



NEWSLETTER

Winter 2015

RITTENHOUSE ASTRONOMICAL SOCIETY

Founded 1888 WWW.RITTENHOUSEASTRONOMICALSOCIETY.ORG

MONTHLY MEETINGS OPEN TO THE PUBLIC

7:15 PM

The Franklin Institute
20th Street and Benjamin Franklin Parkway

Upcoming Meetings/Events Include:

Table with 3 columns: Date, Meeting, and details. Rows include Mar 11, Apr 08, May 13, and Jun 10.

Vice President's Message "New Year's Resolutions" Possibly Some Goals

~Ted Williams

I'm not one for making resolutions since many wind up broken, but I thought I'd use the New Year as an excuse to chart some ideas for our immediate future.

1) Membership Certificates - we have fallen out of practice with our certificates. Peter Bruemmer has stepped forward to assist with the printing of these.

2) Blue Book committee - Milt started the second attempt at putting together a historical retrospective starting at 1960 through current times.

3) Updating of our Celestial Highlight section of our members site which has fallen out of date - I suggested that we need help to keep these postings current.

4) RAS should seriously consider updating our Bylaws - A copy that Milt provided from back in the 1960's is sorely out of date and needs to be revised.



## Meeting Report

~Ted Williams

Our November meeting had members sharing gift ideas with those attending that might be useful for the upcoming holiday season. We don't do this every year, but it provides a great experience for members to share with each other some of their favorite astronomy gadgets. Special thanks to Denise V., Dave W., Renee S., Mitch B., Mike M., Joe S., Alan D., Eric C., Al R. and Fern C. for stepping up with an array of interesting gifts. From books to maps, laser collimators to spotting scopes, sun filters to nebula filters, we had the holidays covered. I'm sure those who attended walked away with either gift ideas for others, or a better understanding of what they want on their own holiday wish list.

The December meeting had Dr. Paul Halpern as our guest speaker as he is putting the last touches on his newest publication: "Einstein's Dice and Schrodinger's Cat". His newest book addresses the topic of how the discovery of what we now label Dark Energy came about. Not only do we get a background as to Einstein's "greatest blunder" but we also get insight on the ebb and flow of the professional relationship that Einstein and Schrodinger developed over the years. Dr. Halpern is returning this June to discuss in detail the Schrodinger's Cat scenario as the book will just be reaching local book stores by the June meeting. (Advance orders currently taken at Amazon.com)

January started off our year with an investigation into Earth's crust, mantle and core by Patrick McQuillan. He shared some background of how various earthquake waves travel through and around the earth. Members developed a basic understanding of how we know what is in the core of the earth so as to better understand how we will be examining what is below the surface of Mars with the Mars Insight Lander Mission.



Patrick McQuillan, IRIS Education and Outreach Specialist, poses with the Active Earth Display. [iris.com](http://iris.com)



<http://www.davidreneke.com/use-binos/#>

## Binocular Touring

~Ted Williams

On cold winter nights, we comfort ourselves with the warmth of our homes and the glow of our electronics. Turning away from the night sky, we might miss some of the subtle motions on display of our planetary system. To enjoy the view, consider a few brief "step-out" sessions.

What one might consider is a good pair of binoculars, a warm insulated winter jacket, a piece of sky and the ability to endure some brief cold gusts. That effort may just bring you some sights that might just take your breath away.

A star map is of help when starting, but with a few tries and the establishing of a few paths to follow across the sky, the map becomes less necessary. It becomes rather easy to track five or six sights worth checking out on multiple viewings as the continuously changing weather conditions of our winter skies offer up ever changing views. A pair of 8 x 50 -or- 10 x 50 binoculars make a good starting size, not too big to be heavy, large enough to catch some extra starlight. Low power to grab a larger view of the sky.

Have the pair of binoculars handy. By handy, that means easily reached and near the door you will use to step out to steal a quick view. This increases the probability you will reach for them. Quick glances at the winter sky are worth the few cold minutes since the view can take ones breath away. The trick is to keep the binoculars in a spot that is easily accessible, no fuddling, just grab and go ready. I keep mine sitting in their cases with the case open so I can pull them out easily.

The winter sky provides sites worthy of a good pair of binoculars and an observer willing to give it a try. At the January meeting we provided a trail to follow across the winter sky that included a number of deep sky sights that are easier to locate. Be it a simple sweep over the Winter

Triangle and up to the belt of Orion, down the sword to the great Orion nebula, the splash of starlight that makes up the handle and the sword is always an easy treat to find. M35 at the foot of Castor is a naked eye sight in a dark sky, but it is an easy catch with binoculars. Jump up to the Zenith point for the Pinwheel and the Starfish clusters in Auriga along with the minnow asterism, and continue following the Milky Way passing over the Alpha-Perseus association to the grand double cluster in Perseus. The more you practice following the path, the easier the sights become.

Now finish out your observing session with some glittering jewel boxes which include the Pleiades cluster and the Hyades cluster. Both are better observed with binoculars than a telescope due to the large angular size. To appreciate the clusters in their entirety, binoculars are the only choice.

Binoculars can also assist in providing a feeling of connectedness which occurs when you realize that the two glowing stars (one bright and one dim) you are observing in the low western sky at, and just after sunset, are our inner planets. Over the past month, night by night you could see them moving relative to each other and the backdrop of the stars. Venus and Mercury have offered quite a view and pointing one's binoculars at bright Venus ensured success at finding dimmer Mercury. Now Mercury has fallen back to the horizon at sunset, and Venus is on to join with Mars. Mars will be quite dim and a challenge, but that binocular view, a quick glance at Venus and I'll bet you will pick out Mars. Watch over the coming month to see their positions change and you too can feel connected as you observe the motions of our solar system



## The Traveling Astronomer

~Dan McCormick

As an avid amateur astronomer I base my vacation across the darkest regions of our area. Some might think this crazy because when you go on vacation it's to go to big attractions and events like Disney World or a warm crowded beach in California. This is the complete opposite of what I look for in the search for the area's perfect dark sky. This time I traveled eight hours to the Adirondack Mountains in New York. When I was on the long drive, I thought of a CD Title that came to mind by a new-age artist Jonn Serrie - "The Stargazers Journey" and quite the journey this was!

Personally this was the longest road trip that I've taken. Round trip totaled about 1000 miles but it was so very worth it. Some of you attended our previous road trip to Cherry Springs State Park and I wanted to go even further north to compare the skies. I had several telescopes packed, new eyepieces, and a new green laser pointer to sight align my scope. All sounded well as I pulled out of my drive in New Jersey up to 100 miles away from Montreal, Canada. Another good reason of going far away on your own rented property is the fact that you don't have to hear someone yell - "Hey, turn off that LASER!"

Now, we all know the Astronomers Curse, Murphy's Law... What ever you want to call it; and boy did it happen to me when I arrived! Luckily the journey all in all was a safe and enjoyable one. However, the skies did not behave too much as expected. Out of the seven nights, I had 1.5 to 2 clear nights if I was lucky. I had a full day of snow - about 4" and an average temperature of 30° F and the lowest night went down to 9° F! Now, when I did see a clear sky all I could think of was "WOW." To me (and others that were in attendance) Cherry Springs ceased to



Venuse and Mercury - [sjastro.org](http://sjastro.org) - Joe Stieber



*Snow on the front lawn*

meet our original expectations. You may have even seen a commercial by “The Weather Channel” featuring this state park. The Adirondacks to me was another story. I stayed in a town named Wilmington, which only has a population of about 1200 people. That is hard to believe since my high school population was 3400 at the time of my graduation! The low population and isolation really helped with the seeing when it was clear out. During the brisk autumn nights the seeing was tremendous.

I took note to a couple of objects. One night when it was clear out, I was relaxing in the hot tub to the most amazing view of Orion rising. Since weather conditions were quickly changing, I just kept a hold of my handy binoculars (I didn’t even take the two telescopes I brought out of my car!) and that was all I needed to enjoy the Orion Nebula. To the right of Orion were the Pleiades shining like I have never seen it before. At first I was confused to what I was looking at. It was the most nebulous thing that I’ve seen. I thought I was mistaking it as another object in the sky. After studying it for a second longer, I quickly realized that it was in fact this great open cluster of stars.

Now, moving on to the spectacular part of the show. The Milky Way in this part of the country is spectacular. With out hardly being dark adapted I was able to see the dust bands stretching all the way up and down the sky. As I was walking out of the car into the cabin I studied it for a bit, and boy it was amazing. Usually the best view I get of the Milky Way is down at Batsto - and that is still very good. I would rate this view as excellent. Under the most perfect conditions at this location, I could only imagine what the Milky Way would look like as I was peering into our own galaxy. This by far was the best view of the Milky Way that I’ve had. I would say overall, that it was 1-2 magnitude darker than what it showed us at Cherry Springs.

This is all part of astronomy. We can all sit in a dark room under the fake dome sky of The Franklin Institute and gaze into a computer displaying rendered images of the

sky, but it is a completely different experience when you go out and actually experience it for yourself far away from any city glow. You have heard this from many people in our group, come out and attend one of the many public star parties that are out there! Do not make big arrangements to a pitch-dark sky without going to Batsto first. For one, if you have never driven on a road without a single street light for miles on end, practice at Batsto!! Even at Batsto it is very easy to get lost and turned around; I know this from first hand experience! It can be very scary at first. Cherry Springs and my current trip to the Adirondacks were just that. At one point I even passed a road sign up to the mountains that said “Limited Cell Phone Service on this Highway.” I love that. Once that sign popped up you actually saw those old call boxes with direct connect to 911 for at least 15 miles when I was passing through an area that had no towns or civilization. The last thing before this was a Hess Station where I filled up with gas. This was a good thing because there was nothing else in sight – rest areas or exists – until I just about reached the town of Wilmington.

At one of our past meetings our Vice President gave a few astronomer terms. If I recall, one of those terms is a “Poser”. This is someone who attends meetings, talks to their friends like they know astronomical facts but doesn’t practice what their love of astronomy. I try to avoid this. Get out there with your scope and observe! You don’t have to drive 500 miles or more to get away to a dark sky.

Come practice with us first down at Batsto. If you think you can take on those conditions (which are still modestly good) start to venture out a little further. Take a road trip to Valley Forge or the Poconos. Some say it is just as dark there! I hope you enjoyed this travel review for those far away journeys so you can reconnect with our heavenly sky. What ever you do bring your gear out and have a good time. When you look up you are looking thousands of years into the past. I leave you with this: What other means in life exist where you can practically go on a real time machine? Astronomy is just that. Get out, look up and clear skies!

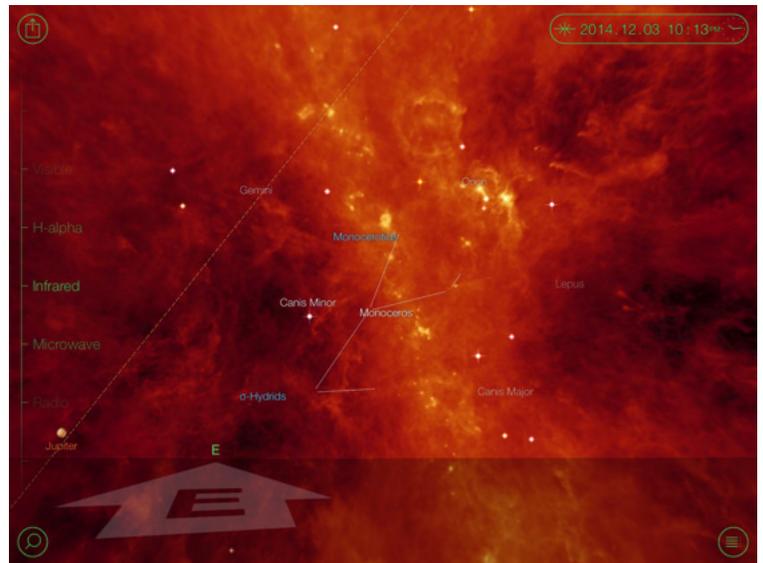


## App Review Corner 1 - Star Walk 2 ~Dan McCormick

What a better time to write an app review for an amateur astronomer when it's cloudy and rainy outside. I was looking through my Astronomy App folder on my iPad and realized that I have a good amount. This forum is perfect for me to share my review with you so you can make an informed decision about which app for you to try out on your device.

Star Walk 2 is one of the first Apps I came across for my iPad that really took my breath away. From the features to the graphics, it has something for everyone. Launching the app, the first thing you will notice is the pretty 'space music' that plays in the background. When I am observing by myself I do like to keep the music on. It holds my interest and really makes me think about what I am observing and the powers that behold within the universe. Contrarily, I can see that it may annoy people. If you do not like the music, it can be disabled at any time through the settings menu.

Now, going beyond the music. This app has a lot of useful features. It has handy quick icons in each corner of the screen, which is how you will navigate the app. Starting in the upper left hand corner is your typical iOS share icon. This is one of the more useless icons in this reviewer's opinion, as I have never used it. Next to that in the upper right hand corner is an analog clock. This clock shows you the accurate time, however, when you tap it, you will be able to advance or reverse time as one would expect to find in any kind of software. On the bottom left is your search icon. The search icon is pretty nifty because it organizes things like constellations, solar system objects, deep space objects, stars and even satellites; which I will talk about in



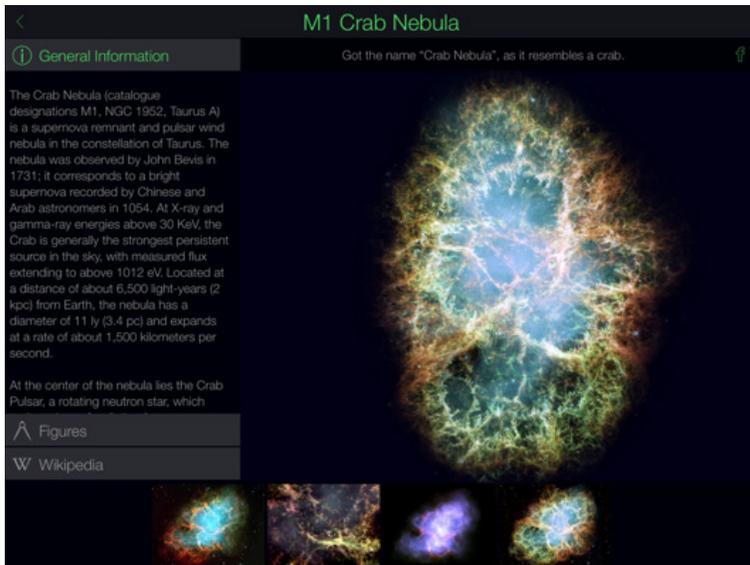
a little bit. Items that appear in bold are objects that are currently in view, while dark items are objects that are set. If you are just going out for a quick observing session, I think this is the best place to start. Secondly, if you do not know what you want to find on a night this is your private sky tour. Start out with your constellations and then go to planetary objects so you can quickly learn the layout of the night sky!

The list icon, in the bottom right corner, offers quite a few items. It has a handy calendar to tell you about upcoming astronomical events and it also has a "sky live" feature, which I think is my favorite. Think of it as a dashboard. It gives you a quick very visual and pretty heads up of solar system objects for that day along with their rise and set time.

Now, earlier I said there is an option to track satellites. This is one of the apps most powerful features, but at a price. Lets say that the ISS (International Space Station) pass is happening on a night you decide to venture out. When you tap on the search icon, followed by the Satellite button and tap on the ISS icon it will show you a live, precise view, of its current position. The first time I used this feature, the ISS was just creeping above the horizon. So as I held my iPad (the app knows where you are, with or without wifi) there is an arrow pointing under the horizon for the space station as it rises and creeps above the horizon. This made it extremely easy to locate the station as I have only done a few times prior. If I did not have the aid of this app I would have not been able to find it during that observing session.

Let's talk about some other features for the app. Of course, because of the iPad (and iPhone compatible) accelerometer, when you move your device up or down the sky will follow you in real time pointing out viewable constellations. You can also change in the settings menu





what the constellations look like. For example, you can choose from traditional stick figures or artist renderings. The horizon line is also a feature of this app. With the horizon line you can see which objects are getting ready to rise. Among other useful features in the settings menu is a 'night vision' mode so you can make the screen red to protect your night vision. One warning about night vision is that if you open the search feature and use the on screen keyboard, it will show up in white light (not in night vision mode). This has ruined my night vision during a few observing sessions and I had to become dark adapted again a few times; even with the screen brightness on its lowest setting. I suggest buying some red cellophane and wrapping it around your iPad. It's a cheap solution that works fairly well! Another quick setting I wanted to mention is the "visual magnitude" setting. This is handy if you observe in many different locations. It allows you to adjust the amount of stars you see just like in a real planetarium. A very handy feature!

One other not so handy, but neat, feature is the bar on the left hand of the screen. When you slide this bar up and down it shows you what the universe looks like in different wavelengths. Some wavelengths feature gamma, infrared and radio just to name a few. This can be a very handy educational tool. To bundle in some more pretty features, this app has imagery in it from the Hubble Telescope. Another thing that sets the app apart is when you zoom in on one of these images it will show you a detailed image of the object you are looking at, but it will also give you information about the object as well.

Now, let's talk about pricing. This is an extremely powerful and educational app. I don't mind supporting developers who make amazing apps like this. Some people may complain and then I think of the when apps cost \$45 on a Windows 95 machine with 1/10th of the graphical

power that this app has to offer. At the time of writing this article, Star Walk 2 is \$2.99. It is a native iOS App that means it will function the same on an iPhone as it does iPad. This makes me able to justify this price much more. Now, a couple of the features I mentioned like Satellites and Deep Space Objects are offered as those pesky In-App Purchases. Pick your purchases wisely, but Star Walk 2 offers 5 In-App Purchases ranging from \$1.99-\$2.99. Still not bad compared to apps that charge \$10 for 100 coins so you can advance in a level. I think this is much more worth it.

The Bottom Line: As someone who has tried many astronomy apps, I rate Star Walk 2 a solid 4 out of 5 stars. This app is well designed, solid and reliable. While a few In-App Purchases may be pesky to unlock features I am a person who doesn't mind supporting the developers. If you are looking to start your Astronomy App list I would recommend this for sure. It is perfect for someone who wants to learn night sky in a fun and interactive way.

Coming up next newsletter: Exoplanet for iOS. If you have an astronomical app you would like me to review, please send an e-mail to me, [daniel@celestialsoundscapes.com](mailto:daniel@celestialsoundscapes.com) ... I will happily review applications \$10 and under.



## Contact - A Book Review

~Denise Vacca

I love the book *Contact* by Carl Sagan. The movie was ok but left out a lot of the Meat. *Contact* the novel, is a wondrous journey though, science, technology, astronomy, aspirations, religion & humanity. This is on that novel and not the movie. Where I feel it's appropriate, I will note the difference from the movie. (book spoilers)

The protagonist is a radio astronomer named Ellie who grew up in the 1960s when it was difficult for a female to be recognized in most scientific fields.

As a little girl, she opens the back of an old broken radio, straightens a pin on one of the vacuum tubes and gets the radio working.

This started her to think and wonder about sound waves, vacuums, what it means to be "on the air," space, astronomy & the Universe. When her Mom asks her what she's doing she replies, "nothing mom, just thinking"

I'll fast forward a bit to the day Ellie doesn't want to go to school because it was raining but her mother suggests "you never know what you might learn today"

They had been working on Pi in school. "How can a number go on forever?" she asks her teacher, he tells her it was a stupid question and it made Ellie so mad she went to the library and read that people throughout history had been asking that question so she learned all she could about Pi and mathematics.

By this time Ellie's father dies, her mother remarries (Ellie's mom dies in childbirth in the movie so that's very different)

Ellie never really bonds with her stepfather. He couldn't compare to her father, who treated her with respect and equality. Her mother's new husband, was narrow-minded and thought her scientific pursuits were foolish.

In high school, she builds encrypting machines and radio, and eventually earns her PhD after she finds a way using rubies to amplify radio signals and discovers the cosmic background radiation.

One of her colleagues mentions a new type of radio astronomy called SETI, the search for extraterrestrial intelligence and this excites Ellie's sense of wonder. She thinks it's important Earth be listening in case there is someone out there trying to communicate with us. She gets a job at the Arecibo Observatory radio telescope in Puerto Rico, and then moves on to The Very Large Array in New Mexico.

One night, while listing to the stars, the VLA detects a signal. Ellie is called in and after quick decrypting they

realize it's a pattern of prime numbers.

Ellie sends a telegram around the world (Carl wrote this before the internet was so socialized and even remarks in the book through Ellie's wonderment, how the world's astronomy community has such poor communications)

Anyway, the signal is picked up easily at an Australian radio observatory and elsewhere around the world. One of Ellie's old professors from Grad School comes in and he sort of overshadows Ellie as the leader although she does all the work.

A second part of the message is discovered and it turns out to be audio & video...of ADOLF HITLER!!!. It was a broadcast of the very first TV signal, Hitler's opening of the 1936 world Olympics. Everyone suspects a hoax but the military is still brought in. It's not a hoax and the signal is confirmed to come from a star called Vega, 26 light years away. But it's a young system, and Ellie can't understand how beings could have evolved there so soon.

Nasa, the US President, the United Nations and every country who has gathered any radio data meet to discuss what this means for humanity and Ellie and her Russian friend & colleague, Vaygay, discover a third level to the message. This time, its instructions on building a machine. The earth decides to build the machine and a crew is assembled. (in the movie it's just Ellie but in the book there are five people on board)

Ellie is not among the crew, but a back up for her old Grad School Professor who was chosen.

Four men and one woman make up the crew. They are from America, Russia, India, China & Africa.

It was called Machindo, the feeling that took over the planet with the prospect of building the machine. The crew becomes like rock stars but controversy erupts all over the world. The president asks Ellie to meet with 2 evangelists. They test Ellie's faith and Ellie proclaims her faith in science. They have a very interesting discussion in a creationist museum and in the end they all give each other things to think about.

Two machines were made, one in Russia, one in America. The components were meticulously made and tested with the specs from the message, new materials are discovered and made, it's creating jobs but costs lots of money.

There is one religious group of fanatics that are very upset about the machine and get a bomb into the components, They blow up the machine in America, killing Ellie's old Grad Professor. She's upset but realizes that she now gets to

go on the machine. However, the Russian machine now has to be checked out and is years behind schedule. One of the side characters, Hadden, a super rich, engineer who lives in space and has a soft spot for Ellie and helped decrypt the message lets Ellie in on a secret that a 3rd machine is being built in Japan...all is happy again.

She is constantly working and thinking about the machine but her mother gets sick and goes into a nursing home. Ellie's stepfather tells her she's a rotten daughter. Ellie feels bad and goes to see her mother.

The five (that's what the crew become known as) go to Japan for the launch, which happens on the last day of 1999.

They take a small assortment of equipment, video and audio cameras, sit in the chairs, an electrical field surrounds the machine and they are whisked away through a tunnel or wormhole out into space. They all record data and tell what they are observing and thinking and eventually they pop out around a blue white star with a dusty disk, which could only be Vega. There are no aliens but a giant radio telescope pointing at all areas of the sky. Ellie is impressed and takes a lot of video to show earth what serious radio astronomy should be but they are soon swept into another wormhole, again and again and they pop out in different star systems. They describe it as a metro system and at the very last "stop" or the grand central station, it turns out to be a sunny beach resembling earth but it's really in the center of the galaxy.

They camp out on the beach over night and wake up with slight headaches. A door appears on the beach out of nowhere and everyone goes through except Ellie who remains a little longer for a swim not wanting to jump through the alien's hoops. By the time the water is covering the bottom of the door, a figure walks onto the beach and Ellie is amazed and shocked to see it's her father who had died.

He's actually one of the caretakers of the metro. Reading the crews minds when they were asleep, they were able to take the form of the person they each loved the most and whom they would be most comfortable with.

Ellie's dad explained they were not the ones who created the subway system, didn't know who did, just that they were the caretakers watching over the making of a giant radio source in the sky, Cygnus X-1. There were billions of living beings in the galaxy and they all get here at one point or another. He shows her the huge intergalactic subway system full of machine size doors for a variety of different alien species.

The other members of the crew come back to the beach with their loved ones and are all told of secrets deep within certain transcendental numbers from the original creators.

The crew goes back into the machine and get back to Japan a day after they left...Or did they?

According to the people in Japan, the machine didn't go anywhere, the needles blipped on the control consoles, and they lost communication with the crew for a few seconds but that was all. The crew noticed everyone was wearing the same clothes and tried to explain they were gone a full day.

The government suspects a hoax again, the message stopped as soon as the machine was activated, all the crew's equipment recorded nothing and all they had were their individual stories of what happened. They are all interrogated and their claims cannot be proved or disproved.

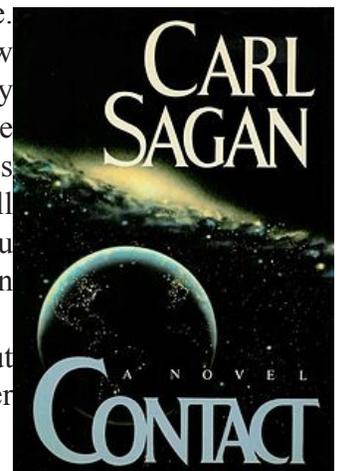
All governments agree that the five must keep silent about what they experienced but they are permitted to peruse any new science projects they wanted as long as it wasn't SETI.

Ellie writes a program to look deeper into Pi than any other computer has ever done. Her mother dies, as she reads a letter her mother left her, she finds out that her stepfather was in fact her real biological father and the man she loved as her father wasn't her father at all. Her computer alerts her that something suspicious is found in Pi, she ignores it for a while to let the news of her life's lie sink in but the computer was programmed to be insistent...she looks at the printout, the artist's signature, deep within the numbers of Pi in base 11, there is a sequence of 1s and 0s that make a perfect circle.

Carl Sagan incites wonder throughout Contact, not only through Ellie's story, but also in the human story in all of us. I left out much of the garnish and only provided specific details without giving away too much. It has changed the way I think about the Universe.

It's interesting to think how I would react if we suddenly received an intelligent message from the cosmos. Sagan writes a very entertaining story. It will keep you interested and make you wonder. You might even learn something

Perhaps I'm just a Carl fan but I truly believe every astronomer should read Contact.





Greetings Everyone!

Philadelphia Science Festival invites you to join us again for the 5th annual city-wide 'Astronomy Night' on Friday, April 24th, with a rain date of May 1st. Many of you have participated in this event over the past several years and we are deeply appreciative of your partnership. This year we have almost 30 observing locations where telescopes will be set up around the city to engage and involve citizens who don't realize what can be seen telescopically in an urban environment.

You all know the sense of amazement a person has when seeing the moon or Jupiter through a telescope for the first time and you also understand the need to debunk the myth that it's impossible to observe the night sky in an urban environment. Challenging? Yes, but impossible? No. The role that amateurs can play in introducing viewers to the night sky is a significant one and PSF invites amateurs to join our team, helping connect people to science through astronomy.

Sunset is at 7:48 that evening and twilight ends at 8:12. Venus is well-placed in the western sky early that evening. Mars is much lower, close to the



horizon actually. Jupiter and the moon are high in the southwest sky. Unfortunately, Saturn, near B Scorpii, doesn't rise until more than an hour after the schedule program closes. The event runs from 7:30 to 10:30 p.m.

This year four college and university observatories have agreed to open their facilities that evening. It could be quite a regional event if we could all join together in a one-night, region-wide star party.

Like last year, we'll locate two experienced people with a telescope or two at SAFE locations in safe neighborhoods at community centers, nature preserves, schools, cemeteries and even a battleship. I understand your concerns about safety. To that end, each location is a SAFE location where we have an established program partner with a facility like a library, school, neighborhood recreation center, church, police station, etc. for participants to choose from. Our team is comprised of Franklin Institute staff and volunteers, college interns, and all who'll help us take astronomy to the public. We'll provide signage for each group at each location and PSF 2015 T-shirts for all participants. Again this year, we're offering valuable astronomy equipment in a raffle for all who participate.



As an additional incentive, we'll offer two tickets to this summer's blockbuster special exhibition "Ghengis Khan" to each club member who participates!

If you're willing to participate again in the 'Astronomy Night' event, please register at this link where they check the box Astronomy Night Astronomer – Friday April 24. We look forward to working with you again this year. If you have suggestions about how to help make this effort successful or any questions, please let me know.

We'll also host a coordination dinner party several weeks before the event to distribute the materials, distribute T-shirts and get entered into the big prize drawing.



This year's list of sites is below:

2015 City-wide Astronomy Night Locations

- Independence Seaport Museum
- ASPIRA Campus
- Folk Arts-Cultural Treasures Charter School
- Grumblethorp Historic House & Garden
- Historic Fairhill Burial Ground
- Jefferson University Lubert Plaza
- John Heinz National Wildlife Refuge
- Laurel Hill Cemetery
- Philadelphia Center for Arts and Technology
- Riverbend Environmental Education Center
- String Theory High School of the Arts and Sciences
- John Story Jenks School
- Schuylkill Banks
- Falomi Club
- MaST Comm Charter School
- St James School
- Lenfest Center
- APM
- Esperanza
- St. Raymond
- WOW! Science Camp



- Creative Kids Club
- Dornsife Center for Neighborhood Partnerships
- Zion Baptist Church Girl Scouts
- Battleship New Jersey

Colleges and Universities

- Rowan University
- Haverford College
- Swarthmore College
- West Chester State University

Again, many thanks for your club's participation. We hope you'll join us this year and please call me if you have any questions, comments, or suggestions for improvement or gifts for the astronomy grab bag for all who participate!

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