

Citation for the 2019 RAS Chapman Medal: Dr Tom Stallard

The 2019 Chapman Medal in Geophysics is awarded to Dr Tom Stallard, for his contributions to understanding planetary upper atmospheres and their interactions with their magnetospheres.

Dr Stallard's work looks at infrared emission from the H_3^+ molecular ion, making use of ground-based observations and data from space missions. In the course of his investigations, he has carried out the most precise and painstaking observations of the giant planets, exploiting the instrumentation available in novel, creative and typically individual ways, to provide key scientific insights.

Dr Stallard's observations have led to the detection and characterisation of the wind systems in Jupiter and Saturn's auroral/polar regions and other signatures of magnetosphere-ionosphere coupling, ion vertical profiles, and temperature and density changes that signify major energetic processes and events.

His latest contribution – the discovery of the signature of Jupiter's magnetic equator – is typical of his insight, patience, and the way in which his work supports space missions. To find this, Dr Stallard systematically reanalysed nearly 14,000 infrared images of Jupiter, re-registering and superimposing them to find this very subtle signature. This work is key to the JUNO mission team characterising Jupiter's magnetic field, one of the mission's prime objectives. As part of the CASSINI VIMS team, he also used the H_3^+ spectrum to redefine the instrument's wavelength scale.

Dr Stallard is a prime example of the way in which ground-based measurements can augment, complement and extend space missions, ensuring that the maximum scientific return is obtained from these costly investments.

For these reasons, Dr Tom Stallard is awarded the Royal Astronomical Society's Chapman Medal.