

NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC | VOLUME 2010 ISSUE A | ASTRONOMY DAY 2010

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About Astronomy Day

Founded in 1973 by Doug Berger, former president of the Astronomical Association of Northern California, Astronomy Day's goal is "to promote the forerunner of all scientific endeavors and to provide information, resources, and encouragement in all facets of astronomy." On this day, professional and amateur astronomers the world over host events which bring this oldest and most accessible of sciences to the public.

Information about the RASC, our services, and how to join can be found on page 5.

Looking Ahead

Oct. 14: John Chapman: "Mining the Solar System."

Nov. 11: Dr Thomas Kallanger of MOST: "How a Canadian suitcase, a French painter, and an ancient German astronomer sound the stars."

Title image: Jason Rickerby

The Absolute Minimum You Need to Know about Astronomy

17 Factoids by Dan Collier

1. Astronomy is nothing like astrology. Astronomy is a physical science practised by a worldwide community of accredited professionals (and amateurs) who agree on the basic structure of our Universe. Astrology isn't. Sorry.

2. The Universe is **BIG**. Really, **REEEEEALLY** big. How big is it? From the Earth to the Moon is 400,000 kilometres, but that's nothing to an astronomer. It takes light only about 1 second to go from the Earth to the Moon. In contrast, light takes 1,000,000,000,000,000,000 seconds (30 billion years) to cross the observable Universe. And that's just the observable part! Amazingly, radio waves from the edge of the universe are landing on your body all the time! Astronomers call them "cosmic background photons."

3. The stars you see at night are a **LOT** farther away than the planets in our Solar System. Sirius, the nearest bright star that you can see from Canada, is 20,000 times as far as Pluto. However, even Sirius is close compared to the galaxies.

4. Our Solar System is a dynamic place.

- The planets are going around the

Sun

- Dozens of moons are going around many of the planets
- The orbits are constantly shifting (though not by much)
- New moons, asteroids and comets are being discovered all the time, many by amateurs
- Except for Pluto, robot explorers have visited every planet, and even a few asteroids and comets
- From time to time, an asteroid or comet crashes into a planet, like Jupiter—or even the Earth

5. The rest of the Universe is dynamic too, but it's so big and slow that it can take a lifetime to see any developments at all. However, there are exceptions!

- variable stars (some actually pulsate in size)
- binary stars (one star circling another)
- novae, supernovae and hypernovae (very rare)
- gamma-ray bursters (whatever they are!)

6. In the last few years, astronomers have discovered hundreds of planets that are not revolving around the Sun. They revolve around stars that

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As Vice-President of the Vancouver Centre of the Royal Astronomical Society of Canada, and as Director of Simon Fraser University's astronomy outreach program, I am doubly excited about the joint RASC-SFU event taking place on Saturday September 18, at SFU's Burnaby campus.

This event is in support of the proposed SFU Astronomical Teaching Observatory and Science Outreach Centre, and we are calling it "Starry Nights @ SFU Forever!"

Admission is **FREE** and **OPEN TO EVERYONE**, and includes **FREE PARKING!**

It takes place **RAIN OR SHINE**, **STARTING AT 2pm**, and continuing into the evening, with an action-packed program of science activities for kids of all ages! There will also

be a raffle, a silent auction, and an evening **BBQ**, all by donation, with all donations going to the proposed SFU Observatory and Science Outreach Centre!

The RASC Vancouver is hosting its annual Astronomy Day event as part of "Starry Nights @ SFU Forever!" The Vancouver Centre program will include its annual Paul Sykes Memorial Lecture at 4pm, this year presented by Dr. Jim Whiteway of York University, who is principal investigator for the Canadian weather station on board the Mars Phoenix lander.

Other activities in our afternoon and evening programs will include hands-on science activities for grade-school age kids, a campus-scale "Solar System Amazing Race" led by SFU undergraduate

and graduate students, telescopes on show and tell, a **BIG** raffle and silent auction for several fantastic astronomical prizes, and (weather permitting) an evening star party starting at 7pm, with dozens of telescopes to look through. In case "real" stars don't show that evening, we will instead host an entertaining Hollywood movie with a space theme, suitable for all ages. We are also thrilled to report that the Burnaby Mountain Business Association will sponsor a family **BBQ**, by donation, during a dinner break before the start of the evening star party or space movie.

Here's to clear skies and a great day and evening of science fun at SFU on September 18! ★

Centre Donations

by Ron Jerome

Vancouver Centre has benefitted from the generosity of members and outside benefactors. The largest financial contributions have come from Paul Sykes and Martha Ellen Pearse. The former, a UBC physics professor and Centre member, made a bequest which we have used in part to establish an annual memorial lecture. This is normally presented as part of our Astronomy Day activities. Regrettably, we know little of Martha Pearse but we have used her contribution to establish an award for the annual science fair competition in British Columbia. In addition, funds from both donors are used to support the Centre's outreach activities. We have also

benefitted significantly from the time and technology donation of Chris Graham with whom we shared a robotic telescope venture.

Others have contributed funds, sometimes anonymously, as well as astronomy equipment and library materials. Where possible, the equipment is incorporated into our loaner programme to help make access to telescopes possible, particularly for new members.

As a registered charity, we are able to provide donors with tax receipts which may enhance their willingness to give. Donations can be made in person, by mail or by using CanadaHelps.org or the RASC National Office. Funds can

be designated for specific projects, such as our observatory or for other purposes. We are grateful for all the support we have received and thank all of those who have contributed in the past. ★

Our mailing address is:

RASC Vancouver Centre
c/o H.R. MacMillan Space Centre
1100 Chestnut Street
Vancouver, B. C.
V6J 3J9

SCHEDULE OF EVENTS

- **Hands-on science experiments and planetary scavenger hunt from 2 PM!**
- **Mars Phoenix Lander scientist Dr. Jim Whiteway of York University at 4 PM!**
- **Raffle and silent auction!**
- **Family BBQ 5:30–7:00 PM by donation!**
- **Star party or space movie 7–9 PM depending on the weather!**

Talks from 2–4 PM: Talks will take place in the North Concourse of the AQ. Ask a volunteer for room numbers and other information.

Room 1: Astronomy for Beginners

Why Look up? – Harvey Dueck

Constellations in our Night Sky – Bill Burnyeat

宇宙的尺度 (The Scale of the Universe) – Kenneth Lui (NOTE: this talk is in Cantonese)

Room 2: Observing (these talks will be geared towards aspiring or experienced observers)

Telescope Basics – Bob Parry

Night Sky Observing – Wayne Lyons

Room 3: Light Abatement & Astrophotography (these talks are geared to seeing as much as possible!)

Youth Astronomy Class! – Ronan Kerr

Astrophotography – Jason Rickerby



The Earth and Moon shown to scale. At 385 000 km distance, the Moon is very far away, indeed!

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you can see on a dark night. We've only seen a handful of these planets themselves, using clever tricks on the largest telescopes. But we know the rest exist because their parent stars wobble very slightly as they go around them. The implication is that planets are very, very common in our galaxy, just like in Star Trek. What we **DON'T** know is whether there is life outside our Earth. We may never know that for sure.

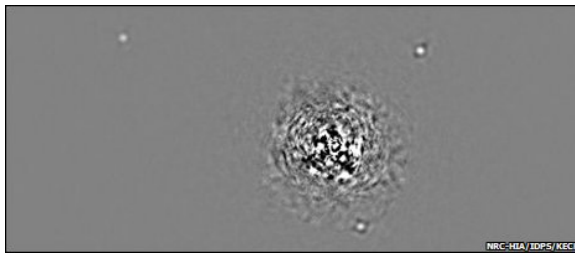
7. The Sun is the nearest star. It's huge—100 times the size of Earth and 300,000 times heavier. The Sun and the rest of the Solar System were formed 4,500,000,000 years ago when a huge cloud of gas and dust collapsed under its own gravity. The Sun will shine more or less like it does now for 5,000,000,000 more years until its hydrogen “fuel” is depleted. Then it will expand into a red giant star, engulfing Mercury and Venus and destroying all life on Earth. A few million years after that, the Sun will throw off its outer layers and contract into a white dwarf star the size of Earth—but more than 100,000 times heavier.

8. The North Star, also called Polaris, is always visible half-way up the sky in the direction of true north. Polaris isn't the brightest star in the sky, but it **IS** as bright as the stars in the Big Dipper. You can always find Polaris by tracing a line through the two stars at the end of the Big Dipper's “bowl.” People in the Southern Hemisphere can't see Polaris, and they don't have a “South

Star.” To find south they use the Southern Cross, a constellation not visible from Canada.

9. The constellations change position in the sky all the time, hour to hour, month to month.

- They generally rise in the east, move across the sky during the night, and set in the west, like the Sun
- A few “circumpolar” constellations, like the Big Dipper and Cassiopeia, do not set at all but go around the North Star every 23



Star HR 8799 (center blob) with its planets HR 8799d (bottom), HR 8799c (upper right) and HR 8799b (upper left), discovered by astronomers from the National Research Council of Canada

hours, 56 minutes

- Constellations come and go with the seasons, except for the circumpolar ones, which can be seen all year
- The shape of a constellation doesn't change, even over centuries
- Planets look like bright stars to the unaided eye but are distinguishable because they drift from one constellation to another

10. The Milky Way, a faint band of light crossing the night sky, is actually our home galaxy seen from the inside. The band is billions of distant stars blending their light together. The Milky Way is visible only if you get far away from city lights. To see it well, pick a moonless

summer night and drive for about an hour into the countryside.

11. A black hole is what you get if you squeeze a star 400 times the size of Earth down to the size of Vancouver. Astronomers have yet to see a black hole directly because it's like looking at a black cat in a coal bin! However, it is possible to detect them revolving around visible stars. There is also evidence that giant black holes lie at the centre of many galaxies, including our Milky Way.

The gravity of a black hole is the same as any other object with the same mass, unless you come very, very close. And don't worry—the Sun will never turn into a black hole and swallow the Earth.

12. City lights blot out most of the stars your eyes are capable of seeing. Thousands of stars are visible in country skies, but in the city, the number goes down

to 200 or even less. This is “light pollution,” and it hurts migrating birds and animals even more than it hurts astronomers. It's caused by fixtures that throw light upwards, either by design (as in bottom-lighted billboards) or because people just aim them too high. Believe it or not, badly installed lights actually help burglars. Glare from a nearby light might be annoying—the courts call it “light trespass”—but this is only part of the problem. There's also light from thousands of streetlights and billboards being reflected down by the air itself. The result is artificial twilight all night long. By reducing glare, well-designed light fixtures

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About RASC

The Vancouver Centre, RASC meets at 7:30 PM in the auditorium of the H.R. MacMillan Space Centre at 1100 Chestnut St., Vancouver, on the second Thursday of every month. Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently \$73.00 per year (\$41.00 for persons under 21 years of age) and can be obtained by writing to the Treasurer at the address above. Annual membership includes the invaluable Observer's Handbook, six issues of the RASC Journal and SkyNews, 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 necessarily those of the Vancouver Centre.

LIBRARY

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

RASC-VC on the Internet

<http://rasc-vancouver/> or
<http://www.rasc.ca/vancouver>

Details of upcoming meetings and events can be found at our Meetup group at:

<http://astronomy.meetup.com/131/>

H.R. MACMILLAN SPACE CENTRE

The Pacific Space Centre Society is a non-profit organization which operates the H.R. MacMillan Space Centre and Gordon M. Southam Observatory. Annual Membership (\$30 Individual, \$80 Family) includes a newsletter, discounts on Space Camps, special programs and lectures, Vancouver Museum discounts, and free admission to the Space Centre. Admission to the Space Centre includes: Astronomy shows, Motion Simulator rides, multimedia shows in GroundStation Canada, and access to the Cosmic Courtyard Exhibit Gallery. For Membership information, call Mahi Jordao at 604-738-7827, local 237 for information. You can also reach them on the Internet at www.hrmacmillanspacecentre.com

MEMBERSHIP HAS ITS PRIVILEGES!

Membership in the Vancouver Centre entitles you to the use of our telescope loan program. This program gives prospective telescope owners a chance to use an example of the telescope of your dreams or borrow a telescope for the family vacation.

The Vancouver Centre is one of 28 chapters of the Royal Astronomical Society of Canada and membership in our centre brings benefits from the our national body including: The *Observer's Handbook*, regarded by many as the most sought after annual astronomical publications in the world, subscriptions to the National Newsletter and *SkyNews*; Canada's national astronomical magazine. Annual Meetings of the society are held in different cities and are opportunities for Canadian amateur and professional astronomers to

share experiences, observing tips and to exchange ideas on astronomy in general.

Aside from the regular meetings of the Centre, where world-class astronomy speakers and knowledgeable amateurs add to our understanding of the universe, there are monthly 'star parties'—places where we go to observe the night sky. Of course Vancouver suffers from sky glow, but we've found a place near the Boundary Bay Airport that is relatively dark. The Centre owns an observatory in the forests north of Haney and it has an association with an owner of a remotely operated telescope in New Mexico. Members can train to use either of these telescopes for photographing the thousands of galaxies, nebulae and other objects in the night sky. For really dark skies and camaraderie, there are two major star parties in BC: the Merritt Star Quest, held near Merritt, and The Mount Kobau Star Party, held on Mt. Kobau, just west of Osoyoos. The Vancouver Centre also has outreach programs such as today's International Astronomy Day where we set up our telescopes, or hold a 'meteor watch' in urban locations to show 'the locals' what's up. The Centre also has an association with the H.R. MacMillan Space Centre that affords us opportunities to use the Gordon Southam Observatory telescope and other instruments the Space Centre owns. When we do sit down for a meeting, they are a wonderful mix of professional and amateur astronomy content. Being close to a number of institutes of higher learning, we are able to draw from a huge number of professionals at the cutting edge of their fields. The 'amateur' content is a mix of 'fact and fantasy': business and observing.

On the morning of August 14th, 2010, Vancouver Centre members attending the Mount Kobau Star Party gathered atop the mountain to prepare breakfast for fellow amateur astronomers. On the menu were Galactic cakes, fruit chunks and a variety of stellar materials including sausages, ham and bacon.

One recipe that was used was the **Buttermilk Galaxy**, a fast forming, quickly expanding object!

Mix all dry ingredients, then add the eggs, milk and butter or oil and mix only until moist. Add a bit more regular milk for a slightly thinner pancake.

Ladle the Galaxy mixture onto a hot oiled griddle and flip once after

lightly browned. These ingredients are enough for about 10 Galaxies.

Delicious with maple syrup and fruit chunks!

Another concoction that was used involved incubating a variety of elements to create a firm dough based object, known as the **Sourdough Spiral!**

The night before, you will need to mix the flour and sourdough starter with milk and buttermilk. Be sure to use a container that is large enough to accommodate some expansion of the mixture. In the morning, the mixture will be a bit bubbly and spongy.

The next morning, mix eggs, oil, sugar, baking soda and salt and then

add to the spongy leavened mix which burped through the night. Add a little extra milk to thin it to a nice spreading consistency if needed.

Ladle the mixture into Spirals onto a hot oiled griddle and flip once after lightly browned. These ingredients are enough for about 10 Spirals.

These are delicious with copious amounts of butter, maple syrup and fruit chunks!

Many thanks to the talented Dana Rickerby for her Spirals recipe and thanks to Vancouver Centre Members who helped make the universe just a little bit tastier. *

The Buttermilk Galaxy

2 cups flour (half whole wheat/half unbleached)
2 tsp sugar
1 ½ tsp Baking Powder
½ tsp Baking Soda
¼ tsp Salt
2 eggs
2 cups buttermilk
3 tbsp butter (melted) or oil

The Sourdough Spiral

Mix night before
2 cups flour (half whole wheat/half unbleached)
½ cup sourdough starter
1 cup milk
1 cup buttermilk

Mix and add to leavened blend above

2 eggs
¼ cup oil or melted butter
2 tbsp sugar
1 tsp baking soda
½ tsp salt

To make the sourdough starter:

1 cup yogurt
1 cup milk
1 cup flour

Mix the milk and yogurt together in a plastic container. Keep lid on, but let some air escape. Leave out at room temperature for about 24 hours.

Then add the flour and put it back in a warm place for 3-5 days. Stir it daily.

It should be fermented and bubbly (otherwise start again!). It's ready to use. If you want to keep the starter going, just replace any starter you use with equal amounts of flour and milk and let it bubble up again. It can be then stored in the fridge until ready to activate.

In a coffee shop, a woman stopped me to ask what is the bright light she saw near the Moon. I told her Jupiter. I've had a few other similar questions; so, I thought this would be a good topic for a wider forum.

Each month, the Moon goes all the way around the sky and comes back to the starting point. It goes through a complete set of its famous phases as it marches merrily around the

heavens. Currently, Jupiter is in the southern sky, so the Moon must pass by Jupiter each month. It's doing this now, as the Moon is about half full and the two objects make a pleasant pair to watch. The reunion takes place late in the month. Towards the end of November and the end of December, you can see the two solar system marvels in the sky as darkness sets in. The action will change early

in the New Year as the Sun catches and passes Jupiter.

In a telescope, or pair of good binoculars, Jupiter can be seen to have four moons of its own which, although about as large as our own, look like tiny dots at the range of the giant planet. Turn to our Moon and you can enjoy craters and dust dry oceans making dark stains on its silent deserts. ★

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improve road safety and home security. They also **SAVE MONEY**.

13. The four most important things to consider when buying a small telescope are:

- the diameter of the main lens or mirror
- how solid the mount is, and how smoothly it moves
- how easy it is to transport it to a dark place
- the eyepieces. One or two good eyepieces are much better than half a dozen cheap ones.

14. Did you notice something in that last factoid? High magnification (same thing as power, times, or "x") is **NOT IMPORTANT**. Before you buy a telescope, consider a good 7×50 or 10×50 binocular which your family can still use if interests change. Avoid the temptation to buy a "500 power" discount-store telescope. Virtually all of them are very poorly made. An inexpensive Dobsonian telescope made of plywood and cardboard can work as well as a fancy telescope costing thousands. You can even

build a telescope, and many people do. All telescopes work **WAY** better when you take them to a dark place away from the city. Exceptions to this rule are the Moon and the planets, which look the same anywhere.

15. The Hubble Space Telescope takes very sharp pictures. It has contributed a lot to science. It costs about \$1.50 a kilometre to operate, about the same as a car—**BUT** Hubble goes more than 600,000 kilometres **EVERY DAY**! And every few years, astronauts have to risk their lives to keep Hubble working. If astronomers had it to do over again, they'd have spent the bucks on something else. New technology allows ground-based telescopes to work nearly as well as Hubble anyway. Space telescopes are necessary for certain observations, but ironically, the really important discoveries were made by modest ones—satellites with names like **IRAS**, **IUE** and **Uhuru**—years before Hubble went up.

16. You can't see the flags that the astronauts left behind on the Moon

with any telescope. Not even Hubble can (but the Hubble astronomers are trying anyway, just to see if it can be done).

17. The Royal Astronomical Society of Canada is 5,000 ordinary persons like yourself who enjoy the night sky. Membership in **RASC's Vancouver Centre** is a bargain (\$73 for 12 months, or \$41.00 if you're under 21). Members get six bimonthly magazines, a 300-page **Observer's Handbook**, and access to our library and loaner telescopes. Our meetings are open to everyone and they're **FREE**. Just show up at the **H.R. MacMillan Space Centre** at 7:30 P.M. on the second Thursday of each month. For more information, browse our web site at <http://rasc-vancouver.com>.

RASC Vancouver Centre Events:

- Astronomy Day
- Sidewalk Astronomy
- **AOMO** Observatory Open House
- Members' Nights

"Where Urania Leads" ★

STARRY NIGHTS @ SFU FOREVER!

Saturday September 18, 2-9PM, Burnaby campus

FREE science fun for kids of all ages! FREE PARKING IN LOT C!

Co-hosted with Vancouver Royal Astronomical Society of Canada!

For info & to RSVP visit: www.sfu.ca/starrynights

- ★Hands-on science experiments and “Astronomy Day” activities from 2PM!
- ★**Mars Phoenix Lander scientist Dr. Jim Whiteway of York University at 4PM!**
- ★Raffle and silent auction!
- ★Family BBQ 5:30-7PM by donation!
- ★Star party or space movie 7-9PM!



Proposed SFU Astronomical Teaching Observatory and Science Outreach Centre



With the very generous support of the following sponsors and partners

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