

Keele Observatory Annual Report



2025

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From the Director

The partial eclipse on the 29th of March was blessed with sunny weather and a lively crowd - a great repeat of the one a decade before, and much to look forward to at next year's deep eclipse in August.

After we broke the 4000 barrier for the number of visitors for the first time last year, we broke the record again setting it at over 4400. This will be hard to beat, since we are working at capacity - with just one Keele astronomer contributing.

We made great progress getting the 17" Hindle telescope back into operation, by acquiring Stephen Doody's mount that turned out to be a perfect match. We've already got the next project on our minds: returning one of the 12' radio dishes that currently rest at Newchapel Observatory.

Jacco van Loon

Administrative report

Personnel

The Keele Observatory is operated and maintained through a partnership of the School of Chemical and Physical Sciences and a group of volunteers and students.

In 2025 the team composition was: James Albinson, Alan Bagnall, Dave Caisley, Ian Johnson, Paul Klimczak, Richard and son Patrick Oppenheimer, Ray Rutter and John Webb, almost all of whom have now migrated to university status of Volunteer with guest IT accounts and Keele cards. Matthew Stretch remains an Observatory associate, Honorary Member Steve Doody assists from a distance, and Nick "radio" Haselgrave rejoined the team.

Keele students Dan Pearson, Layal Muhammad and Muskaan Mandil regularly helped in the first half, and new students Jakub Zeławski, Emy King, Simon Bishop and Lilly Edwards-Warner did so in the second half, while Jay Boulton helped out throughout and Hasib Mehmood, George Abraham and Tanishq Shastrakar did so

from time to time, joined by Kathan Noble, Matthew Harris, Amelia Myronovych and Aimee Awingan. Young computer engineer Bella (Grainne) Ross joined briefly.

We collaborate with Newchapel Observatory, who adopted 'The Beast' - a 10" Newtonian telescope bequeathed to us by the British Astronomical Association, and are hoping that the North Staffordshire Astronomical Society may be revived also.

Equality, Diversity and Inclusion

Diversity and inclusion are our core values, which we enact through our noticeboard and how we interact with visitors and the media and work as a team.

We organised a sixth edition of the United Nations International Women and Girls in Science Day, in the "Keele in Town" venue down in Newcastle-under-Lyme.

We hosted visits of underprivileged pupils for the local Higher Horizons team and pupils with challenging special needs from the Castle Hill school, but North Road Academy Islamic school had to cancel their visit due to lack of parental consent. On a more positive note, Lisa Blower happily continued our partnership in her creative writing workshops and we also hosted a performance by an Indian singer.

We always try to accommodate visitors with impairments, but this can be tricky. One of our new acquisitions is a table-top 127mm Maksutov-Cassegrain telescope kindly donated by J Jenkins, and perfect for wheelchair users who cannot reach a conventional telescope eyepiece.



Figure 1 Rainbow over the Hindle enclosure.

Sustainability

We deeply care about nature and try to ensure that our activities can endure with minimal impact on the environment. The control of the heaters remains problematic, and we had a toilet that kept running and light bulbs failing regularly. But Estates responded positively to our suggestion to replace faulty light bulbs with LEDs.

For the fourth time we ran a Dark Skies event for Scouts, this time twice and at the Wolseley Centre of the Staffordshire Wildlife Trust. Most people know that cats see better in the dark than humans do. Their pupils can open twice as wide and they have a reflective layer behind the retina and more light sensitive rods. They can see about two magnitudes fainter, so Oscar the campus cat (featured on the front cover) may have seen planet Neptune!



Figure 2 The 10" Newtonian Dobson telescope in action at the Wolseley Centre for a Dark Skies event.

Finances

Observatory's income enters the accounts of the university, is allocated a cost code, and is reset at the end of a financial year.

The income from visits by schools was modest this year, but from community

groups substantial. Along with a few other events and a small amount of donations we ended up with as much as ever before. The only money spent was on the purchase of Stephen Doody's mount for the Hindle project - the Finance department dropped the ball on the attempted purchase of solar eclipse glasses and IT replaced the PC for the 24" control for free.

We received more books and other items from Margaret Maddison, Apollo and other space memorabilia from Ray Dale, the aforementioned Maksutov-Cassegrain, a 130mm Newtonian from Greg Wilson and an 8" Newtonian from Sharon Burton. We also moved a light table and photographic films from the Lennard-Jones Laboratories.

Table 1 Financial account for 2025.

<i>1. Balance brought forward</i>	£9300
Income	
School activities	£363
Community group events	£846
Other	£450
Donations	£99
<i>2. Total income</i>	£1758
Expenditure	
17" Hindle resurrection	£500
<i>3. Total expenditure</i>	£500
<i>Surplus (items 1 + 2 - 3)</i>	£10,560

Table 2 Budget for 2026.

<i>1. Balance brought forward</i>	£10,560
Income	
Hospitality	£1000
Donations	£100
<i>2. Total income</i>	£1100
Expenditure	
17" Hindle resurrection	£1000
General maintenance	£100
<i>3. Total expenditure</i>	£600
<i>Surplus (items 1 + 2 - 3)</i>	£10,560

The budget for 2026 is set to break even, with expected income at the lower end of what we've become accustomed to. It includes again a generous allocation to resurrect the 17" Hindle telescope mainly because the drive and control mechanism need to be resourced and we expect some further costs before it is fully ready.

Infrastructure and equipment

Various housekeeping and repairs were carried out, such as checking the phone lines (the domes can be reached from outside, but the lecture room only from within Keele) and refurbishing the tripod legs of the Coronado solar telescope - which got company from James Albinson in the form of a small neutral-density scope. The 10" Schmidt-Cassegrain focus and motor control mechanisms were repaired.

Engineering work on the Thornton

While the 24" telescope itself seems fine, the upstairs handset was held responsible for runaways - at least we now know the cause and how to remedy it. We obtained focus on the Moon through the [SII] filter and enjoyed decent pointing. But then the QSI camera gave in, this time for good. It has been replaced with James Albinson's similar SBIG 8300M. The control PC also died and is now replaced with one that has a shared role account (something that had seemed to have become an impossibility) but no permanent admin rights. Finally, the power tripped when the dome was rotated, repeatedly. The motors are thought to be to blame (spoiler alert: this was later confirmed by the university electrician and the motors sent out for repair - again).

This all may seem quite gloomy, but the truth is that the issues have been, or are being, resolved and we do not doubt getting the 24" back into full operation.

Maintenance of the Grubb and its dome

The new 12" refractor's dome control is working very well. Even though the dome

rail shoe came off, it was refurbished and we no longer have dead points on the rail.



Figure 3 Paul Klimczak working on the dome rail (with mains power switched off) while others look on.

The lights kept failing sooner than expected but they are now being replaced by LEDs at our request.

Likewise, the new paint had started flaking off the wall after mere months. It was redone but with the same effect. Clearly, as we had pointed out even at the first attempt, the right paint was not applied to cope with the damp conditions and visitors resting against it.

The focus mechanism was tightened but the finder scope still loses alignment. It is probably time for a thorough check and renovation were needed. The same is true for the dome, from which a bit of the shutter broke off (without consequences).

The Hindle Telescope Project

With the enclosure prepared and the telescope truss ready, it was time to fetch Steve Doody's mount from son Ed Doody's garage. This was accomplished in parts, with the heavy fork needing a trailer and extra hands.



Figure 4 Doody's mount's fork, lifted and laid to rest.

Some welding was needed. As the keen eye may have spotted (on Figure 4), the wooden door of the enclosure had expanded and wouldn't close, so it was replaced. Other than that, good progress!



Figure 5 Inside the Hindle enclosure: the telescope truss on the left and base of the mount in the centre. The pillar of the 10" Meade is still in place at the back.

The Radio Telescope Project

The next project is already in swing. The renovation of Newchapel Observatory prompted the planning of the return of one of the two radio dishes that Ron Maddison installed on (Keele) Observatory Hill. With an aperture of 12' this can be both useful and logistically accommodated.

Having a radio telescope on site has been an ambition (see Annual Report 2014 - KOP6), but previous funding applications were unsuccessful. This would be another example where we can fall back on our legacy and get something that is both fit for purpose and embodies the history of science and in-house engineering prowess.

This project does not come without challenges. Besides transporting the dish from Mow Cop to Keele, it will need a solid foundation, a mount and a fence to protect it against vandalism. Originally, Bofors gun mounts of World War II fame were used, one of which is still in situ on Observatory Hill, but by now it finds itself inside a wood as well as being heavily corroded.



Figure 6 Bofors gun mount that used to carry a radio dish, now surrounded by trees near the Observatory.

Research activities



Figure 7 Comet Lemmon on 31 October with a Nikon DSLR and 300mm lens (Jacco van Loon).

Yet another comet came within easy reach of binoculars: C/2025 A6 (comet Lemmon). Photographing it was again both easy, with current sensitive detector technology, and frustrating, with the increasing number of satellites etching trails in many an attempt. Figure 8 captures a multitude of celestial but mostly atmospheric phenomena - what with the burning up of a SpaceX Falcon 9 rocket's upper stage!



Figure 8 Comet Lemmon on 29 October, outshone by a Falcon 9 upper stage, a cloud and an aircraft trail - three faint satellite trails are visible near the top-left.

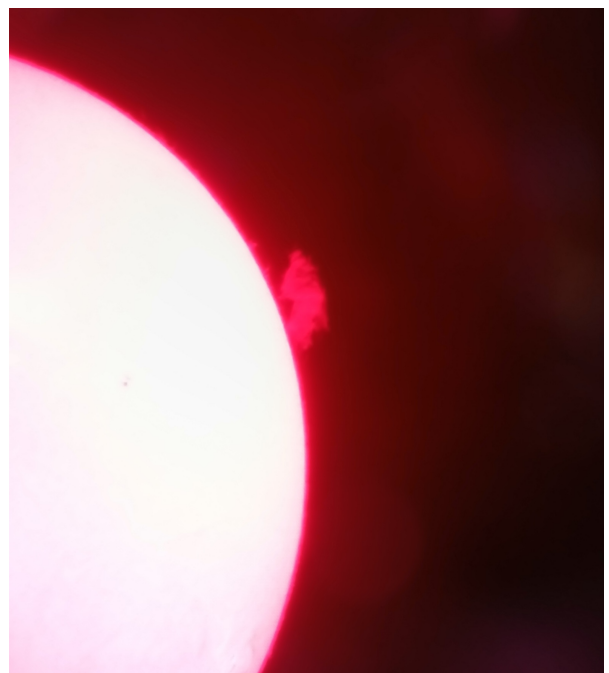


Figure 9 The Sun photographed with a smart phone (Paul Klimczak).

Undergraduate laboratory work

The Observatory lab for first-year students is rearranged. There are now four weekly evenings at the end of the first semester, and four (instead of six) weekly evenings at the start of the second semester (followed by three day-time sessions, as before). Despite this, the weather was so atrocious this Autumn that none of the late-2025 sessions could get anything on sky. The pictures shared here were all taken in the previous season, earlier in 2025.

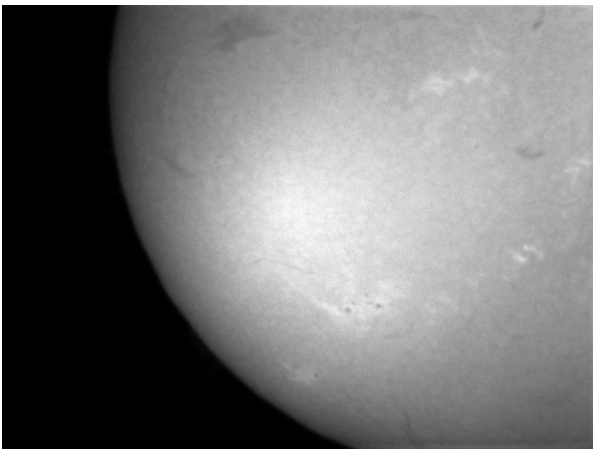


Figure 10 Moon with ATIK-11002 and 12" refractor on 3 February (top); Sun with ATIK-314E and Lunt 6" solar telescope on 27 March (centre and bottom).

Publications

In 2025 we didn't publish anything, but we will continue to produce annual reports, as well as having plans for publications about some of the Observatory's possessions and, eventually, scientific research.

Outreach activities

With 4438 people we interacted with, we smashed last year's record.

For the sixth time we organised Women and Girls in Science Day, on the official day of 11th of February but also on the Saturday before (the 8th), this time in the venue that Keele University bought in the centre of town, called "Keele in Town". It wasn't ready, but that meant we had the space for ourselves - we were the inaugural event! It's still proving difficult to attract casual passersby; the total of 130 visitors was similar to previous editions.



Figure 11 Women and Girls in Science Day in Keele in Town; PhD student Francesca Dresbach in yellow.

The fourth edition of the Dark Skies scouting event moved from Cannock Chase to Wolseley, twice two weeks apart. The



Figure 12 The partial solar eclipse on 29 March; top row pictures by Nathan Stirk, bottom right by Krysia Diedzic.

first batch of cubs were unlucky with the weather but the second, larger cub group saw Venus, Jupiter and Mars.

The big event of the year was the partial solar eclipse. Not quite reaching 40% it was much less deep than the 90% eclipse from 2015, but it attracted the same number of visitors (350), plenty of media interest, and the weather was again kind.

We returned to The Glebe pub in Stoke city, where we met about 80 people, and hosted Contemporary Music for All featuring a traditional Indian singer.

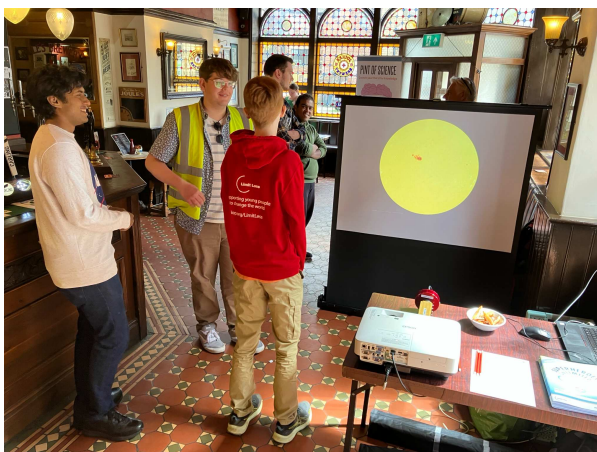


Figure 13 At The Glebe pub, with (from left to right) Tanishq Shastrakar, Kathan Noble, George Abraham, Matthew Harris and Danil Raj.

Additional events included Space Week organised by the SPARK student society (the successor of Astrofiz), Keele Day, a conference, and three sessions on creative writing with Lisa Blower.

Media activities

The Observatory enjoyed quite a bit more prominent media attention. Vibe 1 radio for sure resulted in dozens of visitors and Stoke-on-Trent Live promotion followed shortly after. The solar eclipse was covered on the BBC website as well as Space.com thanks to Nathan Stirk from Getty Images. We also featured in a recording for the BBC World Service radio show "CrowdScience".

It wasn't the first time that students from Staffordshire University came to film for their projects. We've also welcomed Staffordshire University researchers into our Pint of Science shows, but there are no examples where we benefitted.

Public viewings

About 1612 people visited the Observatory this year on its free Tuesday evening and Saturday afternoon public viewings, which is an unusually high number.

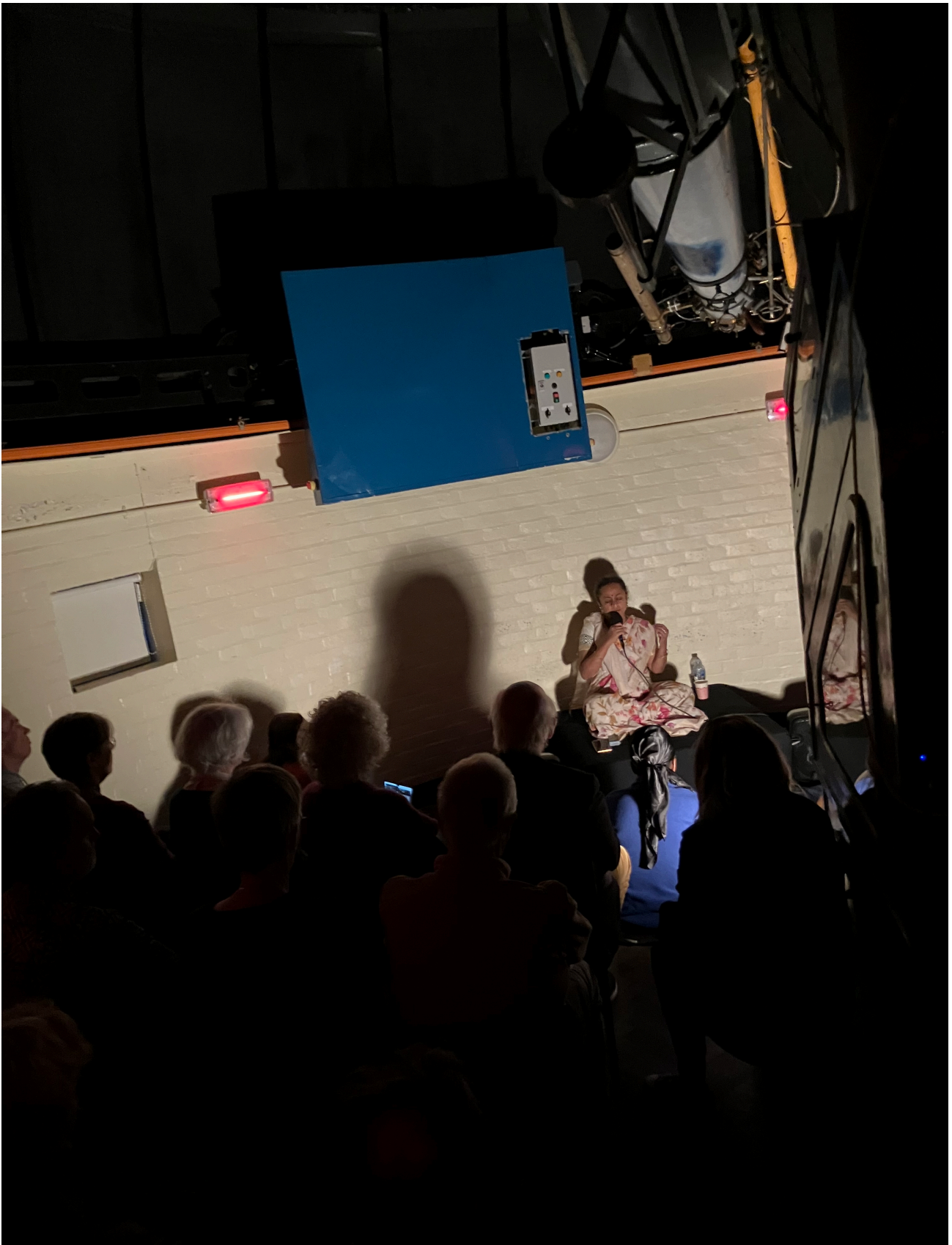


Figure 14 Contemporary Music for All came to the 12" dome, with a traditional Indian singer for a two-hour meditative experience. It's just another example where our fantastically unique place enables esoteric art.

This year, Mars joined the show, but we also found less common objects such as fiery red Mira variable R Leonis, near in the

M65, M66, M67 and M95, and the beautiful binary Tarazed - stumbled upon by chance while hunting for old-favourite ϵ Lyrae.

Perhaps even more special were the flypass of a Lancaster bomber aircraft and marriage proposal in the 12" dome - which was accepted!

Schools and teachers

We hosted 9 visits by schools, reaching some 281 learners and about 35 teachers, a little down from last year. A few potential visits didn't happen either because of cancellation and poor communication or communication lost in the ether (and the incident about parental consent, which we still don't understand the reason for). We offer them an alternative learning space and do not focus on recruitment as this must be a consequence of good experience.

Open days for prospective students, some teaching activities, Lisa Blower's creative writing workshops and a visit to Birches Head Academy, on the other hand, amounted to another 670 young learners.

Community group visits

We entertained 22 community groups – mainly scouts of all ages and genders but also, for instance, the North Staffordshire National Trust Association. This resulted in interactions with 503 children and 202 adults, up from last year but fairly typical.

These groups approach us because they've heard good things about us, but we cannot advertise it widely as we do not have capacity to expand our service.



Figure 15 Indian music fills the dome - we welcome all.

`The sky's the limit', they say but that's not true: imagination knows no bounds!

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Front cover: campus cat Oscar can see planet Neptune without a telescope (Jacco van Loon)