



Binary Stars in the Space Era

Astrophysics Conference

30th June to 4th July 2025

Keele University, Staffordshire, UK

Rationale

The study of binary stars is one of the oldest areas of astrophysics. Results from binary stars are fundamental to our understanding of how stars form and evolve, galactic stellar populations, chemical evolution, and the cosmological distance scale. Wide binaries allow us to probe the properties of normal stars, including direct measurements of their masses. Eclipsing binaries are the only stars whose masses and radii can be measured to high precision. Close binaries can be used to study the physics of mass transfer, mass loss, accretion discs and how stars evolve. Binary star evolution is critical to the formation of cataclysmic variables, novae, supernovae, X-ray binaries, millisecond pulsars, gamma-ray bursts and gravitational wave events. Planets are found in binary star systems in both S-type and P-type orbits.

We are now firmly in the space-photometry era, with observations of binary stars available from the WIRE, MOST, BRITE, CoRoT, *Kepler*, TESS and CHEOPS satellites. In the near future PLATO will offer another leap forward in the quality of photometric data, and binary stars will in turn provide crucial information for the interpretation of the many planetary systems it will find. What legacy of achievements can we attribute to the study of binary systems? What is the current state of this area of astrophysics? What problems are still to be solved? How can we further improve our understanding of normal stars? What new analyses are now possible with *Kepler*, TESS and CHEOPS data? What more will PLATO allow us to do? How should we prepare? The aim of this conference is to bring together observational and theoretical astrophysicists to critique the past, understand the present, and organise the future of binary star research.

Scientific topics

- Space photometry
- Modelling binary systems
- Spectroscopic binaries
- Astrometric binaries / Gaia
- Pulsations in binaries
- Benchmark binaries

- Binaries and planets
- Interacting binaries and mergers
- Binary formation
- Binary evolution
- Binary populations
- Comparison to theoretical models
- Looking forward to PLATO

Invited speakers

- Poojan Agrawal (UNC, US)
- Dominic Bowman (Newcastle, UK)
- Paul Clark (Cardiff, UK)
- Dariusz Graczyk (CAMK, Toruń, Poland)
- Kelly Hambleton Prša (Villanova, US)
- Cole Johnston (MPA, Germany)
- Krzysztof Hełminiak (NCAC, Toruń, Poland)
- Pierre Kervella (Paris, France)
- Nikki Miller (Uppsala, Sweden)
- Maxwell Moe (Wyoming, US)
- Andrej Prša (Villanova, US)
- John Southworth (Keele, UK)
- Elizabeth Stanway (Warwick, UK)
- Andrew Tkachenko (Leuven, Belgium)

Scientific Organising Committee

- John Southworth (Keele University, UK)
- Conny Aerts (KU Leuven, Belgium)
- Jan Eldridge (University of Auckland, NZ)
- Kareem El-Badry (California Institute of Technology, US)
- Pierre Maxted (Keele University, UK)
- Nikki Miller (University of Uppsala, Sweden)

Local Organising Committee

- Pierre Maxted (Keele University, UK)
- John Southworth (Keele University, UK)
- Barry Smalley (Keele University, UK)
- Ayush Moharana (Keele University, UK)
- Steve Overall (Keele University, UK)
- Lex Griffiths (Keele University, UK)

Location

The conference will be held at **Keele Hall** on the campus of Keele University, Staffordshire, UK. Information on how to get to the campus of Keele University can be found on the university [travel page](#) and on the Keele Conferences [travel page](#).

Accommodation will be on campus in en-suite rooms. Attendees can instead choose the on-campus [Courtyard Hotel by Marriott](#).

Dates

The conference will begin with a welcome reception on the evening of Monday 30th June 2025.

The conference dinner will be on Thursday 3rd July.

The conference will end after lunch on Friday 4th July 2025.

Registration

The conference will last from Monday evening to Friday lunchtime, to allow many attendees to fit the conference and travel within one working week. Accommodation and food will be provided within the cost of the registration fee.

Full package: £750. This includes conference registration, accommodation (four nights, Monday to Friday), opening reception buffet (Monday night), breakfast (Tuesday to Friday), lunch (Tuesday to Friday), dinner (Tuesday and Wednesday), the conference dinner (Thursday), and morning and afternoon refreshments.

Attendance package: £450. This is like the full package but without accommodation and breakfast.

We will set up a registration and payments page shortly. It will include the opportunity to submit an abstract for a contributed talk or poster.

The deadline for registration and payment is 31st March 2025.

The number of participants is limited to 90 due to the capacity of the Salvin Room. We ask you to register promptly to help us manage the numbers, and to avoid finding yourself on the waiting list.

Contact

Conference webpage: <https://www.astro.keele.ac.uk/jkt/keelebinaries2025/>

Head of the Scientific Organising Committee: John Southworth

Head of the Local Organising Committee: Pierre Maxted

Conference email address: spacebinary2025@gmail.com

Conference Slack channel: <https://binarystarswi-omr4237.slack.com/>



Keele Hall in the summer sunshine