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## Greetings!

Welcome to the Cowichan Valley StarFinders Astronomy club's "Clear Skies" monthly newsletter.

*By Freda Eckstein*

For most of us it usually takes something out of the ordinary to re-establish our sense of community and connectiveness to one another. It may be due to a power outage, heavy snowfall or a torrential flood that cause us to break out of our comfortable routines and pull together as humans, neighbours and friends. It is during these times (sadly enough) that we get to know our neighbours because we are interested in exchanging our experiences. Through adversity most of us feel more connected and are willing to assist others where we can.

To a lesser degree the same can be said for participating in a club or event that focuses on a particular interest or concern that we may have. It is about being part of something that is larger than ourselves, finding an environment to expand and/or impart our knowledge and to experience the camaraderie that comes with getting together with like minded enthusiasts. We essentially create a tight knit community.

This idea of "community" and "being connected" was a big part of life in the early 18<sup>th</sup> and 19<sup>th</sup> centuries. Barns were often the first, largest, and most costly structure built by a family who settled in a new area. A "barn raising" event was held where neighbours and the community gathered to help the family get the job done quickly and easily. Despite traditions of independence, self-sufficiency, and refusal to incur debt to one another, community barn raisings were a part one's life. Today, echoes of the tradition continues through "work parties" or "work bees" happening in rural communities, within the religious sector and organized groups such as those carried out by Habitat for Humanity.

Most of us hire others to do jobs that we cannot accomplish alone instead of asking for help from our friends. Maybe its fear that we may be judged or that others may see us as weak or damaged. When we finally do ask we find the people around us are eager and happy to help achieve whatever goal is set out to do. We can all use a little help now and then. This past weekend, on Astronomy day, we had friends come together for a "work party" to help Bryon and I finish off a landscaping project. For me it was about seeing a dream come true and "accepting" and "receiving" help. For both of us and for everyone who participated; there was a powerful feeling of "connectedness" that went far deeper than friendship. It was truly amazing to feel the positive energy and the sense of "community" and being a part of something that was larger than ourselves. Astronomy day 2009 will live in my heart forever. I would like to thank everyone who made this day very special for us.

I thought it would be fun to do a David Letterman "top 10". The subject: The Top Ten Reasons **Why You Should Join the Cowichan Valley StarFinders**. Email me with your reasons at [newsletter@starfinders.ca](mailto:newsletter@starfinders.ca). We can post the list at the membership table during the star party.

Thanks to this month's contributors Ron & Anne Greig, Moe Raven, Bryon Thompson and Paul Randall for their input and enthusiasm.

PS: Try and make someone's day better. You'd be surprised at what sharing a smile and saying "Have a wonderful day" can do!

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## Socials

Socials are held on the **4th Wednesday of each month** at the home of Bryon and Freda. See the website for a map or follow these directions.

Island Hwy, Mill Bay

Turn on Frayne Rd towards ocean (Serious Coffee is on the corner)

Turn right on Huckleberry Rd

3rd house on the left across from Springbank road and Mail boxes.

Look for the STAR sign

Please park on Huckleberry or Springbank Rd's.

Call Brian 743-6633 if you need directions

Our next Social will be held at **7:30 on WEDNESDAY May 27th**

This social will be geared more as a workshop to get everyone ready for the July starparty. Our feature will be "**Learn How to Collimate Your Scope**" a workshop by **Brian Robilliard**. More on what you will need will be provided prior to the workshop. Hope to see you all there.

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## Highlights - April 22/09

*By Paul Randall*

Called to order at 19:35. Eddie Presidente passed on a hello from our past president Frank in Saskatchewan. The treasurer reports that we have \$3237.85 on account. He suggests that we change our account to VanCity credit union to save \$4.00 per month on service charges. A motion to change banks was raised and passed by vote.

Bryon reported that RASC members Bruno and Nelson will be meeting to discuss plans for the star party. they will be talking to us later about what our duties will be. Bryon expressed concern about the proposed entry cost to the star party. (\$30 for single, \$40 for family) It maybe too high.

Bill Huot is looking for someone to contact local auto dealers and other businesses about outside lighting. There maybe funding available for lighting improvements beneficial to the environment.

Our speaker this week was Roger Baily, Roger is an engineering consultant in the fields of energy technology and sundial design. He is also member of the North American Sundial Society (NASS) and helps with study, development, history, and preservation of sundials and the art of dialling throughout the continent. Roger has travelled the world in search of sundials and recently has been very busy at home promoting "Timelines".

So what is the concept of time? what time is correct? is it hours and minutes or is it the rising and setting of the sun? If it's the sun, all of our clocks are wrong. At " it's really 1:13pm, this is due to our latitude and the angle of the sun. Sundials can tell more than just simple time, they can show astronomical events, birthdays, prayer times, they can even work at night given enough moonlight. There are many very old historic sundials all over the world, some of the most interesting are in the Prague Klementinum, a building used as a teaching, religious and science center that was founded in 1232. apparently this time thing isn't new..watch for (pun intended) a sundial coming to the RASC observatory hill soon. Roger designs beautiful and complex sundials. You can view some of Roger's works at his website [Walking Shadow Designs](#). Thanks for your time Roger.

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## Upcoming Events

**Every Monday - Astronomy Café from 7:30pm - 9:00 pm**

Get together with local astronomers at the Fairfield Community Centre to discuss the night sky over coffee. On clear nights, there is observing too. Perfect for people interested in starting this hobby. All ages welcome.

**Now to June 4 (event times vary) - Cosmic Voyage** at the IMAX, Royal BC Museum Victoria, BC Narrated by Morgan Freeman, this dramatic tour of the cosmos covers everything from the Big Bang to the fate of the Universe. 3-4 shows daily. More information is available at the [event website](#).

**Now to May 16, from 8:00pm to 10:00pm - A Short History of Night**

Little Fernwood Hall, 1923 Fernwood Rd, Victoria, BC Theatre Inconnu presents a comedy-drama by Canadian playwright and Mathematician John Mighton. More information is available at the [event website](#).

**May 2, 2009 - Astronomy Day** - lots of activities for all ages from 10am to 4 pm at the Centre of the Universe (CU), Observatory Hill. Stargazing from 7pm-11pm (weather permitting). Admission: Free

**May 6 – 10 Walking with Dinosaurs**

Location: the Victoria Save On Foods Centre. In this production, fifteen roaring, snarling "live" dinosaurs mesmerize the audience – and are as awe-inspiring as when they first walked on earth." The show depicts the dinosaurs' evolution, complete with the climatic and tectonic changes that took place, which led to the demise of many species. With almost cinematic realism, WALKING WITH DINOSAURS has scenes of the interactions between dinosaurs, and the audience sees how carnivorous dinosaurs evolved to walk on two legs, and how the herbivores fended off their more agile predators. . More information is available at the [event website](#).

**May 31, 2:30-5:00 pm – Lecture The Planet in the Window: Exploring Space, Consciousness and Cosmic Connections.** University of Victoria. Dr. Edgar Mitchell, Apollo 14 astronaut and the 6th man to walk on the moon, Scientist, test pilot, naval officer, astronaut, entrepreneur, author and lecturer, Dr. Mitchell's extraordinary career personifies humankind's eternal thrust to widen its horizons as well as its inner soul. Tickets are \$45 + GST register here:

<http://www.spiritheals.ca/register.htm>

**Also read our feature story on Dr. Edgar Mitchell:** Former [Astronaut: Man Not Alone In Universe](#)

**NASA Launches:**

**Date:** May 5

**Mission:** STSS ATRR - Missile Defense Agency

**Launch Vehicle:** United Launch Alliance Delta II

**Launch Site:** Vandenberg Air Force Base - Launch Pad SLC-2

**Description:** STSS ATRR serves as a pathfinder for future launch and mission technology for the Missile Defense Agency. To be launched by NASA for the MDA.

**Date:** May 12\*

**Mission:** GOES-O

**Launch Vehicle:** United Launch Alliance Delta IV

**Launch Site:** Cape Canaveral Air Force Station - Launch Pad 37-B

**Description:** NASA and the National Oceanic and Atmospheric Administration (NOAA) are actively engaged in a cooperative program, the multi-mission Geostationary Operational Environmental Satellite series N-P. This series will be a vital contributor to weather, solar and space operations, and science.

**Date:** May 12 +

**Mission:** STS-125

**Launch Vehicle:** Space Shuttle Atlantis

**Launch Site:** Kennedy Space Center Launch Pad 39A

**Launch Time:** 1:31 p.m. EDT +

**Description:** Space Shuttle Atlantis will fly seven astronauts into space for the fifth and final servicing mission to the Hubble Space Telescope. During the 11-day flight, the crew will repair and improve the observatory's capabilities.

## This Month In History

Courtesy of: Nick Greene, About.com

May 01 - 10th Anniversary (1998), Discovery of [Dar al Gani 476](#) (Mars Meteorite)  
 May 02 - Space Day  
 May 14 - 35th Anniversary (1973), [Skylab](#) Launch  
 May 15 - [Louis de Lacaille's](#) 295th Birthday (1713)  
 May 15 - 45th Anniversary (1963), [Mercury 9](#) Launch (Gordon Cooper)  
 May 20 - 30th Anniversary (1978), [Pioneer Venus 1](#) Launch  
 May 31 - 10th Anniversary (1998), [Galileo](#), [Europa 15](#) Flyby

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## Cool Pics/Videos

Want to show off your latest pics? Well here's your chance; email the editor at [My Cool Pics](#) and we will try to post them in the next edition of "Clear Skies".

Most have no idea of the size and complexity of the International Space Station. That's because it has been too big a chore to keep track of each of the launches aimed at its completion. Here's a one-minute animated recap that will amaze you. Notice, too, the time-line and launches involved.

[http://i.usatoday.net/tech/graphics/iss\\_timeline/flash.htm](http://i.usatoday.net/tech/graphics/iss_timeline/flash.htm)

Plaskett Telescope at the Dominion Astrophysical Observatory in has installed a camera near the dome of the 1.8-metre. Click on the link to view it at full-size.

<http://www.hia-ihd.nrc-cnrc.gc.ca/images/skycamera.jpg>

This page will automatically reload once per minute to display the most recent image.

Check out our Photo gallery on the website where you can find pics from the Island Star Party (ISP). Quick link is <http://starfinders.ca/photogallery.htm>

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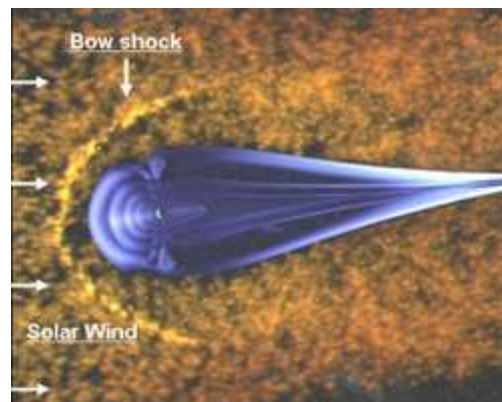
## Featured Articles

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**Cluster Satellites Investigate Space Turbulence**— March 27/09 credit ESA, Noordwijk, The Netherlands



The four satellites of ESA's Cluster mission have revealed how turbulence develops in space just outside Earth's magnetic environment. This result improves the understanding of turbulence, a key physical process by which energy throughout the universe is transported from large scales at which it is input to small scales where it is dissipated.

Just as the turbulence experienced by aircraft is caused by high-speed winds, turbulence in space can be caused by the solar wind, an uninterrupted flow of high-speed solar particles. Thanks to Earth's magnetic field, most of this solar material is deflected around the Earth's magnetosphere (blue region in image), delimited by the magnetopause.

The solar wind, when it reaches a magnetized planet, is first decelerated from supersonic to subsonic speed by a shock wave (called the bow shock), located in

front of the magnetopause. The region between the bow shock and the magnetopause is called the magnetosheath. This region is one of the most turbulent environments of near-Earth space, making it an excellent laboratory in which to study turbulence. Other environments such as the solar atmosphere, or accretion disks around young stars, are likely to exhibit similar behavior, but the terrestrial magnetosheath is by far the most accessible place to perform measurements. Characterizing the properties of the magnetic turbulence in this region is of prime importance to understand its role in fundamental processes such as energy dissipation or the acceleration of particles to high-energies.

In March 2007, Nature Physics publication reported for the first time that not only did turbulence exist in the magnetosheath in the form of many small magnetic islands - with a typical size of 60 miles (100 kilometers), but also that magnetic reconnection occurred within these islands. The observations showed that the turbulent plasma is accelerated and heated during the reconnection process. The discovery of reconnection in turbulent plasma has significant implications for the study of laboratory and astrophysical plasmas, where both turbulence and reconnection naturally develop and thus where turbulent reconnection is very likely to occur. Possible applications range from the dissipation of the magnetic energy in fusion devices on Earth, such as the International Thermonuclear Experimental Reactor (ITER) project to the acceleration of high-energy particles in solar flares. This discovery was based on data collected by the four Cluster spacecraft when they were flying together in formation with a very short separation distance - about 60 miles (100 kilometers).

A more recent study, published May 23, 2008, again made use of data collected by the four Cluster satellites, but this time it was with an inter-spacecraft separation of several thousands of miles. This configuration enabled the study of magnetosheath turbulence at large scales. Magnetic field data collected April 16, 2003, by the four satellites.

At this time the Cluster satellites were widely spread in space, from just behind the bow shock (C3 and C4) to more than 5,000 miles away (C1), while C2 was located in between. One property of the turbulence, the intermittency, was studied in particular and was accurately reproduced with a theoretical model. The intermittency appears in the transfer (or the cascade) of the energy from large scales to small scales as an uneven distribution of the energy between the scales, and this was used to examine the evolution of the turbulence in the magnetosheath.

"For the first time, we use multi-spacecraft observations to characterize the evolution of magnetosheath turbulence," said Emiliya Yordanova, lead author of this study. "The intermittency significantly changes over the distance, being increasingly stronger away from the bow shock."

"Magnetic reconnection, turbulence, and shocks are three fundamental ingredients of the plasma universe," said Matt Taylor, acting ESA Cluster project scientist. "The detailed understanding of these key processes and their associated multi-scale physics is a challenge for the future of space physics. One of the lessons learned from the Cluster mission is the need for new space missions equipped with instruments of higher sensitivity and better time resolution along with a larger number of satellites to sample different scale sizes simultaneously. Such a mission concept exists - a fleet of 12 satellites named Cross-Scale. This is a candidate mission within the ESA Cosmic Vision program."

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**Russian-European Crew Starts 'Mars Mission'** – March 27/09 credit ESA, Noordwijk, The Netherlands

Earlier today, a crew of six, including two European Space Agency-selected (ESA) participants and four Russians, embarked on a simulated mission to Mars. Although they will not leave the confines of a dedicated isolation facility in Moscow for 105 days, their mission will help prepare for a human mission to Mars in the future.



Accompanying ESA-selected participants Oliver Knickel and Cyrille Fournier on their simulated journey are four Russian crewmembers: cosmonauts Oleg Artemyev and Sergei Ryazansky, Alexei Baranov - a doctor, and Alexei Shpakov - a sports physiologist.



During their stay in the facility, the crew will experience all aspects of a mission to the Red Planet, including launch, the outward journey, arrival at Mars and, after an excursion to the surface, the long journey home.

Their tasks will be similar to those on a real space mission. They will have to cope with simulated emergencies, maybe even real emergencies. Communication delays of as much as 20 minutes each way will not make life any easier. The crewmembers will act as subjects in scientific investigations to assess the effect that isolation has on various psychological and physiological aspects, such as stress, hormone regulation and immunity, sleep quality, mood, and the effectiveness of dietary supplements. "A crew traveling to Mars will face major challenges such as how to cope with being confined to a small space and seeing the same faces for one and a half years," said Martin Zell, head of the International Space Station (ISS) Utilization Department in ESA's Directorate of Human Spaceflight.

The Mars500 study is taking place in a special facility at the Russian Institute of Biomedical Problems in Moscow. ESA - S. Corvaja "It is of paramount importance



to understand the psychological and physiological effects of long-duration confinement, to be able to prepare the crews in the best way possible, and to learn about important aspects of the vehicle design. To contribute to their psychological well-being and long-term performance, we need to learn how to support the crew with optimum nutrition, artificial light, appropriate medical

countermeasures, and also planned and off-nominal task management."

The 105-day study precedes a full simulation of a mission to Mars, due to start late in 2009. This will see another six-member crew sealed in the same chamber to experience a complete 520-day Mars mission simulation.

Both studies are part of the Mars500 program conducted by ESA and the Russian IBMP, with Roscosmos funding. ESA's Directorate of Human Spaceflight is undertaking Mars500 within its European Program for Life and Physical Sciences (ELIPS) to prepare for future missions to the Moon and Mars. "Mars500 is the proof that we are preparing for the future," said Simonetta di Pippo, ESA's director of Human Spaceflight.

"The International Space Station is about to reach full operational capability with a crew of six, and the international partners are considering how to maximize the investment made in the station by working towards a possible extension of its lifetime. In parallel, we are intensifying our activities in preparation for the next steps in human spaceflight and exploration as part of the Global Exploration Strategy together with the space agencies worldwide who endorsed it. Mars500 is an important part of this global endeavor as it provides us with the knowledge of how to keep a small crew psychologically and physiologically healthy and, ultimately, to succeed in the big challenge to bring humankind to Mars and safely

back to Earth." Follow the crew throughout their simulated mission, including **7** regular diary updates from the ESA participants, on the [ESA website](#).

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## STEREO Hunts for Remains of an Ancient Planet Near Earth–

April 9/09 Credit Science@Nasa

NASA's twin STEREO probes are entering a mysterious region of space to look for remains of an ancient planet which once orbited the Sun not far from Earth. If they find anything, it could solve a major puzzle—the origin of the Moon.

"The name of the planet is Theia," says Mike Kaiser, STEREO project scientist at the Goddard Space Flight Center. "It's a hypothetical world. We've never actually seen it, but some researchers believe it existed 4.5 billion years ago—and that it collided with Earth to form the Moon."

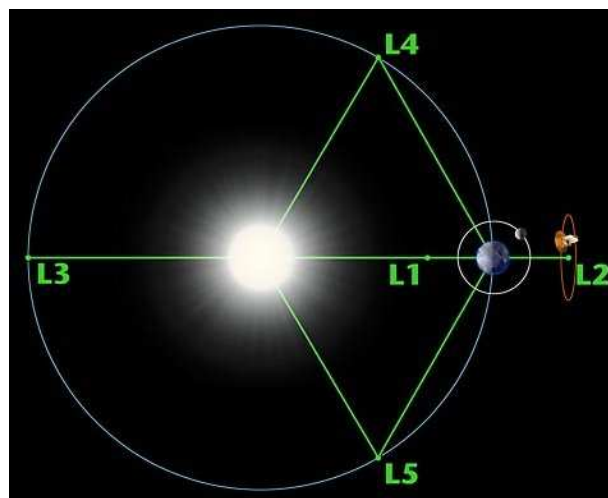
Right: An artist's concept of one of the STEREO spacecraft.



The "Theia hypothesis" is a brainchild of Princeton theorists Edward Belbruno and Richard Gott. It starts with the popular Great Impact theory of the Moon's origin. Many astronomers hold that in the formative years of the solar system, a Mars-sized protoplanet crashed into Earth. Debris from the collision, a mixture of material from both bodies, spun out into Earth orbit and coalesced into the Moon. This scenario explains many aspects of lunar geology including the size of the Moon's core and the density and isotopic composition of moon rocks.

It's a good theory, but it leaves one awkward question unanswered: Where did the enormous protoplanet come from? Belbruno and Gott believe it came from a Sun-Earth Lagrange point.

Sun-Earth Lagrange points are regions of space where the pull of the Sun and Earth combine to form a "gravitational well." The flotsam of space tends to gather there much as water gathers at the bottom of a well on Earth. 18th-century mathematician Josef Lagrange proved that there are five such wells in the Sun-Earth system: L1, L2, L3, L4 and L5 located as shown in the diagram below.



When the solar system was young, Lagrange points were populated mainly by planetesimals, the asteroid-sized building blocks of planets. Belbruno and Gott suggest that in one of the Lagrange points, L4 or L5, the planetesimals assembled themselves into Theia, nicknamed after the mythological Greek Titan who gave birth to the Moon goddess Selene.

Above: Sun-Earth Lagrange points. The STEREO probes are about to pass through L4 and L5. Solar observatories often park themselves at L1 while deep space observatories prefer L2. "Their computer models show that Theia could have grown large enough to produce the Moon if it formed in the L4 or L5 regions, where the balance of forces allowed enough material to accumulate," says Kaiser. "Later, Theia would have been nudged out of L4 or L5 by the increasing

gravity of other developing planets like Venus and sent on a collision course with Earth." If this idea is correct, Theia itself is long gone, but some of the ancient planetesimals that failed to join Theia may still be lingering at L4 or L5.

"The STEREO probes are entering these regions of space now," says Kaiser. "This puts us in a good position to search for Theia's asteroid-sized leftovers." Just call them "Theiasteroids." Astronomers have looked for Theiasteroids before using telescopes on Earth, and found nothing, but their results only rule out kilometer-sized objects. By actually entering L4 and L5, STEREO will be able to hunt for much smaller bodies at relatively close range.

The link below is dynamical simulation which shows how asteroids linger in the gravitational well of a Lagrange point of the Sun-Jupiter system. The principle of Sun-Earth Lagrange points is the same. Credit: Prof. Aldo Vitagliano/[SOLEX](#).

"The search actually began last month when both spacecraft rolled 180 degrees so that they could take a series of 2-hour exposures of the general L4/L5 areas. In the first sets of images, amateur astronomers found some known asteroids and new comet Itagaki was imaged just a couple of days after the announcement of its discovery. No Theiasteroids however."

Hunting for Theiasteroids is not STEREO's primary mission, he points out. "STEREO is a solar observatory. The two probes are flanking the sun on opposite sides to gain a 3D view of solar activity. We just happen to be passing through the L4 and L5 Lagrange points en route. This is purely bonus science."

"We might not see anything," he continues, "but if we discover lots of asteroids around L4 or L5, it could lead to a mission to analyze the composition of these asteroids in detail. If that mission discovers the asteroids have the same composition as the Earth and Moon, it will support Belbruno and Gott's version of the giant impact theory." The search will continue for many months to come. Lagrange points are not infinitesimal points in space; they are broad regions 50 million kilometers wide. The STEREO probes are only in the outskirts now. Closest approach to the bottoms of the gravitational wells comes in Sept-Oct. 2009. "We have a lot of observing ahead of us," notes Kaiser.

Readers, you may be able to help. The STEREO team is inviting the public to participate in the search by scrutinizing photos as they come in from the spacecraft. If you see a dot of light moving with respect to the stars, you may have found a Theiasteroid. Links to the data and further instructions may be found at [sungrazer.nrl.navy.mil](http://sungrazer.nrl.navy.mil). Let the hunt begin!

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## Orion Study Reveals Chaotic and Overcrowded Stellar Nursery—April 20/09 Credit *The Joint Astronomy Centre*

Astronomers, using the United Kingdom Infrared Telescope (UKIRT) in Hawaii, the IRAM Millimeter-wave Telescope in Spain, and the Spitzer Space Telescope in orbit above Earth, have completed the most wide-ranging census ever produced of dynamical star formation in and around the well-known Orion Nebula (M42). They have found this stellar nursery to be a lively and somewhat overcrowded place, with young stars emitting gas jets in all directions and creating quite a chaotic picture. There is much more going on in Orion than previously thought.

This image of the Orion Molecular Cloud combines observations from the United Kingdom Infrared Telescope (UKIRT) and the Spitzer Space Telescope. It shows just a small portion of the region surveyed. In this figure, nearby stars are illuminating parts of the Orion Molecular Cloud, which causes the cloud to glow an eerie green color. The jets punch through the cloud and can be seen as a multitude of tiny pink-purple arcs, knots, and filaments. The young stars that drive the jets are usually found along each jet and appear golden-orange. UKIRT/JAC, Spitzer Telescope

The research team comprises more than a dozen astronomers from the United





States, the United Kingdom, and a number of other European countries. A number of them are in Hertfordshire in the United Kingdom this week to share their discoveries with colleagues at this year's annual National Astronomy Meeting of the United Kingdom (NAM 2009). Take a look at the constellation Orion at night. With the naked eye, you see only the brightest stars, such as Betelgeuse (Alpha [α] Orionis) and Rigel (Beta [β] Orionis) at the shoulder and knee of the constellation, or perhaps the Orion Nebula as a vaguely fuzzy patch around the sword. What your eye does not see is an enormous cloud of molecules and dust particles that hides a vast region where young stars are being born. In the sky, the region — known to astronomers as the Orion Molecular Cloud — is more than 20 times the angular size of the Full Moon, spanning from far above the Hunter's head to far below his feet. It is one of the most intense regions of star formation in

the local Milky Way and has been the subject of many small-scale studies over the years. However, the current work is the first to present such a complete study of the young stars, the cloud of gas and dust from which they are being born, and the spectacular supersonic jets of hydrogen molecules being launched from the poles of each star.

Most of the "action" is hidden from view in visible light because the molecular cloud is thick and opaque. Only the Orion Nebula, which is really just a blister on the surface of the cloud, gives an indication of what is really happening within. To see through the cloud, we need to observe at wavelengths beyond the reach of the human eye. The longer (or "redder") the wavelength, the better. Thus, the team has used UKIRT, Spitzer — which works at even longer "mid-infrared" wavelengths — and the IRAM radio telescope, which operates beyond the infrared at short radio wavelengths.

The key to the success of this project was the combination of data from all three facilities. Inspired by the richness of his images from UKIRT, Chris Davis contacted colleagues in Europe and on the United States mainland. Tom Megeath, an astronomer from the University of Toledo in Ohio, provided a catalogue of the positions of the very youngest stars — sources revealed only recently by Spitzer. Thomas Stanke, a researcher based at the European Southern Observatory in Garching, Germany, then provided extensive IRAM maps of the molecular gas and dust across the Orion cloud. Dirk Froebrich, a lecturer at the University of Kent in the United Kingdom, later used archival images from the Calar Alto Observatory in Spain (data acquired by Stanke some 10 years ago) to measure the speeds and directions of a large number of jets by comparing them with their positions in the new images. Armed with these data, Davis was able to match the jets up to the young stars that drive them, as well as to density peaks within the cloud — the natal cores from which each star is being created.

This close-up view shows a jet (seen in red) popping out of a busy region of star 10



formation in Orion. All of the red wisps, knots, and filaments are in fact associated with jets from young stars, which in this figure appear orange. These data were acquired with the Wide Field Camera (WFCAM) at the United Kingdom Infrared Telescope. UKIRT/JAC

"Regions like this are usually referred to as stellar nurseries," Davis said, "but we have shown that this one is not being well run: It is chaotic and seriously overcrowded. Using UKIRT's wide field camera (WFCAM), we

now know of more than 110 individual jets from this one region of the Milky Way. Each jet is traveling at tens or even hundreds of miles per second; the jets extend across many trillions of miles of interstellar space. Even so, we have been able to pinpoint the young stars that drive most of them."

Froebrich mentioned that "measuring the speeds and directions of the jets is essential to pinpoint the driving sources, especially in such crowded regions as M42 in Orion." Megeath added: "With such a large number of young stars, we can study the 'demographics' of star birth. This study will give us an idea of how long it takes baby stars to bulk up by pulling in gas from the surrounding cloud, what ultimately stops a star from growing bigger, and how a star's birth is influenced by other stars in the stellar nursery."

"Star-formation research is fundamental to our understanding of how our own Sun, and the planets that orbit it, were created," Stanke noted. "Many of the stars currently being born in Orion will evolve to be just like the Sun. Some may even have earthlike planets associated with them." Andy Adamson, Associate Director at the UKIRT, said: "This spectacular dataset demonstrates the power of survey telescopes like UKIRT. With online access to data from other telescopes around the world, and the ease with which one can communicate with collaborators across the globe, massive projects like the Orion study are very much the future of astronomy." Adamson, along with Gary Davis, director of UKIRT, presented this and other UKIRT science results at the European Week of Astronomy and Space Science (NAM 2009) at the University of Hertfordshire.

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### Solar Wind Tans Young Asteroids – April 22/09 Credit ESO

A new study published in Nature this week reveals that asteroid surfaces age and redden much faster than previously thought — in less than a million years, the blink of an eye for an asteroid. This study has finally confirmed that the solar wind is the most likely cause of very rapid space weathering in asteroids. This fundamental result will help astronomers relate the appearance of an asteroid to its actual history and identify any after effects of a catastrophic impact with another asteroid.



ESO PR Photo 16a/09  
Young Asteroids Look Old

"Asteroids seem to get a 'sun tan' very quickly," says lead author Pierre Vernazza. "But not, as for people, from an overdose of the Sun's ultraviolet radiation, but from the effects of its powerful wind."

It has long been known that asteroid surfaces alter in appearance with time — the observed asteroids are much redder than the interior of meteorites found on

Earth but the actual processes of this "space weathering" and the timescales involved were controversial. **11**

Thanks to observations of different families of asteroids using ESO's New Technology Telescope at La Silla and the Very Large Telescope at Paranal, as well as telescopes in Spain and Hawaii, Vernazza's team have now solved the puzzle. When two asteroids collide, they create a family of fragments with "fresh" surfaces. The astronomers found that these newly exposed surfaces are quickly altered and change colour in less than a million years — a very short time compared to the age of the Solar System.

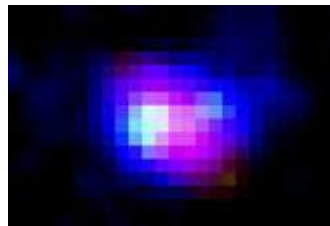
"The charged, fast moving particles in the solar wind damage the asteroid's surface at an amazing rate", says Vernazza. Unlike human skin, which is damaged and aged by repeated overexposure to sunlight, it is, perhaps rather surprisingly, the first moments of exposure (on the timescale considered) — the first million years — that causes most of the aging in asteroids.

By studying different families of asteroids, the team has also shown that an asteroid's surface composition is an important factor in how red its surface can become. After the first million years, the surface "tans" much more slowly. At that stage, the colour depends more on composition than on age. Moreover, the observations reveal that collisions cannot be the main mechanism behind the high proportion of "fresh" surfaces seen among near-Earth asteroids. Instead, these "fresh-looking" surfaces may be the results of planetary encounters, where the tug of a planet has "shaken" the asteroid, exposing unaltered material. Thanks to these results, astronomers will now be able to understand better how the surface of an asteroid — which often is the only thing we can observe — reflects its history.

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### **Giant Mystery Blob Discovered Near Dawn of Time** – April 22/09 Credit Space.com

A newly found primordial blob may represent the most massive object ever discovered in the early universe, researchers announced today.



The gas cloud, spotted from 12.9 billion light-years away, could signal the earliest stages of galaxy formation back when the universe was just 800 million years old. "I have never heard about any [similar] objects that could be resolved at this distance," said Masami Ouchi, a researcher at the Carnegie Institution in Pasadena, Calif. "It's kind of record-breaking."

A light-year is the distance light travels in a year, about 6 trillion miles (10 trillion kilometers). An object 12.9 billion light-years away is seen as it existed 12.9 billion years ago, and the light is just now arriving.

The cloud predates similar blobs, known as Lyman-Alpha blobs, which existed when the universe was 2 billion to 3 billion years old. Researchers named their new find Himiko, after an ancient Japanese queen with an equally murky past. Himiko holds more than 10 times as much mass as the next largest object found in the early universe, or roughly the equivalent mass of 40 billion suns. At 55,000 light years across, it spans about half the diameter of our Milky Way Galaxy. Lyman-Alpha blobs remain a mystery because existing telescopes have a hard time peering so far back to nearly the dawn of the universe.

Himiko sits right on the doorstep of an era called the reionization epoch, which lasted between 200 million and 1 billion years after the Big Bang. That's when the universe had just emerged from its cosmic dark ages and had begun brightening through the formation of stars and galaxies. Hot, energized hydrogen gas from that time period has allowed astronomers to begin seeing some objects — as much good as it does to squint at such fuzzy blobs. "Even for astronomers, we don't understand," Ouchi told SPACE.com. "We are keen to try to understand what those systems are in the reionization epoch."

Himiko may represent an ionized gas halo surrounding a super-massive black hole or a cooling gas cloud that indicates a primordial galaxy, Ouchi noted. But it might also be the result of a collision between two young galaxies, or the outgoing wind of a highly active star nursery, or a single giant galaxy. Pinning down this riddle will require further telescope time. The W.M. Keck Observatory in Hawaii can help accurately estimate star formation in the blob, while NASA's Chandra X-ray Observatory could test the super-massive black hole scenario, Ouchi noted. And even Hubble could get in on the action.

"We're planning deep infrared imaging with the Hubble Space Telescope to tell whether [Himiko] has merger-like qualities or not," Ouchi said. However, that particular research hinges upon the future success of a risky repair mission to the aging Hubble. Astronauts are slated to blast off with the space shuttle Atlantis in the attempt next month.

For now, researchers may celebrate the fact that they found Himiko at all. They almost overlooked the blob among 207 galaxy candidates, while sweeping a portion of the sky designated the Subaru/XMM-Newton Deep Survey Field. After making the initial sighting with the Subaru telescope in Hawaii in 2007, Ouchi and his colleagues followed up using instruments from the Keck/DEIMOS and Magellan/IMACS arrays. Those spectrographic observations allowed them to pinpoint the signature of the ionized hydrogen gas and determine the distance and age of the mysterious Himiko. "We never believed that this bright and large source was a real distant object," Ouchi said. "We thought it was a foreground interloper contaminating our galaxy sample. But we tried anyway."

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**Former Astronaut: Man Not Alone in Universe**— April 20/09 Credit CNN

**Editor Note: I just could'nt resist, since he will be in town doing a lecture on May 31 at UVIC.**

Earth Day may fall later this week, but as far as former NASA astronaut Edgar Mitchell and other UFO enthusiasts are concerned, the real story is happening elsewhere.



Astronaut Edgar Mitchell, shown after his Apollo mission in 1971, claims there "is no doubt we are being visited."

Mitchell, who was part of the 1971 Apollo 14 moon mission, asserted Monday that extraterrestrial life exists, and that the truth is being concealed by the U.S. and other governments.

He delivered his remarks during an appearance at the National Press Club following the conclusion of the fifth annual X-Conference, a meeting of UFO activists and researchers studying the possibility of alien life forms.

Mankind has long wondered if we're "alone in the universe. [But] only in our period do we really have evidence. No, we're not alone," Mitchell said. "Our destiny, in my opinion, and we might as well get started with it, is [to] become a part of the planetary community. ... We should be ready to reach out beyond our planet and beyond our solar system to find out what is really going on out there."

Mitchell grew up in Roswell, New Mexico, which some UFO believers maintain was the site of a UFO crash in 1947. He said residents of his hometown "had been hushed and told not to talk about their experience by military authorities." They had been warned of "dire consequences" if they did so. But, he claimed, they "didn't want to go to the grave with their story. They wanted to tell somebody reliable. And being a local boy and having been to the moon, they considered me reliable enough to whisper in my ear their particular story." Roughly 10 years

ago, Mitchell claimed, he was finally given an appointment at Pentagon to discuss what he had been told.

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An unnamed admiral working for the Joint Chiefs of Staff promised to uncover the truth behind the Roswell story, Mitchell said. The stories of a UFO crash "were confirmed," but the admiral was then denied access when he "tried to get into the inner workings of that process." The same admiral, Mitchell claimed, now denies the story.

"I urge those who are doubtful: Read the books, read the lore, start to understand what has really been going on. Because there really is no doubt we are being visited," he said. "The universe that we live in is much more wondrous, exciting, complex and far-reaching than we were ever able to know up to this point in time."

A NASA spokesman denied any cover-up. "NASA does not track UFOs. NASA is not involved in any sort of cover-up about alien life on this planet or anywhere else -- period," Michael Cabbage said Monday.

Debates have continued about what happened at Roswell. The U.S. Air Force said in 1994 that wreckage recovered there in 1947 was most likely from a balloon-launched classified government project.

Stephen Bassett, head of the Paradigm Research Group (PRG), which hosted the X-Conference, said that the truth about extraterrestrial life is being suppressed because it is politically explosive. "There is a third rail [in American politics], and that is the UFO question. It is many magnitudes more radioactive than Social Security ever dreamed to be," Bassett said.

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## Buy and Sell

Here's your chance to clean out the closet and find a home for your slightly used treasures. Post your buy and sell items by emailing the [Editor](#) with your details.

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## Ask an Expert

Have you been thumbing through the Astronomy or Sky and Telescope magazine and have some questions on the latest and greatest in astronomy gear? Or maybe you're narrowing down your search for just the right telescope and want to know the difference between Dobsonians, Schmidt-Cassegrains, Reflector and Refractors. Well wonder no more, email [Brian Robilliard](#) our resident expert to get the "inside scoop" on what's hot or not in astronomy gear.

Are you seeing double or unable to focus? Chances are you need to collimate your scope. Are you looking for a good eyepiece? Why do you need to know the focal length of your telescope's mirror and how do you determine the focal length? For answers to these and other telescope questions email [Ed Maxfield](#) our expert on telescope tips, hints and suggestions.

Are you new to astronomy? Want to know the how to find objects in the sky? Or just wondering what that bright object in the evening sky is? Well wonder no more; email [Bryon Thompson](#) our Public Outreach Officer and master of Astronomy 101 basics.

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## Kids Korner



For the younger astronomers. We want your input on what you would like to see<sup>14</sup> happening at the club. Tell us a bit about yourself and why you love astronomy. Email the [Editor](#) with your submissions. For the older folks, if you have any ideas that might spark the interest of a young upcoming astronomer, please send your submissions to the editor.

Here's some neat facts about the Earth from NASA you can memorize and impress your friends and family.

### 10 Things You Never Knew About the Earth – courtesy of NASA

Fact 1 – The earth is not flat, but it's not perfectly round either.

Fact 2 – Days are getting longer

Fact 3 – There weren't always several continents

Fact 4 – Earth nearly or completely froze several times

Fact 5 – Atacama Desert in Chile is the driest place on Earth

Fact 6 – Earth's gravity isn't uniform

Fact 7 – In the past sea levels were very different

Fact 8 – Our Sun has a voracious appetite

Fact 9 – The Moon is not Earth's only companion

Fact 10 – The calm before the storm really exists

For answers to these facts go to

[http://www.nasa.gov/externalflash/10\\_things\\_slideshow/10things\\_flash\\_index.html](http://www.nasa.gov/externalflash/10_things_slideshow/10things_flash_index.html)

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## RASC News

Royal Astronomical Society of Canada, Victoria Centre <http://victoria.rasc.ca>

### Meetings

Meetings are held on the second Wednesday of each month except July and August downstairs in the Elliot Bldg at U of Vic.

### Astronomy Café

The Astronomy Café Meets on Monday evenings at Sir James Douglas School on Fairfield Road.

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## The Sky This Month

By Bryon Thompson

Observing Site: **Duncan, 48.783°N, 123.700°W**

As I sit here and write this (apologies for the lateness of this entry) an early evening rain shower is helping the flowers to grow in my yard. I guess it doesn't know it was supposed to occur last month and leave this month's sky clear for us astronomers! "April showers bring May showers? It just doesn't have the same ring to it. Oh well, for those few of us with clear skies May does promise some real treasures.

Mercury although very low on the horizon reaches its highest point in the sky on the 1st of the month. Setting 90 minutes after the sun, our little inner planet gets lower every night and by next month will reappear low in our morning sky.

Dim Saturn on the other hand is found high in the south in Leo at Magnitude 0.8. The ring system now at only 4°, will reach an edge on angle to our line of sight when they are unavailable for viewing. This will happen when Saturn is on the far side of the sun in the late summer and early fall. The rings or "handles" as Galileo called them (his small 1 inch telescope's poor optics didn't allow for much more detail than that) span a full 42". Saturn's disc is only 19" wide. As I have mentioned in earlier articles, with the rings nearly edge on it is possible now to witness the shadows of Saturn's moons pass over the planets disc or to see the moons themselves pass into Saturn's massive shadow. Two of each of these events occur

this month. The shadow of Titan, Saturn's largest moon and the second largest 15 moon in the whole solar system, is easiest to spot with a telescope. The Shadow of this 32 hundred mile wide moon crosses Saturn's face **May 14th** at 10:26 pm and once again on **May 30th** at 9:32 pm. It takes approximately 5 hours for Titan's shadow to complete its trip across the face of the planet. For us western observers, Saturn will set well before these transits are finished. Titan will also seem to disappear as it moves into Saturn's shadow on **May 7th** at 12:16 am and again on **May 22nd** at 11:23 pm. Some of Saturn's other moons are also visible but you'll need a 4 to 8" telescope to see them. Rhea, Tethys and Dione are all available to a 4" telescope but you'll need at least a 6" scope to see 11th magnitude Iapetus and at least an 8" scope to find small 12th magnitude Enceladus.

Titan isn't the only moon putting on a show this month. If you stay up late or get up early, you can catch the larger Galilean moons of Jupiter eclipsing each other! When one moon passes in front of another it is called a "mutual event". Ganymede starts the show on **May 4th** at 2:35 am when it passes in front of (occults) smaller Io. An occultation is when one body passes in front of a smaller one. The term "transit" is used if the smaller body passes in front of a larger one as in the case of the aforementioned Titan. Ganymede then occults Europa on **May 11th** at 1:19 am. These mutual events are only visible every six years when Jupiter's equatorial plane lines up with Earth's. Jupiter recently did just that on April 16th. These types of events will continue to be visible for one year until April 7th 2010.

If you haven't spotted Neptune in a pair of binoculars you'll have a good chance to do so this month. Jupiter will point the way to the magnitude 7.9 distant blue planet on **May 25th** when it lies 1/2° south of Neptune.

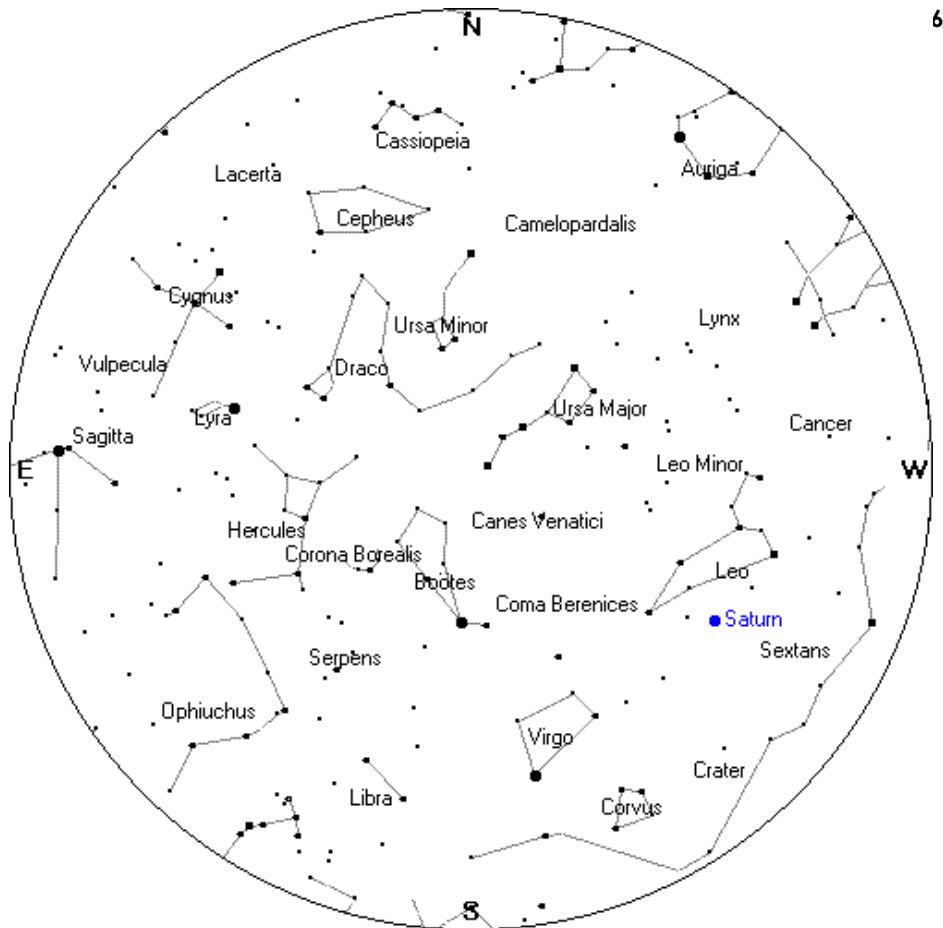
Uranus is also a good binocular target shining at magnitude 5.9 and can be found 5° south of Lambda Piscium in Pisces.

Mars is an early riser this month but at magnitude 1.2 is barely visible low in the pre-dawn sky. Venus on the other hand has returned to its place as the "morning star", the brightest object in the sky except for the Sun and the Moon. At magnitude -4.7 Venus gleams like a beacon to mark the beginning of each new day.

The eta Aquarid meteor shower peaks in the early morning hours of **May 6th** as Earth passes through the dust lane left behind by comet Halley. Not to be confused with the "fallen star" Bill Haley and the Comets, comet Halley's falling stars are visible from **May 3rd** to **May 10th**. I hope they rock your world! Until next time, remember, Astronomy is looking up.

May 1	01:44pmPST	First Quarter Moon
May 2	08:00amPST	Venus reaches its brightest, -4.7
May 4	02:35amPST	Ganymede occults Io
May 6	01:30amPST	Eta Aquarid meteor shower peaks
May 7	12:16amPST	Titan moves into Saturn's shadow
May 8	09:01pmPST	Full Moon
May 11	01:19amPST	Ganymede occults Europa
May 14	10:26pmPST	Titan's shadow transits Saturn
May 17	12:26amPST	Last quarter Moon
May 22	11:23pmPST	Titan moves into Saturn's shadow
May 24	05:11amPST	New Moon
May 25	06:00amPST	Jupiter .5 degrees South of Neptune
May 30	08:22pmPST	First Quarter Moon
May 30	09:32pmPST	Titan's shadow transits Saturn

**Sky Chart**—Here's your **mid-May** midnight sky chart. In order to use the sky chart properly remember the centre of the chart is the sky directly above your head (or the Zenith). Turn the chart so that the direction you are facing is at the bottom of the chart (or pointed toward your toes). The star field directly in front of you will be between the bottom of the chart and the centre.



Sky Chart Courtesy of Heavens-Above

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