CELEBRATING 40 YEARS 1978 - 2018

The Messenger

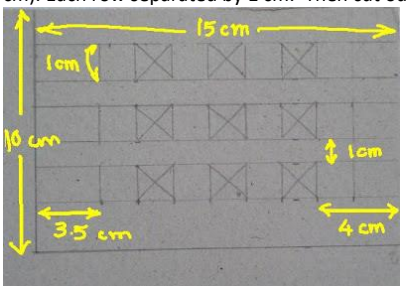
Mexborough & Swinton Astronomical Society

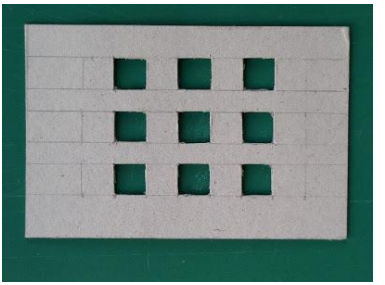
November 2018

Blue Sky Research

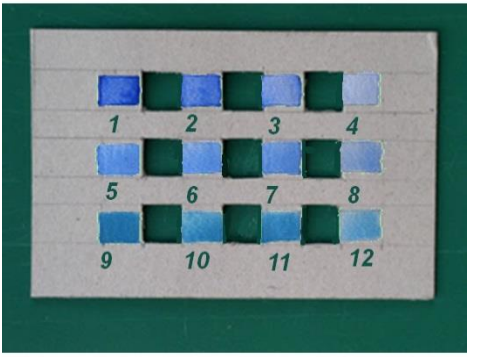
How to measure the "blueness" of the sky so you can carry out blue sky research with a cyanometer , this little article will give clues on how to build one. I'm sure you may be even able to improve on it.

Cut a rectangle of cardboard (15 cm x 10 cm). Trace on the cardboard three rows of squares (1.5 cm x 1.5 cm). Each row separated by 1 cm. Then cut out the windows in the cardboard





Paint on a sheet of paper two sets of blue squares diluted more and more with water or white paint to and order these to get graded blue shades. Cut out the squares and grade them into "blueness", when sorted use if you have kept the original paint shades then paint each shade of blue next to the hole cut into the card. So, the scale is your own creation but you have a "blueness" meter by matching the blueness of the sky to the blue nearest to that seen through one of your square holes. These devices are usually used by artists wanting to be accurate with the colour of the sky



Guy Ronson

The Thoughts of Chairman Les



As we approach the half way point in our 40th Anniversary Year it is worth pausing to think about what we have done in the last six months. In April we began celebrating our 40th Year by taking on a yearlong series of events for the public and ourselves but also to extend and modernise our observatory at Hoober.

The Solstice Dinner was again a great success with our president Dr Allan Chapman remarking on what a wonderful occasion it was. Then onto our trip to Oxford and tours around the Radford Observatory and the Museum of the History of Science and Medicine, a day that will be remembered for a long time by those taking part. By the time you see this you may be reading it at our second major event for this celebratory year of 'AstroCon' where we will be sharing our member's enthusiasm for astronomy with other amateurs and the general public. We are not only providing a full day of astronomy but there is more to be enjoyed by the society with an observing weekend in March 2019. At the end of our very busy year in April a final party for the whole membership to give themselves a pat on the back and enjoy the years success.

Since May this year members of the society have been working at our observatory to bring it up to date. It is worth remembering why we are carrying out the work, to allow as many people, regardless of age, gender of physical capabilities to use the observatory and the equipment in more comfortable surroundings to observe the skies. I know that the installation of a toilet and a bigger presentation room won't mean everyone will be able to use it but their creation will vastly extend the range of people who will.

Neither have we forgotten about our observing, many members are enthusiastically looking for Messier Objects for the 'Binocular Challenge' with some going as far as booking foreign holidays so that they can show off. Also, even though our equipment has been out of use for the duration an observing session was arranged at a nearby society for the closest approach of Mars. We offer our grateful thanks to Doncaster AS.

I am looking forward to our J A Jones Observatory being back in full operation and once again seeing members and visitors using the equipment, but please will someone write me a new PVE presentation! There are many people who need thanking, not just for the last six months but for the past 40 years, whose combined efforts have made MSAS the great and forward moving society it is today.

Finally, my hope is that Mexborough and Swinton Astronomical Society continues in this tradition as we face the challenges of the future and the next forty years.

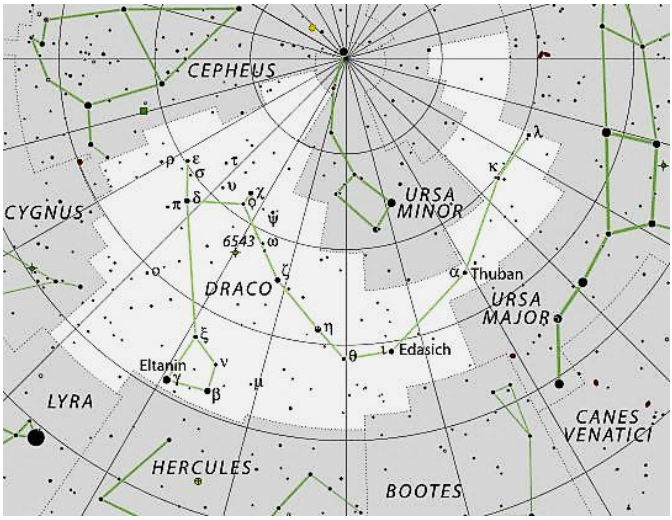
I'm sure that everyone involved with the past year will enjoy some well-deserved rest

I wish you all clear skies

Les H Marsden

FRAS Chairman

Draco



The constellation of Draco, the Dragon, is a beautiful line of stars sweeping gracefully round between the Plough and Ursae Minor. This line begins not far from the line that joins the Pole Star with the Pointers, and runs nearly parallel with the Plough, till, when nearly opposite the end of the handle, it turns around and bends towards Cassiopeia. Then, after twice turning, it terminates in two stars not far from Vega which represent the head of the Dragon. A third star, which seems to form the snout of the Dragon, belongs to the constellation of Hercules. In some positions, the body of the Dragon has the appearance of a great necklace hanging round the Little Bear.

Thuban (α Draconis) was the northern pole star from 3942 BC, until 1793 BC. The Egyptian Pyramids were designed to have one side facing north, with an entrance passage geometrically aligned so that Thuban would be visible at night. Due to the effects of precession, it will again be the pole star around the year AD 21000. It is a blue-white giant star of magnitude 3.7, 309 light-years from Earth. The traditional name of Alpha Draconis, Thuban, means "head of the serpent".

Draco is home to several double stars and binary stars.

Eta (η) Draconis (the proper name is Athebyne) is a double star with a yellow-hued primary of magnitude 2.8 and a white-hued secondary of magnitude 8.2 located south of the primary. The two are separated by 4.8".

Mu (μ) Draconis, traditionally called Alrakis, is a binary star with two white components. Magnitude 5.6 and 5.7, the two components orbit each other every 670 years. The Alrakis system is 88 light-years from Earth.

(Nu) ν Draconis is a similar binary star with two white components, 100 light-years from Earth. Both components are of magnitude 4.9 and can be distinguished in a small amateur telescope or a pair of binoculars.

Omicron (o) Draconis is a double star divisible in small telescopes. The primary is an orange giant of magnitude 4.6, 322 light-years from Earth. The secondary is of magnitude 7.8.

Psi (ψ) Draconis (the proper name is Dziban) is a binary star divisible in binoculars and small amateur telescopes, 72 light-years from Earth. The primary is a yellow-white star of magnitude 4.6 and the secondary is a yellow star of magnitude 5.8.

One of the deep-sky objects in Draco is the Cat's Eye Nebula (NGC 6543), a planetary nebula approximately 3,000 light-years away that was discovered by English astronomer William Herschel in 17

Draconids meteor shower – centred on October 9th (we just missed it!). Occasionally we get a high frequency of meteors – last time was 2011, it is predicted that 2025 should be good, but if you can hang around until 2062 and 2064 we should get an extremely brilliant display

Ed Malone

Analemma – A Solar Project for Gardeners to Enjoy

Many astronomers and non-astronomers enjoy sun dials in their gardens. These ancient instruments still give an indication of the local time to the amazement of all ages.



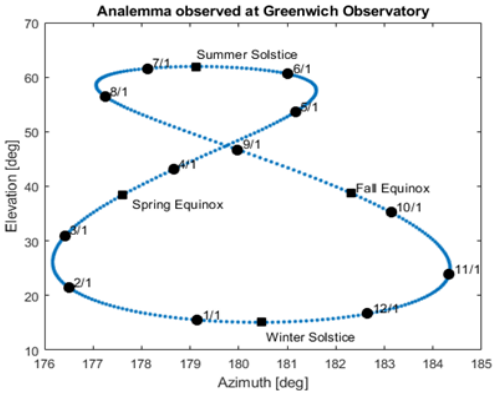


Figure 2.
An Analemma for Greenwich UK

However, did you know that there is a way to use the shadow of the sun, or more precisely the sun's position in the sky at the same time of the day, to tell you the date in the year. This is called an Analemma, Greek for support, and is the apparent track the sun's position makes if imaged at the same time every day in a year (fig1).

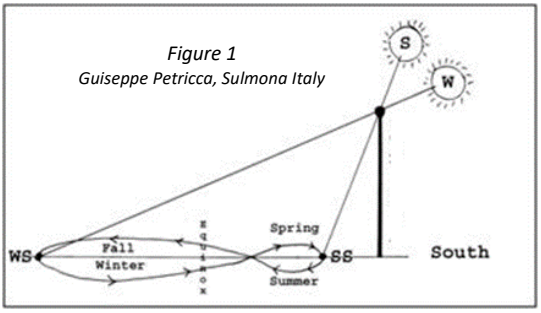


Figure 1
Guiseppe Petricca, Sulmona Italy

Figure 3 Layout for a garden analemma

As the Earth goes around the Sun the position of the Sun at the same time varies to produce a figure of 8. This pattern is mainly down to the 23.5o tilt of the Earth and that the orbit of the Earth is elliptical. This latter fact means that local noon does not happen at exactly the same time every day (cf 'equation of time') Fig 2. If you take the images at a different time of the day the figure will be tilted east or west depending on the hour. If you have the equipment and time to take a picture from exactly the same place at the same time then this is an interesting yearlong project. A more practical version would be to trace a shadow Analemma. All you need is a south-ish facing garden with an area that the Sun can cast a shadow every day. Set a pole in the ground and mark the top of the shadow of the pole every few days at the same time. In fig 3 the Sun marked 'S' is for summer and 'W' for winter. After plotting the Analemma keen gardeners may decide to plant flowers that bloom at the appropriate time along its path. A perfect project for the keen astronomer/gardener.

Paul D'Silva

Mike Hall's November 2018 Skynopsis



Diary (all times Greenwich).

1st	Sunrise 07.03, Sunset 16.38
7th	New Moon
6th	Mercury at greatest Eastern elongation of 23.3 ° from Sun; look low in Western horizon at sunset.
9th	06.00 Mercury at 1.8°. North of Antares
12th	Northern Taurids meteor peaks at 18.00; Dwarf planet Pluto 0.9 °. south of Moon
14th	03.00 Venus stationary; 16.00 Moon at apogee
15th	Moon at First Quarter
16th	04.00 Mars is 1° north of the Moon
17th	Saturn's moon Iapetus at western elongation (mg.+10.1)
20th	20.00h Uranus 5° North of Moon
23d	Full Moon
26th	07.00h Jupiter in conjunction with Sun; 12.00h Moon at apogee
27th	09.00h Mercury at inferior conjunction
30th	Moon at Last Quarter

Goodies:

South Taurids	Active on 5th; good observing conditions in thin crescent Moon
Northern Taurids	Meteor shower on 12th, fairly good observing conditions
Leonids	Meteor shower 17th, fairly good seeing around mid-night under a setting gibbous Moon
Messier 76	"Dumbbell Nebula"; in Perseus at mag. +10.4; RA 01h 42m 20s, Dec +51° 34' 32"

Keep Your Eyes Open



Thursday November 15th **"Electromagnetic Spectrum"**

James Swinscoe has been involved in medical research for over 25 years at Weston Park Hospital and University of Sheffield. He will give us a talk on the Electromagnetic spectrum and its uses in medical imaging and investigations.



Thursday November 22nd **"What Atoms tell us about Galaxies"**

The elements in the world around us are created almost exclusively by stars and this creation process is intertwined with the larger scale growth of galaxies in the Universe. Galactic archaeology is the process of understanding how galaxies formed using clues hidden in the elemental composition of stars. I will explain the origins of the elements and exactly how we can use them to learn about the long-lost history of galaxies.
Dr C Gareth Few is an astrophysicist working at Hull University.

The Time Capsule

The time capsule has now been sealed beneath the floor in the observatory. It contains photographs of the club's activities over the last 12 months, copies of recent newsletters, and some newspaper articles we featured in. These are in both paper and digital form (USB Stick – hope they know what they are in the future – might be a bit like a Betamax video tape!). The capsule was sealed having been filled with inert argon gas to, hopefully, reduce deterioration of contents. The capsule itself is stainless steel and inscribed "Mexborough and Swinton Astronomical Society, Summer 2018, Time Capsule". We had the press from Rotherham Advertiser present to feature the event in the next issue of the paper. Roy Gunson can be seen holding the capsule and then fixing the floor in place after it was deposited in the observatory foundations.



Steve



Steve seen at Caithness, Scotland

'You may have met people named Steve in your life, but have you met the radiant ribbon of colorful light in the night sky named Steve? This unexplained phenomenon looks deceptively similar to an aurora and is observed at the same high latitudes in both hemispheres where you'd expect to see magnetic light shows.

Named by Calgary-based photographer Chris Ratzlaff—it's a nod to the 2006 film Over the Hedge, which classifies "the unknown" as "Steve"—this ribbon appears to be made of hot gas, in the range of 3,000°C (5,430°F). It forms 450 kilometers (280 miles) above Earth's surface.

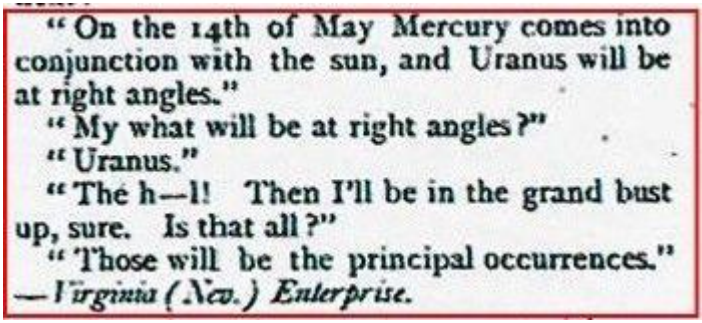
Once scientists started studying Steve in 2016, they gave it an official backronym: Strong Thermal Emission Velocity Enhancement. Despite its visual similarity to auroras, research published Monday in Geophysical Research Letters confirms that Steve is generated by a different, unexplained process.

Steve can be spotted closer to the equator than the aurora, and has been observed in the United Kingdom, Canada, Alaska, northern U.S. states and New Zealand. Steve appears as a very narrow arc extending for hundreds or thousands of miles, aligned east-west. Steve generally lasts for 20 minutes to an hour. Steve has only been spotted in the presence of an aurora.

Thomas Marvel

Uranus –Still funny after 137 years!

Science jokes are part of the landscape now, but you have to feel for early scientists, who had to appear oh-so-serious to be taken seriously. In 1851, when the name of the planet Uranus was first published, the convergence of an astronomy term with an anatomy term opened the door to puns that are still with us. But who made the first one? The research must be limited to available printed sources, and the evidence leads to a screenshot from an 1881 issue of Puck magazine.



"On the 14th of May Mercury comes into conjunction with the sun, and Uranus will be at right angles."

"My what will be at right angles?"

"Uranus."

"The h—l! Then I'll be in the grand bust up, sure. Is that all?"

"Those will be the principal occurrences."

—*Virginia (Nev.) Enterprise.*

So, there you have it, a Uranus joke from 1881 — can it be called funny?

Is it Uranus Joke Zero, though? The attribution indicates that the joke was reprinted from the Virginia Enterprise of Nevada, attesting to a longer-lived frontier tradition. (Intriguingly, Samuel Clemens first used the pen name "Mark Twain" when writing for the very same Enterprise in 1863, though no mention of the planet occurs in his writing for that publication.)

What we can surmise is that in 1881, three decades after the consensus agreement about the name of the seventh planet from the sun in a world without mass electronic communications (but not without playground comedians), a Uranus joke was still novel enough to merit inclusion in a noteworthy satirical publication in New York City. Unless the punchline is actually "Those will be the principal occurrences," which I wager it is not.

However, the extended version of the joke indicates that the pun is a throwaway line, and not the point of the story. That could indicate that the spoken pun was already well known. Earlier print items on Uranus might have been intended as puns, but they are too subtle or too poor to know for sure.

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Limericks

A mathematician confided
A Möbius strip is one-sided.
You'll get quite a laugh
If you cut one in half,
For it stays in one piece when divided.

A mathematician called Klein
Thought the Möbius strip was divine.
He said if you glue
The edges of two
You get a nice bottle like mine.

Searching for Brown Dwarfs: The Backyard Worlds: P9 Project

I recently gave a talk about Backyard Worlds: Planet 9 (Citizen Science Project) at MSAS. This is my report about the experience. Did you know that brown dwarfs get smaller the more massive they are?

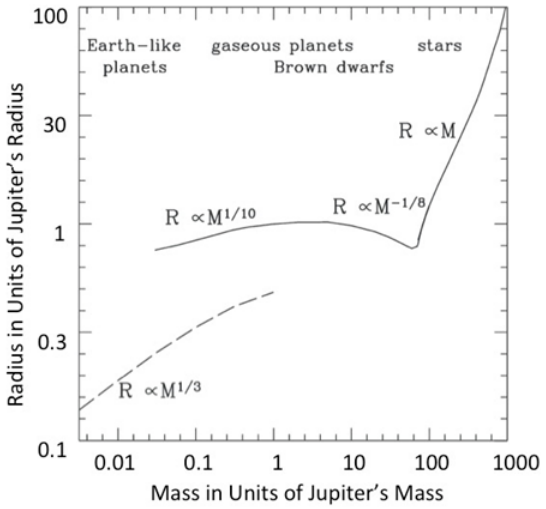
The evening was divided-up into two parts consisting of two completely different presentations. One sent by Marc Marc Kuchner, NASA, specially for the occasion and the other by myself.

1. The First Presentation

This started with an introduction to the Science team and the important fact that Planet Nine is presumed to exist. It is estimated to be around 10 Earth masses, on an elliptical orbit, averaging a=700 AU because of visible disruption in the orbits of detached Kuiper Belt Objects. Next, the nearest neighbours to the Sun were discussed with examples of these BD systems and the prizes of participating in BYW:P9 included discovering such objects. The flipbook was introduced followed by examples of what to mark and what not to mark: the submissions procedure. How this would be related to the Astronomical software/ procedures described in the second presentation blended both presentations ideally. The successes of BYW:P9 include the discovery of a T Dwarf in the first few days of the project!

2. The Second Presentation

This started with a comprehensive description of brown dwarfs, with the three main categories and their associated spectral classes; and culminated in a review of the mass-radius relationship from solar-type stars to the terrestrial planets (G. Chabrier et. al., 2008). A chart demonstrated the decrease (compression) of BD radii with mass before the critical mass is reached as a BD turns into a star. After this point the radius increases dramatically. The positions of L, T and Y objects and sub-BD objects was discussed down to Jovian mass.

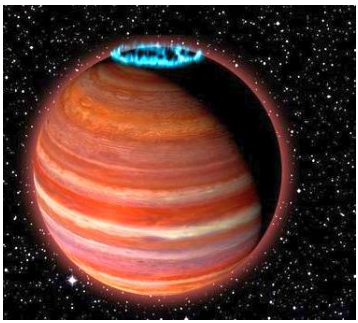


Mass-radius diagram for planet, brown dwarfs and low-mass stars, from Fortney, Baraffe and Militzer 2014.

More massive brown dwarfs are slightly smaller than less massive ones!

Peter Jalowiczor

Going Rogue



It's more than 12 times the size of the biggest planet in our solar system, Jupiter, has a magnetic field 200 times more powerful, and lives 20 light years outside of our solar system. Yet unlike Jupiter, it has no parent star around which it orbits. So what is it?

It's a rogue planet. The newly discovered planet was found drifting alone – no host star in sight – with a glowing aurora that has left scientists with questions.

A study published in the Astrophysical Journal last week evaluated this floating mass in more detail; and although it was discovered in 2016, up until now it was thought to be a brown dwarf, a failed star dimmer than a red dwarf star but larger than the largest gas giants. . Yet this particular , object turned out ot be younger and less massive than scientists originally thought, which opened the door to the revelation that this cold, wandering sphere may, in fact, be a planet instead.

According to the National Radio Astronomy Observatory, scientists tend to look for something called the "deuterium-burning limit" when trying to distinguish between whether or not a mass is a planet or a brown dwarf. Deuterium, an isotope of hydrogen with one neutron and one proton, is involved in the lowest-temperature fusion-burning reactions, the fusion process being the engine that heats and powers stars; a stellar object that burns deuterium (and/or heavier elements) may constitute a star, rather than a planet or another object. At 12.7 Jupiter masses, this rogue planet is just shy of the limit at which deuterium nuclei have sufficient density and heat to fuse into helium, which begins at approximately 13 Jupiter masses.

"This object is right at the boundary between a planet and a brown dwarf, or 'failed star,' and is giving us some surprises that can potentially help us understand magnetic processes on both stars and planets," Melodie Kao, a lead author of the study, said in a statement.

The discovery of the object, officially named SIMP J01365663+0933473, was unique for several reasons. Not only was it inexplicably glowing, and moving about alone, but it was also found using solely detections of its radio emissions — a-never-before-used technique for finding new rogue planets.

Rogue planets are not new, but as far as exoplanet discoveries go, they have a fairly recent history. The first one was theorized in the 1960s, but one was not actually found until the 1990s. Perhaps with this new form of radio emissions detection, many more will be found in the future.

"Detecting SIMP J01365663+0933473 with the VLA [Very Large Array] through its auroral radio emission also means that we may have a new way of detecting exoplanets, including the elusive rogue ones not orbiting a parent star," Gregg Hallinan, of Caltech, said in a statement.

The glow is another mystery of the planet. While auroras are not uncommon – we see them here on Earth, most often from the North and South poles, where Earth's magnetic field lines emanate – they are typically a product of a planet's magnetic field interacting with particles from the sun, in the form of solar winds. And since this rogue planet doesn't orbit around a sun, it only has half of that equation.

So without solar winds interacting with its magnetic field, how does the rogue planet get its auroral glow? Scientists aren't exactly sure, but one hypothesis is that the glow comes from stray particles from an orbiting moon or other planet.

Despite all the unknowns about this celestial mass, its discovery may prove to be promising for future research on objects outside of our own solar system.

"This particular object is exciting because studying its magnetic dynamo mechanisms can give us new insights on how the same type of mechanisms can operate in extrasolar planets — planets beyond our Solar System," Kao said. "We think these mechanisms can work not only in brown dwarfs, but also in both gas giant and terrestrial planets."

k Griffin

Gravity Fields – Grantham, 28/29 September

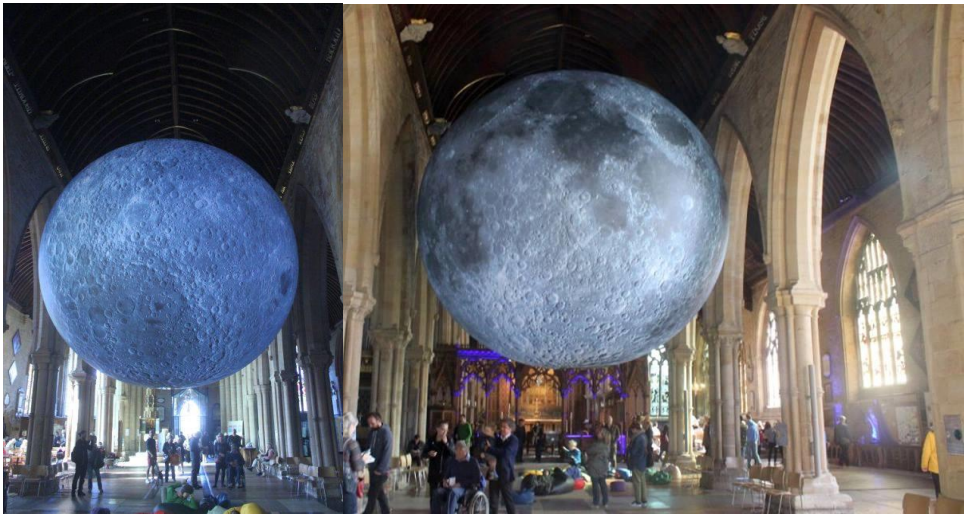


Dr Anna Ploszajski

Gravity Fields is a science based festival, taking Isaac Newton as it's inspiration. The festival is centred around the town of Grantham, lincolnshire, and the nearby Woolthorpe Manor – Isaac Newtons family home. I decided to spend two days there, Friday 28th and Saturday 29th September.

The program identified 90 separate events over the 5 days (Wednesday to Sunday) that the festival was in full swing.

So arriving just after lunch on the Friday (I am a slow starter!) first visited a churh building near the guildhall (Alive Church), where there were presentations by several universities and other groups. Spoke to Phd students fron Durham who were investigating Dark Matter, and had a simulation of a "Dark Matter detector". Close by was a demonstration from Birmingham University, who seem to be doing similar things the Sheffield University with regards to Gravity Wave detection, spoke briefly to the guys there before we were overcome by a School visit. At four o'clock I popped across the street to the Guildhall for a talk by Dr Anna Ploszajski of UCL on "Smart Materials" which change shape and react to their environment in different ways.



After a nice meal at a Thai Restaurant nearby it was back to the Guildhall for a talk entitled "Science on Screen", which was a "chat show" style event featuring, Dallas Campbell - presenter of "Bang Goes The Theory", Steve Crabtree – editor of BBC Horizon, Dr Suzie Imber from University of Liecester who who the BBC's "Astronauts: Do You Have What It Takes?"

Saturday satrted with a visit to "The Museum Of The Moon", to quote – 'Measuring seven meters in diameter, the moon features a 120DPI detailed NASA imagery of the lunar surface. At an approximate scale of 1:500,000, each centimetre of the internally lit sculpture represents five kilometers of the moon's surface'. Yes you can get up close and personal to the Moon! It was quite fasinating to look at the very large globe hanging from the ceiling inside St Wulframs' Church, trying to identify all those features I have seen through my telescope. It was also amazing to be able to gaze at the back side of the moon, and even better to have a cup of tea and a scone at the same time! Whilst there there was a 45 minute "Comedy Show" [I use the word comedy in it's vaguest connotations there], I wasn't impressed.







Helen Sharman

It was then off to the Meres Leisure Centre fo a talk by ProfessorDr Lucie Green (of UCL and "Sky at Night") on the Sun. She took us aon a tour of the sun using some of the latest imagary from the numerous spacecraft either orbiting the Earth or orbiting the Sun. We again then had a short talk by Dr Suzie Imberon "Astronaut Training", then after the interval a talk and Q&A session with Helen Sharman on how she became Britains first astronaut and her "adventures" in Russia and on the MIR space Station.



All in all I suspect I will go back next year. The festival holds something for all, from the dedicated Science and Astronomy Buff to Young Schoolkids. The Saturday Night Light Show and Childrens dance looked spectacular but unfortunately I had to leave before the finish, and the final firework display.
Well done Grantham.

Roy Gunson

Diary

Date	Time	Location	Subject / Event	
Thu Nov 1st	**19:45**	**Club Room**	**The First Astrophotographer**	*Roy Gunson*
Thu Nov 8th	**19:45**	**Club Room**	**Magnetometers**	*Phil Muffett*
Wed Nov 14th	**20:00**	**Club Room**	**Executive Committee Meeting**	
Thu Nov 15th	**19:45**	**Club Room**	**Electromagnetic Spectrum**	*James Swinscoe*
Sat Nov 17th	**17:00**	**Old Moor RSPB**	**PO**	
Thu Nov 22nd	**19:45**	**Club Room**	**What Atoms tell us about Galaxies**	*Dr C Gareth Few*
Thu Nov 29th	**19:45**	**Club Room**	**Winter Sky**	*Andy Kirton-Vaughan*
Thu Dec 6th	**19:45**	**Club Room**	**TBA**	*Dr Susan Cartwright*
Wed Dec 12th	**20:00**	**Club Room**	**Executive Committee Meeting**	
Thu Dec 13th	**19:45**	**Club Room**	**TBA**	
Thu Dec 20th	**19:45**	**Club Room**	**TBA**	*Jez Robinson*
Thu Dec 27th	**19:45**	**Club Room**	**TBA**	

(Details correct to time of publication)
PVE – Public Viewing Event – Bookable Only
CAE – Community Access Event
PO – Public Outreach
TBA – To be announced – (otherwise – We don't know!)

Web site: http://msas.org.uk
Old Moor RSPB – Manvers Way, Barnsley, S73 0YF
Meeting room is at Swinton Working Men's Club, Station Street, Swinton, South Yorkshire, S64 8AU.
Observatory is at Lee Brook Lane, Hoober, S62 7SH
Masonic Hall - Swinton Masonic Hall, 63 Station St, Swinton, Mexborough S64 8PZ
Mexborough & Swinton Astronomical Society is Registered Charity Nº 1064103 in England & Wales

For submissions to The Messenger - Editor: Roy Gunson: royg@gmx.co.uk

Selenelion

A selenelion or selenehelion occurs when both the Sun and an eclipsed Moon can be observed at the same time. This can occur only just before sunset or just after sunrise, when both bodies will appear just above the horizon at nearly opposite points in the sky. This arrangement has led to the phenomenon being also called a horizontal eclipse.

Typically, a number of high ridges undergoing sunrise or sunset can view it. Although the Moon is in Earth's umbra, both the Sun and an eclipsed Moon can be simultaneously seen because atmospheric refraction causes each body to appear higher in the sky than their true geometric positions. A Selenelion can also be observed from an aircraft during a lunar eclipse at sunset or sunrise.