

NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC
VOLUME 2016 ISSUE 6 NOVEMBER-DECEMBER 2016



A Summer Night Under Perseus' Shower

by Leigh Cummings and Elena Popovici

It may seem difficult these days to think that the sky was or will ever again be clear, what with the downpour of this October. Let us thus reminisce about the astro-friendly days of the past summer.

Every August, our spaceship Earth cuts a swath through the debris field left by the last passage of comet Swift-Tuttle. It has now become a regular event for us to accept Metro Parks' invitation to join them at their Aldergrove Regional Park for

a night of festivities to celebrate and observe this wonderful occurrence. What we and the visiting public get to observe, of course, is the Perseid Meteor Shower, one of the premier astronomical events of the summer.

As with all astronomical events, the success is greatly dictated by the fickle weather of the Pacific Northwest. In 2014 we had really good weather and



an equally good turn out by the public. In 2015, however, it rained and turnout reflected our bad luck. This year the weather co-operated and we had a great turnout. According to Vanessa Lee of Metro Parks, we had 1420 visi-

tors with over 500 of those choosing to camp overnight in order to extend their "out-of-this-world" experience. (This is the only night of the year that overnight camping is allowed in the park.)

What is not reflected by the fluctuating numbers is the amount of hard work put in by the Metro Parks staff every year to put this event on and make it so special for all the families that show up. Rain or shine, the work is the same. They also call upon volunteer organizations from the community to help make the evening so much fun for kids from 2 to 82 years old. There is something for everyone.

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NOVEMBER 10

Dr. Catherine Johnson of UBC EOS on NASA's upcoming OSIRIS-Rex asteroid sample return mission and her role in it. Room SWH10041

SFU

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DECEMBER 8

Annual General Meeting. Room SWH10041

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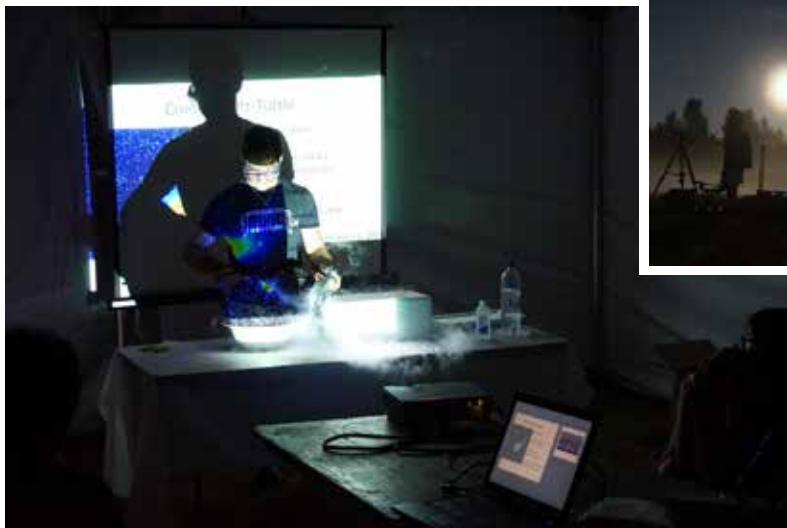
JANUARY 12

Dr. J.J. Kavelaars of the Herzberg Institute and member of the New Horizons science team on the Pluto mission results. Room TBA

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Members' Gallery – Aldergrove Lake Perseids



Photos by Elena Popovici



President's Message

by Suzanna Nagy

December will conclude my first year as your President. When I was nominated in December 2015, I'll be honest and say that I was hesitant to take on the role. My general knowledge of the science of astronomy is poor. In many ways, I still consider myself a beginner enthusi-

ast. I couldn't tell you how to work an equatorial mount or explain the difference between a CCD camera and a DSLR.

However, I was assured by Council that I had a lot to offer Vancouver Centre because of my organizational and administrative skills, and

I could always rely on others for any technical concerns. So I accepted the nomination and for the past 12 months, I have been directing the attention of Council to tackle some long-outstanding administrative tasks.

With the amazing assistance of our members, I have been able to continue to do so.
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About RASC

The RASC Vancouver Centre meets at 7:30 PM on the second Thursday of every month at SFU's Burnaby campus (see map on page 4). Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently \$78.00 per year (\$45.00 for persons under 21 years of age; family memberships also available) and can be obtained online, at a meeting, or by writing

to the Treasurer at the address below. Annual membership includes the invaluable Observer's Handbook, six issues of the RASC Journal, and, of course, access to all of the club events and projects.

For more information regarding the Centre and its activities, please contact our P.R. Director.

NOVA, the newsletter of the Vancouver Centre, RASC, is published on odd-numbered months. Opinions expressed herein are not nec-

essarily those of the Vancouver Centre.

Material on any aspect of astronomy should be e-mailed to the editor or mailed to the address below.

Remember, you are always welcome to attend meetings of Council, held on the first Thursday of every month at 7:30pm in the Trotter Studio in the Chemistry wing of the Shrum Science Centre at SFU. Please contact a council member for directions.

2015 Vancouver Centre Officers

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Howard Trotter
Trustees Pomponia Martinez
J. Karl Miller

Library

The centre has a large library of books, magazines and old NOVAs for your enjoyment. Please take advantage of this club service and visit often to check out the new purchases. Suggestions for future library acquisitions are appreciated.

On the Internet

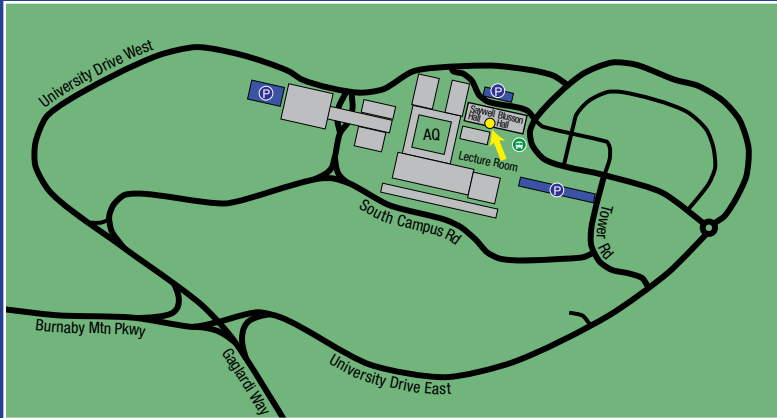
<http://rasc-vancouver.com> or
<http://www.rasc.ca/vancouver>
<http://astronomy.meetup.com/131/>
<http://www.facebook.com/RASC.Van>

 @RASC Vancouver

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Map to Meeting Site



SFU

Our fall meetings are in room SWH10041 of Saywell Hall, about halfway down the main corridor as indicated by the arrow on the map.

Pay parking is available at several locations around campus (indicated as “P” on the map).

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tance of a dedicated and hardworking team, we have accomplished the following:

- Our charitable status (lost in 2015) was reinstated;
- A “President’s Book” was created with details of everything the President and Council members need to be aware of—which from this point forward will be passed on to all following presidents. Contained within the President’s Book is a written outline of each role on Council, a contact list, past minutes, copies of signed contracts such as the SFU Memorandum of Understanding, and a timeline for the year setting out important dates such as liability insurance renewal, deadlines to report to National Office, etc;
- Our website content was updated as some content

was over 5 years old and still referred to us as being at the Planetarium;

- Our account with Meetup was changed to a Dedicated Organizer rather than a person, which will assist with future changes on Council;
- All Council email accounts were updated to our domain of rasc-vancouver.com;
- Our telescope loaner program was inventoried, overhauled, and new telescopes purchased;
- Our “club owned” scopes (separate from the loaner program and used primarily by members of Council) were inventoried and anything needing repair was attended to;
- Library shelves were designed, ordered, and installed. After 5 years in storage, our library is up and running again;

- Our Centre Bylaws (which hadn’t been updated since 1986) were re-written and will be voted on at the December Annual General Meeting.

All of these things were behind the scenes and in addition to the hard work Council has done all year that have been visible to you all such as hosting monthly lectures, organizing public events, and participating in educational outreach.

I am looking forward to my next year and enjoying my time working with such wonderful and dedicated people. Having said that, I wish to take this opportunity to thank each and every member of Council for the many, many hours of their personal time spent ensuring the ongoing success of your Vancouver Centre. ★

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We are one of those volunteer organizations that they call upon and we also want to thank our volunteers for all the time and commitment in order to bring their scopes, cameras, binoculars and their knowledge to help out.

Our volunteers this year included council members Sam, Kyle, Adrian, William, Karl and Jeremy as well as members Wilfred Lai, Bob Hanson, Anca Romano-Datcu and Terry McComas.

We also had three great guest speakers this last year in Stanley Greenspoon, Craig Breckenridge and Kenneth Lui. Talks

were well-attended and we had great feedback on their popularity. One of them demonstrated how a comet is made up of ice and dirt! Thanks to the speakers for such great effort.

We met guests from all over the lower mainland as well as from the U.S.A., Mexico, China, Japan, Great Britain, Hungary and Switzerland and probably many more.

We started setting up in the after-

noon, with the Moon rising while the Sun was still up, and a few early visitors got a chance to see the Sun through a couple of our scopes equipped with solar filters. As usual, few people had such an opportunity before; a group of sunspots was visible to make it even more



interesting. The Moon and its many craters got a lot of “wow”-s early in the evening as the crowds gathered, until it got dark enough for Mars & Saturn to steal the show! A special “performance” was put on by the international space station (ISS), which joined the lunar and planetary alignment, taking a few minutes to cross the sky west to east. After watching other satellites and many meteors criss-cross the sky, all but the

bravest kids went to bed in their tents.

By this time, the nearly-full Moon was less than helpful, as trying to look at any faint deep sky objects was a challenge, and it felt like our natural satellite would take forever to set. But the weather co-operated long enough for the majority of our guests to get a look at the night sky; and, living in a large lit-up city like Vancouver, many people were also amazed to see their own Moon-shadow for the first time. In the early morning, fog started to roll in, dewing-up every instrument, lawn chair and blanket in the open. With the still-

there Moon giving its eerie bluish light to the ground fog, it would have made a better Hallowe'en night than an astronomy night, however even that made it fun for the kid in all of us. Time to call it a night!

As we grumble about the rainy days surrounding the actual Hallowe'en, we look forward to hanging out with the Metro Parks crew again next year under a shower from Perseus. ✨

Images by Elena Popovici

Membership has its Privileges!

New members, did you know? The Vancouver Centre has several telescopes available for loan free of charge! We have telescopes ranging from 60mm to 10” in diameter. For more information see the Director of Telescopes after the members meeting. The loaner period is for one month, to be returned after the next meeting. Telescopes are not allowed to circulate outside of these meetings. You

can now reserve two different telescopes per year and use what is left at the end of the meeting anytime.

Your greatest opportunity as a member of the RASC is to take advantage of the company of other enthusiasts to increase your knowledge, enjoyment and skill in astronomy.

The best thing you can do to gain the most from your membership is to get ac-

tive! Take in the club meetings; engage other members with questions; come out to observing sessions (also known as “star parties”), and, by all means, volunteer to take part in our many public events.

For the usual observing sites and times, visit our website at <http://rasc-vancouver.com> or contact the Observing Chair at observing@rasc-vancouver.com.

Upcoming Events

December
8 – AGM

Target for Tonight: Alsatia Niner Seven One, Pt. 1 by Dan Collier

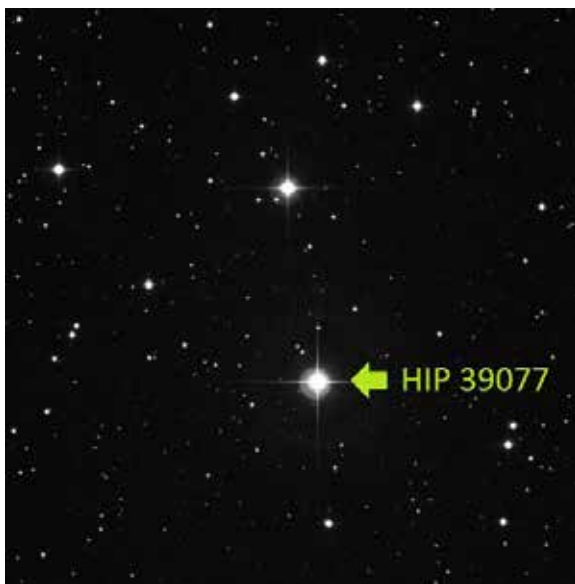
Occultations are romantic assignments against the inky deep. An asteroid goes at large upon the sky to seek a partner in the stars. The strangers court. Onlookers at Earth await a nuptial. The wizards throw their bones. Should the bones land in favour, heartbeats race. But many are disappointed. Whirl whirl, twist and twirl! All sweep apart. Asteroid, star, and observers go their ways, never to meet again. They pass away in the night.

I worked with Vancouver Centre life member Phil Morris to record two occultations in September. The first, 957 Camelia, was a “no D/R”—no disappear, no reappear. It was only a warmup. Four hours later we’d have another shot. Minor planet 971 was discovered after World War One by Schaumass at Nice Observatory. It is called *Alsatia*, the German name for the province in northeastern France. Schaumass wanted to name it *Alsace*, but the German institution in charge of minor planet names did not respect his wish.

Niner-seven-one was chasing the star HIP 39077 near Pollux. Tony George had put out an IOTA circular informing his B.C. observers (“you Canadians”) that the virtual shadow

of 971 would trace a line from Victoria to the Rockies. Observers close to the line would see the Hipparcos star vanish for a second or two. Up the Okanagan, Jim Failles, Guy Mackie, and Alan Whitman were also getting ready for 971, which I didn’t know.

We had problems with Camelia.



The camera was picking up something from the power lines overhead. A herringbone effect was stuck in our images. It made me think of an old-fashioned TV beset by the transmissions of a radio ham. And we’d hear music on the shortwave radio each time the CCD read out. I had tuned my shortwave to the WWVH time station on 10 MHz. The signal, arriving from distant Hawaii, was

susceptible to hash from the camera electronics. Sister WWV in Colorado was coming in on 5 megs but not strongly. I remained hopeful of timing 971’s occultation before the signal weakened even more. The ultraprecise WWV tick-tock would be recorded on one stereo channel while a microphone on the other channel caught the sound of the CCD shutter. Why not GPS timing? Because WWV is cheaper. And I won’t go into why PCs can’t keep time accurately enough.

We would be using the drift method. The telescope would be stopped to let HIP 39077 drift across the CCD for 30 seconds. Should 971 block the starlight, the occultation would be apparent as a gap in the star trail. The shutter sound would tell us exactly when the star began trailing. The D/R events can then be extracted.

After Camelia, the scope had to be moved and polar aligned. We located the HIP star low in the east. I tinkered with the setup. Running the laptop on battery reduced the herringbone a little, but I decided to leave the AC on. Left to its own, the elderly battery might give out and we would be skunked—again.

I was concerned that 971's bright Hipparcos target star might saturate the CCD even in drift. Phil went in search of some cardboard to make an aperture mask for my telescope. We decided it was not needed, although I did try it as a handheld shutter for a rehearsal image. It was a fortunate impulse. This shot saved our *derrieres* after I went on to bungle the "science" image.

The shortwave was tuned to 5 MHz and an Audacity recording was started to capture wwv while it was reasonably audible. Even if wwv faded out now, we would be able to time our D/R from a few seconds of audio capture.

By 5:30 AM, the brightening eastern sky had carried the star up and clear of the apartment across the street. Target time grew near. We positioned our Hipparcos target star near the east side of the CCD field. The target had a faint field star for company, and that too was fortunate, in hindsight. We briefed our procedure. I adjusted the laptop clock to wwv. While not good enough for science timing, it was OK for a cue. We would start the 30-second "science" exposure 15 seconds in advance of prediction to have the best chance of catching a D/R. Phil sat down at the laptop with his finger over the mouse key, ready to start the "science" exposure while I sounded a countdown.

At T minus 15 seconds, I reached over in the dark to switch off the telescope drive. It's all in the sound track. You hear a faint click and the spoken "Now" that was my cue to Phil. The camera came to life, causing EM noise to burst onto the radio over

wwv's weakening signal. The shutter opened. The die was cast.

A positive D/R had eluded us for years. Minor planet 971 was not even a particularly good prospect for one. We could have driven closer to the centreline but that would be putting the D/R ahead of science; and anyway, Jim and Guy were already on centre. The graze line, on the other hand, passed over our Kits neighbourhood. Our odds would be 50/50 for a D/R, but 100 percent that we would increase our knowledge of 971. This is how occultation research works. For a solar eclipse, you would be an idiot to stay on the graze line.

Mixed feelings came over me. As long as we didn't actually screw up, our image would show two stars trailed majestically across the field, stopping near the west edge. Only caprice could now grant us what we sought, a gap in HIP 39077's sparkly trail where the asteroid would be the only source of light. It is known from routine studies that 971 is car-

bonaceous. Black as tar, actually. The gap, if present, would be completely dark. The K0-class target star was 8 magnitudes brighter than 971 with which it was now in virtually perfect alignment.

Numbers: 971 would subtend 30 milliarc-seconds, roughly a hundred times larger than the red giant HIP 39077. Its shadow (so-called) was sailing in over the Pacific at over 130,000 kilometres an hour, and would reach Alan, Guy and Jim only 5 seconds after passing over Vancouver.

The shutter closed quietly; more radio sounds; a "downloading" progress bar petered away in Max-Im. When I think about it, it's the buildup of suspense that's the whole attraction of these occultations.

Our image assembled onscreen without ceremony. And there it was, a beautiful D/R. I whacked Phil in the arm. No need for any exchange of words. *

[To be continued in our January issue]



Cosmic Rays in the Classroom

by Francesca Crema

Whether you know it or not, planet Earth is under constant bombardment from extraterrestrials. Although that statement may seem more like science fiction than fact, particles such as protons—whose sources can range from distant supernovae to our own sun’s solar wind—travel vast

on subatomic particles, since their energetic sources behave like natural accelerators.

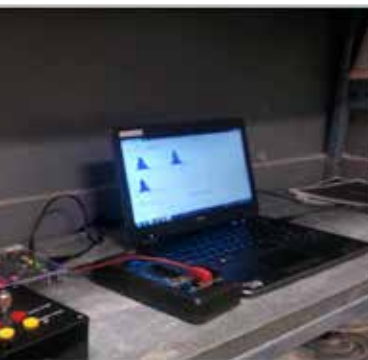
I take part in a STEM-focused secondary school program in East Vancouver, where much emphasis is placed on project-based learning. During the final term of the scholastic year (in

related to both physics and astronomy, due to my interest in both fields. Along with a group of four other grade 11 students, I managed to obtain a set of scintillator paddles from the University of Victoria. While there, we gave presentations pertaining to the Standard Model and mass-energy equivalence, as well as the general concept of cosmic rays to UVic professors. We taught ourselves how to use and set up the panels, operate the data-collecting software, run different experiments and create graphs which accurately displayed the results of these experiments. This included monitoring mean muon lifetimes (before they decayed into electrons, muon neutrinos, and electron an-



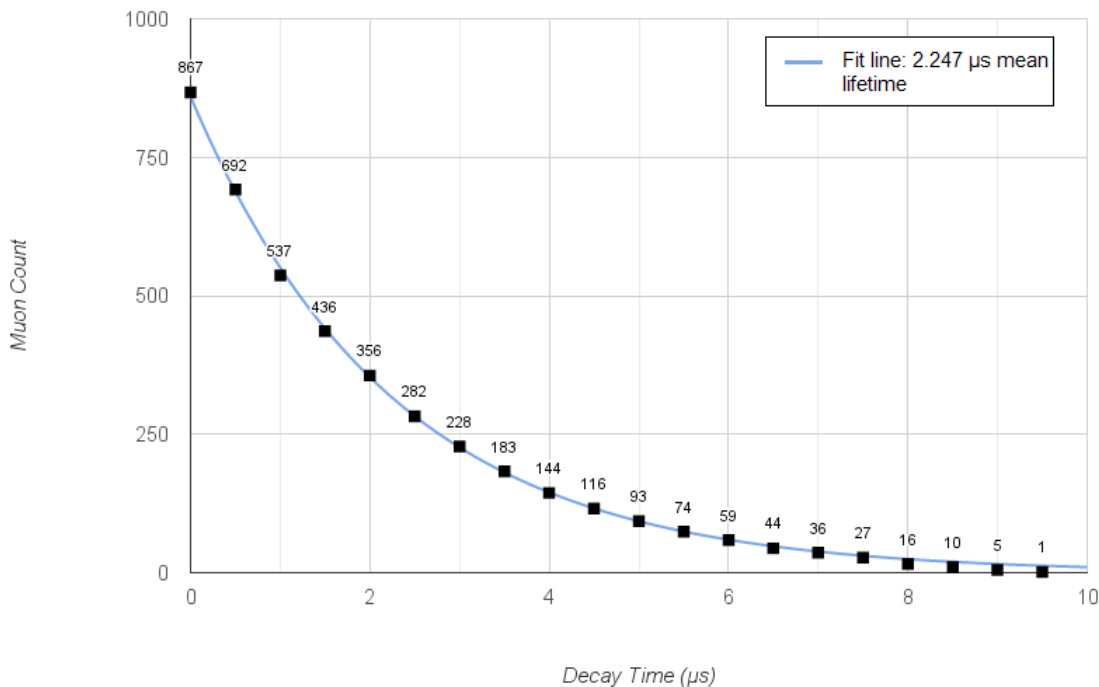
distances across space until finally showering our planet (and everyone on it) with smaller and smaller particles as they break up through atmospheric interactions. As these showers plummet towards the Earth’s surface, elementary particles known as muons (μ^-) are produced. Physicists can study muons and other forms of cosmic rays in order to understand the composition of our universe and relativistic effects

in addition to following required academic curricula), we students are allowed to pursue self-guided capstone projects related to the sciences or technology—provided they are sufficiently challenging and educational. This past April, I leapt at the chance to undertake an exciting project



tineutrinos), coincidence events (from which we could determine the approximate size of a shower), muon speed, and more. A few members of our group even managed to speak to other high schools

Muon Lifetime in Microseconds



about our project, and suggested we create a Vancouver-wide array of muon detectors for determining the sizes of larger showers. The graph included is linked to our muon lifetime experiment, and it displays how quickly the muons we counted decayed in microseconds (μs). The average decay time is represented by the blue fit line, which determines that most muons decayed at $2.247 \mu\text{s}$. This data is 98% accurate when compared to more conclusive experiments, most of which found the average lifetime to be approximately $2.197 \mu\text{s}$.

Due to our extensive re-

search, every member of our group gained a more comprehensive understanding of relativity and its effects on the quantum world. Additionally, we each obtained invaluable opportunities to work with many professionals involved in high-energy particle physics. I personally became even more enthusiastic about this branch of science, and as a current secondary school senior I am seriously considering particle physics as a possible career trajectory. The amount of interest this project generated, as well as the numerous concepts we learned, acted as an excellent

advocate for project-based learning. Instead of regurgitating abstractions recited in classrooms, which can be very discouraging to students curious about pursuing a career in physics, we had the opportunity to apply our knowledge and extend it into something empirical. It's certainly interesting to read about cosmic rays passing through our atmosphere, but it is another thing entirely to actually visualize them on an oscilloscope, graph their behaviour, and develop a complete and thorough understanding of this remarkable natural phenomenon. *

The Library is Open for Business

by Suzanna Nagy

We are pleased to announce that the Library for RASC Vancouver is once again open for business. After being in storage for five years, we have been graciously provided space by SFU to host the library inside the Trottier Observatory. The library will be opened after every monthly lecture held on the 2nd Thursday of every month.

Borrowing from the library is a RASC benefit and, as such, only RASC members may use the library. Available to be borrowed are books on astronomy, cosmology, physics, history, and telescope making—to name a few subjects. Also available are star charts

and DVD documentaries.

If you are interested in perusing the library, please go to the Trottier Observatory after the lecture. Our Librarian, Mr. William Fearon, will be there and happy to assist you.

To quote Alan Bennett, “A book is a device to ignite the imagination.” *



Richmond Public Library Science Bash

by Jeremy van den Driesen



Dexter Hine and Isabelle Eyemere (two new youth members) teach kids about the phases of the moon using Oreo Cookies as their tool. A BIG hit for obvious reasons. About a 100 kids passed through this station. Dexter and Isabelle were busy for the duration of the four-hour Science Bash at the Richmond Public Library on Friday Oct. 21st. All of us, that is Karl Miller (far right), Samson Joseph (right), Wilfred Lai, Dexter Hines, Isabelle Eyemere and I, were kept busy throughout the afternoon tempting the kids with our moon phases, having them peer through the telescopes we set up indoors and handing out star-finders, etc. at our table.

Members' Gallery



Mars in Scorpius by Elena Popovici

Throughout July and August, Mars moved fast through Scorpius, getting closer to Saturn and Antares. On August 15th, they all formed an isosceles triangle with Mars brightest in the bottom right, Saturn on top and Antares in the bottom left and dimmest of the three. Image taken from downtown Vancouver, looking south over False Creek. Equipment: Sony ILCE-5000 camera.



VANCOUVER TELESCOPE CENTRE
Serving the Astronomers of Vancouver and British Columbia since 2004

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