



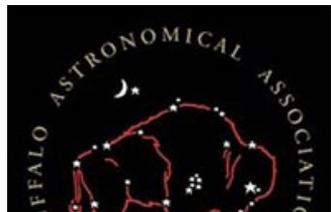
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### March 14 Meeting

Please join us at our March 14 meeting at 7:30. Speaker Jim Zappa, NASA Solar System Ambassador will give a presentation titled “ **Spacecraft Exploration of the Solar System**”.



Humans have sent spacecraft to explore many of the planets and bodies in our solar system. These spacecraft have vastly increased our knowledge of the planets and the other solar system bodies. This presentation will cover spacecraft propulsion technology and its application in the exploration of space. Participants will even get the opportunity to see a real rocket thruster.



The Buffalo Astronomical Association invites you to

Join us for the 2014  
**BAA Dinner Banquet**

The Buffalo Astronomical Association invites you  
to join us for our **2014 Annual Dinner Banquet**

with special guest speaker

**Gary E. Carver, PhD**

Director of R&D, Omega Optical, Brattleboro, VT



## **The Interaction of Light and Matter from Living Cells to Stars and the Big Bang**

Optical science spans many aspects of physics – all centered on how light interacts with matter. Much of this science is of interest to astronomers. Gary will discuss this topic using personal interactions with scientists and projects he experienced during his education and professional career. He will also share his knowledge of existing and new optical filters that are of interest to the amateur community.

Gary E. Carver, PhD, completed his doctorate in optical sciences at the University of Arizona. After a post-doctoral grant from the NSF, he applied his expertise in free space and fiber optics at AT&T Bell Labs, OFS Fitel, Princeton Lightwave, and Omega Optical, resulting in 48 publications and 11 patents.

**Saturday, April 12, 2014**

**Risotto Ristorante**

930 Maple Road, Amherst, NY 14221

Cash bar opens at 6:00 pm

Sumptuous buffet dinner served at 7:15 pm

followed by speaker and program

**Tickets \$30** for BAA members and guests

**Reservation form with payment must be received by April 7th**

- Mar 14 BAA meeting at Buffalo State 7:30pm, speaker Jim Zappa, a NASA Solar System Ambassador, will present "Spacecraft Exploration of the Solar System"
- Mar 19/20 Regulus Occultation Road Trip!!
- Mar 22/23 Beaver Meadow Maple Festival Obs open 11am-4pm Public night on Mar 22 at 7pm
- Apr 5 1<sup>st</sup> public night BMO –Theme – Telescope Clinic – bring your scope for a tune up.
- Apr 12 BAA annual Dinner meeting at Rizotto Ristorante in Williamsville, note meeting / dinner is on Saturday
- Apr14/15 Total Lunar Eclipse
- May 3 Public Night BMO– Theme – Deep Sky Delights.  
Moon is just a thin sliver and sets early
- May 9 BAA Meeting at Buffalo State 7:30pm
- June 7 Public Night BMO – Theme – Luna and lovers of Astronomy
- June 13 BAA Meeting at Buffalo State 7:30pm – elections and pizza party
- June 21 Star Lights at Buffalo Museum of Science— details to be announced
- July 5 Public Night BMO
- Aug 2 Public Night BMO
- Sep 6 Public Night BMO
- Sep 12 BAA Meeting at Buffalo State 7:30pm
- Sep 13 Beaver Meadow Fall Festival 11am to 5pm Solar viewing
- Oct 4 Public Night BMO – last one for the season
- Oct 7/8 Total Lunar Eclipse
- Oct 10 BAA Meeting at Buffalo State 7:30pm
- Oct 23 Very partial Solar Eclipse at sunset
- Nov 14?15? BAA Meeting - location and time TBA
- Dec 12 BAA Meeting at Buffalo State 7:30pm – Holiday Party

*Wilson Star Search dates to be announced*

Did you manage to get out and view the stars in January and February?? What! you did not see the super nova in M82? Well neither did I ;-(. It just gave me more incentive to start plotting and planning this year's fun. We are starting off the fun with the Occultation of Regulus by and asteroid on the night of March 19/20. What the heck is it and why is it special? A 12.2 magnitude asteroid **163 Erigone** is a main belt asteroid, the namesake of the Erigone Family of asteroids that share similar orbital elements properties. It was discovered by French astronomer Henri Joseph Perrotin on April 26, 1876 and named after one of the two Erigones in Greek mythology. We will get to watch a 1.3 mag star turn into a 12.2 mag star for 14 sec or so. An asteroid occultation of a star this bright close to home is a major event. There is still time to join in on the fun. All you need is a video camera (DSLRs that take video work as well) that can image a 1.3 mag star, and a shortwave radio to listen to WWV a time station. You do not even have to travel to help with real science. Imaging it from home can provide useful information. A negative report is also valuable to determine the edges of the asteroid, and find any unsuspected moons. I will be leading a trip to view the occultation of Regulus by an asteroid the night of March 19/20 - <http://www.asteroidoccultation.com/observations/RegulusOcc/> . If you go to the web site, you will see we HAVE to travel. The path stretches from Long Island NY through Watertown NY and up into Canada. We WILL be going to someplace on the centerline where it is clear to view the occultation. It also gives instructions on how to do scientific observations that can be used to measure the size of the aster-

and I have a time stamping device along with video capture hardware so we will be accurately able to time the event. Please let me know if you are planning to come with me- currently we have 3 signed up. You can contact me at [DMa3141551@msn.com](mailto:DMa3141551@msn.com) One thing I will guarantee about my trips- it might not always be clear, but we have LOTS of fun trying. I have a Sister who lives ON the occultation path North of Syracuse so we have a place to crash and view if we need one in that direction. We will not need real dark skies to view this one, so all we need is to find a place to let us in that has power and heat.

The first public event will be Beaver Meadows Maple Festival March 22 and 23 from 9 till 4. If you can assist with solar viewing from 11am to 4pm one or both days or the public night we will have if clear on the 22<sup>nd</sup> it would be greatly appreciated.

Public nights will start on April 5 and will continue to be the first Saturday of the Month through October. This year we are going to try "theme" public nights. April's will be a telescope clinic. Bring your scope and we can help you tune it up for the summer viewing season! If you are interested in helping out, or have a theme night you would like to have please let me know.

Eclipses! - Make sure to get your taxes done early because the night of April 14/15 we have a nice Total Lunar Eclipse see details here- <http://eclipse.gsfc.nasa.gov/OH/OHfigures/OH2014-Fig01.pdf>. Observatory will be open if I can get someone to man it. I plan to take my nieces there, but will travel with them to a clear location if necessary so I can't plan on being there for the public. Be-

Here are two great opportunities to help your astronomy club take off and have a blast at the same time!

**HELP  
WANTED**

**Run for office.** We will elect a club president, vice president, secretary and treasurer at our June meeting. Mike Anzalone, Jeff Gardner and Janet Zehr have expressed a willingness to serve for another term, but nominations are open and all with an interest in holding club office are welcome to run. The vice-president slot is currently without a candidate. Please contact club secretary Janet Zehr at jbzehr@aol.com if you are interested in putting your hat in the ring. The deadline for being listed on the ballot is our May meeting – May 9<sup>th</sup>. The official ballot will be announced at that time.

**Join our Education Committee.** The BAA gets many calls for speakers, presenters and volunteers to share their knowledge of the night sky with schools and organizations. We would like to convene an education committee to field these requests, evaluate the feasibility and connect the organization with club members who might like to participate in public outreach. We have many educators in the BAA (professional and amateur, active and retired) who enjoy the rewards of working with the public. Join in and help us spread our mission and knowledge in the community. To participate, send a note to club president Mike

He had been a member of the Buffalo Astronomical Association for at least ten years, but just when he joined is uncertain. Although he generally was not an active member, he regularly attended meetings and had given a presentation to the club a couple of years ago. He donated his 8-inch Schmidt-Cassegrain telescope to the BAA a year or two ago. An electrical engineer and member of an engineering honor society, he was president of a general contracting company until his retirement in 1981. In retirement he was an active outdoorsman (skiing and golf), a ham radio operator, photographer, painter, and organist. His obituary was in the Buffalo News of February 1st.

Submitted by Rowland Rupp

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### **Observatory Report** (cont'd from page 4)

a great location, and the teachers would love you. Again on the night of October 7/8 There is another Total Lunar Eclipse - <http://eclipse.gsfc.nasa.gov/OH/OH2014.html#LE2014Oct08T> . Followed with a (Very) Partial Solar Eclipse on October 23 at sunset. <http://eclipse.gsfc.nasa.gov/OH/OHfigures/OH2014-Fig04.pdf> Does anyone want to set up a time and place for public viewing of any eclipse?? Please let a board member know if you are interested.

Now for the bad news- Employment has temporarily found me again, and since I need my 10 hours of beauty sleep, and am not home for 12 hours, getting my beauty sleep is difficult enough as it is so, Tuesday night at the Observatory will be canceled for

Here's a very brief review and commentary of part of an essay written by George Wald for a 1955 Scientific American book, *The Physics and Chemistry of Life*. This small bit was extracted from the original essay and was later included in a weekly calendar - a page facing the dates much like one might find a picture or an anecdote in a calendar today. This review is brief because the fragment of the essay is brief.

George Wald was born in 1906 in New York City and received a Ph.D. from Columbia University in 1932. He is well known as the discoverer of vitamin A as a component of the retina of the eye shortly after the vitamin was first isolated. His continued studies led to determining the absorption of various wavelengths of light by pigments in the eye. He became a professor of biology at Harvard and, in 1967, received the Nobel Prize for Physiology or Medicine. He later received many honorary degrees and prestigious awards.

In his essay Wald contends that there may be 100,000 earth-like planets in our galaxy, and concludes that all will support life - "life as we know it." The author says that foundation for this surprising assertion "must await another occasion." He believes, given time, life forms should arise and, although they may develop in a variety of ways, they "should look familiar to us - perhaps even men." Life "has come many times, in many places - places closed off from us by impenetrable distances, probably never to be crossed even with a signal." He reasons that even if we should fail to preserve our own planet we should not despair because: "Our kind will try

They preceded the first attempts to intercept radio transmissions from distant civilizations, the Drake equation, and were far earlier than our current preoccupation with discovering extra-solar planets, particularly those with properties similar to Earth. The concept of DNA was then in its formative years.

Surely the comment about failing to preserve our planet is a reference to the anxiety shared by so many then when the proliferation of atomic weapons and the heated rhetoric of the cold war were feared to lead to the devastation of civilization and, perhaps, life on this world. However, the suggestion that life on other worlds might follow the same biological and evolutionary patterns that have occurred here is seldom, if ever, expressed today. Indeed, as more exotic and specialized life forms have since been found recently in inhospitable places on Earth, the diversity of living organisms is widening, certainly not narrowing.

The first radio searches for extraterrestrial artificial signals came five years after this essay was written. So far, his claim that we may never hear a signal, though strongly rebuffed by many, seems to be frustratingly true, despite fairly diligent searches. Of course, there's always tomorrow. We've landed on the moon and a couple of planets with no sign of life. Our hopes within our solar system are limited to something plying the waters deep inside hostile Europa or, more bizarre yet, one of the ice planets. Outside our solar system we aspire to see an atmospheric signature of an extra-solar planet that suggests life.

So much for a brief treatise written

communication with civilizations elsewhere was justified, or both? Would he alter his expectation of the number of Earth-like planets in our galaxy now that we appear to have a plethora of newly discovered planets with a broad range of sizes and orbits?



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## The Axis Of Evil

**Randy Boswell**

"Things just get curiously and curiously," uttered Alice as she entered the strange world of Wonderland. Well, it turns out that in the real world astronomers have likewise discovered curiously and curiously things in the form of cosmic anomalies.

The best known of these and perhaps the easiest to recall has been dubbed the "axis of evil." Coined by cosmologist Joao Magueijo of Imperial College in London, it refers the pattern of hot and cold spots in the map of the Cosmic Microwave Background (CMB) that points to a special direction in space. [1,2] Discovered by NASA's Wilkinson Microwave Anisotropy Probe (WMAP) launched in June 30, 2001, this has prompted a rethinking of the cosmological principle, i.e., that the universe is homogeneous and isotropic when viewed on a large scale. Or, stated another way, there is no privileged position in the universe, its contents looking roughly the same in all directions, irrespective of location.

Regarding this, according to the

in 1981 as the process by which temperature differences would be smoothed out as well as providing an explanation for cosmic homogeneity and isotropy. The first part of this statement was borne out more precisely in 1992 when NASA's Cosmic Background Explorer satellite (COBE) detected slight variations in the temperature of the CMB. The variations indicated a temperature difference of 3/100,000 Celsius degree from place to place [3, p. 120.] However, data from WMAP did not support the second part of this statement, i.e., the universe does not appear to be isotropic. I.e., WMAP indicated that the hot and cold spots in the CMB were not randomly distributed. Instead, the hot and cold spots were shown to have a preferred direction.

Moreover, this finding was confirmed by data from the European Space Agency's Planck surveyor satellite. Planck has created the highest-resolution map yet of the CMB—its detectors having over 10 times the sensitivity and about 2.5 times the angular resolution to that of WMAP. [4]

This anomaly came as a surprise to astronomers based on the fact that according to the Standard Model, the universe should be roughly the same in all places and should appear to be so in all directions. The fact that it appears otherwise by data from both WMAP and Planck has caused astronomers to offer possible answers.

For example, it has been suggested that the axis of evil may be due to the overall shape of the universe. According to cosmologist Glenn D. Starkman at Case Western Reserve University, at large scales the universe could be rolled up like a tube, curved in one

in what he has termed a "slab universe." I.e., a universe in which space is infinite in two directions, but extending to about 20 billion light years across in one direction; the extent of the observable universe.

In this connection, it should be noted that on account of the observed axis of evil, Magueijo has been critical of the Standard Model or Big Bang Cosmology. The fact that the axis of evil appears to defy the two principle tenants of the Standard Cosmology –i.e., that the universe is homogeneous and isotropic–has prompted Magueijo to suggest that the assumptions behind the Standard Model may be wrong. [4] Magueijo's views were outlined in the popular-level publication, *New Scientist* in the July 2, 2005 issue under the provocative title, "Did The Big Bang Really Happen?"

However, most cosmologists are in agreement with the Standard Model and are less drastic in their assessment of the axis of evil. A promising and tentative solution is that the axis of evil may be due to a distortion in the CMB from gravitational lensing. According to Chris Vale of the University of California at Berkeley, this could be caused by a giant concentration of mass in our nearby cosmic neighborhood. Vale has suggested that this may be due to the Shapley Supercluster, which is composed of 100,000 galaxies, though invisible to the naked eye. Vale's idea looks plausible to other astronomers. Among them is WMAP scientist Gary Hinshaw of the Goddard Space Flight Center in Greenbelt, Maryland. "Vale's model generates a good match of what we see," said Henshaw. [5]

In conclusion, there are other more

## Notes

1. *New Scientist*, Marcus Chown, " 'Axis of evil' warps cosmic background," 22 October 2005, [http://www.nigelkerner.com/Confirmation/Axis\\_of\\_Evil.html](http://www.nigelkerner.com/Confirmation/Axis_of_Evil.html)
2. *Scientific American*, Michael Moyer, "Astronomers Find Evidence of a Special Direction in Space. Could the cosmos have a point?" 9 December 2011, <http://www.scientificamerican.com/article.cfm?id=universal-alignment>
3. Terence Dickinson, *The Universe And Beyond*. 3<sup>rd</sup> Ed. (Firefly Books, Inc.: Buffalo, NY, 1999).
4. Jacob Aron, *NewScientist*, "Planck shows almost perfect cosmos –plus axis of evil," 21 March 2013, <http://www.newscientist.com/article/dn23301-planck-shows-almost-perfect-cosmos--plus-axis-of-evil.html>
5. Marcus Chown, *The Independent*, "The Universe: The new Axis of Evil," 1 February 2006, <http://www.independent.co.uk/news/science/the-universe-the-new-axis-of-evil-465199.html>



AstronomyRocks@roadrunner.com

(716) 839-1842

Vice President: Janice Gardner

Spectrum Editor: Cheri Harper

Secretary: Jan Zehr

cheri.harper@gmail.com

Treasurer: Jeff Gardner

Star Parties: Dan Marcus

At Large Directors: Steve Smith

BAA Yahoo E Group: Dennis Hohman

Neal Ginsberg ngpilsung@gmail.com

BAA Website Webmaster: Chris Elliott

Irene Ziarnowski

www.buffaloastronomy.com

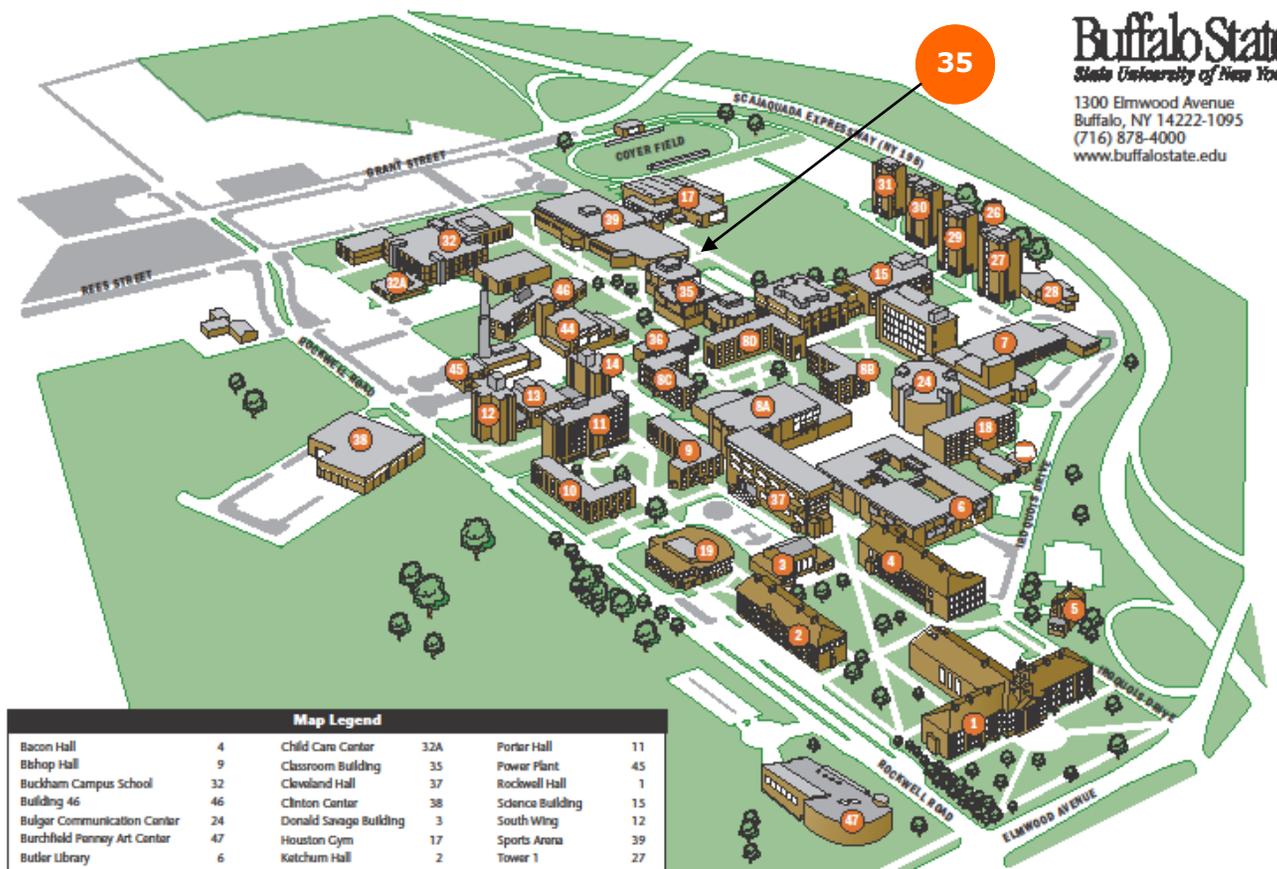
Observatory Co-Directors:

BAA voice mail box: (716) 629-3098

Dan Marcus (716) 773-5015

Derek Bill

Location / Time of Meetings: BAA meetings are held on the 2nd Friday of the month from September to June starting at 7:30pm. Our meetings are held in room C122 of the Classroom Building at the Buffalo State Campus. See map below, building 35.



Map Legend			
Bacon Hall	4	Child Care Center	32A
Bishop Hall	9	Classroom Building	35
Buckham Campus School	32	Cleveland Hall	37
Building 46	46	Clinton Center	38
Bulger Communication Center	24	Donald Savage Building	3
Burchfield Penney Art Center	47	Houston Gym	17
Butler Library	6	Ketchum Hall	2
		Porter Hall	11
		Power Plant	45
		Rockwell Hall	1
		Scienca Building	15
		South Wing	12
		Sports Arena	39
		Tower 1	27