

---

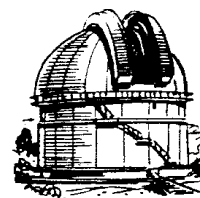
# Journal

of the

## Nottingham Astronomical Society

June 2021

---



***In this issue***

- A Message from the Chairman
- E-Services
- Sky Notes for June
- Diary Dates for 2021
- Social and Practical Astronomy: meeting report
- Observation of the Transit of an Exoplanet using the eVscope
- Advertisements
- Society Information

**Thursday, June 3<sup>rd</sup>**

**8pm: ONLINE**

**This evening we welcome**

**Prof. Ian Morison**



**Emeritus Gresham Professor of Astronomy,  
Manchester University**

**who will be speaking on the subject of**

**Harbingers of Doom?**

***Comets***

---

### **Current Arrangements for our monthly “Gotham” meetings**

These meetings, held on the first Thursday of each month, are intended for members of the Society only. “Plumtree” meetings – those held on the third Thursday of each month – will continue to be freely accessible to the public via YouTube.

Until further notice, our main meetings will be held on YouTube and will be for **members only**. Members will be emailed a link to the live stream on YouTube about 20 minutes before the meeting commences at 8pm. You will not be able to search for the meeting in YouTube, access is via the link provided in the email only.

For non-members wishing to watch our meetings, please email [membership@nottinghamastro.org.uk](mailto:membership@nottinghamastro.org.uk) before the meeting and we will send you a link to your first two meetings before requesting you join the society to join future online meetings.

## Chairman's Message – June 2021

Well another month has passed, and things are looking brighter with the restrictions easing.

We are having a welcome return from Professor Ian Morison on the subject of comets at our next meeting, so something to look forward to there.

We have made some good progress at the observatory with the plan we are following, and are perhaps hoping to hold an actual, physical, in person(!) meeting there for people who wish to see what has changed, as long as restrictions allow such things. We will keep you informed!

We are still planning to meet with Severn Trent to see what our options are for development of the land, and what we can and can't do (although our current plans are fairly modest!). We have had problems arranging a mutually compatible time, but I think we are there now.

We don't know yet when the full meetings will continue (which use to be a Gotham, and may still be - we are looking at options) - I think probably not before September, but again we will keep following the recommendations, and keep you informed.

Currently it looks like the August BBQ at the observatory will also go ahead, but keep your fingers crossed both for being allowed, and good weather! Meanwhile keep the date free (7th August)!

Best wishes, and I hope to SEE you all soon!

**Julian,**  
NAS Chair

### The Nottingham Astronomical Society: E - SERVICES

Whether or not you are a NAS member, you can keep up to date with details of the Society's meetings and other events by visiting the NAS website: [www.nottinghamastro.org.uk](http://www.nottinghamastro.org.uk)

#### **NAS on Facebook**

You are welcome to connect with other members and friends of the NAS on Facebook by going to: <http://www.facebook.com/nas.org.uk>

#### **NAS on Twitter**

The Society has a Twitter account at <https://twitter.com/NottinghamAstro>

#### **NAS Journal e-mailing list**

To register for your monthly e-mailed link to the NAS Journal, and a copy of our SkyNotes, just e-mail [secretary@nottinghamastro.org.uk](mailto:secretary@nottinghamastro.org.uk)

You don't have to be a Society member to take advantage of this service.

*If you happen to change your email address, please remember to inform the Society by emailing us at [treasurer@nottinghamastro.org.uk](mailto:treasurer@nottinghamastro.org.uk)*

# Sky Notes

## June 2021



Compiled by Roy Gretton

*All times given below are in British Summer Time*

**The Summer Solstice** occurs in the early morning of June 21<sup>st</sup>, when the Sun will be 23.44 degrees north of the celestial equator.

### PHASES OF THE MOON

<i>Phase</i>	<i>Date</i>
Last Quarter	June 2 <sup>nd</sup>
New Moon	June 10 <sup>th</sup>
First Quarter	June 18 <sup>th</sup>
Full Moon	June 24 <sup>th</sup>

This month the Moon is closest to Earth on the 23<sup>rd</sup>, and furthest on the 8<sup>th</sup>.

### ANNULAR ECLIPSE OF THE SUN, June 10<sup>th</sup>

An annular solar eclipse, visible from the British Isles as a partial eclipse, will take place on the morning of June 10<sup>th</sup>. The full annular eclipse will be seen from parts of Canada, Greenland and Siberia. Viewed from Nottinghamshire, the eclipse will begin at about 10:07am and end at about 12:24pm, with maximum eclipse occurring at about 11:13am, when 23 per cent of the Sun's disk will be obscured. **Taking proper precautions** such as wearing eclipse spectacles, or looking at the Sun's reflection on the surface of still water, look for a "bite" taken out of the top of the Sun. With a two-hour slot available for observation, and the Sun really high in the sky at this time of year, it will have to be very cloudy for us to miss the eclipse altogether. But with British summer weather, you never know!

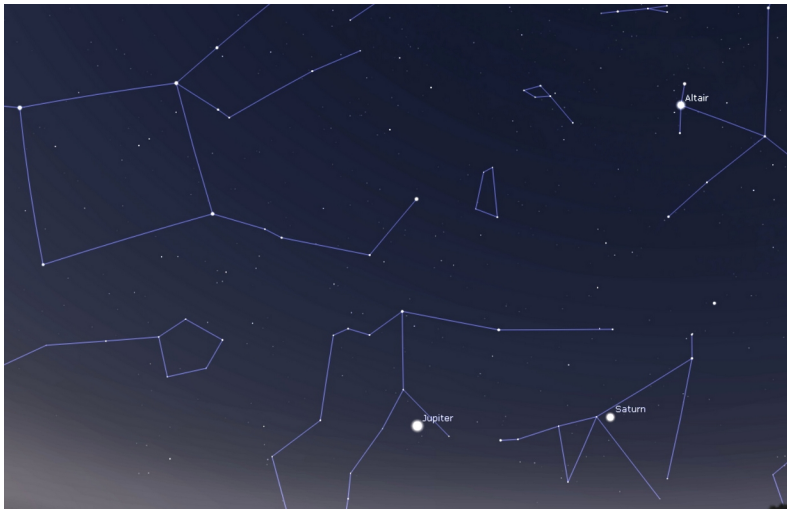
### THE PLANETS

**Mercury** passes through inferior conjunction on June 11<sup>th</sup>, and is practically unobservable this month.

**Venus** is an evening object, settling about an hour and a half after the Sun, but very low down in our sky (more than 20 degrees south of the celestial equator) and therefore difficult to spot in spite of its brightness (magnitude -3.9).

**Mars** is now on the long declining "tail" of the present apparition, with its angular diameter diminishing to 3.9 arcseconds by the end of June, by which time it will be setting well before midnight.

In mid-June **Jupiter**, in the constellation of Aquarius, will be rising at 1 am. Shining at magnitude -2.5, it will be by far the brightest "star" in that part of the sky. It is now less than 12 degrees south of the celestial equator and will be a prominent object in the pre-dawn sky.



**Looking  
southeast  
at  
2:30am  
on  
June 23<sup>rd</sup>**

**Saturn**, in Capricornus, remains more than 17 degrees south of the celestial equator throughout June. It will be rising at midnight in mid-month and shining at magnitude +0.5.

By the end of June **Uranus**, in the constellation of Aries, will be rising at 2 am. It is now 15 degrees north of the celestial equator.

**Neptune**, a magnitude +7.9 object in the constellation of Aquarius, will be rising at 1 am in mid-June.

## **METEORS**

With its lack of true darkness, June is not the best time of the year for observing meteors, and there are no major showers during the month.

## **NOCTILUCENT CLOUDS**

Noctilucent clouds are pale blue filamentary clouds, formed about 50 miles above the Earth's surface, far above the normal clouds we associate with the weather. They are best observed in June and July, becoming visible when illuminated by the Sun when it is well below the horizon. They are still poorly understood, but their "electric blue" appearance is quite distinctive. If you wish to see (and possibly photograph) noctilucent clouds, look toward the north or northwest on a clear evening after 10pm. In 2020 we enjoyed some very memorable displays of these clouds as shown, for example, in this image from John Hurst:



## DIARY DATES 2021

### Monthly Meetings of the Nottingham Astronomical Society

**There will be no meetings at  
Gotham or Plumtree until further notice**

*We nevertheless continue to display our pre-arranged programme of speakers  
in the hope that it may be possible to livestream these talks.*

***Members of the Society will receive further updates  
each month from the Chairman***

Date	Topic	Speaker
June 3 <sup>rd</sup>	Harbingers of Doom? Comets	Prof Ian Morison Emeritus Gresham Professor of Astronomy
July 1 <sup>st</sup>	The JUICE Mission <i>Exploring Jupiter's icy moons</i>	Dr Chris Arridge Lancaster University
August 7 <sup>th</sup> <i>(Saturday)</i>	Annual Barbecue at the Observatory <i>(Members and their guests only)</i>	
September 2 <sup>nd</sup>	The Vikings at Barsoom Part 2: The Search for Life	Paul Money FRAS, FIBS
October 7 <sup>th</sup>	Fiat Lux 3 <i>The Large Synoptic Survey Telescope</i>	Dr Steve Barrett University of Liverpool
November 4 <sup>th</sup>	Annual General Meeting with a Wine and Cheese Social	
December 2 <sup>nd</sup>	<b>The NAS Christmas Lecture</b> <i>to be confirmed</i>	

## Social and Practical Astronomy, Plumtree, June 2021

Our May 2021 online Plumtree meeting saw Mike Provost and Richard Severn give us a demonstration and talk about Mike's Unistellar [eVscope](#). Mike has written about his eVscope in past editions of the Journal.

The beauty of the eVscope is its simplicity of use. Within a few minutes and with minimal technical know-how, the eVscope can be imaging deep sky objects and sending images of them directly to a smart phone or tablet over its own Wi-Fi network.

This is one of the first such telescopes, but we are sure it won't be the last and technology will continue to advance and bigger and more capable versions will be coming out. I am very excited to see how this field develops in the next 5-10 years.

If you missed the talk or want to watch it again, it, along with all our past Plumtrees since April 2020 are on our YouTube channel:

<https://www.youtube.com/channel/UC5L-iPfcFqFHO8KLOO9-AA>

The **June** Plumtree meeting is going to be devoted to the Milky Way. See you then.

**James Dawson**

[helpdesk@nottinghamastro.org.uk](mailto:helpdesk@nottinghamastro.org.uk)

---

### **Observation of the transit of exoplanet TOI 1811.01 (orbiting around star TYC 1992-307-1 in Coma Berenices) using my eVscope: 14<sup>th</sup>-15<sup>th</sup> April 2021**

The Transiting Exoplanet Survey Satellite (TESS) is a space telescope designed to search for exoplanets using the transit method in an area 400 times larger than that covered by the Kepler mission: full details are published by Wikipedia ([https://en.wikipedia.org/wiki/Transiting\\_Exoplanet\\_Survey\\_Satellite](https://en.wikipedia.org/wiki/Transiting_Exoplanet_Survey_Satellite)), the mission leaders MIT (<https://tess.mit.edu>) and NASA (<https://exoplanets.nasa.gov/tess> and <https://www.nasa.gov/tess-transiting-exoplanet-survey-satellite>). TESS was launched by a SpaceX Falcon 9 rocket on April 18, 2018 and placed into a highly elliptical 13.7-day orbit around the Earth. Over the course of its two-year primary mission, TESS was expected to ultimately detect about 1,250 transiting exoplanets orbiting the targeted stars and an additional 13,000 transiting planets orbiting additional stars in the fields that TESS observed. As of 5 April 2021, TESS has identified 2,601 candidate exoplanets, of which 122 have been confirmed so far: the others are classified as TOIs (TESS Objects of Interest).

One of these TOIs (TOI 1811.01, in orbit around star TYC 1992-307-1 in Coma Berenices) was the subject of a Unistellar exoplanet transit observation campaign (see <https://unistellaroptycs.com/citizen-science/exoplanets>) which a very clear sky on 14<sup>th</sup>-15<sup>th</sup> April this year enabled me to participate in with my eVscope: details are given below:



**Exoplanet Transit – TOI 1811.01: 14<sup>th</sup> April 2021, 20:44 UTC/GMT to 15<sup>th</sup> April 2021 00:21 UTC/GMT**

**Location: Bramcote, Nottingham, England. Sky clear throughout. eVscope owner: Michael J Provost.**

iPad time same as Atomic Time  $\pm 0.143$ s at start,  $0.2\text{s} \pm 0.146$ s behind Atomic Time at end (<https://time.is>).

Dark frames taken at 21:36 BST on 14<sup>th</sup> April 2021 & 01:23 BST on 15<sup>th</sup> April 2021 (BST is +1 hour relative to UTC/GMT).

Some drift of target star inside the field of view noticed during each 30 minute data gathering period, as well as between periods.

Pictures below are screenshots from <http://www.avastronomyclub.org/skymap/d/skymap.php>



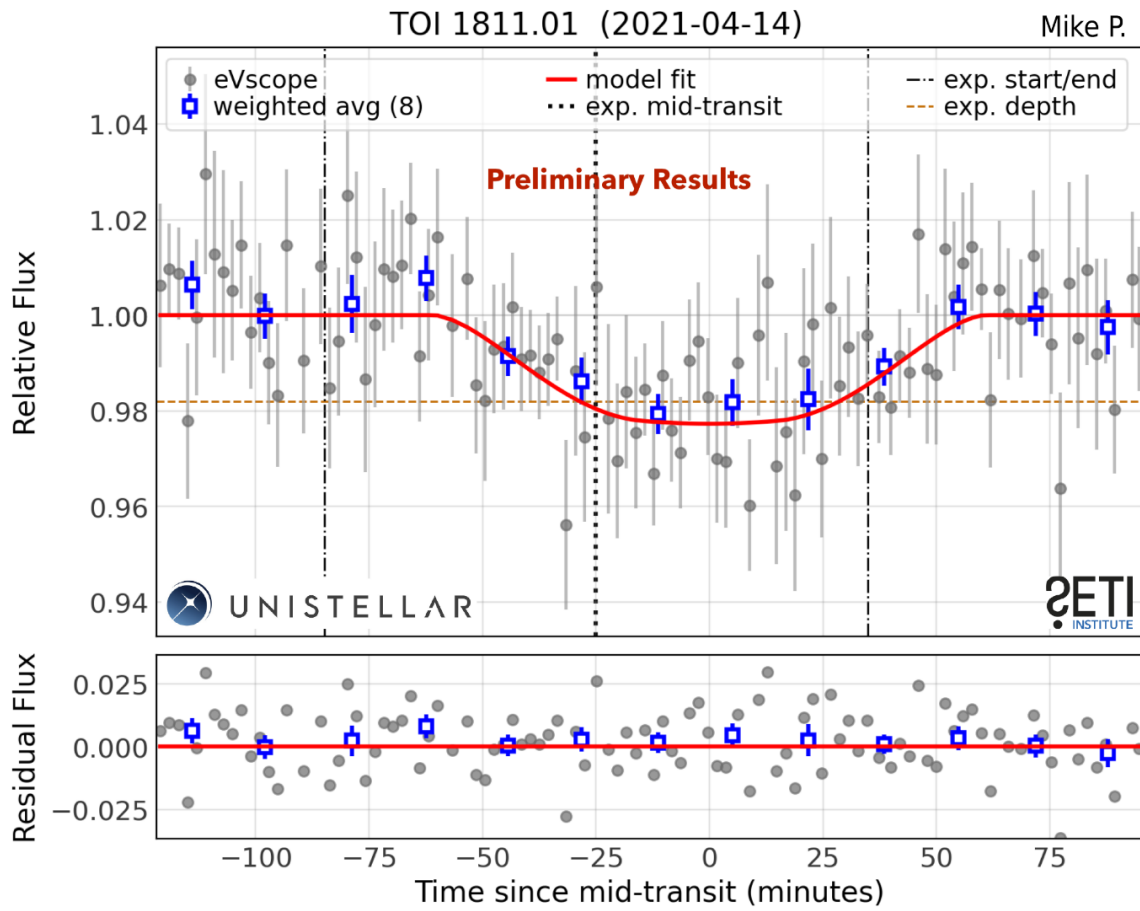
Details of exoplanet transit: TOI 1811.01 orbiting around TYC 1992-307-1 in Coma Berenices, 14<sup>th</sup>-15<sup>th</sup> April 2021

The top panel in the first figure on the next page shows the light curve extracted from my images produced by Tom Esposito, an astronomer at both the University of California in Berkeley and the SETI Institute who analyses Unistellar eVscope data

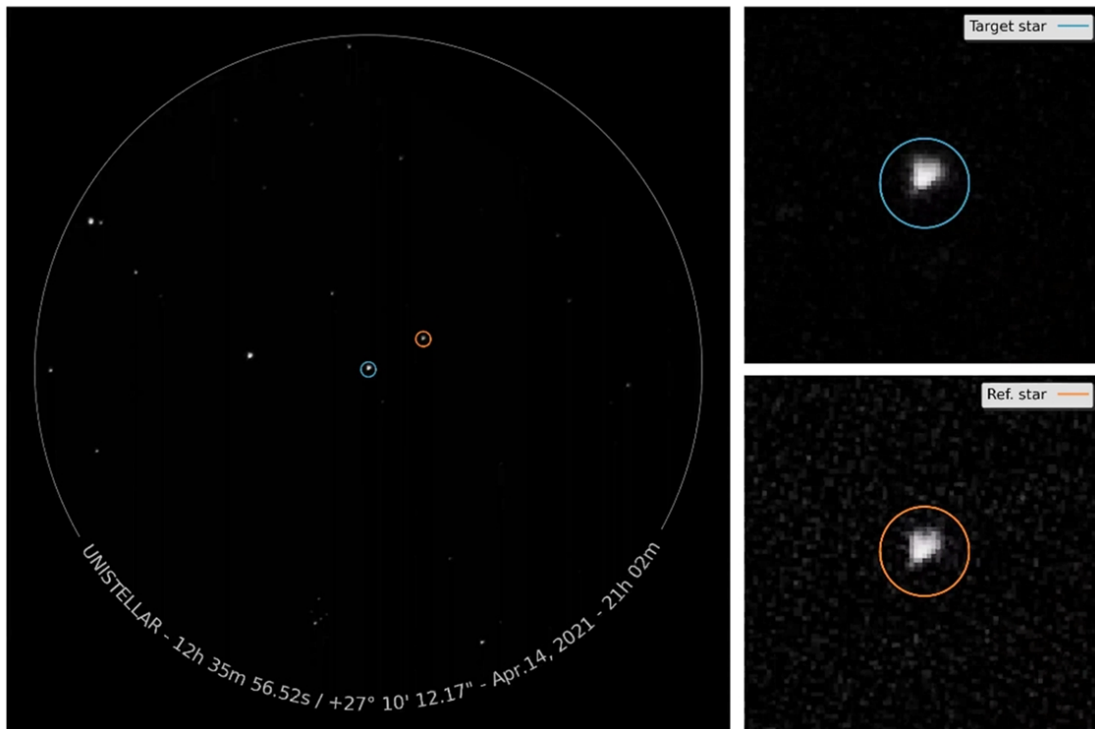
(<http://w.astro.berkeley.edu/~tesposito>, <https://www.seti.org/our-scientists/thomas-esposito>).

The Y axis is the "relative flux ratio" (the light flux of the planet-hosting target star divided by the light flux of a nearby reference star: see the figure at the bottom of the next page): note that the flux ratio outside of the transit has been normalized so that it averages to 1.0. The X axis is the time relative to the measured middle of the transit (minutes) at X=0. The grey points are flux ratio measurements from my images that are each an average of 30 individual frames from my eVscope: error bars on the flux ratios show the 68% confidence range (or 1 sigma error) of each measurement. The blue squares are weighted averages of 8 grey points each, shown for easier visualization. The red line is the best-fit model of a transiting exoplanet light curve to my data, using a least-squares minimization method: the dashed lines mark the predicted depth of the transit (horizontal orange) and the predicted start/middle/end times (vertical black).

The bottom panel shows the "data minus model" residuals from the top panel, where the model flux ratio has been subtracted from the measured flux ratio at each grey and blue point: values near zero show good agreement between my data and the model.



Light curve from transit of TOI 1811.01, 14<sup>th</sup>-15<sup>th</sup> April 2021: image courtesy of Tom Esposito, Unistellar/SETI Institute





(Previous page): Target and reference stars for transit of TOI 1811.01, 14<sup>th</sup>-15<sup>th</sup> April 2021: image courtesy of Tom Esposito, Unistellar/SETI Institute

Tom's analysis shows that the mid-transit time compared to predictions is 24.9857 minutes  $\pm$  2.8254 minutes: this is later than predicted. It also shows that the transit depth is 2.402%  $\pm$  0.473%: somewhat deeper than the 1.8% expected but, given the differences in observation wavelengths and the uncertainty of  $\pm$  0.473%, this is statistically consistent with the prediction. Regarding the apparently late occurrence of the transit, there are some inconsistencies in the predicted times of mid-transit. Different times are predicted by different online databases: based on one, my data is 25 minutes late with a high degree of statistical significance while based on another, my data is about 15 minutes late, still with a high degree of statistical significance. The timing result from my data is therefore considered "preliminary", until more understanding is gained about why the predictions are different. If all the times are correct and my data did measure a late transit, it would be an important scientific contribution: either another planet in the system is slowing the orbit of TOI 1811.01 down or the previous transit measurements were somehow wrong. Other eVscope observers did measure a similarly late transit in March, so my data has provided another piece of evidence (though it could still be due to the same prediction time issue).

Incidentally, the light from this transit set off 417 years ago (the parent star is 128 parsecs away, according to Tom), just after Queen Elizabeth I died and around about the time that Guy Fawkes and his co-conspirators were starting to think about blowing up the Houses of Parliament! My great-great-great-great-great-great-great-great-great-grandfather Jérôme Prévost (a son of French Huguenots Jean Prevost and Simone Leman) was born two years after this transit happened. Exoplanet transits were completely beyond human comprehension at that time: even thinking about the possibility of planets orbiting stars at that point in European history could get you burned at the stake as a heretic. During the time that the light travelled from TYC 1992-307-1 in Coma Berenices to my back garden in Bramcote, Nottingham, all the elements making up my eVscope were invented or discovered: none of them were known about then or probably even imagined to be possible:

- Galileo invented the refracting telescope and discovered the moons orbiting Jupiter that bear his name, in the process laying the foundations for our understanding of orbital motion;
- Newton invented the reflecting telescope and used Brahe's and Kepler's work to derive his Law of Universal Gravitation;
- Volta invented the battery;
- Faraday discovered electricity and invented the electric motor;
- Kirchhoff and Ohm derived their laws of electricity flow;
- Hertz discovered radio waves, following work done by Maxwell;
- aluminium was discovered and plastics were invented;

- the researchers at Bell Labs invented the transistor (forerunner of the silicon chip) and the CCD;
- many people designed and developed computing hardware and software;
- Berners-Lee at CERN invented the Internet;
- etc, etc.

Even the rubber making up the tripod feet wasn't known about by Europeans when the transit that I observed occurred! The clever people at Unistellar then brought all of these elements together into an affordable package, in time for me to detect this event over a period of less than four hours. As Newton said, we all stand on the shoulders of giants.

This interesting and very challenging exercise also shows that the Unistellar eVscope (<https://unistellaroptycs.com>, <https://nottinghamastro.org.uk/review-of-the-evscope>) is much more than an instrument for obtaining images of deep sky objects: it is a serious scientific tool.

Thanks.

**Mike Provost:** Treasurer, Nottingham Astronomical Society.  
[treasurer@nottinghamastro.org.uk](mailto:treasurer@nottinghamastro.org.uk)

## Advertisements

### Telescope for Sale

#### Celestron Astromaster 130EQ-MD - Model #31051

Purchased in 2012

It has remained indoors for 9 years and has barely been used

**£75**

If interested and happy to collect, please contact

Mrs Adele Pattie, Newton, Nottingham, NG13 8HJ  
– Tel: 01949 21310



### For Sale

#### Celestron NexStar 8SE telescope

Complete with tripod, two finder scopes, dew shield and solar filter.

**£650 ono**

Contact Roger Blackburn in Bottesford

07960911804

# Nottingham Astronomical Society

Affiliated to the **British Astronomical Association**  
Member of the **Federation of Astronomical Societies**  
Supporters of the **Commission for Dark Skies**

---

## **CHAIRMAN:**

**Julian Onions**

email: [chairman@nottinghamastro.org.uk](mailto:chairman@nottinghamastro.org.uk)

## **VICE CHAIRMAN:**

**Richard Severn**

email: [vicechairman@nottinghamastro.org.uk](mailto:vicechairman@nottinghamastro.org.uk)

## **SECRETARY:**

**Chris Sneddon**

email: [secretary@nottinghamastro.org.uk](mailto:secretary@nottinghamastro.org.uk)

## **TREASURER:**

**Mike Provost**

email: [treasurer@nottinghamastro.org.uk](mailto:treasurer@nottinghamastro.org.uk)

## **JOURNAL EDITOR:**

**Roy Gretton**

email: [journal@nottinghamastro.org.uk](mailto:journal@nottinghamastro.org.uk)

## **MEMBERSHIP SECRETARY**

**Richard Severn**

email: [membership@nottinghamastro.org.uk](mailto:membership@nottinghamastro.org.uk)

## **CURATOR OF INSTRUMENTS:**

**Rob Bush**

email: [curator@nottinghamastro.org.uk](mailto:curator@nottinghamastro.org.uk)

## **WEBMASTER:**

**Leigh Blake**

email: [leigh@nottinghamastro.org.uk](mailto:leigh@nottinghamastro.org.uk)

## **DIRECTOR OF OBSERVING:**

**James Dawson**

email: [observatory@nottinghamastro.org.uk](mailto:observatory@nottinghamastro.org.uk)

## **ORDINARY COMMITTEE MEMBER:**

**Andrew Green**

---

## **Meetings**

**Under normal circumstances** our formal meetings, often with an illustrated talk by a guest speaker, are held on the first Thursday of each month (except in August) at:

**Gotham Memorial Hall**

**Gotham**

**Nottingham NG11 0HE**

Doors open 7.00pm

**Meetings start 8.00pm**

Meetings end 10.00pm

These meetings are open to the public, and visitors are welcome to attend.

## **Annual subscriptions 2021**

Full	£30
Joint rate for partners living at the same address	£45
Under-18s and full-time students	£5

Subscriptions become due on 1<sup>st</sup> January. Half-price subscription is charged if joining after 30<sup>th</sup> June (minimum subscription £5).

Please make cheques payable to:  
*Nottingham Astronomical Society.*

---

If you would like more information about the **Nottingham Astronomical Society**, or would like to become a member, please contact the Secretary [secretary@nottinghamastro.org.uk](mailto:secretary@nottinghamastro.org.uk) or speak to any NAS committee member at one of the regular monthly meetings. A membership application form is inside this issue of the Journal.

---

## **The Nottingham Astronomical Society**

The Nottingham Astronomical Society, and/or the Editor accept no responsibility for any errors that may occur within this publication. Any views expressed in the **NAS Journal** are those of the individual authors and not necessarily endorsed by the Nottingham Astronomical Society, its Committee or Members.