



The IAS News & Views

Volume 80, Issue 3

www.iasindy.org

**Indiana Astronomical Society/Holcomb Observatory Public Lecture
March 9, 2013
7:00 PM
Holcomb Observatory
ASTROPHOTOGRAPHY – Faint Fuzzies and Color brought to Light
Presented by Bill Conner**

Astrophotography is practiced by a relatively few amateur astronomers, but it can be done with simple setups and a little dedication. Anyone with a camera, be it film or digital can enjoy this aspect of our hobby. It does take patience and study to be successful, and it can be very rewarding.

Astrophotography allows you to enjoy the colors and details of nebula and galaxies beyond the scope of what you can see at the eyepiece. It can be a permanent memento of your personal observations and efforts.

Bill will introduce the basics and what can be done with a camera alone, a camera and simple telescope, then more elaborate set-ups. The object is to try with what you have on hand, then move on to better arrangements if your interest prevails.

Purchasing equipment without full knowledge of the configuration requirements for photography can frustrate your efforts and be an expensive mistake.

Bill has practiced astrophotography since 1997, first with a simple Dobsonian telescope and film camera, then progressing incrementally to more appropriate telescope configurations and digital cameras. Mistakes were made along the way and he wishes to steer you clear by conveying his experiences. He currently operates a professional quality astrophotography set-up at Hale Hill Observatory in southwestern Indiana.

IAS NEWS

From the President's Desk

Our next meeting is on March 9th, at Holcomb Observatory, courtesy of Butler University and it is open to the public. Feel free to join us at 7PM, enjoy our program and claim a chance to win our door prize of a beautiful Hubble photo filled book titled *Universe, a journey from Earth to the edge of the Cosmos*, by Nicholas Cheetham, courtesy of Ron Burgess.

Last month, Jeff Patterson, our past President was able to attend. It was my pleasure to present him with a plaque for his dedication to the Society from 2001 through 2012, a total of 12 years as President. Well done, Jeff.

I'll be giving a presentation on basic astrophotography in March. Please email me any questions you may have, so that I can be prepared to cover areas that interest you most.

I'm interested to know what you think about our programs and whether you have any suggestions, so please feel free to stop by and talk to me after each meeting.

Let me know if you would like to make a presentation at one of our future meetings. I'm well aware that many of you have exceptional knowledge on astronomical or space subjects. We would appreciate your contribution.

William Conner

Society Honors Jeff Patterson for Serving as President for the Past Twelve years



I want to thank the Society for the plaque. It has been fun and an honor to serve you in all the capacities over the years. My plans are to continue doing that but in just a different way. The website and the yahoo group will be a challenge but a good learning experience. My goal is to begin observing again and be more active in our public outreach programs. I want to thank the Boards that I have worked with. I could not have done it without them

Changes to the Website IASindy.org

We have updated the website with a widget to receive the radio program Star Talk with Neil DeGrasse. There is a button under the rolling calendar which you can use to hear the three most recent pod casts. Try it.

American Astronomical Society will meet in Indy

American Astronomical Society will meet in Indy the first week of June, 2013. There will likely be sessions of interest to IAS members, and I think everyone will enjoy the exhibit hall. Registration is pretty pricey, though they usually have special arrangements for teachers and workshop attendees. Members of the press are also welcome.

Apparently, if you volunteer to help at the convention, you can get in free. Contact the coordinator to volunteer at Here's the volunteer web page. I'm certainly interested:

<http://aas.org/meetings/aas222/volunteer>

Free Science Night at Carmel High School

On March 23rd there will be a free event about Astronomy and Physics in the Universe at Carmel High School. The event runs from 6 to 8PM. From 6 to 7PM we have a walkthrough of the Chandra X-Ray Telescope display... "Here, There, Everywhere". What happens with everyday events like eyeglasses bending light, red sunsets, can be seen or observed out in our galaxy and beyond!

<http://hte.si.edu/> This portion of the event will take place in our beautiful Media Center!!

Also there will be short 10min planetarium shows about "Here, There, Everywhere".

From 7-8 PM there will be a guest speaker from Indiana University Bloomington to talk about Women in Astronomy... <http://alvarri.com/outreach/woman-in-astronomy-carmel-planetarium/>

· 6-7PM Open Walk-thru of Here There Everywhere science display; short 10 minute planetarium shows

· 7-8PM Women in Astronomy: Historical Contributions of Women through the ages to the science of Astronomy.

All of this is Free!!!

<http://www1.ccs.k12.in.us/chs/planetarium/Publicplanetariumshows>

Comet C/2011 L4 PanSTARRS, A Potentially Great Comet in Early March

The first of two comets expected to make a splash this year is already putting on a good show for Southern Hemisphere skywatchers — and by the time it makes its appearance in northern skies, Comet PanSTARRS should be visible to the naked eye.

C/2011 L4 PanSTARRS, which was discovered in 2011 by the Pan-STARRS telescope in Hawaii, isn't expected to be as much of a spectacle as Comet ISON, which could get as bright as the full moon in November. But it's on track to reach a brightness of at least magnitude 2 in early March. That's roughly equivalent to the brightness of Polaris, the North Star.



Comet PanSTARRS glows with a fanlike tail in this picture from Argentine astrophotographer Ignacio Diaz Bobillo.

"This comet definitely is a dynamically new comet, so we do have the wild-card factor in there," Karl Battams of the Naval Research Laboratory told NBC News in an email. "In an ordinary year, this comet would be grabbing the headlines, but most people are so worked up over ISON that this one is getting short-changed a little. It should be a good one though. For us urban dwellers, we might need to dust off the binoculars to get a decent look. Battams and other astronomers say PanSTARRS is a special case because it's apparently coming in from the Oort Cloud on the solar system's edge to make its first swing through the inner solar system. That's what

makes PanSTARRS a wild card: There's a chance that the comet will get brighter than expected, or stay dimmer than expected, when it wheels around the sun. "Comets do love to surprise us," Battams said.

Right now, the comet is on display only in the Southern Hemisphere, but bright enough to be seen with the naked eye under optimal conditions (as bright as magnitude 4.2). Pictures taken through telescopes, such as the shots you see here from [Pampaskies.com's Ignacio Diaz Bobillo](http://Pampaskies.com) in Argentina and amateur astronomer Terry Lovejoy in Australia, are already showing a fanlike double tail. One of the tails is a stream of dust illuminated by the sun, while the other is a glowing stream of ionized gas.



An image captured by Australian amateur astronomer Terry Lovejoy shows Comet PanSTARRS.

PanSTARRS should start showing up in the Northern Hemisphere around March 7. "To see it, you will need an unobstructed, cloudless view of the western horizon," the University of Hawaii's Institute for

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Astronomy said. "It is best to pick a dark spot, away from streetlights. Look in the direction of the sunset just after the sun has gone down. The comet will be just above the horizon."

It'll be tricky to spot the comet because of the glare of the twilight sky, and even trickier after March 12, when the light of the moon will start interfering. You'll definitely need binoculars to see the tails. Actually, March 12 or 13 might be the best time for your comet-viewing, picture-taking party, because PanSTARRS should be visible alongside a pretty crescent moon in western skies.

"By the end of March, the comet will no longer be visible in the evening sky, but if you get up early, you may be able to see it in the eastern sky just before sunrise," the institute said. "However, by then the comet will be farther from both the sun and Earth, and will therefore be fainter."

When PanSTARRS fades, keep your binoculars in a handy place. You'll want to bring them out again for this year's other sky highlights, including the advent of Comet ISON in November.

By Alan Boyle, Science Editor, NBC News

Book Report

Parallax – The Race to Measure the Cosmos by Alan W. Hirshfeld



This book is great reading for those who are interested in the history of observational astronomy. What makes it so interesting is that it includes biographical sketches of the men and women who labored to determine the distance to the nearest stars, the conflict between them and the relatively recent technical advancements in telescope construction by Joseph Fraunhofer and Alvin Clark that made the measurement possible. It is written in everyday language so that advanced knowledge of astronomy is not a prerequisite.

Parallax is the apparent shift of a nearby object, observed from different vantage points relative to a background object. This is easily demonstrated by holding up a finger about a foot in front of your face and alternatively opening each eye. Relative to an object across the room, the finger appears to shift position. This is how we get our depth perception. Our base line is the distance between our eyes.

When heliocentrists like Aristarchus (280BC), Copernicus (1473) and Galileo (1564) came on the scene it became apparent that Earth's orbit offered a significantly greater base line over that of two widely separated places on earth.

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Unfortunately, with exception of the Sun, stars were much further away than anyone realized and there were many failures. Early on, parallax of a star was sought as proof that Earth orbited the Sun. However, acceptance of the heliocentric model occurred long before astronomers had the capability to measure the parallax of a nearby star.

Though out of print, the book may be obtained on line for a few dollars and the Indianapolis Public Library has copies. I recommend that you add this book to your own library.

Bill Conner

Recent Events for the IAS

Winter Star Party 2013

Held February 4 thru 10 by the Southern Cross Astronomical Society of Miami on Scout Key about 25 miles from Key West FL. Formerly known as West Summerland Key was recently



renamed for the 2 scout camps on the key. Other features of the key include a boat launching ramp and 2 nature/beach areas - many locals on nearby Big Pine Key know astronomers come each year to pursue the hobby. Members in attendance from the IAS included Lisa and Joe Wambo, Dick Rhodes, Terry Steadham, and John Molt. Overall the weather was quite nice; plentiful sunshine, highs in the low 70's and nights

around 60, a couple evenings were windy but that kept dew at bay, we needed to use dew controls only 1 evening. On display was the usual farther south astronomical delights of Omega Centauri, the Jewel Box, the Southern Cross - Jupiter and Saturn are fabulous under the very steady skies. One evening we were treated to a magnificent safety flare sent up from a boat off shore that really lit up the sky one evening – would have been really cool if it was a meteor! Again this year attendance was down due to numerous factors but that allowed for more room for instruments, tents and RVs – most felt fewer in attendance makes for a more relaxed star party. If you have to opportunity to attend sometime it's really one of the most interesting.



Submitted by John Molt

Observing at the Link February 16

We had a pretty good start last night. We went directly to the objects we needed to complete the Feb Observing list and found them all. NGC2438 was very faint. I don't think we would have seen it at all if Wayne hadn't brought his filter and found it for us. He's actually pretty good at finding the fainter objects. NGC2261 was obvious after we looked for the correct object. It looks sort of like a comet. We even found Thor's Helmet. It didn't look much like a helmet but just a fuzzy blob in the correct location. Pointing issues then shut the scope down.

Steve McSpadden

Upcoming Public Events

We really need scopes at public events, please contact Gerald Venne at events-coordinator@iasindy.org

Pike Township Math And Science Fair

NEW ASTRONOMERS GROUP

Cleaning Optical Surfaces

Bruce Bowman

March 9

Holcomb Observatory"

The next NAG presentation will be a short presentation on how [and when] to clean optical surfaces: Front-surface mirrors, lenses/corrector plates, and eyepieces. Recipes will be provided for making your own cleaning solutions.

Onions and Orchids

Thanks again to Steve McSpadden for opening the Link on a cold night

IAS Calendar of Events for March

March 5 Board Meeting
March 7 Pike Science Night 7-9 PM
March 9 General Meeting and NAG

Observing Activities

Activities for March:

Link Observatory -

Impromptu observing as sky conditions allow. Check Yahoo site for information.

Prairie Grass Observatory Activities--

Impromptu observing as sky conditions allow. Check Yahoo site for information.

McCloud Activities--

Impromptu observing as sky conditions allow. Check Yahoo site for information.

Dark Sky Observing Site Information

We are able to go to the Link, Prairie Grass Observatories, and McCloud Nature Park at non scheduled times if they do not conflict with reserved activities:

The Link Observatory is open for observing during IAS functions held there from early Spring to late Fall. See our calendar of events on the website www.iasindy.org. Observing opportunities at non scheduled times are announced on the IAS Yahoo group and are generally scheduled by our telescope operators as weather permits.

For those interested in going to McCloud to observe, please call the park office 765 676 5437 before 4PM on the day you want to go out. They will give you permission to be there at night and make arrangements to cut off the lights.

For those interested in going to Prairie Grass Observatory for observing call Hoppe at 1-765-296-2753.

THE MARCH DEEP-SKY CHALLENGE

[Note the change of name. Elsewhere in this newsletter, you'll find that the IAS has decided to implement a Novice Observing program. To avoid overlap in the programs, the easier/brighter objects can be found on that list. The Deep-Sky Challenge will be more focused on intermediate to advanced observing going forward.

Below please find a list of ten (10) objects to view this month. Those who complete the 10 primary objects will receive a certificate via email and be recognized in the News and Views. We're also providing a challenge object to help push the limits of your observing skills. It's not necessary to successfully view the challenge object to receive the certificate; we only ask that you try.

Please complete the following list to receive the March certificate:

NGC2506 (open cluster in Monoceros)
NGC2527 (open cluster in Puppis)
NGC2571 (another bright open cluster in Puppis)
NGC2784 (galaxy in Hydra)
NGC2903 (a fairly bright galaxy in Leo)
NGC2976/NGC3077 (galaxy pair associated with M81)
NGC2841 (another nice galaxy in Ursa Major)
NGC2985 (galaxy in Ursa Major)
NGC2683 (an edge-on galaxy in Lynx)

Challenge object for March 2013: NGC2541 in Lynx

The above objects are all located between 8 and 10 hours of right ascension and so are well-placed for evening viewing this month.

By March we start to get into galaxy season, but the southern skies still provide many nice open clusters. NGC2506 is located directly on the 8h line of right ascension. It's about 12' in diameter, bright and very condensed. NGC2527, 19 degrees further south, is also 8th magnitude but 20' long and vaguely rectangular in shape. NGC2571 is located about three degrees to the ESE of NGC2527. It is about half the size but of similar brightness, containing five 9th-magnitude stars and many fainter. NGC2784 lies in a rich star field but can be difficult to locate due to the lack of nearby bright stars. Large by galaxy standards, this object is gradually brighter toward the center with a bright nucleus. The similarly bright galaxy NGC2903 is located just off the tip of the "sickle" asterism in Leo.

Many galaxies are located among the stars of the Big Dipper, also known as Ursa Major, the Big Bear. NGC2976, about two degrees southwest of M81, should be visible in an 8" telescope. Its 10th-magnitude disk shows little central condensation. NGC3077 and M81 should be visible in the same field of a low-power eyepiece. Look for the 8th-magnitude star SAO 15054 four arc-minutes to the northwest of NGC3077. NGC2841 can be readily found by star-hopping WSW from theta Ursae Majoris. Look for a 10th-magnitude disk with a bright, stellar nucleus. NGC2985 is another nice galaxy in this constellation, located four degrees to the north. The 10th-magnitude oval should be readily visible in a 6" under a reasonably dark sky.

It's been said that the constellation of Lynx was so named because you must have the eyes of a Lynx to make it out. However, those with digital setting circles should have no difficulty detecting NGC2683,

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a 10th-magnitude galaxy with a high surface brightness. However, our challenge object this month -- NGC2541 -- is another matter. This tenuous spiral has a total magnitude 11.5 but a very low surface brightness. I've attempted this one on several occasions without success, so I'm including it here as incentive to go out and try again!

If you complete this list prior to the end of March, contact Bruce Bowman to ensure you receive recognition. Although certificates are now being emailed, we will continue to acknowledge the winners at the following general meeting. At this time only IAS members are eligible.

Congratulations to the following ten (10) IAS members for completing the January list: Eric Allen, Roberta Allen, Mike Birch, Phil Dimpelfeld, Fred Keller, Laura Keller, Steve McSpadden, Wayne McSpadden, John Molt, and John Shepherd. Shep also successfully viewed the challenge object NGC1507 -- but as seems to be the tradition, he cheated. :^)

Q&A ABOUT THE IAS MONTHLY OBSERVING AWARD

Q1: Do I have to use my own equipment?

A: No...although bringing and using your own telescope is strongly encouraged. Also keep in mind that the IAS has an equipment loaner program.

Q2: Do I need to find the objects myself?

A: No. You need only make the observations. Conceptually, if we had 10 telescopes set up -- each trained on a different object -- you could just go from one to the other and become eligible.

Q3: What do I need to submit to you to receive the award?

A: Just contact me and let me know that you completed the requirements for the month.

March Novice/Urban Observing Challenge

This month we are introducing a new observing list for beginning astronomers that are not that familiar with the night sky. This new Novice Observing List will complement the more advanced Monthly Observing List, which will be known as the Deep Sky Observing List.

This is a new observing challenge for the novices in the Society and for those who observe from Urban sites where the seeing is impeded by lights.

Zeta (ζ) Cancri (08h 12.2m, +17° 39'), Double Star in Cancer, mag = (5.6, 6.0), sep = 6"

M48 (08h 13.8m, -05° 48'), Open Cluster in Hydra, mag = 5.8, size = 54'

M44 (08h 40.1m, +19° 59'), the Beehive Cluster in Cancer, mag = 3.1, size = 95'

Iota (ι) Cancri (08h 46.7m, +28° 46'), Double Star in Cancri, mag = (4.2, 6.6), seq = 30"

M67 (08h 50.4m, +11° 49'), Open Cluster in Cancer, mag = 6.9, size = 29'

38 Lyncis (09h 18.8m, +36° 48'), Double Star in Lynx, mag = (3.9, 6.6), sep = 3"

M81 (09h 55.6m, +69° 04'), Galaxy in Ursa Major, mag = 6.8, size = 26'x14'

M82 (09h 55.8m, +69° 41'), Galaxy in Ursa Major, mag = 8.4, size = 11'x5'

Mare Crisium – the Moon (first quarter)

Grimaldi – the Moon (third quarter)

Challenge Object:

NGC 2539 (08h 10.7m, -12° 50'), Open Cluster in Puppis, mag = 6.5, size = 21'

Notes:

Zeta Cancri is a triple, but with a separation of 0.9", you will find the C star difficult to split. Maybe the Link 36" is up to the task? Zeta Cancri has the traditional name Tegmine (Tegmen), meaning "the Shell (of the Crab)".

Iota Cancri is also known as "the Albireo of Spring". It is a striking orange and clear-blue pair.

The double star 38 Lyncis is a fairly close double star (separation = 2.7") in the constellation Lynx. If you are unable to split this double, your seeing conditions may not be favorable. You might try another evening when conditions are better. If, after a couple attempts, you are still unable to split 38 Lyncis, you still get credit for your observation.

M81 ("Bode's Galaxy") and M82 (the "Cigar Galaxy") make a great pair in the same low-power eyepiece!

To qualify for the Novice Observing List, you must observe at least 6 of the objects. Members are encouraged to find these objects without the use of GoTo so that they become more familiar with the night sky.

If you successfully observe at least 6 of the objects, please contact Phil Dimpelfeld (Philip.dimpelfeld@yahoo.com). Let Phil know how many of the objects you were able to observe. You will be e-mailed a certificate recognizing your accomplishment.

Al/Cor Observations

By Chris Cordell

Carbon Star Observing Program

Introduction

Carbon stars are a unique and interesting type of variable star that exhibits peculiar characteristics and spectra. Most are red giant stars, and their distinguishing feature (and namesake) is the unusually high level of carbon molecules contained in their atmospheres. They are fascinating objects to observe, as their appearance may change dramatically during the course of their variation period. While these stars are popularly known for their striking red color, there is a wide range of possible hues that they may display. For the long-period variables or for those with large magnitude ranges, the apparent color may vary from yellow or orange at maximum to deep orange or red at minimum. The stars with shorter periods may remain at an almost constant color, and they often appear pale yellow or white.

While these stars are relatively little-known in comparison to the brighter and more famous galaxies and nebulae, their vivid colors are unparalleled by most other observable objects. This distinctiveness,

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combined with their unusual characteristics, makes them fascinating subjects for observation, and we hope that through this program you will discover and enjoy these intriguing features for yourself.

Rules and Regulations

To obtain your certificate and award pin for this program, please purchase the Guide to the Carbon Star Observing Program (available soon at the Astronomical League store). This manual includes the [carbon star observing list](#), star charts and descriptions of the appearance of each entry, an observation log template, and an overview of the dynamics and composition of carbon stars. Excellent background information.

The carbon star observing list featured in this program is the product of many hours of painstaking research, observations, and compilation; and was created with the backyard observer in mind. All of the stars included are between magnitude 8.5 at maximum brightness and 14.0 at minimum, no complex or expensive equipment is required to complete this observing program. All of these stars are visible through a moderate-sized telescope, and many can be found from considerably light-polluted locations. I logged a great deal of them from the front yard of my house – surrounded by bright streetlights – with skies heavily permeated by the glow of Houston, TX.

To complete the program, the participant must simply observe and log each of the 100 carbon stars featured on the observing list. Please note that all observations should include the following basic information:

Observer's name

Object name

Date/Time (local or Universal Time)

Observing Site (Latitude and Longitude are preferred)

Sky conditions (Seeing, Transparency, Moon Phase, etc.)

Telescope used

Eyepiece used

Magnification

Detailed description of the object

Sketch of the object (should include at least 5 field stars, if possible)

An observation log template containing these fields is available in the Guide to the Carbon Star Observing Program. Any other log form of your choosing may also be used, as long as it meets these specifications.

While “go-to” telescope systems are allowed for submissions, they are not recommended. Rather, traditional star-hopping or setting circle methods are suggested and enthusiastically encouraged for the

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completion of this list, as they require the observer to truly learn the sections of the sky they are exploring; an effort which gives a greater sense of personal achievement once the object is successfully located.

To submit your observations, mail the **copies** of your logs to the Program Coordinator, along with your name, address, astronomy club or Astronomical League affiliation, e-mail, and phone number. Please do not send your original logs, as they will not be returned. Upon verification of your observations, your certificate and pin may be forwarded either to you or the Indiana Astronomical Society Awards Coordinator, for presentation, as you so choose.

For Observing Manual and Object List details, access: www.astroleague.org, click on the "Observe" tab at the top of the home page, and select "Clubs by Experience Level". The Carbon Star Observing Program is listed in the Beginner section.

IU Kirkwood Observatory Bloomington

The Kirkwood Observatory Solar Telescope is open on the "First Saturday" of each month from 1-3 PM. Viewers may even be able to see a solar prominence or two weather permitting. Updated weather conditions and closings will be posted at the Kirkwood Observatory Hotline at (812) 855-7736, and at the Observatory webpage,

<http://www.astro.indiana.edu/kirkwood.shtml>.

Monthly openings of the solar telescope are planned for the first Saturday of each monthly during our 2013 observing seasons. And if you want to follow the Sun in between our monthly Solar Telescope openings, the website www.spaceweather.com provides daily updates.

Kirkwood Observatory on the IU campus **is** open each Wednesday evening **from spring break until mid-November**, weather permitting! Join us for a night of observing the night sky with the Kirkwood 12" refractor. Please visit our schedule at <http://www.astro.indiana.edu/kirkwood.shtml>, for a list of dates and times. For updated weather conditions and closings, please call the Kirkwood Observatory Hotline at (812) 855-7736.

NASA Space Place

Tackling the Really BIG Questions

By Diane K. Fisher

How does NASA get its ideas for new astronomy and astrophysics missions? It starts with a Decadal Survey by the National Research Council, sponsored by NASA, the National Science Foundation, and the Department of Energy. The last one, *New Worlds, New Horizons in Astronomy and Astrophysics* was completed in 2010. It defines the highest-priority research activities in the next decade for astronomy and astrophysics that will "set the nation firmly on the path to answering profound

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questions about the cosmos.” It defines space- and ground-based research activities in the large, midsize, and small budget categories.

The recommended activities are meant to advance three science objectives:

1. Deepening understanding of how the first stars, galaxies, and black holes formed,
2. Locating the closest habitable Earth-like planets beyond the solar system for detailed study, and
3. Using astronomical measurements to unravel the mysteries of gravity and probe fundamental physics.

For the 2012-2021 period, the highest-priority large mission recommended is the Wide-field Infrared Survey Telescope (WFIRST). It would orbit the second Lagrange point and perform wide-field imaging and slitless spectroscopic surveys of the near-infrared sky for the community. It would settle essential questions in both exoplanet and dark energy research and would advance topics ranging from galaxy evolution to the study of objects within the galaxy and within the solar system.

Naturally, NASA’s strategic response to the recommendations in the decadal survey must take budget constraints and uncertainties into account.

The goal is to begin building this mission in 2017, after the launch of the James Webb Space Telescope. But this timeframe is not assured. Alternatively, a different, less ambitious mission that also address the Decadal Survey science objectives for WFIRST would remain a high priority.

The Astrophysics Division is also doing studies of moderate-sized missions, including: gravitational wave mission concepts that would advance some or all of the science objectives of the Laser Interferometer Space Antenna (LISA), but at lower cost; X-ray mission concepts to advance the science objectives of the International X-ray Observatory (IXO), but at lower cost; and mission concept studies of probe-class missions to advance the science of a planet characterization and imaging mission.

For a summary of NASA’s plans for seeking answers to the big astrophysics questions and to read the complete Astrophysics Implementation Plan (dated December 2012), see <http://science.nasa.gov/astrophysics/>. For kids, find lots of astrophysics fun facts and games on The Space Place, <http://spaceplace.nasa.gov/menu/space/>.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



Clusters of galaxies collide in this composite image of “Pandora’s Cluster.” Data (in red) from NASA’s Chandra X-ray Observatory show gas with temperatures of millions of degrees. Blue maps the total mass concentration (mostly dark matter) based on data from the Hubble Space Telescope (HST), the European Southern Observatory’s Very Large Telescope (VLT), and the Japanese Subaru telescope. Optical data from HST and VLT also show the constituent galaxies of the clusters. Such images begin to reveal the relationship between concentration of dark matter and the overall structure of the universe.

Do You Have a Question or Need?

We have established a list of members who would be willing to receive calls for help on specific objects. If you have a specific skill and would be willing to help others please contact Jeff Patterson KB9SRB@hotmail.com.

William Conner (wmtconner@att.net) - for CCD imaging and film photography.

Jeff Patterson (Contact Jeff via the webpage iasindy.org under the contact us section) – Observatory design and construction

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Eric Allen (ericandroberta@sbcglobal.net) - Telescope making and mirror grinding
Brian Murphy (bmurphy@monumentcompanies.com) - "telescope construction and collimation".
Fritz Kleinhans (starman@iupui.edu) Color CCD and DSLR Camera astrophotography

Public Outreach Programs – If you want to schedule a program at the Link Observatory or at your site, please contact the following people:

Gerald Venne is our Public Events Coordinator. He is responsible for coordinating Public Events for the IAS. To schedule a public event contact Gerald Venne (Contact Gerald via the webpage iasindy.org under the contact us section).

He needs your help. Let Gerald know if you would like to show the public our sky. We need people to help at Link and elsewhere. It is actually a lot of fun.

If you would like to schedule the Goethe Link Observatory, please contact John Shepherd. Contact John via the webpage iasindy.org under the contact us section)

Astro Ads

Are you changing or upgrading your equipment? Do you have or are you looking for astronomical materials and equipment? The Indiana Astronomical Society as a service to its members, will publish non-commercial ads at no charge. The ad will stay in the Newsletter for 4 months and may be renewed at the owner's request.

To place an ad, contact:

Newsletter Editor
Jeff Patterson
1780 S. Morgantown Rd.
Greenwood, IN 46143
(317) 300-0449
E-Mail: KB9SRB@Hotmail.com

For Sale: TAL 100RS, dew shield, finder scope, rings, scope accepts either 1.25 or 2" diagonals, very small blemish on the lens coating. Make Offer. Jay Simmons jamesmichael55@hotmail.com

For Sale: Kenneth Novak 4-vane spider assembly for telescope tubes of 15.5-16" O.D.. The hub is 1.75" in length and sized for a 3/8" stud. Asking \$20 or will trade for other Dobsonian construction materials. Contact Bruce Bowman 317-539-2753

For Sale: Meade 8" SC 2080 outfit.

For sale: Meade 8" Schmidt-Cassegrain with lots of accessories. I can e-mail a list of the accessories. \$750. Prefer cash.

Contact me at mrobbinsroost@comcast.net.

Equipment Loan Program

The Loan Program has been helpful to those new to the hobby and others in need of observing equipment. We consider offers of equipment you may not have need for any longer.

Did you know you could borrow a scope or piece of astronomy equipment from the Society and take it for a test drive? The Society has a program where members who are trying to determine what kind of

equipment to buy can borrow one of the Society's scopes for a month or two and see how they like it. Philip Dimpelfeld is the chairman of the program and can arrange for your pickup and training on the use of the particular instrument. This is a great way to see what telescope you want to purchase. We have several scopes, eyepieces and binoculars to loan.

Philip Dimpelfeld at equipment@iasindy.org

Board Meeting –March 5, 2013

The IAS Board Meeting is being held Holcomb Observatory on the Butler Campus at 7:00PM. If you need further assistance, please contact Bill Conner via the webpage iasindy.org under the contact us section

2013 Calendar of Monthly Meetings

Month	Board	General	NAG	McCloud
January	8	12	12	
February	5	9	9	
March	5	9	9	
April	2	6	6	20
May	28	June 1	June 1	18
June	25	29	1	15
July	23	27	27	13
August	27	31	31	17
September	24	28	28	14
October	22	26	26	12
November	19	23	23	
December	None	TBA		

Membership Status Report

The following is the February 2013 status of membership as of 2/26/13:

Total Membership: 153

Renewals: 6

New Members: 3

George Petzen - Mooresville, IN

Trevor Franklin - Markleville, IN

Jonathan Glen Renshaw - Indianapolis, IN

Inactive Status: 2

Danny Barnes

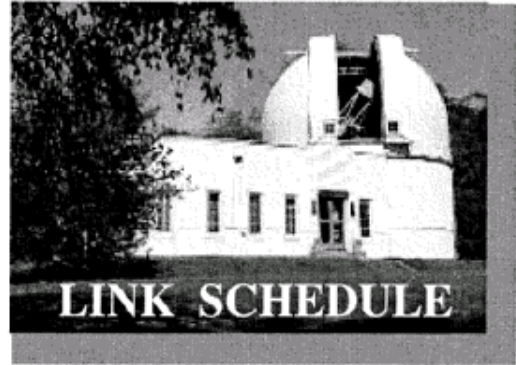
Dean Sylvester

Goethe Link Observatory

Observatory Address

**Goethe Link Observatory
8403 N. Observatory Lane
Martinsville, IN 46151**

Latitude: 39 degrees, 33 minutes north
Longitude: 86 degrees, 24 minutes west
Phone: (317) 831-0668



This schedule is being published to assure proper access to the Link Observatory for programs that are designed as observational, general education, astronomy conferences, or amateur research projects. Training programs are tentatively scheduled for Saturday evenings only. Although other requests can over-ride these sessions. It is the purpose of this listing to prevent activity conflicts.

If you need to acquire use of the 36-inch telescope: remember two important IAS guidelines: 1) *There must be a telescope operator and assistant available* 2) *contact the Observatory Manager: John Shepherd for scheduling* **Contact via the webpage iasindy.org under the contact us section.**

DON'T WAIT UNTIL THE LAST MINUTE TO MAKE YOUR REQUEST OR YOU MAY NOT GET ACCESS.

IAS News & Views Monthly Newsletter for the IAS

Accessing the IAS News & Views

The current Newsletter can be found on the website www.iasindy.org

The monthly newsletter welcomes articles of local astronomical interest information and want ads: Please submit to

The Indiana Astronomical Society, Inc
Jeff Patterson, editor
1780 S. Morgantown Rd
Greenwood, IN 46143
Phone: (317) 300-0449
KB9SRB@hotmail.com

Membership information Contact via the webpage iasindy.org under the contact us section

Contact any IAS officer or the Treasurer John Shepherd or Vicki Switzer

Pay Your Dues by PayPal

We can now pay dues on our website using paypal. There is a cart system where you can pay dues, order magazines, or donate to the Society. Thanks to John Shepherd and Doug Sanguetti for getting it done. It was not as easy as it seemed. The cart is found in the Join the Society section of the website. You will have to establish a PayPal account for yourself to make the transactions.

Observatory Manager

John Shepherd **Contact via the webpage iasindy.org under the contact us section**

Public Event Coordinator

Gerald Venne **Contact via the webpage iasindy.org under the contact us section**

IAS News and Views

Equipment Loan Program Coordinator

Philip Dimpelfeld Contact Phil at equipment@iasindy.org

Membership Coordinator

Roberta Allen Contact Berta via the webpage iasindy.org under the contact us section

Logo Clothing

The Board has developed a new supply of logo ware with our new logo using Mid Central Trophy in Kokomo, IN. Typically T shirts, sweatshirts, polo shirts, and caps are available. Now we are even making it easier for you. We have changed our method of order so that you can have better service. Call Linda, tell her this is an order for the IAS logo ware, discuss what you want and give her the size. She can determine the cost and shipping and mail the order to your home directly.

Linda

Mid-Central Trophy

422 Arnold Ct

Kokomo, IN 46902

765-453-5494

All Major credit cards are accepted.

Hours 9-5 EST

March Calendar, 2013

For a more detailed Calendar of Events see the webpage www.iasindy.org

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4 3rd QTR ☾	5 Board Meeting 7PM	6	7 Pike Science Night	8	9 Public Lecture 7 PM Holcomb Observatory
10	11 New Moon ●	12	13	14	15	16
17	18	19 1st Qtr ☾	20	21	22	23
24	25	26	27 Full Moon ○	28	29	30
31						