

Skyward

March - April 2022 Edition

In This Issue:

- Star Gazers
- The Cosmic Generation Lifts off
- Omicron!
- Marc's Favourite Leo Galaxies
- Photographing the Moon in 3D
- Hubble's Variable Nebula

Marc Rieun

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Cover Photo: NGC 2903. *By Marc Ricard. Welcome to galaxy season! This is a remixed version Marc shot in Pointe-Claire. I pointed my RC-8 over a dozen clear nights during March and April and captured a total of 1120x60 second sub-frames through RGB filters with my QSI 683. I used APP to calibrate and integrate them into separate colour masters and Pixinsight to combine them and create the image you see here. Can you spot the bonus galaxy UGC 5086?*

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Note from the Editor



Hi fellow RASCals.

Remember Marc Ricard's beautiful image, shown below, of the Perseus molecular cloud that graced our cover in December 2021? Well it appears on the back cover of the latest issue of the RASC Journal. You saw it here first, folks!

We have a block buster edition! Welcome to Galaxy Season! Marc Ricard takes us on a tour of his favourites in Leo. Frank Tomaras finally gets credit for splitting Sirius! Check out the upcoming public events and outreach/inreach events or if you missed one, catch up on our [Youtube channel](#) for public events and in the members area of our website for Centre events. David Levy writes about Omicron (no, not that one!) and the merits of just gazing at the stars. Taara Jaffer invites youth members to join the *Cosmic Generation*. Nicole shows us how to build a funnel viewer that allows several people to view the Moon together during outreach events. Finally, we have two in-depth articles. The first, by Martin Rochette, explains how he photographs the Moon in 3D with some samples. (You'll need your 3D glasses but don't worry if you lost yours, he's willing to send a pair!). The second, by Gilbert St-Onge is a follow-up on his article about the missing jet in Hubble's Variable Nebula.

Just in case you haven't realized it, the [RASC Montreal Centre's](#) website is distinct from the National site. See the ad on [page 15](#) about reaping the benefits offered by our Centre.

Check out the articles for sale on the last page.

Ed. 



Word from the President

By Paul Simard



Spring has sprung!

And this morning, my friend David and I decided to do some solar observing. After being cooped up all Winter long, we were finally able to do some observing, even if it was solar.

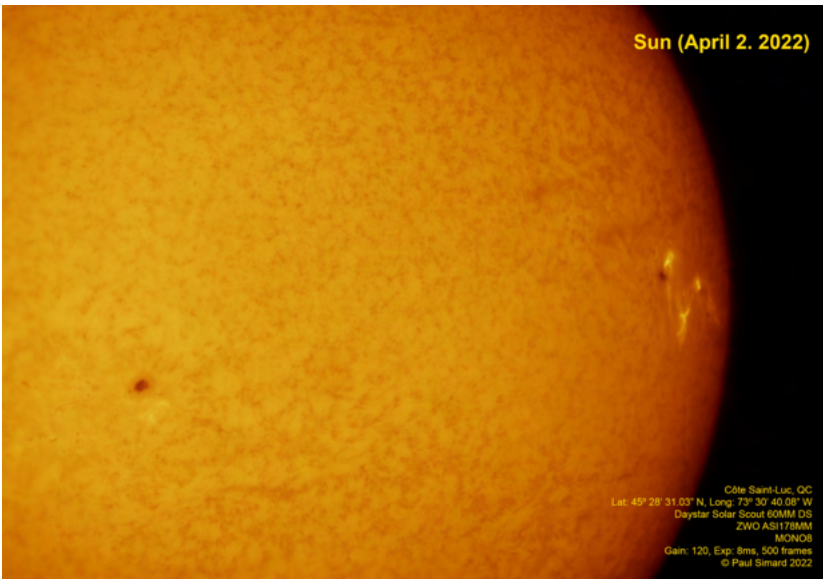
I even went to the trouble of taking some photos and stacking them.

David got to try out his *ASIAIR Plus* although he didn't take any photos since he's still learning how to use it.

With the loosening of the COVID rules, we can all start to get together and enjoy the night sky. So, unpack and dust off your equipment and let's all get out there and observe.

Check our calendar for the nights we will have member observation sessions and come join us.

And on those nights where the weather still will not cooperate (we do live in Quebec), we still have our virtual clubhouse.



For the time being, our public talks are still virtual. However, we are working on setting up our talks in a hybrid way. This will allow those who can to participate in the talk while still including those who cannot. Especially for those from outside Quebec.

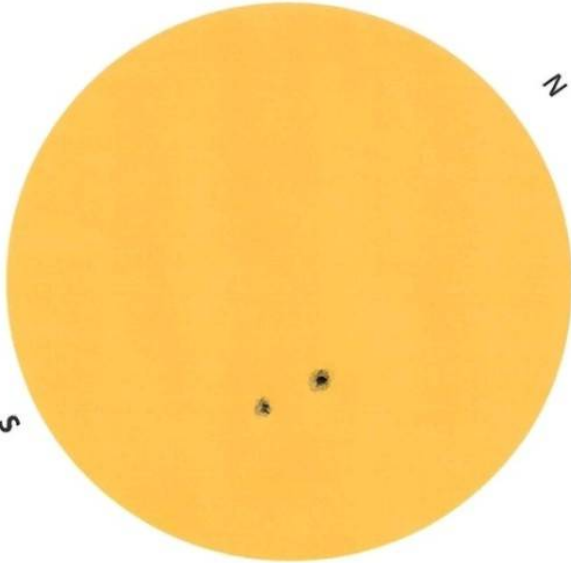
Our April talks include **TRAPPIST-1 Through the Eyes of JWST** by Olivia Lim on April 9 and a **Lunar Crater Sketching Workshop** hosted by Bettina Forget on April 14th. More is on the way.

That's it for now. Until next time. [mfi](https://www.mfi.ca)



**Montreal Centre
Royal Astronomical Society Of Canada
Solar Disk Plotting Form**

Observer Carl Jorgensen Date Mar 8 2022
 Address: 1503 Bellevue #2 Time: Local: 8:32 EST UT: 13:32
 Greenfield Park QC Seeing 2 Transparency 3
 Reflector Refractor Direct Projection Aperture: 60 MM Magnification: 60X
 FL Objective 900 MM FL Eyepiece 15 MM Projection Distance N/A
 Remarks Observed the Sun & observed 2 sunspots.

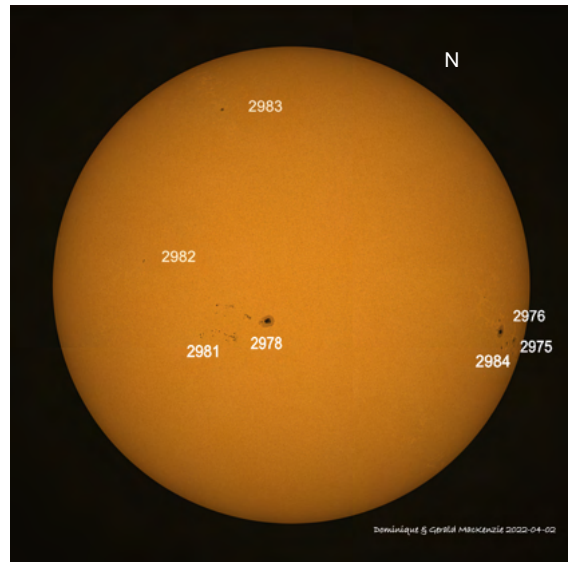
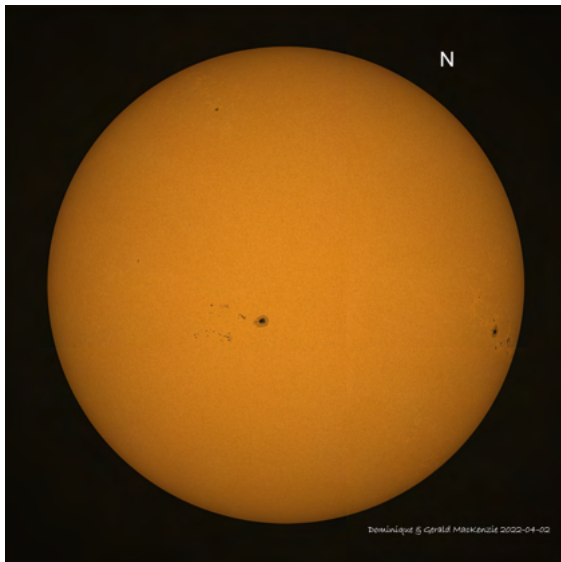


Observed using a Baader Planetarium AstroSolar filter. Ed.

Other recent images of our star by members

Warning

Never look at the Sun without a suitable filter, either directly with the unaided eye or through binoculars or a telescope. To do so risks permanent partial blindness, and this can occur almost instantly in the case of telescopic viewing. Never leave an unattended telescope set up in sunlight especially if children are present. Cit. **Viewing a Solar Eclipse - A Warning** by Roy Bishop and **Solar Observing** by Kim Hay in the most recent **Observer's Handbook**.



Sun Spots 2022-04-02 By Dominique and Gerald MacKenzie. Taken in Beaconsfield with our Tele Vue 85 scope, ASI533MC Pro camera with a Thousand Oaks SolarLite filter. 200 frames at 4 ms and unity gain. Stacked in AstroStakkert keeping 75% of frames.

New Members

Please join us in welcoming these new members:

John Sprague

Chantal Boies

Lukas de Sousa

Mario D'Amico

Roch Trépanier



Dawn March 22 2022. By Carl Jorgensen. I also observed Saturn with binoculars but it did not show up on the photo because it was amongst the trees. See details from my observing session below:

Session 1387: Mar 22 2022 5:40 – 6:05 EDT. Present Carl. Instruments: My Canon EOS X7 DSLR Camera using the 75 – 300 mm lens mounted on a camera tripod, my 15 X 70 binoculars (Gemini) & my 60 mm X 900 mm refractor (Altair) using the 15 mm eyepiece. Observed Venus, Mars & Saturn with Gemini. Observed Venus & Mars with Altair. Venus looked like a mini 1st Quarter Moon. Mars appeared as a very small red disc. I also took 8 photos of Venus & Mars with my Canon Camera. I decided to display the best photo above. Camera Settings: (ISO 3200, EXP 1.3 ", Av F5.6 & FL 120 MM Time: 5:59:51 EST). Processing Photoshop: (Gradient Terminator & 1 levels Adjustment Layer; Seeing 3, Transparency 2. Location: Greenfield Park QC (balcony)

Public Events



By Karim Jaffer, Coordinator - Public Events

The 2022 Public Events schedule continues with fantastic speakers over the past 2 months and the upcoming likelihood of pandemic measures being lifted. Our Public Event talks will continue to be offered by YouTube & Zoom, with the plan being for Co-modal events (both in-person and virtual components) – advertised to both our local and global audiences. Any members with suggestions for speakers, topics, and those interested in volunteering to help are invited to email publicevents@rascmontreal.org

Recent Events

Feb 18th at 19:00 EST, co-host RASC NextGen

Perseverance: First Year on Mars

by Erin Gibbons, McGill University

As part of the Mars 2020 Mission, the Perseverance Rover and Ingenuity Helicopter just celebrated one full Earth Solar year since landing on Mars. Erin Gibbons, PhD candidate at McGill University and part of the NASA's Rover Operation and Science Team, provided a wonderful talk contextualizing the research being done on Mars. Erin has been helping decide Percy's movements, and helping to operate the SuperCam instrument – using lasers to investigate the chemistry of Martian rocks. As part of her introduction Erin explained how the Martian surface compares to Earth's geology in its formation from the solar system nebula 4.5 billion years ago, and why & where we hope to find biosignatures on the Red Planet. The keynote presentation was followed by an animated and informative discussion as the webinar was transformed into a full Zoom meeting. The discussion continued late into the night, and in addition to 80 Zoom attendees the event was live-streamed and has now been viewed over 160 times (including by two classes and two girl guides troops).

<https://youtu.be/bDvIUU4BJ0U>



Mar 26th at 19:00 EST

Celebrating Earth Hour

by Lisa Ann Fanning & Tim Doucette

To celebrate Earth Hour 2022, RASC Montreal hosted two friends from the RASC Halifax Centre. Lisa Ann Fanning (*Lisa's Look Up!*) provided a wonderful overview of the research into how animals respond to astronomical events & the impact of light pollution. Tim Doucette (*Deep Sky Eye Observatory*) showcased his AstroTourism location in Nova Scotia, and the **Cap the Light – Save the Night** project to try to protect the dark skies of that regions. The event was followed by Earth Hour from 8:30-9:30pm EDT, with lights (and screens) turned off to move our gaze skyward!

<https://youtu.be/MX8ggawqQo8>



Upcoming Events

Apr 9th TRAPPIST-1: Through the Eyes of JWST

by Olivia Lim, iREx & UdeM

Register in advance: <https://bit.ly/JWSTApr9>



RASC Montreal Centre Presents a Zoom Public Webinar

TRAPPIST-1 Saturday
Through the Eyes of JWST April 9th 2022
7pm EDT

<http://www.rascmontreal.org/titan/>

Olivia Lim, iREx
PhD Student - UdeM
Photo: Amélie Philibert

Seven Earth-sized rocky exoplanets are orbiting a small red star 39 light-years away, including some with the possibility of liquid water on their surface. Olivia Lim's PhD research focuses on the orbital geometry of the system. Olivia will be using the JWST to detect and possibly characterize the atmospheres of the TRAPPIST-1 planets.

Artist's concept (NASA) depicting the TRAPPIST-1 system from a vantage point near planet TRAPPIST-1f (right).

Register in advance for this Free Zoom Event
<https://bit.ly/JWSTApr9>

Apr 14th Lunar Crater Sketching, co-hosted with RASC National

by Bettina Forget – Director, Artist-in-Residence (AIR) Program at SETI
Crater Images can be downloaded [here](#)



Sketching the Moon

Learn how to draw lunar craters with special guest Bettina Forget

Join us via zoom
April 14th @ 6 pm EDT

Register with this link
<https://bit.ly/Craters2022>

Hosted by RASC National & RASC Montreal

Lunar Sketch by Bettina Forget

May 7th International Astronomy Day

AstroFest In-person @ Rio Tinto Alcan Planetarium, 11am-11pm

RASC National Livestream Online, <https://youtube.com/RASCanada>

Moon & Star Party In-person @ West Island, details to follow

Visit the Calendar on the RASC Montreal Centre website for event details and keep an eye on your email for new public events as they are confirmed. <https://rascmontreal.org/titan/our-calendar/>



Outreach: Education & Public Outreach Committee

Intersection of space and art for Youth!
Ages group is being expanded to 5 - 17 this year

Creation Station
Station de création
RASC SRAC

SPACE
FOR YOUR
IMAGINATION

ESPACE
POUR VOTRE
IMAGINATION

FOR CREATIVE MINDS AGE 5-12
POUR LES ESPRITS CRÉATIFS 5 À 12 ANS



Launching May 2022
rasc.ca/creationstation



This Summer... It's BACK!



B-Q

New Memories, New Fun!
Time to get together again.
Details to come.

Annual Secretary's Report, 2021

By Carl Jorgensen, Secretary



As of New Years Day, January 1 2021 the RASC Montreal Centre had to continue Its operations under COVID-19 restrictions. Our Clubhouse and Library remained closed and our darkest observing site, Woolly Woods remained inaccessible for all of 2021. However after June 30th 2021 we were allowed to access the land around our Arbo Clubhouse for observing and our second darkest site, Thompson Park Hudson Quebec, with a maximum 25 socially distanced participants.

Observing at the Arbo started on Wednesday June 30 2021 & ended Wednesday Dec 1st 2021. There were 18 planned dates but only 2 were a Go.

Public & Outreach Events

- Tue Jan 26: **An Evening of Exoplanets** by multiple presenters.
- Wed Feb 10: **International Day of Women and Girls in Science** organized by Virginia Pacheco.
- Thurs Feb 18: **History of Mars Exploration** – Beaufort–Beaconsfield Historical Society presented by David Shuman (outreach).
- Sat Feb 27: **The Search for Life on Mars** - presented by Dr. Richard Léveillé.
- Fri Mar 5: Beaconsfield Public Library **Alien Drawing Bilingual Workshop** by Taara Jaffer (Outreach).
- Fri Mar 19: Outreach Event Beaconsfield Public Library Mars 2020 English Presentation with Bilingual Q&A by Adrien Blanchet (Outreach).
- Sat March 27: **Astrophotography, From Simple to Advanced** by Debra Ceravolo.
- Sat April 24: **Small Satellites and Big Stars** by Dr. Anthony in Moffat.
- Sat May 8: Virtual Swap Table by The RASC Montreal Centre.
- Sat May 15: **Global Star Party XLV** by The RASC Montreal Centre & Explore Alliance (outreach).
- Sat June 5: **Encouraging Girls into STEM Fields by Fusing Art and Astrobiology** by Bettina Forget.
- Thur Jun 10: **Annular Solar Eclipse** (A backyard outreach observing event).
- Sat July 17: **Quick Astrophotography Under A Light Polluted Sky** by Steve Warbis.
- Sat July 31: **Stunning Star Trails** by Mary McIntyre.
- Fri Aug 6: Beaconsfield Public Library - **The Perseid Meteor Shower** (Outreach).
- Sat Aug 14: Star Party Centennial Park Beaconsfield organized by Karim Jaffer & Russell Fralich (Outreach).
- Sun Aug 15: Outreach Star Party John Abbott College organized by Karim Jaffer.
- Thur Aug 19 – Aug 21: Partners Event Astronomy League Convention (Outreach).
- Sat Aug 21: **Solar Sphere Festival** UK organized by Peter Williamson.
- Sat Sept 18: Townsend Lecture 2021– **Two Weeks on “Mars”** by Elizabeth Howell PhD.
- Sat Sept 25: **45 Degree Outreach Star Party** with the RASC Montreal Centre, Dunedin Astronomical Society and Explore Alliance.
- Sat Oct 16: International Observe the Moon Day - **Solar System Moons**, RASC Centre members and Astronomical League VP Chuck Allen.
- Fri Oct 29: Zoom **Spooky Nights**, with JAC Space Club. (Outreach).
- Sat Dec 4: **Apollo Science Missions** by David Shuman.
- Fri Dec 10: Zoom Outreach Event **astroMIL**, Winter Edition - University of Montreal – Multiple Presenters (in French) (Outreach).
- Tue Dec 14: Outreach Observing Event – **The Geminid Meteor Shower** – Fritz Farm Baie d’Urfé QC.

Presentations for Members

- Wed Jan 6: **The Night Sky for January** by Nicole Laporte.
- Wed Jan 20: **Space Flights** by David Shuman.
- Wed Feb 3: **The Night Sky for February** by Nicole Laporte.
- Wed Feb 17: **Measuring Double Stars using Astrophotography** by Dominique MacKenzie.
- Wed Feb 24: **The Night Sky for March** by Nicole Laporte.
- Wed March 10: **Focus and Collimation** by Greg Beaton.
- Wed March 24: **Chinese and Russian Launch Vehicles** by David Shuman.
- Wed March 31: **The Night Sky for April** by Nicole Laporte.
- Wed April 14: **Choosing a Camera for Astrophotography** by Ben Shu Chang.
- Wed May 5: **The Night Sky for May** by Nicole Laporte.
- Wed May 19: **Getting Started in Backyard Astrophotography During Lockdown** by Russell Fralich.
- Wed May 26: **The Night Sky for June** by Nicole Laporte.
- Wed June 2: **Whirlpools in Space - The Story of the Leviathan Telescope in Ireland.** by Peter Williamson.
- Wed June 9: **Indigenous and Ancient Eclipse Legends** by Karim Jaffer and **An Eclipse Road Trip** David Shuman.
- Wed June 23: **Astronomy Gadgetry** by Karl Petrich.
- Wed July 21: **The Chinese Space Program** by David Shuman.
- Wed Aug 18: **Orbits Are (Not [Quite]) Ellipses** by Pierre Paquette.
- Wed Sept 22 **All About Siril In A Nut Shell** by Jane Lubenskyi.
- Wed Oct 20: **Babylonian Planetary Theory** by Pierre Paquette.
- Sat Nov 13: RASC Montreal Centre's AGM chaired by President Paul Simard.
- Wed Nov 17: **Citizen Science Episode 1** – with 3 Speakers 15 min each.
- Wed Dec 8: **The RASC Montreal Centre in 1967: Trials, Tribulations and Friendships** by Dr David H Levy.



RASC Montreal Centre's Events 2021											
	Wed Informal Meetings	Sat Informal Meetings	Wed M Events	Sat M Events	Sat P Events	Wed P Events	Wed Arbo Observing NOGO Wed Informal Meeting Instead	Wed Arbo Observing GO	Sat Thompson Park Observing (Optional)	Outreach Events	
Jan	2	5	2	0			0	0	0	0	
Feb	0	3	3	0	1	1	0	0	0	1	
Mar	2	2	3	0	1	0	0	0	0	2	
Apr	3	2	1	0	2	0	0	0	0	0	
May	0	3	4	0	1	0	0	0	0	1	
June	1	3	3	0	1	0	0	1	0	1	
July	0	3	1	0	2	0	3	0	0	0	
Aug	0	3	1	0	1	0	3	0	0	6	
Sept	0	2	1	0	1	0	4	0	2	1	
Oct	0	3	1	0	1	0	2	1	3	1	
Nov	0	3	1	1	1	0	3	0	0	0	
Dec	3	2	2	0	1	0	0	0	0	2	Total
Total	11	34	23	1	13	1	15	2	5	15	120

In columns DE row 3 M stands for Members. In columns FG row 3 P stands for Public

Frank Tomaras, Double Star Sirius Certificate

By Carl Jorgensen, On March 16 2022 the Montreal Centre's Double Star Program was proud & honoured to present to Frank Tomaras the Program's Sirius Certificate. Frank observed & separated Sirius on March 24 2014. The details of Frank's observation can be seen below top left. A photo of Frank's Sirius Certificate below top right. Frank holding his Sirius Certificate below bottom left. Frank's Sirius Certificate added to the list of Earned Double Star Certificates below bottom right.

Frank's Double Star Record

RASC Montreal Center Target Star Sirius	
Double Star	Sirius (α Canis Majoris)
Constellation	Canis Major
Magnitude A	-1.5
Magnitude B	8.5
Separation A - B	9.6"
Position Angle A - B	83°
Color A - B	white - blue
RA/Dec	06 ^h 45' / -16° 43'
Date (dd:mm:yyyy)	24 03 2014
Time (hh:mm) /TZ	20:00
Observing Location:	Chomedey Laval, Quebec
Seeing / Transparency	5/4
Instrument:	12in f/5 Newtonian Reflector
Power	305x (using 5mm Hyperion)
Remarks: Using a chart I knew where the pup was located (in my telescope around the 4-o'clock position) so I allowed SiriusA to move out of the FOV and SiriusB popped into view.	



Outreach - Inreach



By and Russell Frailich, Director - Outreach
and Kareem Jaffer, Coordinator - Public Events

Warmer weather with positive temperature values has finally arrived and we are planning to make the most of it. So, get outside and look up!

AstroFest 2022

First up: The **Rio Tinto Alcan Planetarium** (*Espace pour la vie*) is hosting an in-person **AstroFest 2022** on Saturday, May 7. Beginning at 11 am, there will be on-site activities for all ages: workshops, presentations, an astrophotography exhibit, and much, much more. At 7 pm, a special guest, a CSA astronaut, will be doing a talk that will also be streamed live for those who can't attend in-person.

Sat May 7



If the skies are clear, evening observing will start outside the planetarium at 9:30 pm.

Official **AstroFest** information will be available soon at the Planetarium website (<https://espacepurlavie.ca/planetarium>).

RASC Montreal Centre will be there with a table offering a few activities and showcasing our members' astrophotography! More information will be available soon via email and on the club website.

On the same day, RASC Montreal Centre will host a *Moon & Star Party* in the West Island, weather permitting. Details coming soon!

To top off this fun-filled celebration of Astronomy, our Centre is helping organize a nationwide live-stream visiting RASC Centres as we celebrate the *Artemis Missions* with the CSA. We will share some of our in-person festivities as well as some pre-recorded material showcasing the Montreal Centre... all live on the RASC Canada YouTube Channel at <https://www.youtube.com/user/RASCANADA>!

Outreach Events at Cap-St-Jacques Nature Park and Beaconsfield

Provided the COVID situation doesn't worsen, this summer promises a long-awaited return to in-person star parties! Here are the first two star parties we've nailed down, so you can reserve the dates.

Star Party: Voyage dans les étoiles

Cap-St-Jacques Nature Park
Saturday August 6, 7-10 pm
More details to come

Sat Aug 6


Beaconsfield Camp out

Saturday August 13th

Details to come

Sat Aug 13

Citizen Science Series Continues

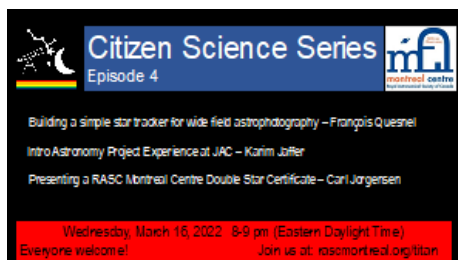


Citizen Science Series
Episode 3

Quantum Entanglement – Jane Lubenskyi
RASC Double Star Program – Carl Jorgensen
Observing Coloured Double Stars – Luc Descoteaux
Measuring Double Stars – Gerald & Dominique MacKenzie

Wednesday, February 16, 8-9 pm (Eastern Standard Time)
Everyone welcome! Join us at: rascmontreal.org/titan

Episode 3 citizen science presentation took place on Wednesday February 16, the Clubhouse meeting nearest the full moon. It was a marathon event, beginning with Jane Lubenskyi's fascinating presentation about Quantum Entanglement, then moving into Double Star territory with informative talks from Luc Descoteaux, Gerald & Dominique MacKenzie and Carl Jorgensen.



Citizen Science Series
Episode 4

Building a simple star tracker for wide field astrophotography – François Quesnel
Intro Astronomy Project Experience at JAC – Karim Jaffer
Presenting a RASC Montreal Centre Double Star Certificate – Carl Jorgensen

Wednesday, March 16, 2022 8-9 pm (Eastern Daylight Time)
Everyone welcome! Join us at: rascmontreal.org/titan

Episode 4 on Wednesday, Mar 16 started off impressing everyone in attendance with François Quesnel describing how he designed and built a high-precision star tracker for wide-field astrophotography. Karim presented numerous mesmerizing projects he and his students have embarked on at John Abbott College, while Carl Jorgensen presented a long-awaited Sirius Double Star certificate to Frank Tomaras.

Episode 5 was held on Wednesday, April 13 with a highly anticipated double star presentation by Blake Nancarrow of RASC entitled "Measuring doubles: techniques for amateur astronomers & citizen scientists."

We're always looking for people who would like to share their astro passion. So if you are interested in presenting in a future episode, please contact Russell (outreach@rascmontreal.org).

NOVA (New Observers to Visual Astronomy)

NOVA is a national program aiming to offer a series of introductions to a vast range of astronomy topics for new or interested members, spanning our place in the universe, to navigating the night sky to cosmology, and much more. The modules will be available to all RASC centres very soon. Here are the confirmed topics:


Core Modules

- Navigating the Night Sky
- Constellations & Asterisms
- Seasonal Observing
- History
- Equipment
- Helpful Tools
- Sun & Moon
- Solar System Structure
- Solar System Observing
- Stars
- Deep Sky Objects

Additional Modules for more specialized topics

- Aurora Borealis & Space Weather
- Radioastronomy
- Cosmology
- Light Pollution Abatement
- Space Exploration
- Astrophotography
- Common Misconceptions in Astronomy

So much stuff! More information available at <https://www.rasc.ca/nova>

What do YOU want to know more about? Email me at outreach@rascmontreal.org 

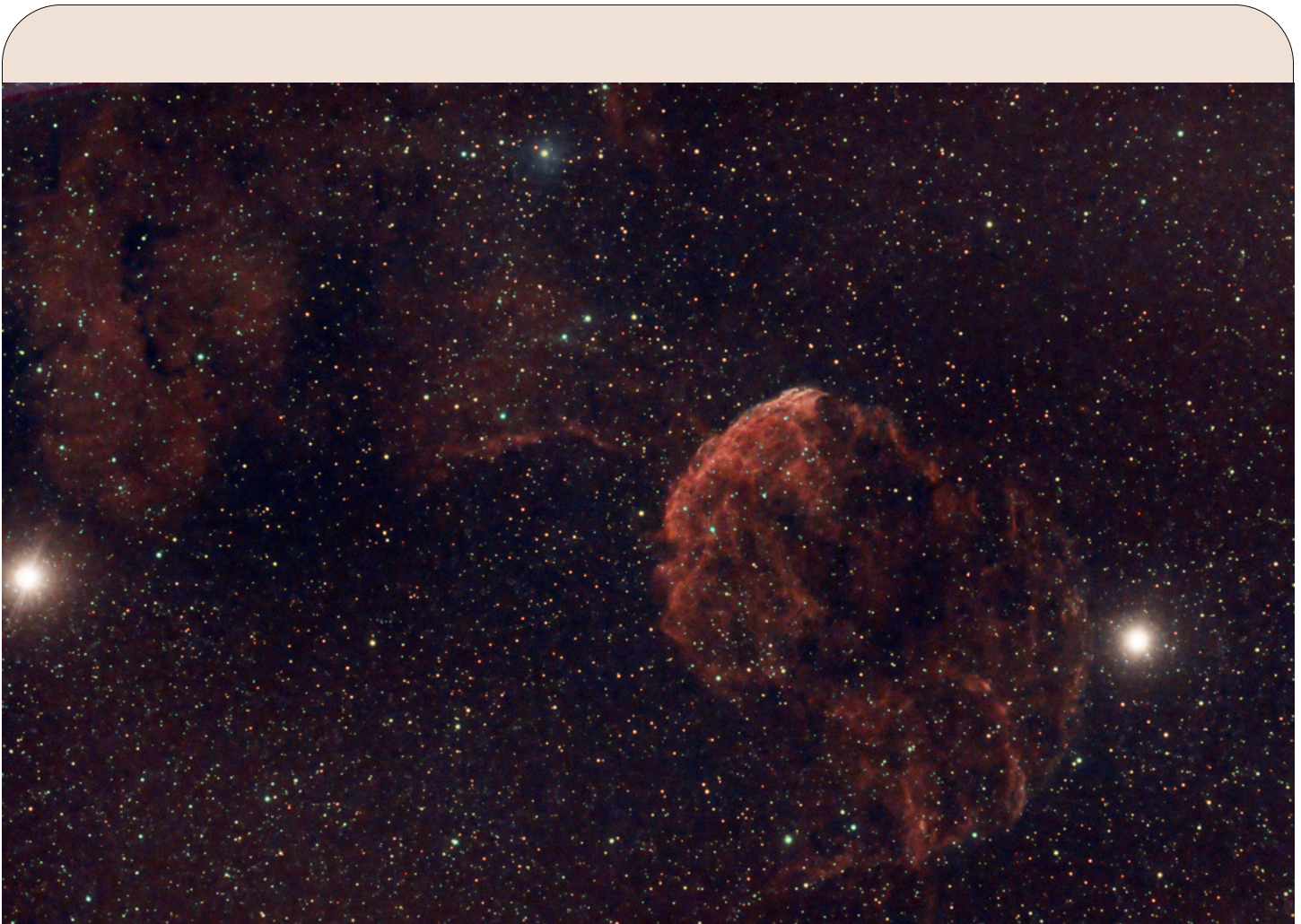
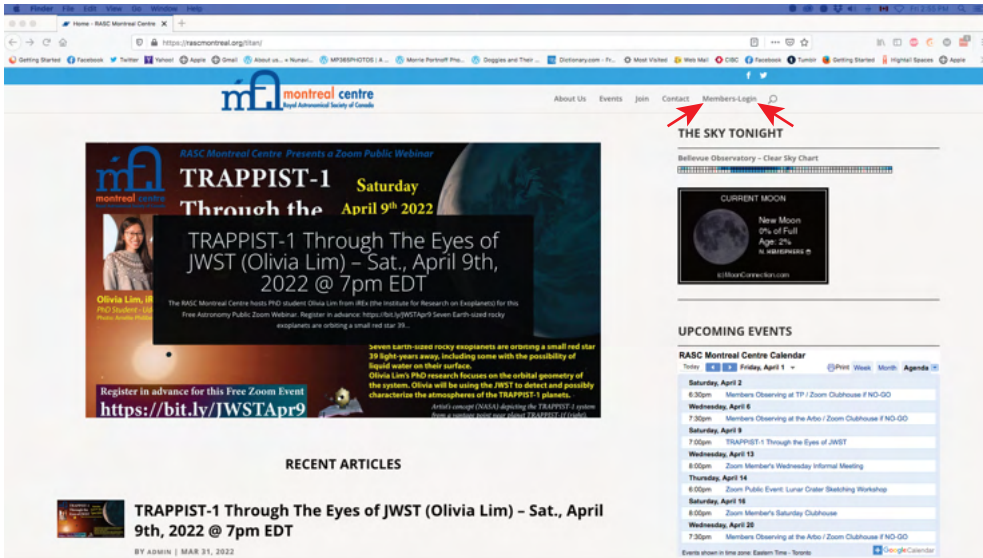
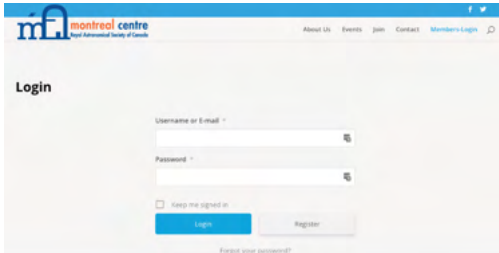


Image by Russell Frailich: IC 443 Jellyfish Nebula, Canon SL3 astromodified DSLR, Evostar 80ED refractor + 0.8X reducer, Celestron AVX mount, Starfield 60mm guidescope + ZWO ASI120mm-mini guide camera, Optolong L-Enhance filter, Software running on my mini PC: Celestron CPWI + N.I.N.A + PHD2 + Remote Desktop. 39 x 300s (3.23 hour) exposure. Images taken Feb 5 and Feb 23, 2022 from my backyard in NDG.

Being a RASC Montreal Centre Member has its ADVANTAGES



Did you know that our web site has a Members ONLY Section?

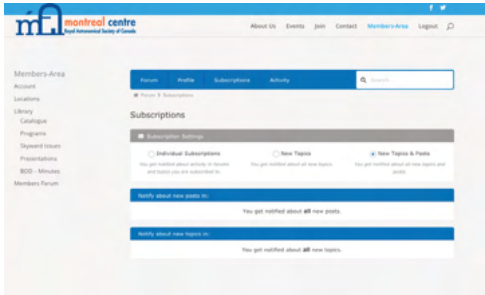
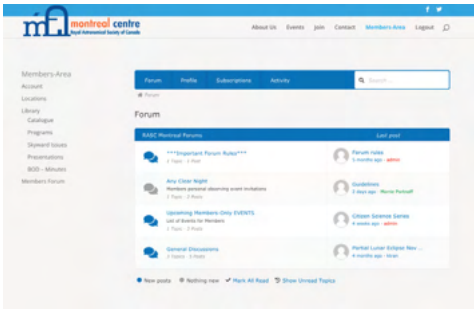


Sign Up Today and discover so much more about your astronomy club
Contact Richard, our Webmaster if you have any problems at webmaster@rascmontreal.org

Discover a host of member only forums

- Including:
- Back issues of Skyward
 - Members-Only Events
 - General Discussions
 - **NEW!!!** Any Clear Night

Going out to do some observing?
Let others know so they may join you,
or you may join others.



Subscribe to any or all of these forum groups

Star Gazers



By David H. Levy
photo: David Levy

*What crowd is this? What have we here? We must not pass it by;
A telescope upon its frame, and pointed to the sky*

William Wordsworth, 1806

While I was working on my master's degree at Queen's University in Canada some 42 years ago, I came across this poem, loved it, and decided to include it in my thesis. Norman MacKenzie, my thesis adviser, a scholar and a genius, pencilled one comment at the bottom of this poem: "Wordsworth wrote some wretched verse." Norman did not have much of a sense of humour, but I am still laughing at his written comment.

In his poem, Wordsworth complains about how many people who look through a telescope are disappointed in what they see. At no point in time is that idea more cogent than now. If a telescope we look through cannot offer us a view as good as a space telescope, then that telescope is a failure.

By the end of the poem, the crowd abandons the telescope:

*"One after one they take their turns, nor have I one espied
That doth not slackly go away, as if dissatisfied."*

For me, the night sky is far more than our imagined perceptions of what we can see through a telescope. Some of us can look at an Internet photograph all day long, but not I. The beauty of the sky lies in its reality. The planets I see are real worlds. The constellations I point out to young observers contain real stars. One evening I asked a group if they had seen the recent eclipse of the Moon. "Yes," answered one, "I saw it online." No, he didn't. Eclipses are real only if you see them in the sky, while they are happening.

It is a given that a back yard telescope will never show us Jupiter as detailed or as colourful as a telescope out in space will. What that telescope does show us is the genuine sky, a sky without artificial colour enhancement, a sky as it really exists on top of our heads on every clear night. It shows us a sky untarnished by the trivial events of the day, and unspoiled by petty concerns that are bothering us. Our own telescope truly shows us the Moon as it was a third of a second ago, a star as it appeared thirty-four years ago, or a galaxy as it appeared twelve million years in the past. Our back yard telescope shows us what is there, and unlike the crowd from 1806 that left dissatisfied, the people of today can understand that the sky they see is real.



Eureka



The Cosmic Generation lifts off!



By Taara Jaffer

My name is Taara, I'm 14 years old and my love for astronomy started 6 years ago, when I used a telescope for the first time, after my family and I joined RASC (Royal Astronomical Society of Canada). Late last year we joined the *Astronomical League* and the *University Lowbrows*. Around the same time, I was invited to a meeting for youth astronomers where we talked about activities we could do to get more youth involved in astronomy. After a few meetings we realized that more youth would get involved if the activities were run by youth than by adults. So a bunch of us youth worked toward making an international club run by youth for youth ages 17 and under — the **Cosmic Generation**.

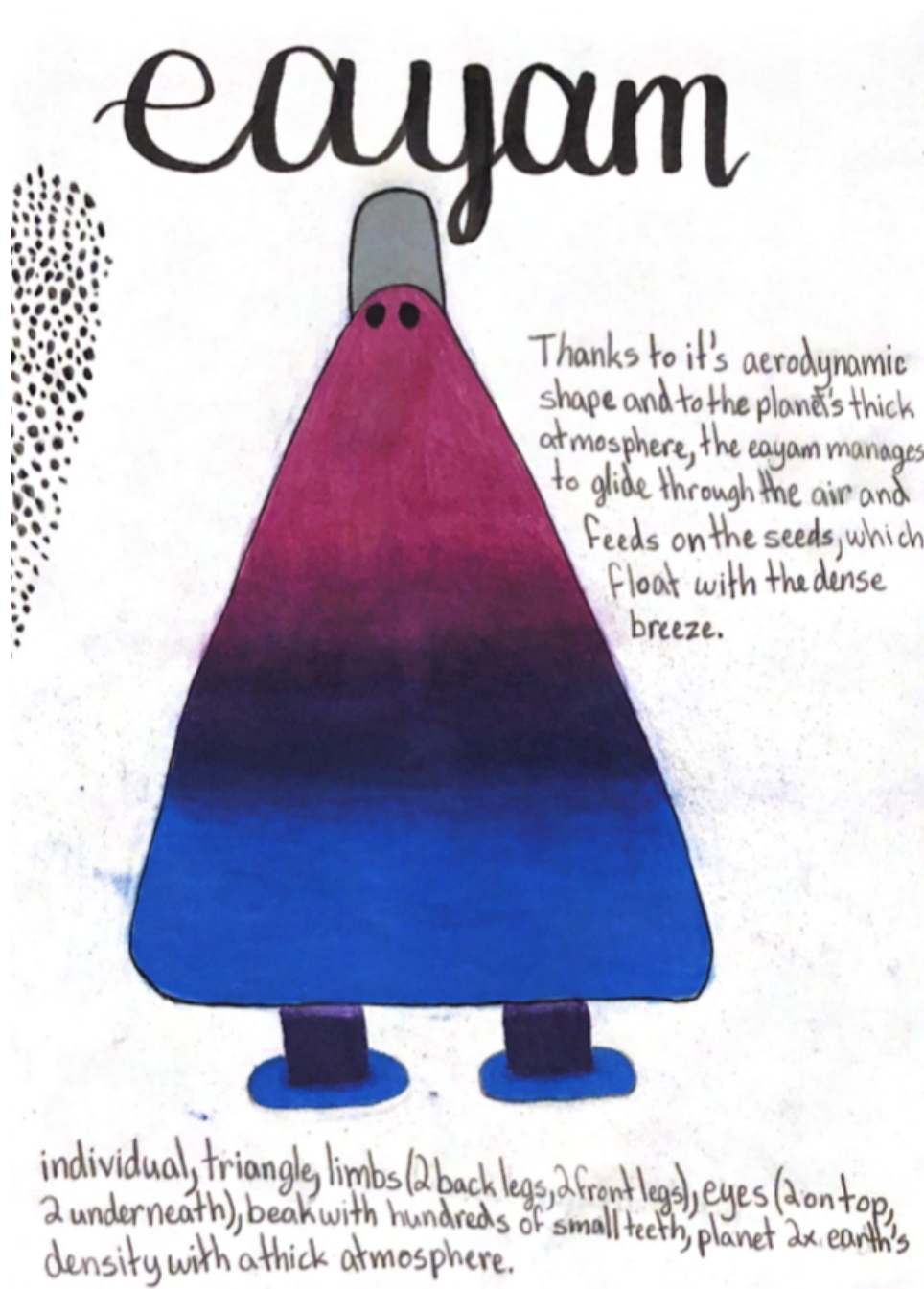
We are currently making a Cosmic Generation newsletter which our members are encouraged to contribute to. We also plan on posting fun at-home activities and projects on our upcoming website and on having monthly workshops run by our youth. In fact, we had our first one on Sunday February 13th, which was an alien drawing workshop that I ran, where we talked about what aliens would actually look like, whether they would look the same way they look like in comic books and cartoons or whether they would look like extremophiles, which are life forms that can survive in the most extreme environments. We also talked about the environments where we could find aliens, like hydrothermal vents in the oceans under Europa's icy shell. Next, we started creating our aliens by thinking about the extreme environment in which the alien lived, the type of alien (individual or colony), its shape, how it moved (whether it had limbs, fins or wings) and how it detected predators or prey around it (eyes or antennae). Finally, we drew our aliens and encouraged the participants to talk about their interests in astronomy which is one of the things I love about the Cosmic Generation since I know that a lot of us youth love to share the things we know and enjoy with our friends and that they often end up getting tired of hearing about them, but here, everyone enjoys astronomy and is happy to hear and talk about it.

I've included the sketch of my alien, and what features I chose to draw it this way:

We also spoke about our club and showed the aliens many of the participants created during the Tuesday, Feb 22nd Global Star Party: <https://youtu.be/vJXIzy8kLSc?t=3041>

For youth interested in joining (no membership fees!), or if you'd like to learn more about the Cosmic Generation, please reach out to us at: thecosmicgen@gmail.com

mf



Omicron!



By David H. Levy

Over the last few months you must have read dozens of articles, online or in print, about the Omicron variant of COVID-19. Fortunately, this is not one of them. This article is about Omicron² Eridani. It is a faint star in the constellation of Eridanus, the River.

Actually, there are two Omicron stars in that constellation. The first is brighter, and is a variable star. The second is one of the closest stars to the Sun. Omicron², also known as 40 Eridani, happens to be not a disease but one of the most interesting star systems in the entire sky.

Omicron² is a triple star system that is only about 16 light years away. Its brightest component is a Sun-like star faintly visible to the unaided eye on a good night. It lies in northern Eridanus, the River, just a few degrees west of Rigel at the foot of Orion. The secondary is a white dwarf star. Unlike the companion of Sirius, this star is 9th magnitude and not near the brighter star so it is easy to see in a small telescope. The third star is not far from the secondary, but at 11th magnitude it is also not difficult to spot. This third star is a red dwarf.

Although red dwarf stars are the most plentiful, by far, in our region of the Milky Way galaxy, they are almost impossible to see because they are so small. The closest one to us is Proxima Centauri, or Alpha Centauri C, which at 4.24 light years is the closest star to the Sun. Also because they are so small and intrinsically faint, only a few of them are easy to find. 40 Eridani C is one of the easiest to find.

This interesting star has something else going for it. In 2018 astronomers discovered a planet orbiting the primary star. With a rapid orbit around Omicron², such a planet would receive much more radiation from the primary star than Earth gets from the Sun. But in 2021 new observations cast doubt on whether this planet exists at all.

Whether Omicron² Eridani really hosts a planet is subject to debate. But in the universe of Star Trek, it surely does. It is the home of Vulcan, Mr. Spock's home world. In the episode "Operation Annihilate", which appears near the end of the first season, Spock is blinded by the intense light used to immobilize the invading parasites on the planet Deneva. However his blindness is temporary because of the existence of an inner eyelid. Vulcan is said to orbit Omicron² Eridani's primary star, and since it is so much brighter than our Sun, even though Vulcan is at the same distance that Earth is from our Sun, they need the inner eyelid to protect their eyes.

I rather enjoy the idea that the fictitious Vulcan happens to orbit one of my favorite real stars. And unlike the Omicron variant, which one hopes will be eradicated soon, we admire Omicron² Eridani, the real star, and wish it to "Live long and prosper."



Omicron² Eridani



By Khoa Tran. Feb 20, 2022. The Orion Nebula is easily one of the most-photographed deep space objects out there. In previous years, I would have been on it early and often, but with only so much clear sky time lately, I've been going after Other Targets in the Sky.

But we also seem to be getting lots of clear nights around the Full Moon. These nights are really not very good for imaging, because the glare from the moon washes out dim objects, and makes processing targets kind of a nightmare, really.

But clear sky time is clear sky time, so I tend to use clear nights around the full moon to test out new techniques and other things. On two nights around the last full moon, I pointed my Orion ST80 at the Orion Nebula (which I don't normally use to image). The ST80 a budget telescope not meant for astrophotography, and Orion is certainly "on its way out" by this point in the season, but yeah, it's still a really pretty target.

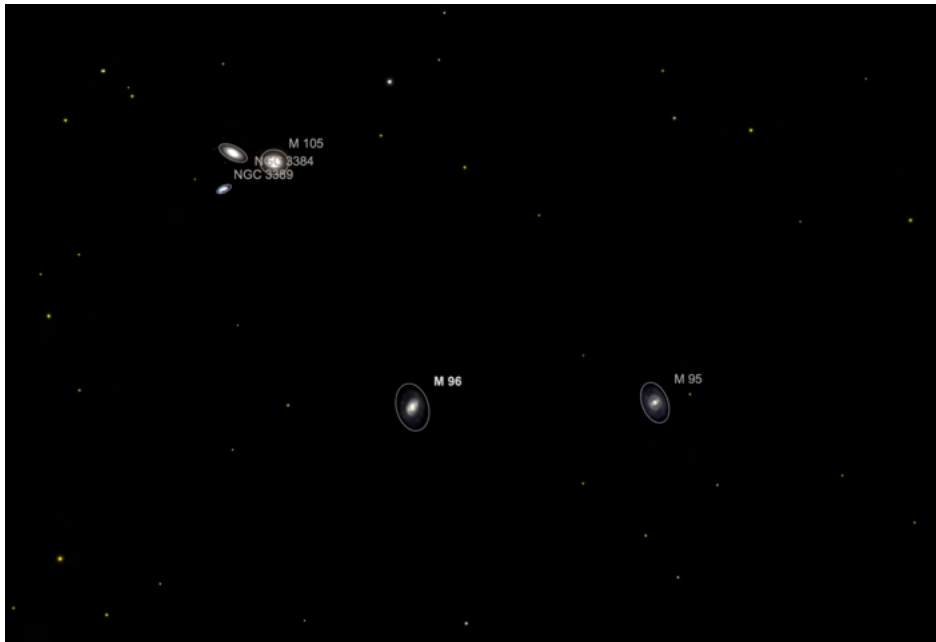
Shot from our balcony in the Plateau in Montreal. #Deepskyfromdowntown.



April 1st 2022, By Khoa Tran. Saying goodbye to Winter Nebula Season with a tribute of sorts to the late, great, Neil Peart. NGC2112 is the open cluster on the left side of the frame. The river of red hydrogen gas running over it is a portion of Barnard's Loop, and the reflection Nebula on the right side of the frame is M78, home of Ultraman! 2h4m of total exposure time from Hudson, QC.

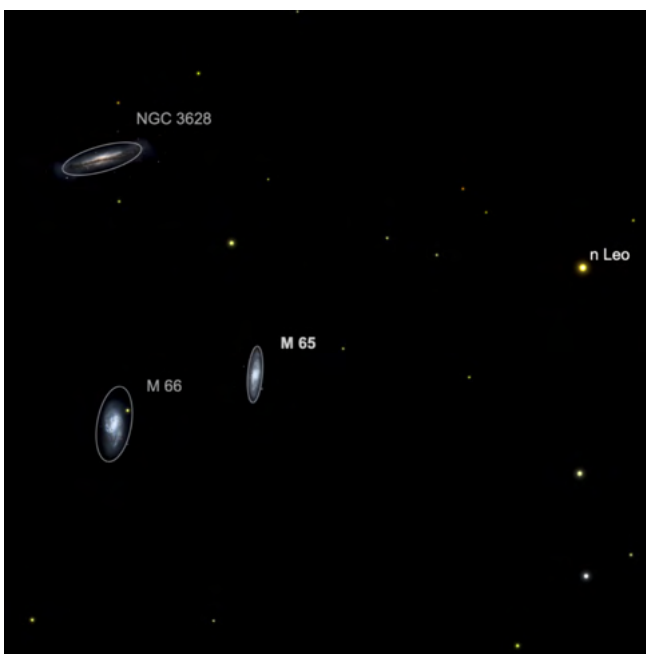
20 x 120s @ISO 800, 56 x 90s @ISO 1600, Olympus Pen-F digital, Sky Watcher EvoGuide 50DX with Starizona flattener and Baader Neodymium filter, Guiding: Askar FMA180 on Synguider 2, Star Adventurer 2i

Ormstown. I noted in my observing log that both were visible at 36x. M96 was a small fuzzy oval oriented North-South that gradually brightened toward the centre. M95 was smaller, rounder and dimmer. What do you see?



Messier objects M95-M96, M105 as well as NGC 3384 & NGC 3389 from Starry Night Pro

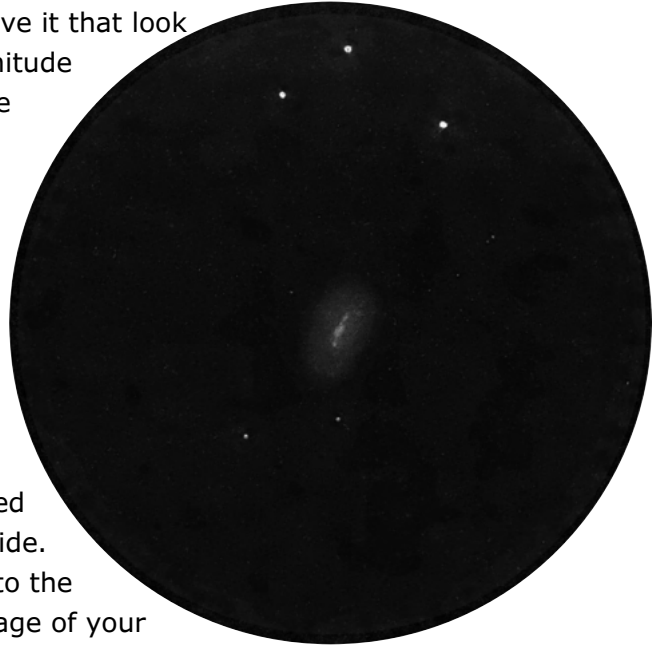
Now nudge your scope about 1 degree to north-east and you'll be rewarded with a beautiful field of 3 closely spaced galaxies: M105, NGC 3384, NGC 3389. I was able to squeeze all three at 189x through my 15-inch Dobsonian on the night of March 29th. I noted that M105 was only slightly brighter than NGC 3384 and that its stellar nucleus could be observed when the seeing permitted. NGC 3384 was fainter, fatter and more diffuse than its brighter neighbour. But the one that stole the show was NGC 3389. I was captivated by this faint little 11th magnitude ghost hovering discretely between its two brighter neighbours. After gazing at it patiently for several minutes I could make out it's elongated ESE / WSW shape and gradually brighter centre, but no hint of a nucleus was seen.



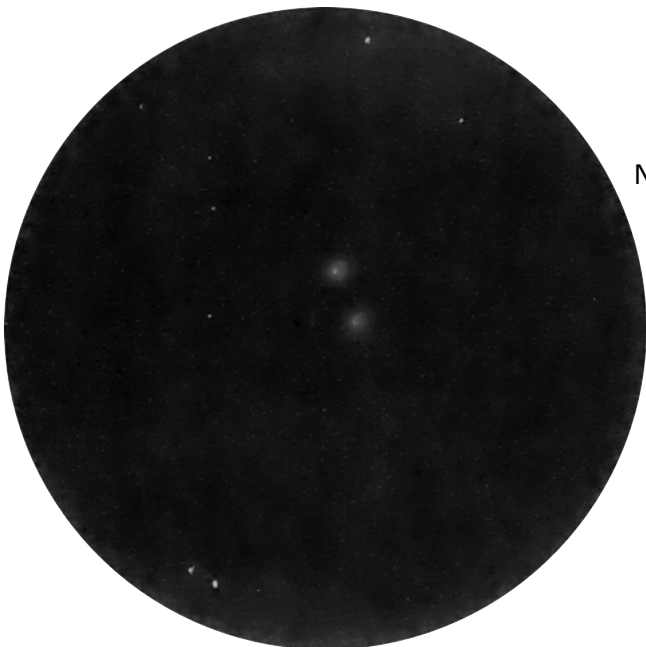
If you can't get out to darker skies, you should have better luck with our next targets. Find the third magnitude star θ (theta) Leo on the finder chart and then slew 2 degrees southward until you're centred on 5th magnitude η (eta) Leo. Now with your lowest power eyepiece slowly sweep eastward until the two 9th magnitude galaxies: M65 & M66 come into view. By the way, on that night when I couldn't make out M95 & M96, I had no trouble finding M65 & M66. When I observed them more recently from my driveway in Ste-Lucie, both appeared elongated N/S at 111x through my 15-inch. The core of M65 was round and I could make out a dust lane along its eastern edge. The core of M66 was brighter, rounder and its envelope was larger than M65's. Nudging your eyepiece a little

northward should bring the large edge-on galaxy NGC 3628 into view. In my 15 inch It's long and thin compared to its neighbours and when I increase the magnification to 189x, it's bisected lengthwise by a dust lane.

Now let's head back to Regulus and follow the 5 stars above it that look like a reverse question mark until you reach the 3rd magnitude star ϵ (epsilon) at its end. Then gently slew your telescope westward until you see the 5th magnitude orange star λ (lambda) in your finder. Just 2 degrees below, (about half the field of an 8x50mm finder) you'll find NGC 2903: the galaxy that Messier missed. Shining at magnitude 8.8 it's a bit brighter than the other objects he catalogued in Leo. Viewed through my 8-inch at 145x, I saw an oval shaped glow oriented north-north-east by south-south-west extending approximately 10 arc minutes. Reviewing my observing log from that April night in Ormstown back in 1993, I noted that its core was bright and that with averted vision I was able to glimpse small appendages on either side. This popular technique involves simply looking a little off to the side while still concentrating on the object to take advantage of your eyes' more sensitive peripheral vision.

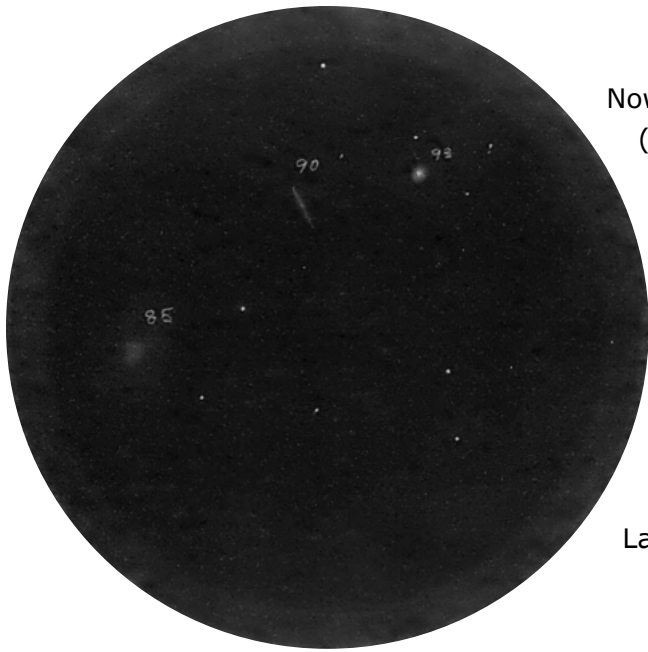


NGC 2903, 145x 8-inch SCT, Ormstown, QC



NGC 3226-3227, 220x 8-inch SCT, Sutton QC

Now let's follow the reverse question mark backwards and stop half-way at the lovely 2nd magnitude double star γ (gamma) Leo. Just two degrees to the east you'll find: NGC 3226 & NGC 3227. I wrote in my log that their bright cores made this pair of 11th magnitude galaxies easy to find at low power through my 8-inch and that increasing the magnification to 220x brought their faint round nebulous envelope into view.



Now if you nudge your telescope 2 degrees above γ (gamma), you'll be greeted by NGC 3193 a small elliptical galaxy with a bright stellar core, followed by the edge-on spiral NGC 3190 and the faint 12th magnitude face-on spiral NGC 3185. That's what filled the field of my 14mm eyepiece when I gazed in wonder on that April night from Ormstown. Unfortunately, 13.5 magnitude NGC 3187, the fourth member of Hickson 44, as this group is known, was beyond the reach of my 8-inch. I glimpsed its faint tiny form for the first time on April 4th this year through my 15-inch from Sainte-Lucie-des-Laurentides.

NGC 3190-3193-3185, 145x 8inch SCT Ormstown QC

The drawings I've included are pretty dim but they give you a pretty good idea of what these distant objects look like through an 8 inch telescope under dark skies. The key to observing galaxies is to get away from city lights. From my Bortle 4 skies in the Laurentians, I was able to observe NGC 2903, M96, M105, M65 & M66 through a mounted pair of 16x70mm binoculars and discern M65 and NGC 2903 through hand-held 10x50mm binoculars. Under dark skies, you too can look 50 million years back in time! [mfi](#)



Supernova in NGC 3667 in Leo, April 4, 2022. By Russell Frailich. Got 30 minutes of exposure time in between the clouds last night. It's a very small and faint galaxy in my C6, but it's there

Moon Funnel for Public Outreach

By Nicole Laporte



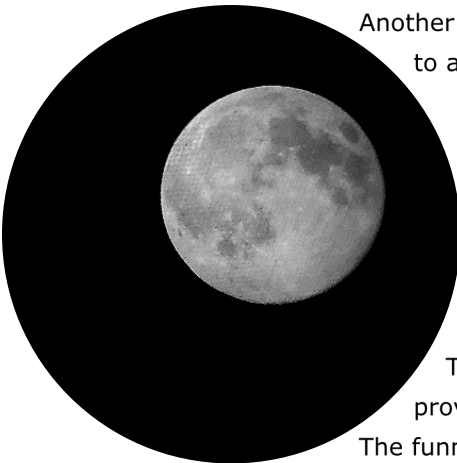
Long line-ups to get a glimpse of a celestial object through a telescope eyepiece are a challenge at outreach events. During solar eclipses, which draw large crowds, the sun funnel has been used as a safe method of projecting the sun and allows several people to view it simultaneously.

The only two celestial bodies that are bright enough to be seen properly with funnel projection are the sun and the gibbous/full moon. Fortunately, the NASA Artemis I Mission is renewing interest in the moon and will influence outreach events to be held on near to full moon nights.

There are a few considerations when using a moon funnel. A medium to large aperture telescope is required to reflect enough light to provide a good view. A magnification between 30x and 40x is optimal for viewing the full moon.



Another consideration to obtaining a clearer image is to add a shield around the screen to create shade from the bright moonlight.



The image to the left is the moon one day before full. It was obtained with a 130mm Newtonian reflector (as shown above) at magnification of 31.25 ($1000\text{mm focal length} / 32\text{mm eyepiece} = 31.25\text{x}$) on a 10 cm circular screen. The distance from the eyepiece to the screen is 15 cm and the height of the shade shield is also 15 cm.


The moon funnel view is not quite as sharp as the one in the eyepiece, but still provides a pleasant view of the maria, large craters and spectacular ray patterns.

The funnel has the convenient property of flipping the image in the eyepiece so it is right side-up when using a reflector. This is useful during outreach when the RASC Moon Gazers' Guide is available.

Instructions on how to build a conventional funnel can be found at the following link: Build a Sun Funnel (https://aas.org/sites/default/files/2020-02/Build_a_Sun_Funnel_v3.4.pdf)

A slightly less conventional approach was taken to build the moon funnel in the above illustration. The materials used consist of:

- A 1.5-litre plastic water bottle with the bottom cut off and the interior painted with flat black paint
- A 326g circular cardboard coffee container with the bottom cut out
- A piece of white shower curtain. (After the above moon photo was taken, it was replaced with projection screen material to avoid the lumpy appearance caused by the shower curtain texture.)
- The bottom portion of black legging material
- Electrical tape
- Hair elastics
- A 32mm Plossl eyepiece

In an outreach event where there are be different views of the full moon being offered by the volunteers, the funnel provides an interesting unplugged view of our nearest celestial neighbour. 

DSC03161.ARW



Moon, 18.0 days, Mar 21, 2022, C5, Dorval

Alex Stefanescu

The Moon, By Alex Stefanescu. Waning gibbous, March 21 (18.0 days) and March 22 (19.1 days), as seen from Dorval, through Celestron C5 scope and my latest acquisition, a Sony Alpha 7 S camera (second hand).

Still need to master colour balance, as the camera is de-filtered for astrophotography (IR filter removed). Custom colour balance setting was used.

DSC03186.ARW

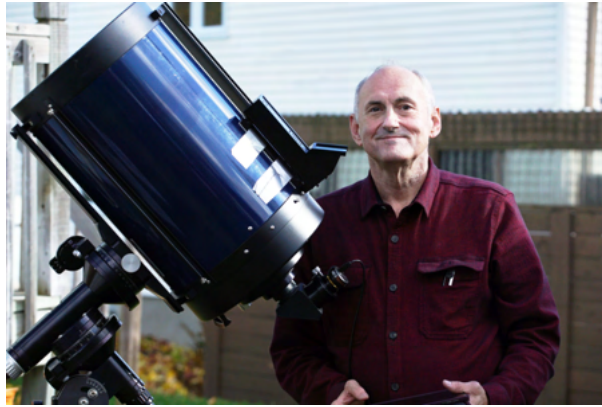


Moon, 19.1 days, Mar 22, 2022, C5, Dorval

Alex Stefanescu



Photographing the Moon in 3D



By: Martin Rochette

Member: Montreal Centre of the Royal Astronomical Society of Canada

Club d'astronomie Cassiopée, Québec City

Centre d'Observation Astronomique des Monts-Notre-Dame ([COAMND](#)), South of Québec City

From a young age, I have been interested in three-dimensional photography. I started with the use of *View-Master* brand stereoscopes. In 1981, following the recommendations of a fellow amateur astronomer, I succeeded in photographing two successive crescents of the first quarter Moon. I then made myself a stereoscope and succeeded in visualizing the three-dimensional effect of the lunar sphere. However, it was very difficult, thereafter, to achieve other three-dimensional shots with film photography.

With the advent of affordable digital cameras on the market in 2003, I purchased a *Nikon Coolpix* brand camera. This allowed me to take multiple photographs of the same crescent Moon phase months apart. I was thus successful in perfecting, in the summer of 2004, a technique of photographing the Moon in three dimensions, allowing the greater appreciation of its spherical quality as well as the relief effect of craters and mountains, which I had failed to see in 1981.

A few years later, I bought a *Canon Rebel T3i* brand camera. This digital camera is equipped with «live view» mode which allows previewing the image of the digital sensor on the LCD screen integral to the camera housing. This camera is also equipped with a remote trigger to avoid vibrations caused by pressing the trigger button.

This article is divided into the following six sections

1. Notions on three-dimensional vision
2. Brief description of the Moon's libration movements
3. Techniques for taking photographs of the Moon
4. Images processing for viewing the Moon in three dimensions
5. Findings
6. Results of my three-dimensional photographs

1) Notions on three-dimensional vision

Considering that the distance between our two pupils is approximately 7 centimetres (2.75 inches) and that the limit of the resolution of the eye is about 1 minute of arc, I was able to calculate, after confirming with an eye expert, that our vision perceives the depth effect up to a distance of about 250 to 300 meters (820 to 1000 feet).

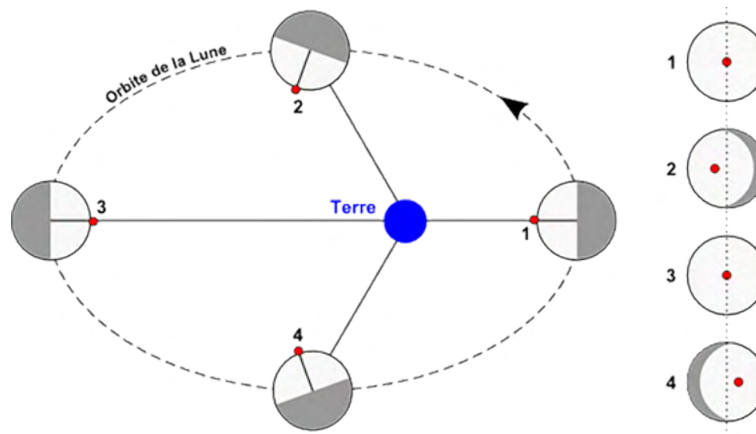
Thus, we cannot visualize the Moon in three dimensions just with our eyes or with binoculars. We must therefore find a way to photograph the Moon from two different but slightly similar angles. The solution consists of photographing two almost identical crescents of the Moon separated by one or more months (lunations) in order to have the same position of the terminator (imaginary line between the illuminated zone and the shaded zone) on each photograph relative to craters or the surface of the Moon. This involves allowing the phenomenon of lunar libration to intervene to obtain two slightly different exposure angles.

2) Brief description of the libration movements of the Moon

With the phenomenon of libration, we can see about 59% of the lunar surface with binoculars or a telescope. Here is the description of the two main librations that allow for three dimensional photography.

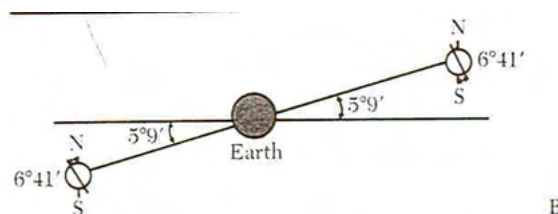
Libration in longitude

The Moon performs a revolution on itself (synodic revolution) during the same period as it performs its movement of revolution around the earth (sidereal revolution), i.e. in 27 days. In addition, its orbit around the earth is elliptical. Thus, during its period of revolution around the earth, its speed of rotation is accelerated at perigee (point of the orbit closest to the earth) and delayed at the apogee (point furthest from the earth), which produces a swaying motion in longitude. This release is approximately 7 degrees 54 minutes.



Libration in latitude

This is a sway due to the fact that the axis of rotation of the Moon is not perpendicular to the plane of this orbit. The axis of rotation maintains a tilt angle of 6.68 degrees throughout its orbital travel. The libration in latitude is therefore 6 degrees 50 minutes.



3) Technique for taking photographs of the Moon

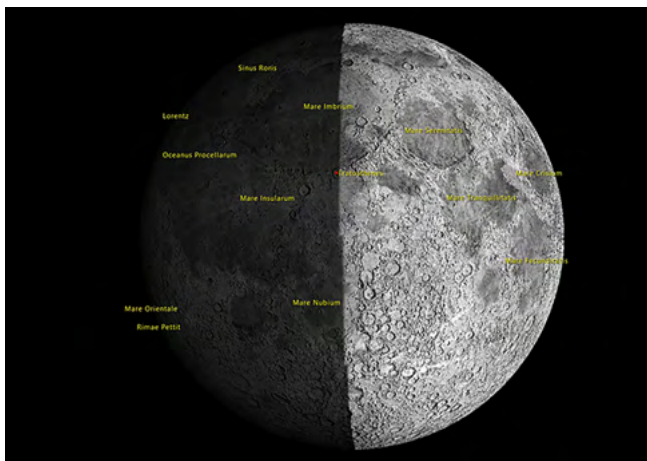
We must plan in advance the dates of our photographs.

To do this, I use the software «Virtual Moon» which can be downloaded free of charge from the Internet, as well as the *Coelix* software, designed by Jean Vallières in Quebec, which was very useful to me.

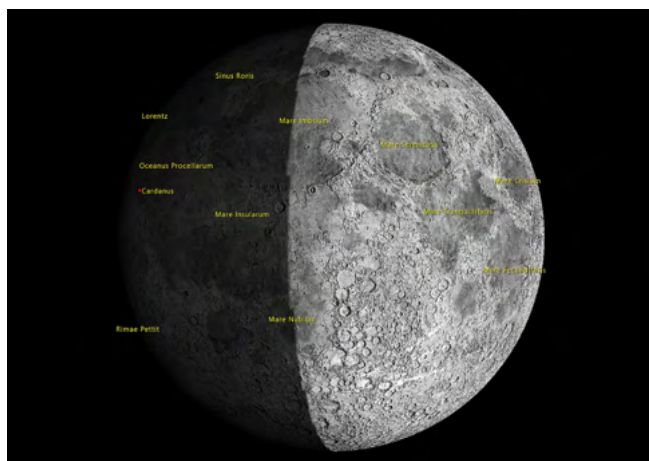
Also, it is essential to take note of the date of our two photography sessions. To do this, I take note of the dates of my photographs on a calendar of the Royal Astronomical Society of Canada (RASC).

First results

For my photographs, I manage to image the first quarters of June 25, July 25 and August 23, 2004, as well as those of January 18 and July 14, 2005. I also had good opportunities for the full Moon of November 26, December 25, 2004 and January 25, 2005. Below are the lunar maps extracted from *Virtual Atlas of the Moon* software for the forecasts of the first quarter of the Moon.



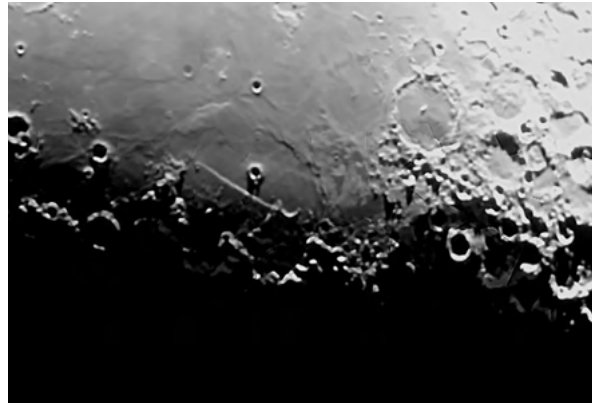
Forecast June 25, 2004



Forecast July 25, 2004

To take my photographs, I used my *Canon Rebel T3i* digital camera with my remote shutter release. My camera was installed at the primary focus of my *Celestron* brand, Schmidt-Cassegrain type telescope with 8 inch (200 mm) aperture at f/10. The telescope was attached to my *Sky Watcher* brand HEQ5 equatorial mount equipped with the go-to option. My mount had previously been aligned on the North Pole with polar sight.

This allows excellent guiding on the Moon. During my photography sessions, I took 30 consecutive shots with my *Canon Rebel T3i* digital camera. I also acquired videos of the Moon with my *NexImage* 5Mp planetary CCD from *Celestron* which allows magnification of the lunar surface since the dimension of the sensor is smaller. For capturing videos, I use the *iCap v2.3 NexImage* software, which is supplied with the CCD and which allows me to capture with my laptop.

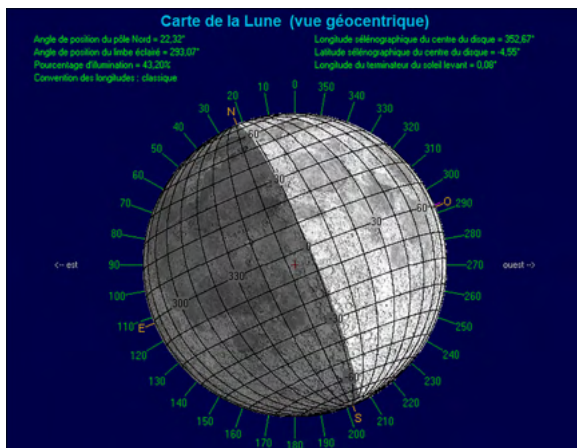


4) Processing of my images for the realization of my three-dimensional photographs

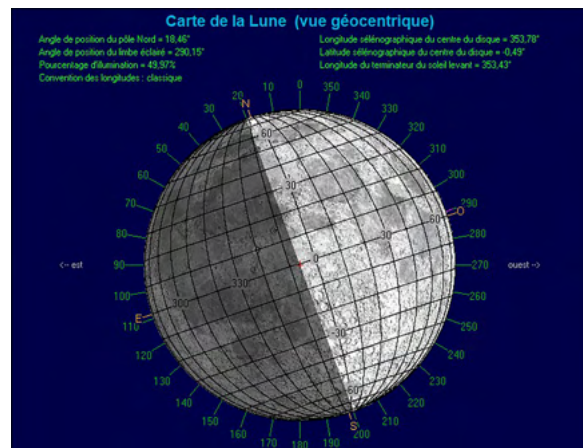
Now here is the crucial step to achieving the 3D effect of my photographs.

Firstly, it is essential to use software to stack the images. *Registax* software allows me to do this processing for both the images from my *Canon Rebel T3i* camera and the videos from my *NexImage* CCD. This first processing makes it possible to obtain images with a good resolution to counter atmospheric turbulence.

Then, you will notice on the two illustrations below extracted from the *Coelix* software by Jean Vallières, that the change in position of the craters on the lunar surface between the photograph taken on June 25, June 2004 and that taken on July 25, 2004 does not correspond to a **horizontal displacement**, which is necessary to obtain a three dimensional image of the Moon's surface.

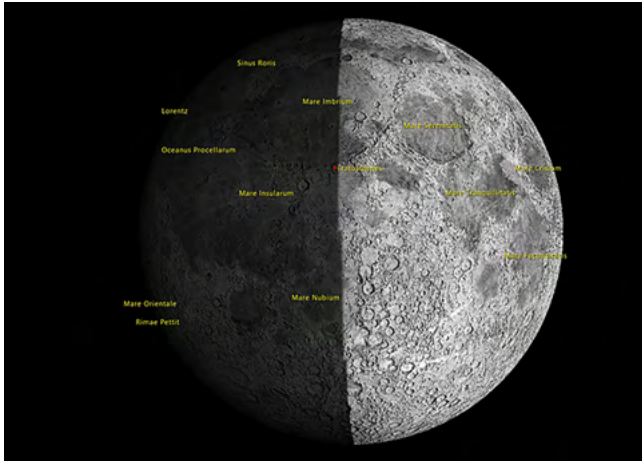


Left view: Libration of the Moon June 25, 2004

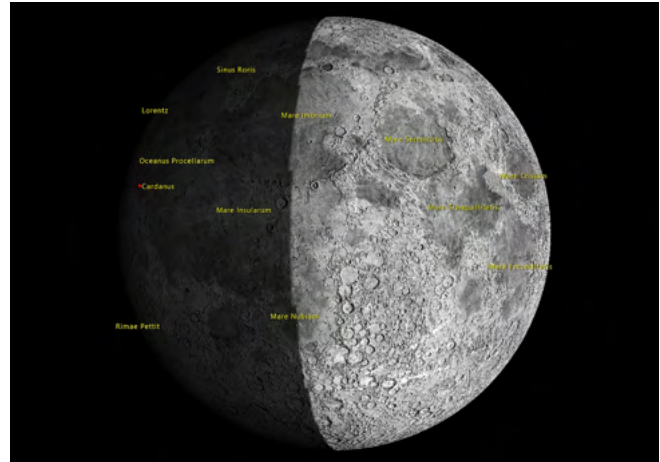


Right view: Libration of the Moon July 25, 2004

It is therefore necessary to adjust each image so that the variation of the libration results in a **horizontal displacement** of the lunar surface of the left view compared to the right view.



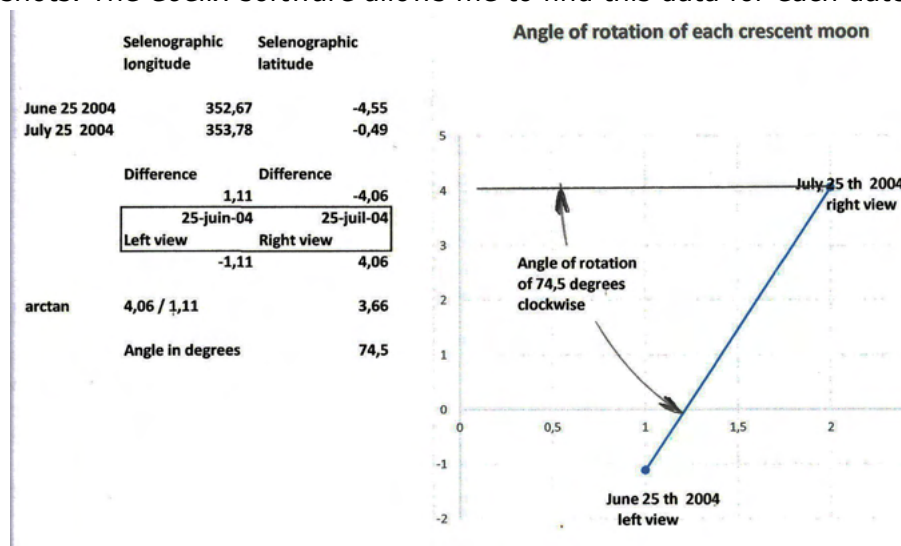
Alignment pose of June 25 2004



Alignment pose of July 25 2004

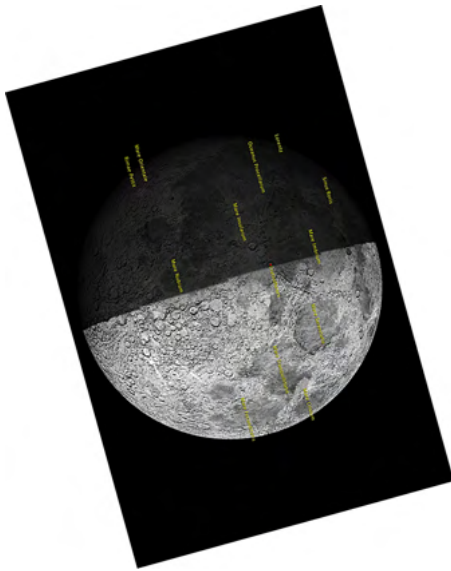
The trick I found is to first position the images so that the terminator line is vertical on each photo.

Next the two images must be rotated by the same angle with respect to the vertical line of the terminator. This angle can be determined by doing a simple trigonometric calculation. It is a question of calculating the difference between the librations in longitude and that between the librations in latitude between our two shots. The *Coelix* software allows me to find this data for each date. Here is the way to

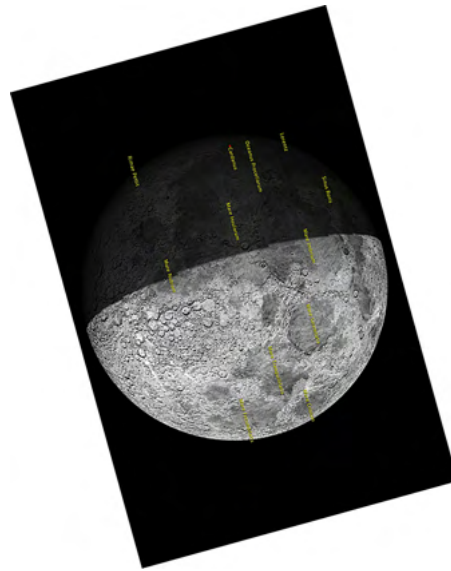


calculate the angle of rotation of our images.

Then we need to rotate our two photos at an angle of 74,5 degrees clockwise. A visual examination of



Rotation of image June 25 2004



Rotation of image July 25 2004

graph helps us determine which direction to turn them. I use *Photoshop* software to rotate each of our two images.

Then the two images must be properly framed together with respect to each other with *Photoshop* to obtain the same image dimensions, because the Moon is not located at the same distance from Earth during each of them our shots.

I would like to point out that there was a lot of trial and error involved when I made my first 3D photographs in 2004. I had to adjust my photos (left view compared to right view) to obtain a satisfactory result. With experience, I was able to better master the way to go about making my 3D photographs.

Finally, it is a question of using the *Anaglyph Maker* software for the production of an anaglyph image. This software allows the creation of a photograph for a red colour filter (for the left eye) with one for a blue-cyan colour filter (for the right eye). Once, the mixing is complete, you get your photograph in three dimensions. It is important to specify that to appreciate the 3D effect with an anaglyph image, it is necessary to obtain a pair of red and blue-cyan glasses (red : left eye, blue-cyan : right eye).

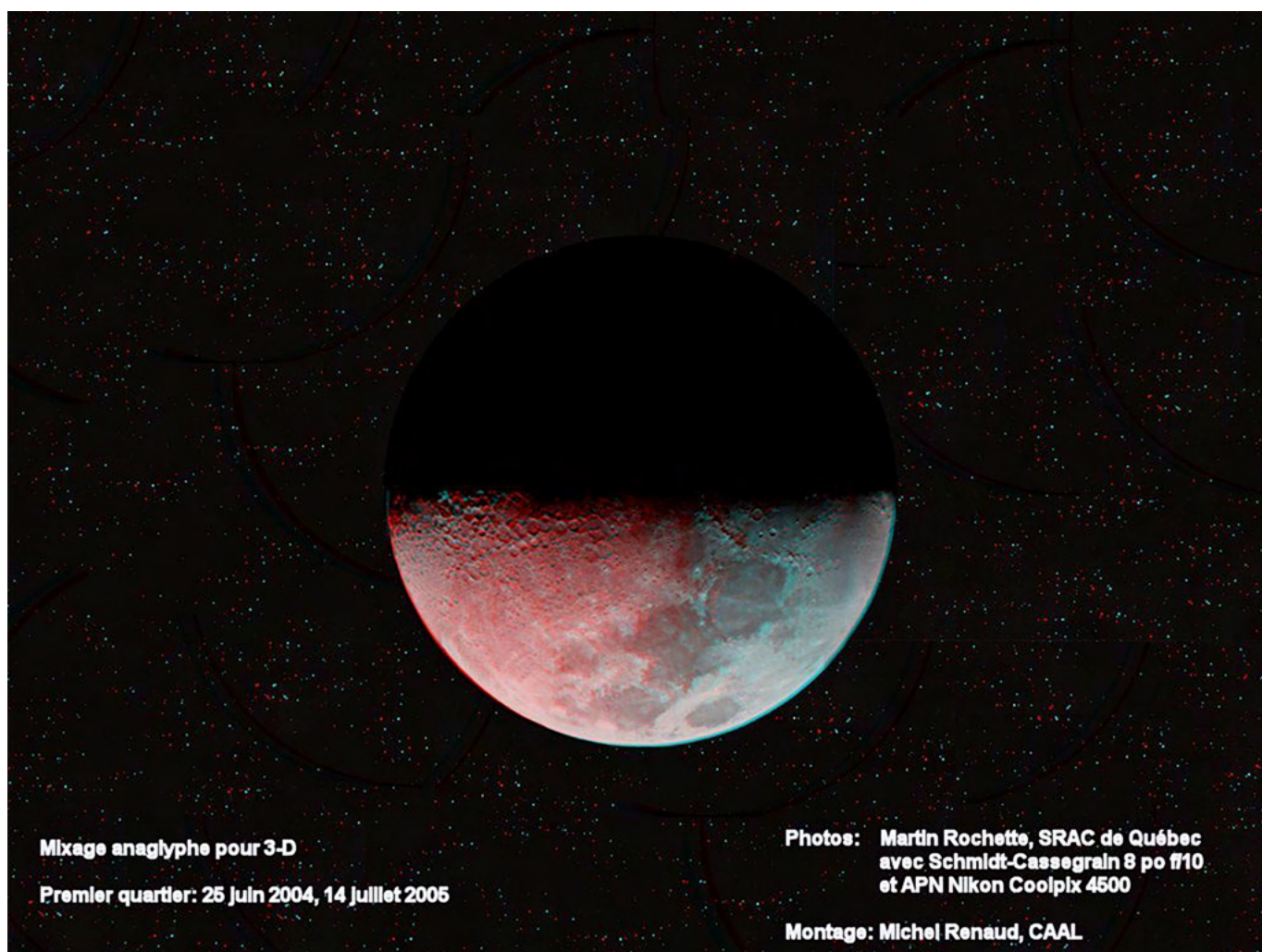
5) Findings

For the photos taken 1 or 2 months apart, the 3D effect stands out quite well for wide field photography of the Moon since the difference in latitude between the librations is small. For photos taken several months apart, take closer photographs of the lunar surface. This makes it possible to better appreciate the 3D effect of the lunar relief such as mountains and craters due to the fact that the difference in latitude between the librations is more pronounced. These photographs taken with my *NexImage* 5Mp planetary CCD from *Celestron*, given the smaller dimension of the sensor compared to that of the *Canon Rebel T3i* digital camera.

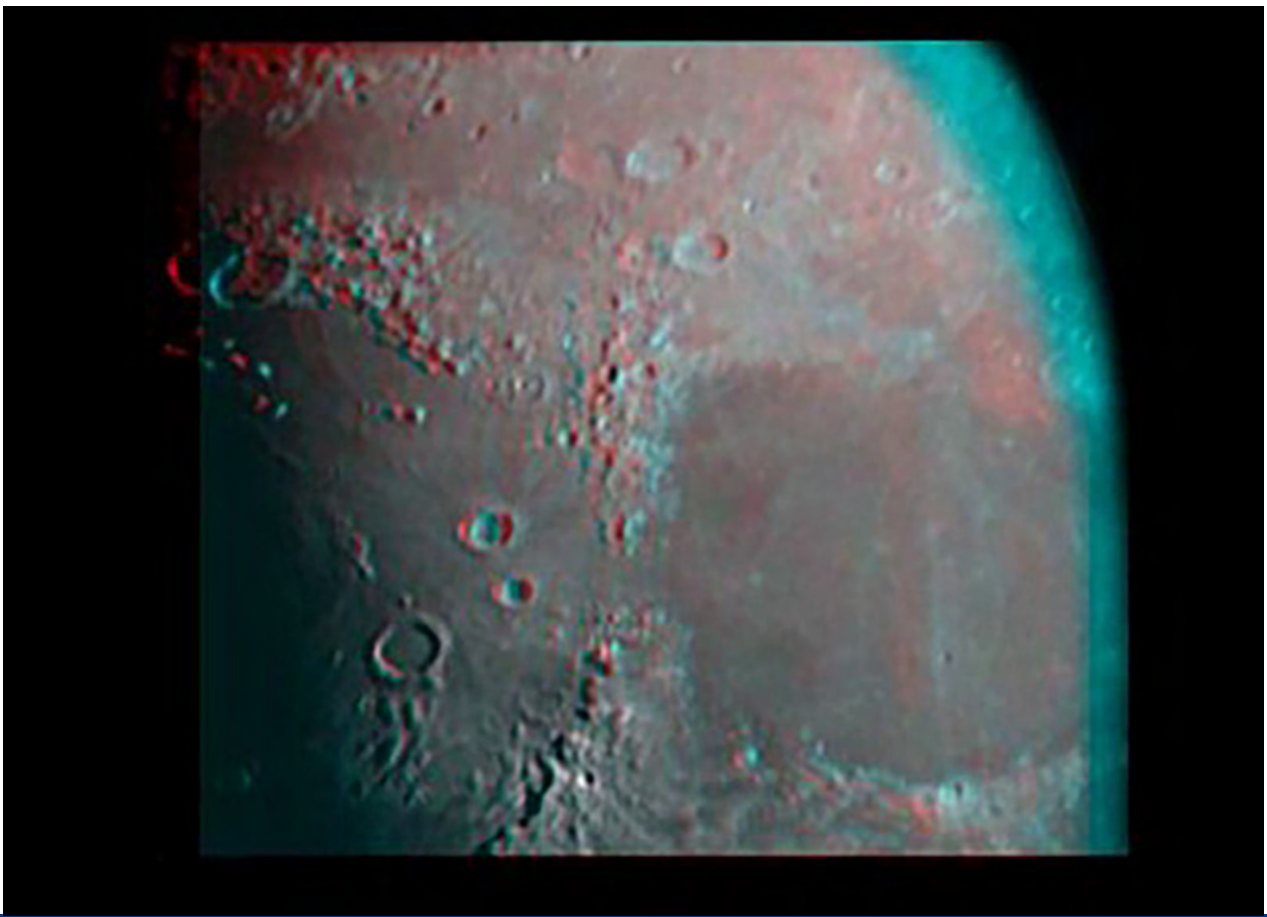
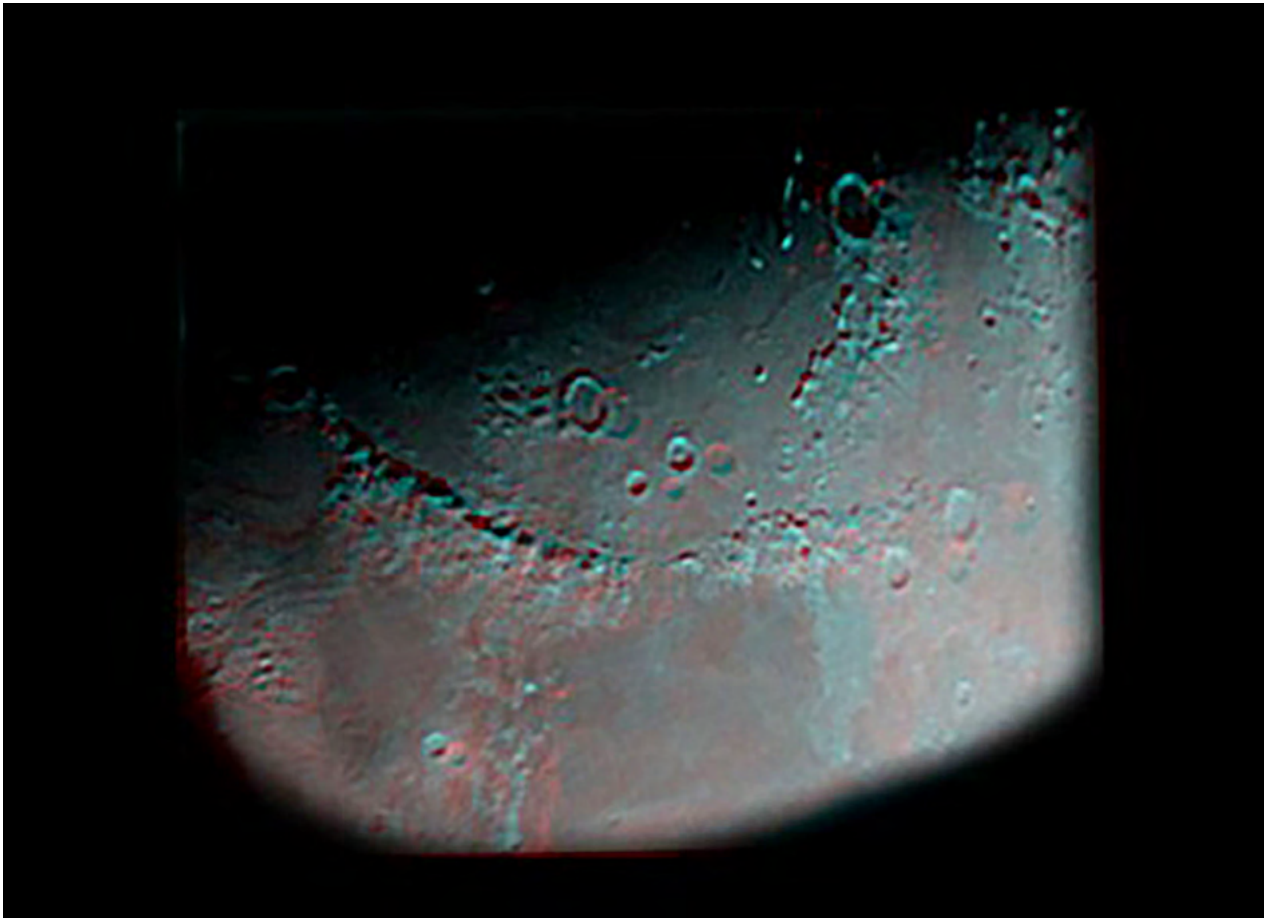
6) Results of three-dimensional photographs

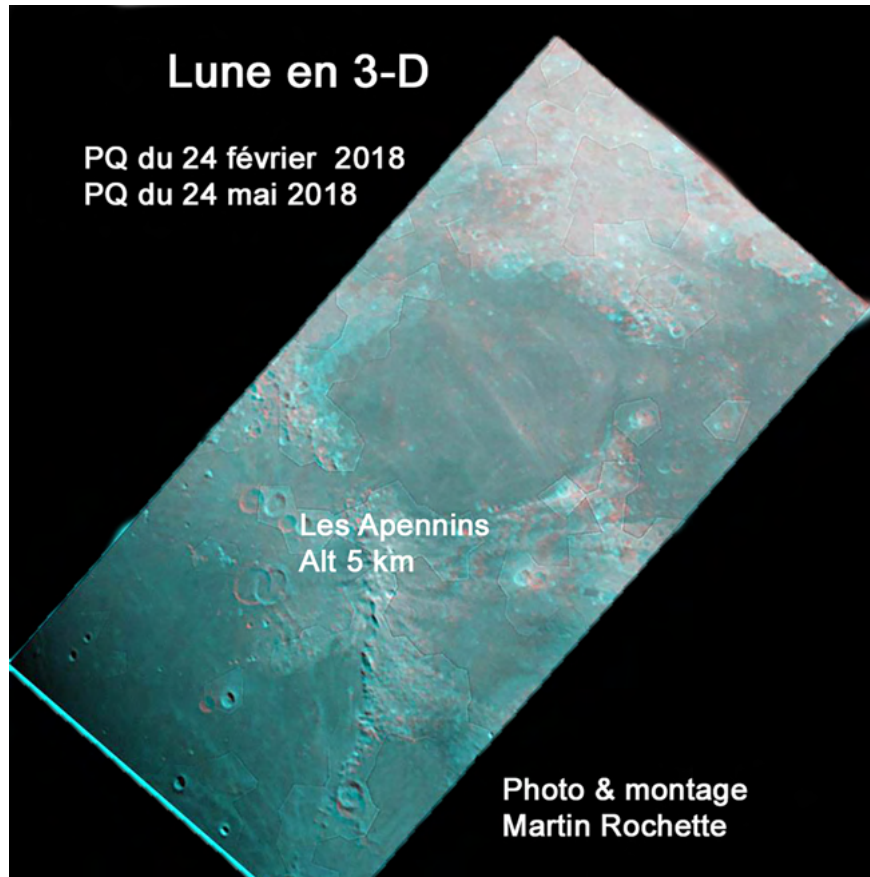
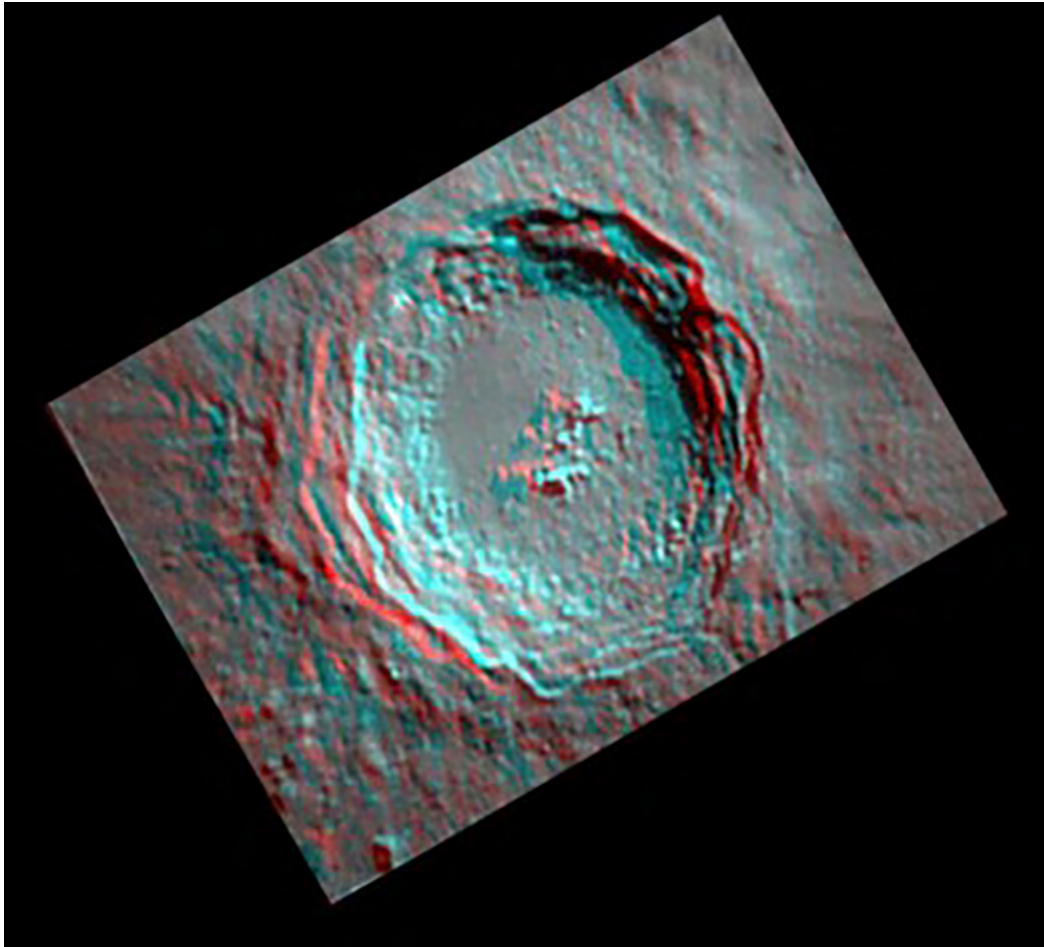
You will find below the results of my 3D photos. Viewing the 3D effect of the photographs requires wearing a pair of anaglyph glasses (red filter : left eye, blue-cyan filter : right eye). If you need a pair, I invite you to contact me at the following email address make arrangements to ship a pair to you. martinrochette1955@gmail.com. Finally, I recommend that you to move away from your computer screen or your TV screen to better appreciate the 3D effect with anaglyph glasses.

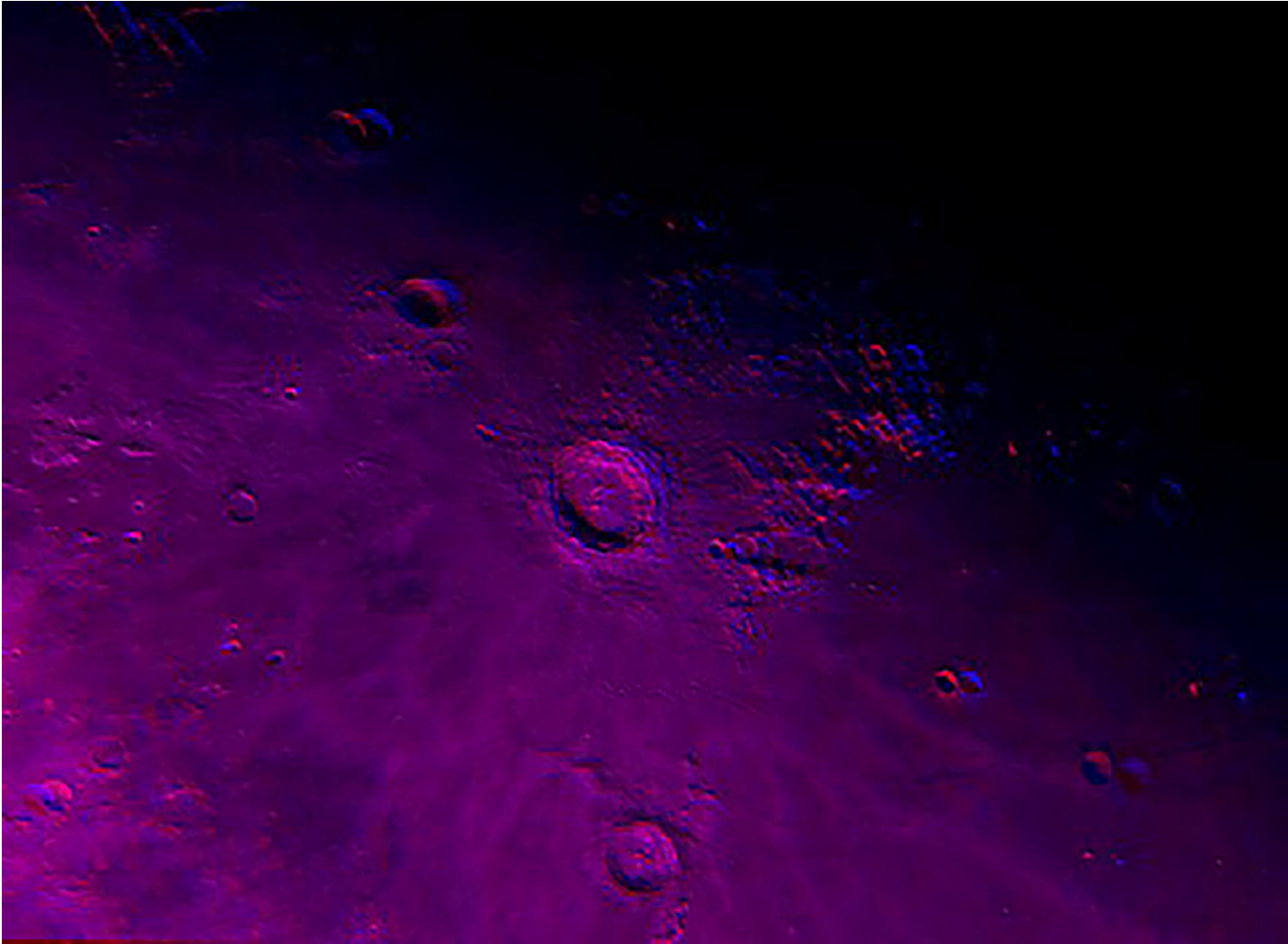
Updated on January 26, 2022. [mfi](#)











In Hubble's Variable Nebula, NGC 2261

2022 03 21

Abstract for RASC Montreal Centre Skyward

In Hubble's Variable Nebula (NGC 2261)

*A jet structure to the south has disappeared from our images since 2015?
Spring 2022 Update*

*G. St-Onge¹, D. Bergeron², D. St-Gelais³, J. G. Moreau⁴, R. Gauvin⁵, J. B. Desrosiers⁶, C. Dupriez⁷,
R. Cazilhac⁸, A. Amsaleg⁹, M. Hanson¹⁰.*

Abstract (2022)

Most of the time observers stick to the variable aspects of the main nebula NGC 2261 to the north side of the R Monoceros "Herbig Ae/Be star" (Finkenzeller & Mundt 1984), the counterpart nebula to the south is almost never detected. Since 2019, we have been monitoring the NGC 2261 nebula more closely. Our work has determined that a section south of the main nebula, associated with the young star R Monoceros, has been missing since ~2015. Our monitoring of this nebula aims to try to re-detect this source and to document its apparent evolution if possible. This present document, focuses further on our work to determine if it is possible to detect traces of this structure in the sky where an elongated nebula of variable luminosity was previously observed, which is in the south component of nebula NGC 2261. The coordinates of the star R Monoceros (J2000), RA: 06h 39m 09,95s and Dec: 8° 44' 09,7" (DSS).

Two documents summarize our most recent follow-ups, one from 2020 and the other in 2021:

astrosurf.com/cdadfs/CDADFS2/recherches/N2261_2020_V243.pdf and
astrosurf.com/cdadfs/CDADFS2/recherches/NGC2261_2021.pdf

Introduction and History

This luminous jet structure of the southern counterpart of the nebula could be detected in good quality amateur CCD imaging. It is part of the southern counterpart of the nebula NGC 2261 identified by Walsh & Malin (1985). The oldest CCD images of our group that highlight this structure are images dating from the years 2000, 2009, 2011 and 2012.

It is some images of 2019 by J. G. Moreau, which revealed to us the disappearance of this jet-like structure to the south of the main nebula. This justified a follow-up to firstly, determine when this jet-like structure disappeared and secondly to observe in the near future its reappearance and new apparent morphology in visible light, if possible.

A3) Our results in Graph 31 indicate that this luminous jet-like structure to the south would have disappeared from our images around 2015 and that, since then, it is no longer detectable with amateur instruments, whether in visible light, luminance, or in light from the emission of Hydrogen alpha at ~656.3nm. This graph contains all detection periods which have been accessed of the jet-like structure in the southern counterpart of NGC2261. On the vertical axis, each measurement point (blue) indicates the intensity attributed to this jet-like structure.

Figure 31

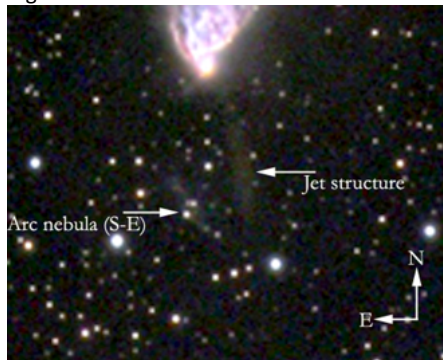


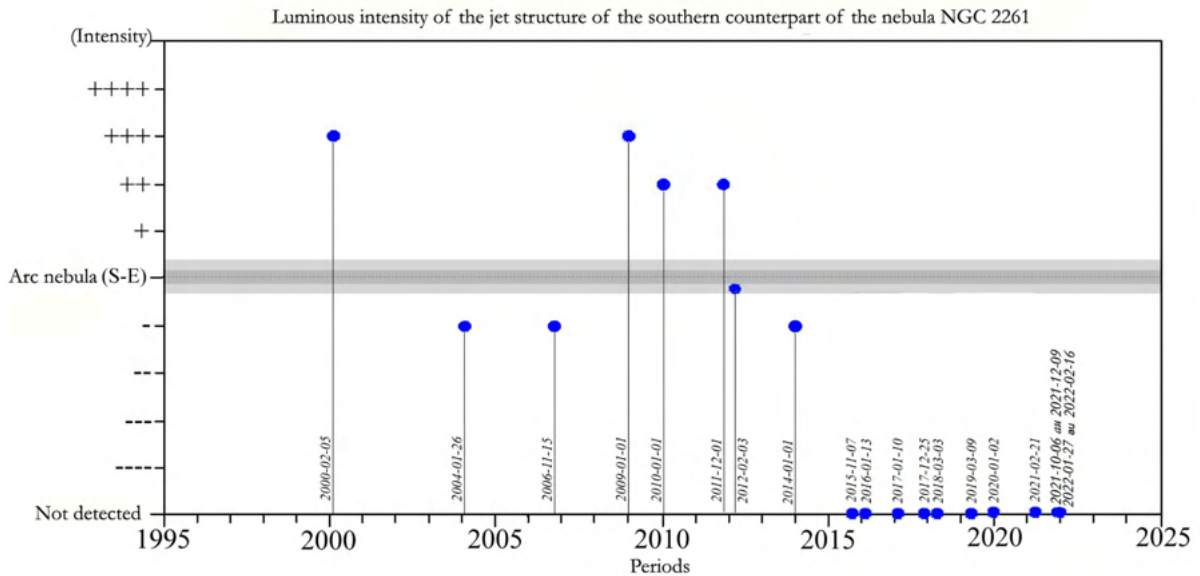
Figure 31, Summary:

NGC 2261, by Christian Dupriez 2014.

The arrow on the right points to the jet-like structure which is studied in this dossier.

The left arrow points to the small arching nebula southeast of the jet-like structure. This nebula serves as a reference for the intensity estimates of the jet-like structure. (See Graph. 31 below).

Graph 31



This graph contains all periods during which the area containing the jet-like structure in the southern counterpart of NGC 2261 has been observed. On the vertical axis, each measurement point (blue) indicates the intensity attributed to this jet-like structure.

The horizontal and central (darker) line corresponds to the reference point of the intensity. This is the intensity of the small curved nebula to the SE. It is detected over all observation periods, it can therefore be used as a reference to estimate the approximate intensity of the jet-like structure we are searching for. The measurement points below this central horizontal line indicate that the jet-like structure is less intense than the small curved nebula (S-E). The points above this horizontal line are periods where the jet-like structure is more intense than this small curved nebula (SE). The dots on the axis line, labelled "Not detected", are the periods when this jet-like structure is absent from the images, i.e. since November 2015.

It seems clear on this graph that this jet-like structure varies in intensity over time independently of the small curved nebula to the SE and that, for several years, it is no longer detectable on our images. This disappearance was happened over a short period, so we can assume that it is a filiform structure which is a reflection nebula illuminated by the young star R Monoceros whose light was hidden by circumstellar material very close to the star in the same plane. At this distance, the great rapidity at which this disappearance occurred cannot imply a high velocity ionized matter jet of the (HH) Herbig-Haro type.

B3) Our images of the period 2021-2022, show no luminous trace of this jet-like structure to the south! We have 6 observation periods: Réal Gauvin, 2021-10-06, 2021-11-10 and 2021-12-05; Robert Cazilhac on 2021-12-09; Jean Guy Moreau on 2022-01-17 and Denis Bergeron on 2022-02-17.

Figure 32

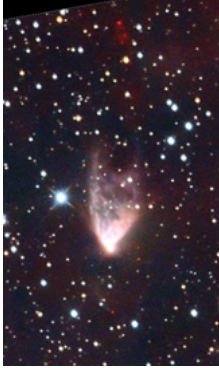


Figure 33

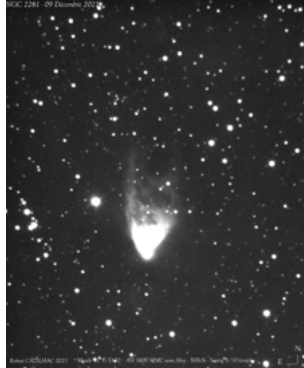
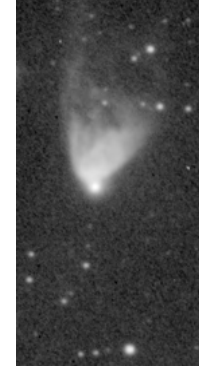


Figure 34



Figure 35



**Figure 32, by Réal Gauvin. We see no trace of the jet-like structure to the south, but we can very well detect the small nearby curved nebula to the SE.*

**Figure 33, by Robert Cazilhac. We can see the small curved nebula nearby to the SE, but there is no trace of the jet-like structure to the south.*

**Figure 34, by Jean Guy Moreau. We can see the small curved nebula nearby to the SE, but there is no trace of the jet-like structure to the south.*

**Figure 35, By Denis Bergeron. With the Moon in the sky, we can detect some traces of the curved nebula, but no trace of the jet-like structure to the south.*

C3) Can we detect in the sky some traces of the elongated structure to the south?

Even if the jet-like structure is not detected, can we see darker traces of it in the sky, where it should be, at the south of the main nebula? The procedure is to check if there are less stars or less signal at its usual position.

Figure 36; We can see in the left image, the region where the jet structure is usually observed, that it seems a little darker than its surrounding area and that there are very fewer stars in this area of the sky!

The number of stars in this region has been estimated relative to the surrounding regions. Considering that if there is a denser nebula at this location, the foreground stars should be dominant and the others, more in the background, must have brightness more affected and therefore be fewer in number and less intense (See Figure 36).

Figure 36

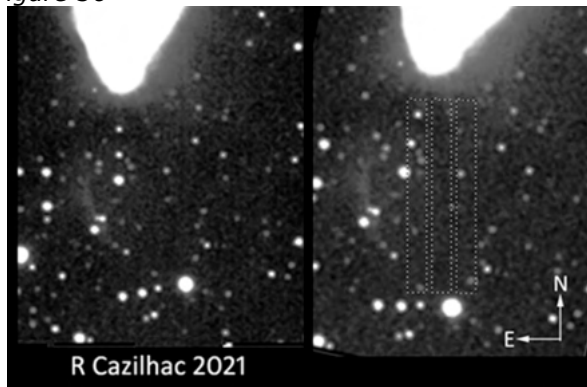


Figure 36; Our results; Right picture: The dotted rectangles are the area and regions used to estimate the number of stars.

Note: The image has been rotated to orient the three measurement regions vertically in this representation.

- * Region on the left (East) \approx 8 stars are observed.
- * Central region (Jet-like structure) \approx 1 star
- * Region on the right (West) \approx 3 stars

Does the nebula material obstruct by extinction the light from background stars?

Three nearby regions to the south, where the jet-like structure can be observed, in which the number of detectable stars has been estimated.

Figure 37 [@hansonastronomy.com](https://www.hansonastronomy.com)



[@hansonastronomy.com](https://www.hansonastronomy.com)

Figure 38



Figure 37 – 38; This gorgeous image of NGC 2261 by Mark Hanson is from the 2018 period.

Figure 37 presents the image of NGC 2261 as published by Mark Hanson on his site. In this image we can clearly see the large band that does not contain stars where we could at times, prior to 2015, see a thread-like luminous nebula in the form of a jet. We also see some pale and diffuse cloudiness toward the south of the main nebula. We also detect a change of intensity and appearance of this diffuse cloudiness at the site where the luminous jet-like structure could previously be detected.

<https://www.hansonastronomy.com/hubble-variable-nebula>

Figure 38, is the same image by Mark Hanson; it has undergone a contrast enhancement to allow this region to be even more highlighted in the sky where the luminous jet-like structure was previously detected. The arrow at the bottom on the right indicates the expected angle of the structure in the image.

Conclusion

Historically, there doesn't seem to be much literature or documentation about this jet-like structure in the nebula south of NGC 2261. Archival observations often lack the optical depth necessary to reveal this fine structure. This contributes to the level of interest in such a follow-up.

For the period covered by this dossier, i.e. 2021/2022, we can conclude that this jet-like structure of the southern component of the nebula NGC 2261 remains undetectable in our images. So since 2015, this luminous filiform structure has disappeared! On the other hand, we think that it is possible to detect it indirectly in the sky, as we demonstrated in the last section (C3), and in Figures 36 to 38. We can infer that this jet-like structure undergoes luminous variations of the same type as the main reflection nebula to the north of the star R Monoceros.

**References and images used for this project*

Rapport – V2

La nébuleuse variable de (Hubble) NGC 2261

La nébuleuse en jet au sud est disparue sur nos images de 2020 !

Une mise à jour

G. St-Onge, D. Bergeron, D. St-Gelais, J. G. Moreau

[N2261_2020_V33b.pdf \(faaq.org\)](#)

[Fédération des astronomes amateurs du Québec \(faaq.org\)](#) / Observation du ciel/Rapports de projet de recherche

La bonne interprétation des cartes de polarisation des étoiles jeunes Par Pierre Bastien
Observatoire du mont Mégantic et du Département de physique de l'Université de Montréal

<http://astrosurf.com/stog/archives/xpolarisation/polaris.htm>

Site web Simbad :

http://simbad.u-strasbg.fr/simbad/sim-id?Ident=%40907222&Name=V*%20R%20Mon&submit=submit

L'ÉTOILE R MONOCEROS ET NGC 2261, Par Gilbert St-Onge, 2008

http://www.astrosurf.com/stog/xtravaux_recherches_2/n2261/ngc2261_v2008.pdf

#1 L'étoile jeune R Monoceros et NGC 2261 nous dévoilent un jet

Par G. St-Onge

http://astrosurf.com/stog/xtravaux_recherches_2/ngc2261/2261osj.htm

(L. M. Close et al. 1997) sur le web à: "Adaptive Optics Infrared Imaging Polarimetry and Optical HST Imaging of Hubble's Variable Nebula (R Monocerotis/NGC 2261): A Close Look at a Very Young Active Herbig Ae/Be Star

http://www.journals.uchicago.edu/ApJ/journal/is_sues/ApJ/v489n1/36055/36055.html

**À la portée de tous NGC2261 et HH-39 par des amateurs québécois
Dans le magazine *Astronomie-Québec* · Juillet/août 2014**

Par G. St-Onge

et

<http://astronomie.quebec/magazine.php>

Une nébuleuse qui n'a pas peur des changements NGC 2261

Par Gilbert St-Onge

Merci à Pierre Bastien, réviseur du document :

Dr. Pierre Bastien, département de physique, U. Montréal, OMM, CRAQ

Astronomie-Québec · Janvier / février 2013 p.26

<http://astronomie.quebec/magazine.php>

La Lumière Cachée par G. St-Onge →

Magazine *Astronomie-Québec* · Mars/avril 2014 → p.34

<http://astronomie.quebec/magazine.php>

Variations autour de NGC 2261, par Carine Souplet,
Astronomie-Magazine france P.33 No 183 novembre 2015

***Carte de polarisation N2261**

(Image 4.1) Une carte de polarisation de NGC2261 en filtre "V" de S.M. Scarrott, P.W. Draper, R.F. Warren-Smith 1988.

M. J. Jiménez-Donaire et al, *Herschel observations of the circumstellar environments of the Be stars R Mon and PSD27*, *A&A* 605, A62 (2017).

[Herschel observations of the circumstellar environments of the Herbig Be stars R Mon and PDS 27 - NASA/ADS \(harvard.edu\)](http://herschel.observations.of.the.circumstellar.environments.of.the.Herbig.Be.stars.R.Mon.and.PDS.27.-NASA/ADS.harvard.edu)

Göran Sandell et al, *The Molecular Outflow from R Mon*, *APJ*, 889:138 (9pp), 2020 February

Sloan Digital Sky Survey (SDSS)

V* R Mon (u-strasbg.fr)

simbad.u-strasbg.fr/simbad/sim-id?Ident=%40907222&Name=V*%20R%20Mon&submit=submit

Et - <https://www.astronbin.com/126445/?q=>

Credit: SDSS/Giuseppe Donatiello, 2014-10-07.

Merci à Mark Hanson de nous permettre d'utiliser sa magnifique image de N2261 dans ce dossier.

Mark Hanson, *Hubble's Variable Nebula - NGC 2261*, 2018 - @hansonastronomy.com

LRGBHa 300,180,180,180,450 Taken with a PlaneWave 24" CDK from Animas New Mexico.

<https://www.hansonastronomy.com/hubble-variable-nebula>

*** Principle collaborators on this project 2021**

G. St-Onge¹

Le suivi de NGC 2261 depuis 1990 et bien d'autres choses... Sites Web: <http://www.astrosurf.com/cdadfs/cdadfs1.htm> et http://astrosurf.com/stog/saisons_ciel/

D. Bergeron²

Il a une chaîne sur Youtube avec plusieurs tutoriels sur plein de sujets en astro et un site web que vous pouvez consulter à cette adresse: http://www.astrosurf.com/d_bergeron/

D. St-Gelais³

Réside à Querétaro Estadio de Querétaro, Mexico. • (Exoplanètes Transit Database). • Projet GRANDMA recherche de KiloNova, • Mesures du transit de l'exoplanète, membre de la liste de diffusion d'Alexandre Santerne depuis la fin 2019. • Photométrie pour AAVSO, étoile variable.

J. G. Moreau⁴

Jean Guy Moreau, de formation je suis un technicien en chimie industrielle. Il a été technicien en travaux pratiques pendant 25 ans.
L'astrophotographie permet un certain contact avec ce mystérieux Univers d'une incompréhensible beauté, qui ne cesse de m'émerveiller.

Réal Gauvin⁵

De la banlieue proche de Drummondville, il se spécialise surtout dans la photo de nébuleuses planétaires au filtre H-alpha et [oxygène III]. Son site d'hébergement d'astrophotos : <https://telescopius.com/profile/herge61>

Jean-Bruno Desrosiers⁶

Observatoire du Mont St-Joseph, <http://omsj.info> | AAVSO: DJED
Télescope C14, Caméra Atrik 414ex
Filtres NarrowBand et en RVB

Christian Dupriez⁷

Région Lilloise dans le Nord de la France

Astrophotographie en Région Lilloise

www.astrosurf.com/chd/index.htm

Robert Cazilhac⁸

Lugny 02140 France
Traitement avec IRIS
<http://www.astrosurf.com/pixel/1ertestZWONGC2261.htm>

Alain Amsaleg⁹

France,
Merci de ta contribution

Mark Hanson¹⁰

Hubble's Variable Nebula - NGC 2261, 2018 - ©hansonastronomy.com
LRGBHa 300,180,180,180,450 Taken with a PlaneWave 24" CDK from Animas New Mexico.
<https://www.hansonastronomy.com/hubble-variable-nebula>

*** Provenance des images utilisées pour ce projet**

J. G. Moreau (Qc.), D. Bergeron (Qc), D. St-Gelais (Mexique), Réal Gauvin (Qc), Jean-Bruno Desrosiers (Qc), Christian Dupriez (France)
Robert Cazilhac (France), Alain Amsaleg (France), Mark Hanson (New Mexico), Sloan Digital Sky Survey (SDSS),

Picture Credits

Réal Gauvin (2021 10 06)

Voici un empilement de 4 images de NGC 2261 avec des poses unitaires de 10 minutes

Image finale calibrée avec flats, darks et bias.

Images prises hier soir; 6 octobre 2021 vers 4h30 du matin.

Télescope 10" RC à 2032mm de focale

Caméra Atik 460ex

Filtre anti-pollution lumineuse Astronomik

Bin2

Réal Gauvin (2021 11 10)

Voici une image empilée de NGC2261 prise dans la nuit du 10 au 11 novembre 2021.

23 images calibrées avec dark, flat et bias de 10 minutes chacune en bin2

Télescope 10" Ritchey-Chretien f8.

Caméra monochrome Atik 460ex

Filtre Astronomik anti-pollution

Réal Gauvin (~2021 12 05)

(Début décembre 2021) La semaine dernière, j'ai complété la photo avec mes filtres Ha, G et B

La couche Ha est constituée de 29 images empilées et calibrées de 5 minutes bin2 chacune.

Télescope Ioptron trusstube 10" Ritchey-Chretien

Caméra Atik 460ex monochrome avec pixels de 4.54 microns en bin1

Filtres Astronomik Ha de 6nm

Robert Cazilhac (2021 12 09)

Voici 2 images prises en milieu de nuit le 09 Décembre 2021

Meade 12" F/D10 (F:3000 mm) ASI 1600 MMC sans filtre

Seeing 5/10

Seulement 500 poses de 5s

(Passage en bin 2x2 au traitement)

Je joins donc 2 images avec des seuils de visualisation différents ...pour les détails dans la nébuleuse et les nébulosités externes !!

Jean Guy Moreau (2022 01 17)

CMOS couleurs

Instrument 14 po F/3,3 avec correcteur/réducteur Keller 0,73X.

Exposition de 155 minutes avec camera QHY268C, pixels de 3.76 microns, matrice Bayer RGGB.

C'est un crop de l'image, je vois le bas des étoiles bordées de rouge à cause de la dispersion atmosphérique, car la nébuleuse était très basse à l'Est.

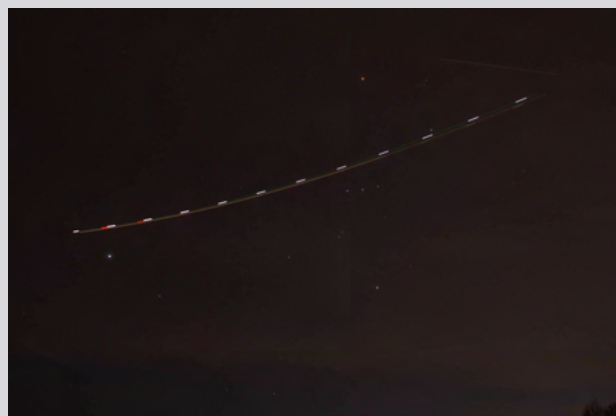
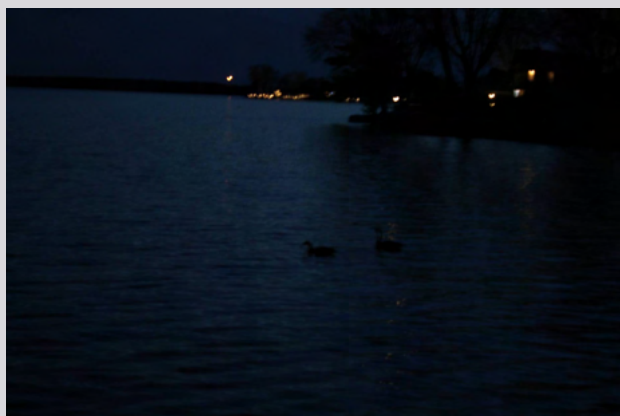
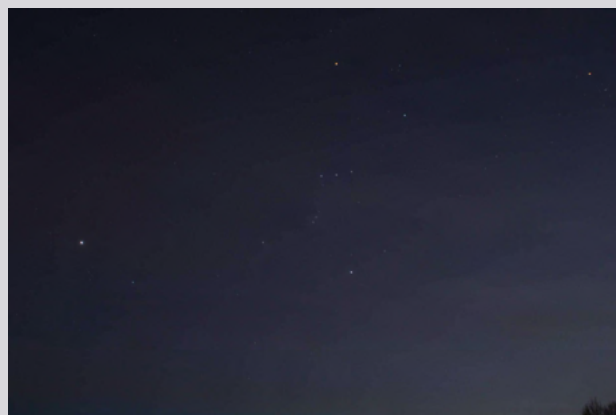
Denis Bergeron (2022 02 16)

Mon telescope est une Planewave CDK 30cm F8 FL: 2555mm avec une camera SBIG STL11000M avec filtre Luminance.

Mark Hanson
Mark Hanson, Hubble's Variable Nebula - NGC 2261, 2018 - ©hansonastronomy.com
LRGBHa 300,180,180,180,450 Taken with a PlaneWave 24" CDK from Animas New Mexico.
<https://www.hansonastronomy.com/hubble-variable-nebula>

Mark Hanson
Hubble's Variable Nebula - NGC 2261, 2018 - ©hansonastronomy.com
PlaneWave 24" CDK from Animas New Mexico
<https://www.hansonastronomy.com/hubble-variable-nebula>

Denis Bergeron Le 2022-02-17.
Val-des-Bois en Outaouais
PlaneWave CDK 12" à f8



By Karim Jaffer, April 2, 2022. Finally got a bit of time under the night sky with temperatures above 0°C for an hour between sunset and clouds taking over. Crescent Moon, Orion & Sirius with a plane & the ISS photobombing with some friendly geese keeping me company.

For Sale



ASTROMASTER 70AZ TELESCOPE #21061

This is a Novice level telescope, in good condition

Note: ** starfinder is missing **

- 70mm refractor telescope with fully coated glass optics and a lightweight frame.
- Observe in no time with a quick and easy, no-tool setup.
- Accessories include: two eyepieces (20mm and 10mm), erect image star diagonal
- Panning handle Alt-Az control with clutch for smooth and accurate pointing.
- Adjustable height tripod

Sells new for \$189.95 + tax ... asking \$90.00

<https://maisonastronomie.ca/product/celestron-refracteur-70-az/>

If interested contact Frank - email: ftomas@gmail.com



ZWO ASI183MC

This is the uncooled version. It has small 2.4µm pixels. Suitable for shorter focal lengths.

Asking \$500.

If interested, contact Gerald MacKenzie at gerald.rascmontreal@gmail.com



ZWO New T2 Tilter

Having trouble focusing your star shapes from one side to the other? Maybe you could use the ZWO New T2 Tilter. It allows you to tilt your camera to match the connection with your optics.

Asking \$45.

If interested, contact Gerald MacKenzie at gerald.rascmontreal@gmail.com