Well, for the last month I've had the great pleasure on working on some of the clubs scopes and taking stock of our rental scopes. It's been fun playing with...er...I mean working on a pretty diverse array of scopes, collimating mirrors and cleaning optics. My garage has been full to overflowing and I'm looking forward to getting them back into the observatory and into your hands.



There are some pretty exotic scopes for advanced users working on projects. Of course the executive will have to set policy on these rigs. By the end of November I hope to have a complete inventory and sort through some boxes looking for missing or misplaced bits and bobs. I'll slowly be building a little video library introducing each scope that I'll be posting to the Centre's Facebook page; maybe once a week or so. I've already had two enquiries via Facebook; one for a family and another from a more advanced member looking to rent a scope for planetary imaging. They already have a mount and the other gear but just wanted to try a different type of telescope.

Speaking of the Facebook group, I encourage members to subscribe to the page as it's becoming fairly busy with members sharing their astrophotos and gear. You should reach out to Colin Chatfield for access, as it's a closed group for members only. The Imaging Group, for example, will become busier with the addition of Nick Larsen to the position of Imaging Group Co-coordinator and will utilize Facebook as well. We have spoken with a few club members about setting up a Saturday afternoon imaging workshop at the campus observatory, etc. I know there is also talk of a Saturday afternoon solar workshop. It's nice to see all the enthusiasm for new programming. Joelle, our Activities Co-coordinator, came over to help me work on the scopes and let me know of some of the things coming down the pipes. She is going to be one busy lady.



Joelle using a laser collimator



Full field Orion & Running Man. Imaged at Sleaford Observatory Friday, November 1st, 2024. 5 hours total, 300 second exposures. RedCat 51x250mm, ASI 2600 Duo colour camera, Optolong L-quad enhance filter, ZWO AM3 harmonic drive mount. Processed in Siril. Photo by Nick Larsen.

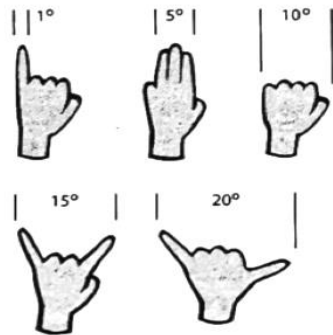
NOVEMBER NIGHT SKY EVENTS AND INFO

Images on the next few pages taken, with permission, from the 2024 Observer's Handbook. It can be obtained by joining the RASC here <http://rasc.ca/join> or ordered from <https://secure.rasc.ca/store/product/observer-s-handbook-2024>

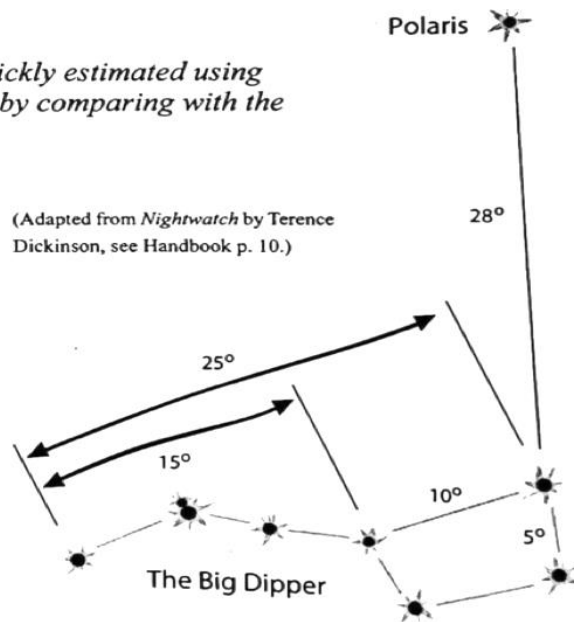


HANDY SKY MEASURES

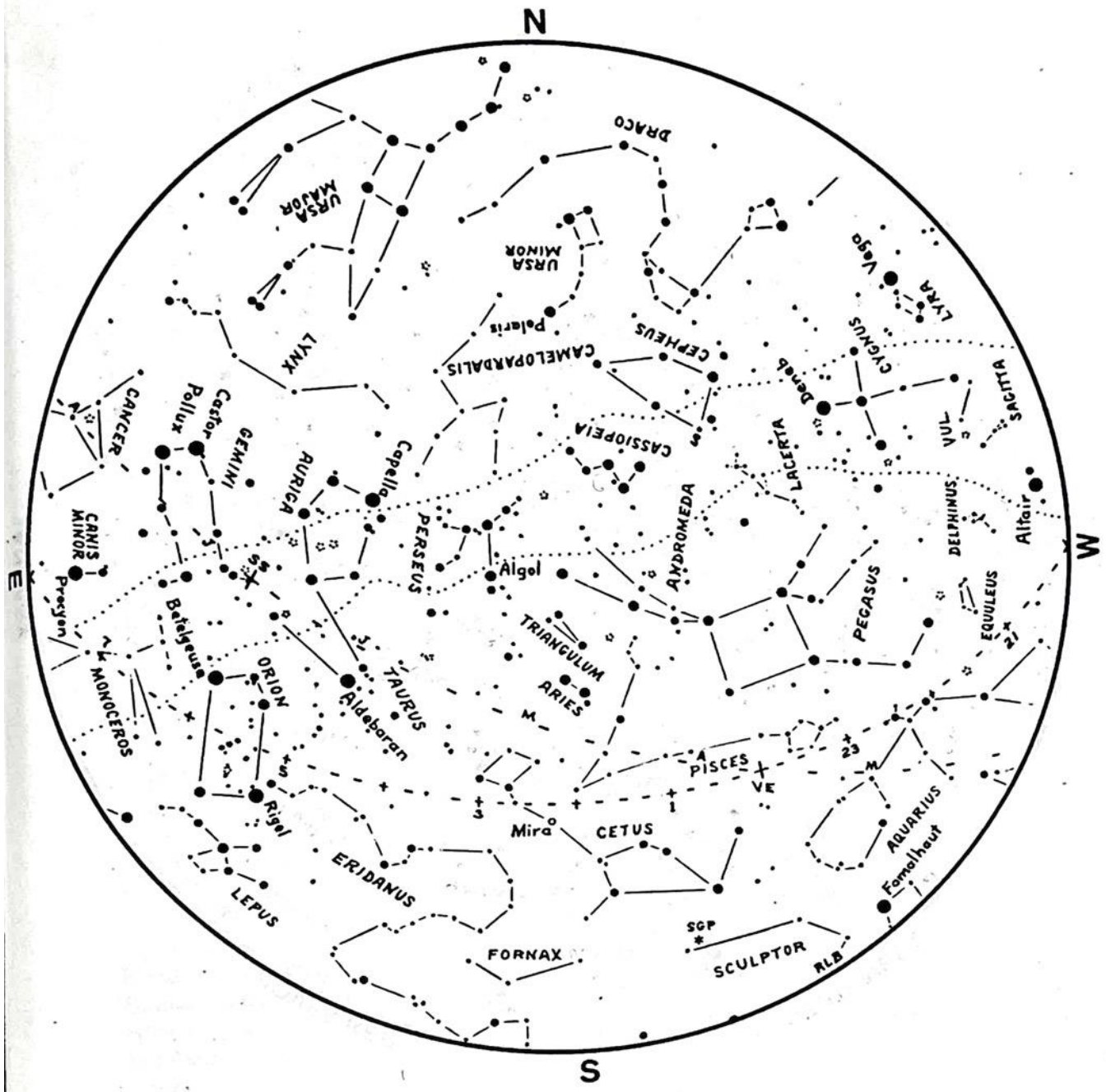
Angular measure in the sky can be quickly estimated using the fingers of an outstretched arm, or by comparing with the star separations in the Big Dipper.



(Adapted from *Nightwatch* by Terence Dickinson, see Handbook p. 10.)



Time (UT)		NOVEMBER EVENTS	Jupiter's Satellites	
d	h m		West	East
Fri.	1 12 47	new Moon (lunation 1260)		1.0
Sat.	2			2.0
Sun.	3 2 28	DAYLIGHT SAVING TIME ENDS Algol at minimum		3.0
	8	Mercury 2° N of Moon		4.0
Mon.	4 1	Antares 0.08° N of Moon, occultation†		5.0
Tue.	5 0 7	Venus 3° N of Moon S. Taurid meteors peak		6.0
	23 17	Algol at minimum		7.0
Wed.	6			8.0
Thu.	7			9.0
Fri.	8 20 06	Algol at minimum		10.0
Sat.	9 5 55	first quarter		11.0
Sun.	10 4	Mercury 2° N of Antares		12.0
Mon.	11 2 16 54	Saturn 0.09° S of Moon, occultation‡ Algol at minimum		13.0
Tue.	12 2 6 15 59	Mercury at greatest heliocentric lat. S Neptune 0.6° S of Moon, occultation* N. Taurid meteors peak Moon at ascending node		14.0
Wed.	13			15.0
Thu.	14 11 13 43	Moon at perigee (360 109 km) Algol at minimum		16.0
Fri.	15 21 29	full Moon		17.0
Sat.	16 1 6 8 8	Uranus 4° S of Moon Saturn stationary Moon in Pleiades (M45)		18.0
Sun.	17 3 10 32 12 15	Mercury greatest elongation E (23°) Uranus at opposition Algol at minimum Leonid meteors peak Jupiter 6° S of Moon		19.0
Mon.	18			20.0
Tue.	19			21.0
Wed.	20 3 7 21 21	Pollux 1.9° N of Moon Algol at minimum Mars 2° S of Moon Venus at greatest heliocentric lat. S		22.0
Thu.	21			23.0
Fri.	22			24.0
Sat.	23 1 28 4 10	last quarter Algol at minimum		25.0
Sun.	24			26.0
Mon.	25 21 31	Moon at descending node		27.0
Tue.	26 0 59 4 12	Algol at minimum Mercury stationary Moon at apogee (405 314 km)		28.0
Wed.	27 12	Spica 0.4° S of Moon, occultation§		29.0
Thu.	28 21 48	Algol at minimum		30.0
Fri.	29			31.0
Sat.	30			



REIMBURSEMENT FOR CENTRE EXPENSES

The Centre has a reimbursement procedure on submission of expense claims. A writeable pdf claim form can be found on the Centre webpage under the Executive tab. The expense form **must** be submitted *along with original receipts* to the Treasurer within 30 days of the transaction. All expenditures must be preapproved by the Executive or be within allocated budgets.

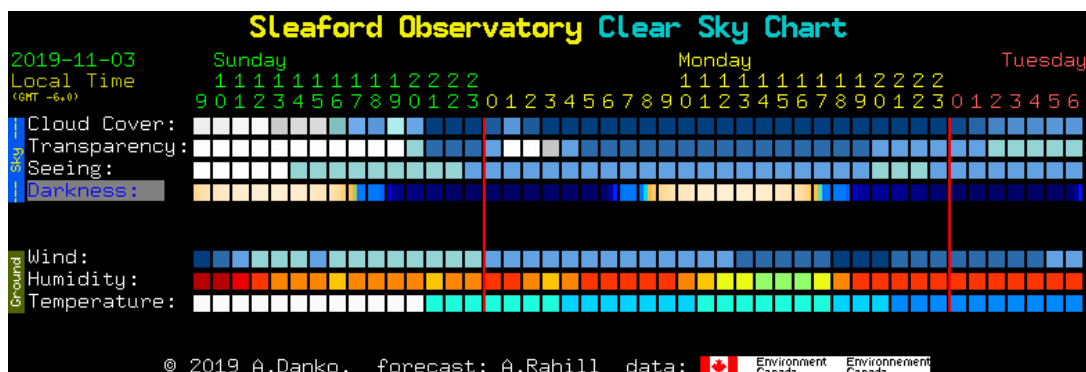
Please contact the Treasurer with any inquiries.

CLEAR SKY AND WEATHER INFO

To find clear skies, visit the Clear Dark Sky website -

<https://www.cleardarksky.com/csk/>

Once there, one can enter your location to find clear skies. The chart will appear as follows:



Environment Canada provides weather information for astronomy -

www.weather.gc.ca/astro



Saskatchewan Light Pollution Abatement Committee -

<http://myotherlife.net/slpac/>



www.darksky.org

MINUTES OF OCTOBER MEETINGS

Lorie Tedford

Minutes of the Monthly Executive Meeting of the RASC Saskatoon Centre Monday, Oct. 21st, 2024 - 7:00 pm Hybrid: Online & In-person: U of S Observatory

Attending: Brent Burlingham, Lorie Tedford, Les Dickson, Joelle Sheard-Patrick, Colin Chatfield, John Takala, Darrell Chatfield, Tenho Tuomi, George Charpentier

- 1. Call to order** 7:05 pm – Brent Burlingham (President and Chair)
- 2. Approval of the Executive meeting minutes** for September 2024 as printed in the October newsletter. Moved by Les Dickson, seconded; carried.
- 3. Call for additional announcements/items** to add to the agenda.
- 4. Announcements from the Chair** - None to present.
- 5. Old Business** - Reports from the Executive Council
 - 5.1 President's Report** - Brent Burlingham
 - The Meade 16" scope was sold to John Burt of Edmonton for \$4,500. Thank you to Ron, Nick and Jeff for transporting the scope from Sleaford and to John's vehicle.
 - Nuit Blanche was successful at the Observatory. There was lots of interest in the club and ~300 people viewing Saturn through the telescope.
 - 5.2 Acting Treasurer** - Les Dickson
 - The Executive had a vote, and it was in favour of conducting a third-party audit of the finances. Motion made by Les Dickson to include the vote in the meeting minutes, seconded by John; carried.
 - There were 8 votes in favour and 1 vote opposing for conducting a third party audit of the finances.
 - The club will be receiving a version of QuickBooks for no cost to use moving forward as a bookkeeping tool rather than excel files.
 - 5.3 National Council Rep** - Joelle Sheard-Patrick
 - None reported.
 - 5.4 Activities Coordinator** - Joelle Sheard-Patrick
 - None reported.
 - 5.5 Sleaford Update** - Darrell Chatfield
 - The site has been rekeyed.

- The batteries have been retrieved for winter, mouse traps checked and installed padlock.

5.6 Bylaws Committee - Les Dickson

- Had a brief overview of the bylaws as they currently stand and where the immediate corrections need to be made.

6. New Business

6.1 Christmas Party

- November 29th will be our Christmas party to be hosted at Great Western Brewing Company. Details will soon follow.
- No meeting will be held in December.

6.2 Ike Thiessen – Memorial

- Discussed the idea of having a plaque with the ability to add several members who have contributed to the centre.
- Darrell to look into pricing and options.

6.3 Member Engagement

- Discussed adding more observe the moon events and posting more on social media platforms.

6.5 Fundraising

- Discussed potential ideas for projects and venues to use for future fundraising opportunities.

6.6 Informal Poll of various RASC president's

- Policies regarding member who profit from astronomical activities or astronomy related business indicates that it is unnecessary strict.

7. Motion to adjourn by Les Dickson; carried. 8:11 PM.

Minutes of the Monthly General Meeting of the RASC Saskatoon Centre Monday, Oct. 21st, 2024 - 7:00 pm Hybrid: Online & In-person: U of S Observatory

Minutes taken and prepared by Lorie Tedford.

- 1. Sharing/Networking Time** - 8:00-8:15 pm - all members.
- 2. Call to Order** - 20:24 pm - Brent Burlingham (President and Chair)
- 3. Call for additional announcements/items** to add to the agenda.

4. Call out to new members/guests: Lyndon Winfield.

5. Adoption of the September General meeting minutes as printed in the October newsletter. Moved by Lisa Caldwell, seconded by Les Dickson, carried.

6. Executive Meeting Summary - Brent Burlingham

- The Meade 16” scope was sold for \$4,500 to Jon Burt from Edmonton. Thank you to Ron, Jeff and Nick for transporting the scope from Sleaford.
- Nuit Blanche had a successful turn out at the observatory with lots of interest in the club.
- The third party review suggested the use of a financial reporting software rather than an excel sheet. The club will be receiving a version of QuickBooks free of charge.
- The Christmas party will be held on November 29th with no meeting in December. It is to be held at Great Western Brewing Company, more details to follow through email.
- Darrell is looking into options to create a memorial plaque for members who have contributed to the club and have passed on.

7. New Business

7.1 Resignation of Outgoing Directors and Appointment of New Directors

7.2 Election of Officers of the RASC Saskatoon Centre Incorporated - Anyone in good standing with the Saskatoon Centre can be nominated for and run for a position as an Officer on the Executive Council. For more information, contact President Leslie Dickson or the Nominating Committee (that will be formed at the October General Meeting).

List of RASC Saskatoon Centre Executive Positions

Position	Incumbent	Status/Candidate
President	Brent Burlingham	Two Year Term
Vice-President	John Takala	Two Year Term
Secretary	Lorie Tedford	Continuing
Treasurer	Les Dickson (acting)	Les Dickson
National Council Rep	Joelle Sheard-Patrick	Continuing
Activities Coord.	Joelle Sheard-Patrick	Continuing
Librarian/Archivist	Darrell Chatfield	Continuing

Meeting Room Coord.	Les Dickson (acting)	Les Dickson
Membership Coord.	Mark de Jong	Continuing
Newsletter Editor	Colin Chatfield	Continuing
Newsletter Printer/Mailer	Les Dickson	Continuing
Observing Cert. Coord.	Darrell Chatfield	Continuing
Observing Group Coord.	Brent Burlingham (acting)	Brent Burlingham
Past President	Les Dickson	Continuing
Photographer	Colin Chatfield	Continuing
Photographer	George Charpentier	Continuing
Sleaford Maint. Coord.	Darrell Chatfield	Continuing
Sleaford Joint Mgmt. Comm.	Darrell Chatfield	Continuing
Sleaford Joint Mgmt. Comm.	Yannis Pahatouroglou	Continuing
Social Media Coord.	Colin Chatfield	Continuing
Speaker Coord.	Les Dickson	Jeff Swick
SSSP Comm. Chair	Rick Huziak/Brent Harrold	Les Dickson
Telescope Rental Coord.	Ike Thiessen	Jeff Swick
Website Content Editor	Tenho Tuomi	Continuing
Webmaster	None	Open
Website Owner/Manager	Andrew Kostiuk	Continuing

8. Program

8.1 The Upcoming Sky presented by Colin Chatfield

8.2 “Experiences as a Manufacturer of Starfield Optics Astronomy Equipment” - Steve Malia from Ontario Telescope

9. Call to adjourn - Moved by Les Dickson, **carried.**

GORDON PATTERSON

Remembering Gordon Patterson: From POW to the University of Saskatchewan

He was the first Canadian awarded the Distinguished Flying Medal for his role in a critical bombing mission and went on to survive five years in 17 German prisoner of war (POW) camps.

By **JAMES SHEWAGA**

Nov 7, 2024

“Patterson would go on to serve as both secretary and president of the Saskatoon Centre, led the production of a star atlas, wrote a guidebook titled *the Handbook for Astrophotography for Amateur Astronomers* in 1974, hosted a weekly astronomy radio show on astronomy in the ‘80s, and served as an astronomy lecturer in Saskatoon and as a guest at other centres around the country.

For his dedication and legacy of work, he was presented with a Life Membership from the Royal Astronomical Society of Canada (RASC) in 1979 and was also awarded the RASC Service Medal for his central role in promoting astronomy in 1982 when the society’s annual general assembly was held in Saskatoon. Patterson remained a leader in the field of astronomy and a key member of the physics department at USask until 1986 when he retired due to ailing health, in particular lung problems dating back to his time as a POW in Germany.”



To read the entirety of the article, visit [here](#).



“Comet C/2023 A3 (Tsuchinshan-ATLAS) taken from our place by my granddaughter with an iPhone on October 13 when the comet was almost closest to earth. Picture by Megan Tuomi.” - Tenho Tuomi



Aurora during Moonset from May 10 by Colin Chatfield, near Langham.



OBSERVING CERTIFICATES AND CLUBS

RASC OBSERVING PROGRAMS AND CERTIFICATES

The RASC offers four observing certificates for **members** who observe all objects in each of the following observing lists in this chapter:

- THE MESSIER CATALOGUE (p. 312)
- THE FINEST NGC OBJECTS (p. 316),
- THE DEEP-SKY CHALLENGE OBJECTS (p. 320),
- DEEP-SKY GEMS (p. 322).

See rasc.ca/certificate-programs for details and contact the RASC Observing Committee Chair at [rasc.ca/contact/observing](mailto:sk_centre@rasc.ca) for further information.



The RASC also offers the **Explore the Universe Certificate** for novice observers (who do not have to be RASC members), the **Explore the Moon Certificate** for beginning members, and the **Isabel Williamson Lunar Observing Certificate** and the **Double Stars Observing Certificate** for intermediate to advanced members. In addition, **Astroimaging certificates** are available for those members with a photographic bent. See rasc.ca/astro-imaging-certificate

Join the Club! Observe all 110 Messier, 110 Finest NGC, 400 Herschel I or II, 140 Lunar, 154 Sky Gems or 35 Binocular objects, or Explore the Universe and earn great OBSERVING CERTIFICATES!

MESSIER CLUB

Certified at 110 Objects:

*R. Huziak, G. Sarty,
S. Alexander, S. Ferguson,
D. Chatfield, T. Tuomi, L.
Scott, G. Charpentier, B.
Johnson, L. Dickson,
B. Burlingham, Norma Jensen,
Donna-Lee May*

Ron Waldron	108
Brent Gratias	104
Marcel Müller-Goldkuhle	94
Wade Selvig	75
Wayne Schlapkohl	43
Ellen Dickson	34
Graham Hartridge	9

CHATFIELD BINOCULAR CERTIFICATE

Certified at 35 to 40 Objects:

T. Tuomi, R. Huziak

Jim Goodridge	12
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FINEST NGC CLUB

Certified at 110 Objects:

*R. Huziak, G. Sarty,
D. Chatfield, T. Tuomi*

Larry Scott	110
Scott Alexander	97
Norma Jensen	83
Sandy Ferguson	23
George Charpentier	13
Brent Burlingham	97

EXPLORE THE UNIVERSE

Certified at 55 to 110

Objects: *T. Tuomi, B. Gratias*

Wayne Schlapkohl	55
Jim Goodridge	35

ISABEL WILLIAMSON

LUNAR OBSERVING CERTIFICATE

Certified at 140 Objects:

T. Tuomi, N. Jensen

EXPLORE THE MOON CERTIFICATE

T. Yaworski

Brent Gratias	37
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HERSCHEL 400 CLUB

Certified at 400 Objects:

*R. Huziak, D. Chatfield,
T. Tuomi*

Gordon Sarty	251
Scott Alexander	117
Larry Scott	45
Sandy Ferguson	18

HERSCHEL 400-II CLUB

Darrell Chatfield	400
Tenho Tuomi	378
Rick Huziak	246

LEVY DEEP-SKY GEMS

Certified at 154 Objects:

Tenho Tuomi	150
Darrell Chatfield	70

Messier, Finest NGC, and David Levy's Deep-Sky lists in the *Observer's Handbook*.

The Explore the Universe list is available here <http://www.rasc.ca/explore-universe>
Messier and Finest NGC lists, charts and logbooks: <https://www.rasc.ca/certificate-programs>

Herschel 400 List: <http://www.astroloague.org/al/obsclubs/herschel/hers400.html>

Chatfield Binocular List is at: https://saskatoon.rasc.ca/Chatfield_Binocular_List.pdf

“Isabel Williamson Lunar Observing Program Guide” program details can be found at:

<https://www.rasc.ca/isabel-williamson-lunar-observing-program>