

November 2011

Events list

Thurs 03 Nov: Clare Bamburgh's Brownies – Joint Event with WWT, 6:30pm start
 Wed 09 Nov: Carl Sagan's Birthday – Scale of the Solar System, Northumberland Street, Newcastle. 5:30pm start
 Thu 10 Nov: Full Moon
 Sun 20 Nov: **Annual General Meeting, 7pm**
 Wed 23 Nov: Brownie Leaders visit to WWT – 6:30pm start
 Fri 25 Nov: New Moon; Deep sky observing opportunity

Fri 02 Dec: WWT Staff Event – Stargazing, time TBA
 Tue 13/ Wed 14 Dec: Peak of the Geminid meteor shower
 Sun 18 Dec: Speaker - **Rachael Livermore**, "The Universe's Largest Telescopes – Gravitational lenses"
 Sat 24 Dec: New Moon

All Society events are free, are held in the Washington WWT facilities, and evening meetings start at 7:00pm unless otherwise noted. Please bring a torch and warm clothing to any night-time observing sessions. All observing sessions are dependent upon favourable weather and may be subject to cancellation.

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Editorial

As the end of October and the Kielder Star Camp come rushing towards us, I find myself working on the list of things I'll need to take with me. Telescopes, Battenberg, warm clothes, waterproof clothes, spare clothes... The weather up at Kielder has been known to be unpredictable, so dressing for the occasion can prove problematic. We've seen most types of weather up at Kielder, usually involving water, and often all in the same day so it pays to be prepared for anything.

So far October's weather hasn't given many clues. A few nights ago I got soaked through, taking a microwave oven back to Argos. (It's a long story, involving an exploding microwave oven. But it has no astronomical interest, apart from a passing resemblance to a nova, so I'll spare you the details.) Yet two hours later, when I was walking the dog, the sky was cold and crystal clear, offering a wonderful view of Jupiter, the Moon and the stars of autumn. Any clear spells like this will be very much appreciated during the star camp.

One of my dog walking pastimes is trying to create new constellations. For example, the Square of Pegasus isn't very interesting. It's not even a proper square as the bottom looks wider than the top. But by connecting up a few stars from Andromeda, I can turn it into a watering can. Does anyone else have interesting pseudo-constellations to relate?

On a more serious note, this issue contains formal notification of November's **Annual General Meeting**. The Secretary's report (on page 4) gives more information on this and the creation of a new post, Vice-Chairman. If anyone wishes to nominate themselves for the committee, please get in touch ahead of the AGM. New faces and new ideas are always welcome.

– Ed.

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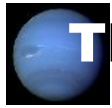
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There's more to astronomy than changing your own oil



THE DARKE SIDE

Society Update with Chairman
Graham Darke

Notice of Annual General Meeting

Notice is hereby given of the 2011 Annual General Meeting of the Society, which takes place on Sunday 20th November at 7.00pm. This is everyone's chance to have their say in the running of the Society and also to volunteer for a spell on the Committee. Below is the agenda:

1. Financial review
2. Significant purchases
3. Membership numbers
4. Membership subscriptions for 2012/13
5. Review of activities in the past 12 months
6. To appoint/reappoint Committee
7. To appoint/reappoint Auditor
8. Members' comments
9. Any Other Business

Forthcoming Events:

Brownies at the Observatory – 3rd November
We have a group of Brownies at the observatory for another joint event with WWT on the above date. All help, as usual, appreciated. Start time is 6.00pm.

Carl Sagan's Birthday - 9th November
We're setting up a scale model of the Solar System on the above date on Northumberland Street in Newcastle from 5.30pm to celebrate Carl Sagan's birthday. It is planned for the BBC to be there to cover this.

Brownie Leaders at Cygnus – 23rd November
From 6.00pm on the above date we are hosting a visit from the Brownie Leaders in the North East. The purpose of this is to develop the joint events programme with the WWT. We are hoping to do some observing, subject to weather, so help, as ever, would be appreciated from members.

WWT Staff Event – Friday 2nd December
On the above date, we are doing an observing session at the observatory for the staff of the WWT from 7.00pm. Please do come along with your scope.

Stay up to date

Keep up to date with all society developments on the website www.sunderlandastro.com and why not sign up for the news group.

September Lecture Evening

It was great to see so many people along for the opening lecture of the new season. I hope that you enjoyed my tale of the planet Neptune from its amazing formation and migration, to the incredible story of its mathematical discovery. It is a challenge to find, requiring a telescope or binoculars to be seen at all and I hope that members will try and track it down over the coming few weeks while it is still favourably placed in Aquarius. Don't expect to see much, the tiny disk is only 2.5 arc seconds across! Do remember though that this cold world is thirty times more distant from the Sun than we are and it has made only one orbit of the Sun since it was discovered!

Starbeque

On Saturday 24th September we tried again with our Starbeque. I'm pleased to say that we got a better night, not perfect but not bad either. 18 people turned up and enjoyed a night of steady seeing, albeit quite a moist one. Neptune and Uranus were tracked down eventually and Jupiter was fine sight in the assembled telescopes.

October Lecture Evening

Many thanks to member Simon Waim for his talk "Bending of Light". As I mentioned on the night, it was very brave to tackle such a subject for someone's first talk although Simon gave an excellent introduction to the concept of how light can be bent by the gravity of a massive object. It's always great to see new people from within the club stepping forward to give talks like this. Well done Simon.

[Editor's Comment: I too would like to thank Simon Waim for giving his talk and reiterate Graham's words. It was a great introduction it was to the subject of gravitational lensing. And the demonstration, involving kite strings and some audience participation, was brilliant in its simplicity. Inspired. – Ed.]



Dark Clues to the Universe By Dr. Marc Rayman

Urban astronomers are always wishing for darker skies. But that complaint is due to light from Earth. What about the light coming from the night sky itself? When you think about it, why is the sky dark at all?

Of course, space appears dark at night because that is when our side of Earth faces away from the Sun. But what about all those other suns? Our own Milky Way galaxy contains over 200 billion stars, and the entire universe probably contains over 100 billion galaxies. You might suppose that that many stars would light up the night like daytime!

Until the 20th century, astronomers didn't think it was even possible to count all the stars in the universe. They thought the universe was infinite and unchanging.

Besides being very hard to imagine, the trouble with an infinite universe is that no matter where you look in the night sky, you should see a star. Stars should overlap each other in the sky like tree trunks in the middle of a very thick forest. But, if this were the case, the sky would be blazing with light. This problem greatly troubled astronomers and became known as "Olbers' Paradox" after the 19th century astronomer Heinrich Olbers who wrote about it, although he was not the first to raise this astronomical mystery.

To try to explain the paradox, some 19th century scientists thought that dust clouds between the stars must be absorbing a lot of the starlight so it wouldn't shine through to us. But later scientists realized that the dust itself would absorb so much energy from the starlight that eventually it would glow as hot and bright as the stars themselves.

Astronomers now realize that the universe is not infinite. A finite universe—that is, a universe of limited size—even one with trillions of stars, just wouldn't have enough stars to light up all of space.

Although the idea of a finite universe explains why Earth's sky is

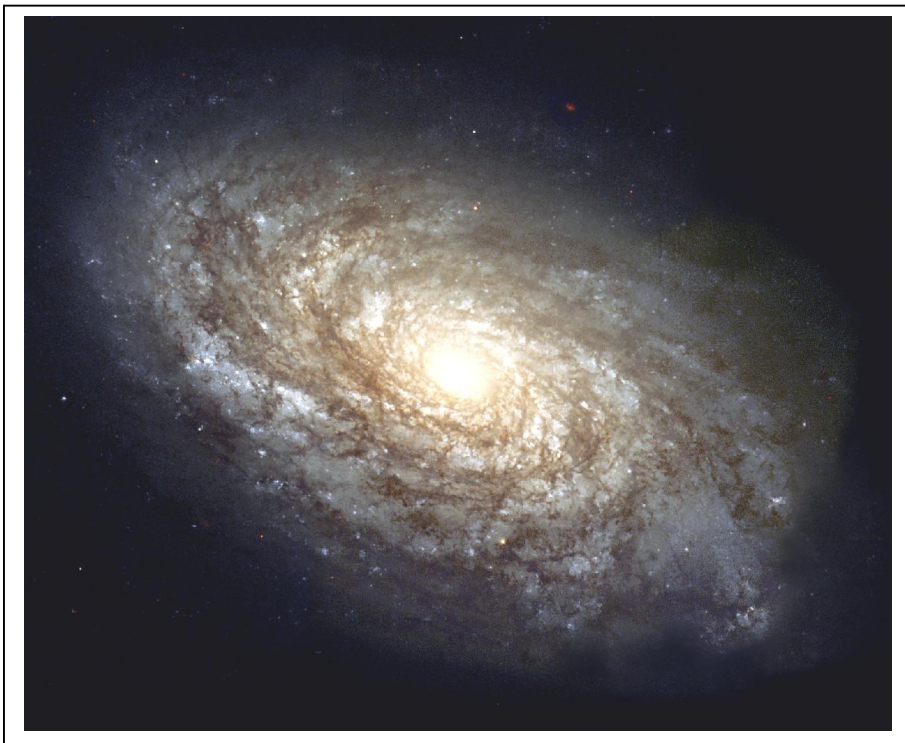
dark at night, other factors work to make it even darker.

The universe is expanding. As a result, the light that leaves a distant galaxy today will have much farther to travel to our eyes than the light that left it a million years ago or even one year ago. That means the amount of light energy reaching us from distant stars dwindles all the time. And the farther away the star, the less bright it will look to us.

Also, because space is expanding, the wavelengths of the light passing through it are expanding. Thus, the farther the light has travelled, the more red-shifted (and lower in energy) it becomes, perhaps red-shifting right out of the visible range. So, even darker skies prevail.

The universe, both finite in size and finite in age, is full of wonderful sights. See some bright, beautiful images of faraway galaxies against the blackness of space at the Space Place image galleries. Visit <http://spaceplace.nasa.gov/search/?q=gallery>.

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



Left: This Hubble Space Telescope image of Galaxy NGC 4414 was used to help calculate the expansion rate of the universe. The galaxy is about 60 million light-years away. Credit: NASA and The Hubble Heritage Team (STScI/AURA)

SAS Yahoo Forum

The Society's Yahoo group provides a forum for members to exchange ideas, ask questions, and a place to post their pics:

<http://tech.groups.yahoo.com/group/SunderlandAstronomicalSociety/>

Secretary's Report

A summary of the Committee Meeting held on 09/10/2011.

Attendees: Kevin Baxter (KB), Graham Darke (GD), Lynn Henderson (LH), David Hughes (DH), Ken Kirvan (KK), Paul Meade (PM), Peter Stokel (PS), Michael Tweedy (MT)

Apologies: Tom Crann (TC)

Items discussed - Completed Actions:

- **GD** has arranged for the insurance for the society equipment.

Items for AGM

GD expressed his wish to stand down from the role of Chairman due to a number of reasons. However recognising that it may be a big jump for someone to take on the role immediately he proposed creating the post of **Vice-Chairman**, where the VC would shadow him for 1 year with the intention that the VC stands for role of chairman the following year.

Additionally, the society currently has no rules on how long the officers of the committee i.e. Chairman, Secretary and Treasurer should be in position. It was suggested to propose to the AGM that these posts be rotated on a 3 yearly basis, but in the first instance only 1 officer would be required to step down each year to give a staggered change and therefore ensure continuity.

However this does not preclude any number of the officers changing at any one year if other members wish to stand for the post. It just gives a maximum number of years an officer can be in post for. Some members have already expressed an interest in some of these roles and further nominations from the membership will be asked for when the notification of the AGM is sent out before the AGM.

Visits and Events: Visits Made

- 01/10/11 Kilhope Lead Mine – this was a very well received event and the organisers have asked that we repeat it again in the Spring and Winter of 2012. It was suggested that January 28th 2012 would be a suitable date to coincide with the first quarter moon.
- 04/10/11 Age Action NE

Thanks to all the volunteers who helped out at these events.

Future visits and Events

- 22/10/11 Kielder Night Watch at Kielder Castle – 7pm start
- 03/11/11 Clare Bamburg's Brownies – Joint Event with WWT 6:30pm start
- 09/11/11 Carl Sagan's Birthday – Scale of the Solar System, Northumberland Street 5:30 start
- 23/11/11 Brownie Leaders visit to WWT – 6:30pm start
- 02/12/11 WWT Staff Event – Early Christmas Stargazing - time TBA
- 31/01/12 Brownies – Joint Event with WWT 6:30pm start

*****Volunteers required to help with all events. Please bring your telescope along.*****

2012 Society Calendars: The production of the 2012 SAS Calendar was discussed. MT stated that he didn't have electronic copies of all of the Astro-photography entries this year and would also like dates of the Starcamps for 2012. **MT** to post a request on the Yahoo Group asking for photographs, **LH** to email MT with dates of 2012 Star Camps, **KK and DH** to get prices of printing from external suppliers

SAS 20th Anniversary – July 2013

GD highlighted that the society would celebrate its 20th birthday in 2013 and suggested that we start thinking now about how to celebrate this. Suggestions for ideas from the membership are requested and some ideas were already put forward e.g: Have a high profile speaker at a big venue. **All** – to think of suggestions for how to celebrate and ask the membership for their ideas.

Stargazing Live 2012

The BBC are one again holding a Stargazing Live event in January 2012 running from Monday to Wednesday, 16th – 18th, It was suggested that as a society we once again take part and agreed that we should host events from 19th – 21st to follow on from this. It was suggested that we host them at WWT and that the theme of the events be Jupiter.

Posters: We need some new posters for the society for outside the Observatory. **MT** to produce new posters and laminate them.

Observatory Maintenance: There were further discussions about the best coating to apply to the inside of the observatory. **GD** to talk to Derek Brown re paint used for outdoor fish ponds.

Membership fees:

Can members please note that annual membership fees became due from the 1st September.

→ **Next committee meeting: 13 November, 6pm**

LETTERS

In this open letter to the SAS committee and membership, David Hughes asks for feedback on an idea:

Many of you will remember **David Sinden**, who was the Senior Optical Workshop Manager at telescope makers Grubb Parsons in the 60's and 70's, and who was responsible for some of the biggest telescopes in the world today. David was a remarkable individual, with a passion and enthusiasm for astronomy and science that remains unmatched to this day. For anyone who knew him, he was and will forever remain a very special human being.

Sadly, in 2005, David was diagnosed with lung cancer and his prognosis was not good. After a lifetime spent pursuing technical and artistic excellence, David wanted to do something that might live on in the astronomical community after his death and so proposed The David Sinden Memorial Medal.

This medal, which was intended to be an annual award, was designed to encourage "good work", and would be presented to any local astronomer who had demonstrated a remarkable degree of commitment in a chosen field over a sustained period.

Sadly, David's idea was never followed through to its logical conclusion and, to this day, there remains no lasting memorial to David's contributions.

I would like propose that Sunderland Astronomical Society contact each of the local astronomical societies, as we have done many times in recent years, and ask them to help us establish The David Sinden Memorial Award. David was close to most of the local societies and I think this idea would enjoy broad support from everyone who knew him.

We should then set up a panel of judges who would accept nominations for the prize and then decide which of the submissions most closely matches the ideals and spirit of the award. Submissions might include a particularly stunning collection of photographs with analysis, a published work or a commitment to public outreach. Indeed, anything that constitutes "good

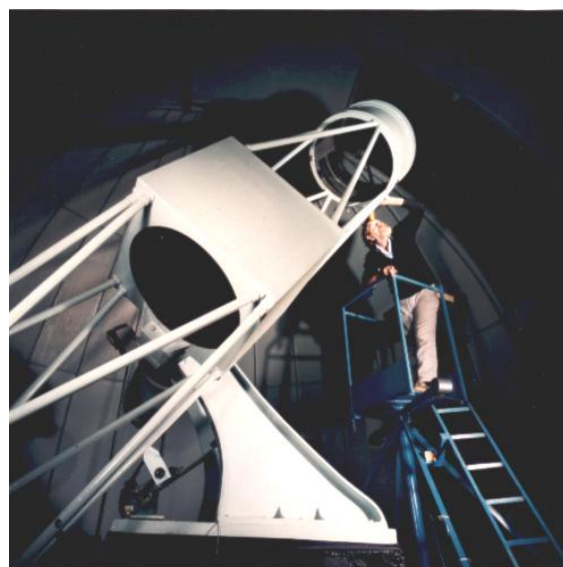
work" and perhaps advances the science of astronomy should be worthy of inclusion but all of the judges must agree that the work is exceptional. If none of the submissions are particularly outstanding then we should be brave enough to say as much and no award should be presented that year.

I further propose that all of the societies meet formally once a year at a suitably prestigious venue so that we can celebrate this award properly. The idea is that we should seek to encourage excellence and reward the kind of effort that David was so keen to celebrate. If we push our collective membership hard then I believe that they will respond. If we openly accept nothing but the best then the award will really count for something special.

These are just initial ideas and I would welcome all positive comments.

Best wishes,

David Hughes
Committee/Web Administrator,
Sunderland Astronomical Society



Above: The late David Sinden, with the restored 24 inch Calver reflector at Close House Observatory



Dark Matter Mystery Deepens

Like all galaxies, our Milky Way is home to a strange substance called dark matter. Dark matter is invisible, betraying its presence only through its gravitational pull. Without dark matter holding them together, our galaxy's speedy stars would fly off in all directions. The nature of dark matter is a mystery -- a mystery that a new study has only deepened.

"After completing this study, we know less about dark matter than we did before," said lead author Matt Walker, a Hubble Fellow at the Harvard-Smithsonian Center for Astrophysics.

The standard cosmological model describes a universe dominated by dark energy and dark matter. Most astronomers assume that dark matter consists of "cold" (i.e. slow-moving) exotic particles that clump together gravitationally. Over time these dark matter clumps grow and attract normal matter, forming the galaxies we see today.

Cosmologists use powerful computers to simulate this process. Their simulations show that dark matter should be densely packed in the centres of galaxies. Instead, new measurements of two dwarf galaxies show that they contain a smooth distribution of dark matter. This suggests that the standard cosmological model may be wrong.

"Our measurements contradict a basic prediction about the structure of cold dark matter in dwarf galaxies. Unless or until theorists can modify that prediction, cold dark matter is inconsistent with our observational data," Walker stated.

Dwarf galaxies are composed of up to 99 percent dark matter and only one percent normal matter like stars. This disparity makes dwarf galaxies ideal targets for astronomers seeking to understand dark matter. Walker and his co-author Jorge Peñarrubia (University of Cambridge, UK) analyzed the dark matter distribution in two Milky Way neighbours: the Fornax and Sculptor dwarf galaxies. These galaxies hold one million to 10 million stars, compared to about 400 billion in our galaxy. The team measured the locations, speeds and basic chemical compositions of 1500 to 2500 stars.

"Stars in a dwarf galaxy swarm like bees in a beehive instead of moving in nice, circular orbits like a spiral galaxy," explained Peñarrubia. "That makes it much more challenging to determine the distribution of dark matter."

Their data showed that in both cases, the dark matter is distributed uniformly over a relatively large region, several hundred light-years across. This contradicts the prediction that the density of dark matter should increase sharply toward the centres of these galaxies.

Some have suggested that interactions between

normal and dark matter could spread out the dark matter, but current simulations don't indicate that this happens in dwarf galaxies. The new measurements imply that either normal matter affects dark matter more than expected, or dark matter isn't "cold." The team hopes to determine which is true by studying more dwarf galaxies, particularly galaxies with an even higher percentage of dark matter.

How the Milky Way Killed Off Nearby Galaxies

Two researchers from Observatoire Astronomique de Strasbourg have revealed for the first time the existence of a new signature of the birth of the first stars in our galaxy, the Milky Way. More than 12 billion years ago, the intense ultraviolet light from these stars dispersed the gas of our Galaxy's nearest companions, virtually putting a halt to their ability to form stars and consigning them to a dim future. Now Pierre Ocvirk and Dominique Aubert, members of the Light in the Dark Ages of the Universe (LIDAU) collaboration, have explained why some galaxies were killed off, while stars continued to form in more distant objects.

The first stars of the Universe appeared about 150 million years after the Big Bang. Back then, the hydrogen and helium gas filling the universe was cold enough for its atoms to be electrically neutral. As the ultraviolet (UV) light of the first stars propagated through this gas, it broke apart the proton-electron pairs that make up hydrogen atoms, returning them to the so-called plasma state they experienced in the first moments of the Universe. This process, known as reionisation, also resulted in significant heating, which had dramatic consequences: the gas became so hot that it escaped the weak gravity of the lowest mass galaxies, thereby depriving them of the material needed to form stars.

It is now widely accepted that this process can explain the small number and large ages of the stars seen in the faintest dwarf galaxy satellites of the Milky Way. It also helps scientists understand why galaxies like the Milky Way have so few satellites around them -- the 'missing satellites' problem. The stripping out of gas from these galaxies makes them sensitive probes of the UV radiation in the reionisation epoch.

Pierre Ocvirk comments, "This is the first time that a model accounts for the effect of the radiation emitted by the first stars formed at the centre of the Milky Way on its satellite galaxies.

"In contrast to previous models, the radiation field produced is not uniform, but decreases in intensity as one moves away from the centre of the Milky Way.

"The satellite galaxies close to the galactic centre see their gas evaporate very quickly. They form so few stars that they can be undetectable with current telescopes. At the same time, the more remote satellite galaxies experience on average a weaker irradiation. As a consequence they are easier to detect and appear more numerous."