

Citation for the 2019 RAS Price Medal: Professor Catherine Johnson

The winner of the 2019 Price Medal in Geophysics is Professor Catherine Johnson.

Professor Johnson has performed outstanding research into the magnetism and geodynamics of Earth, the Moon, Venus, Mars and Mercury. She is arguably best known for her pioneering investigations into the past and present planetary magnetic fields of Earth and Mercury, and it is for her work in the latter of these study areas that she is singled out for the Price Medal.

Professor Johnson's careful study of MESSENGER spacecraft data has provided for the first time identification of a clear fingerprint of a past dynamo in the core of Mercury. At some 3.8 billion years old, this dynamo is truly ancient and it may have produced a magnetic field that rivalled Earth's in strength. Professor Johnson's work now provides the foundation for understanding the thermal and dynamic evolution of Mercury, motivating a host of ongoing multidisciplinary studies.

To obtain such an insight into the magnetic field of Mercury required Professor Johnson to lead research that involved meticulous separation and subsequent description of the internal and external field components recorded by MESSENGER as it orbited the planet. During the final, low altitude orbits of the spacecraft, her team were able to infer that its magnetometer readings required a strong crustal magnetisation, implying that the rocks had captured the signal of a Mercurial planetary dynamo operating as the rocks first formed.

The impressive capacity of Professor Johnson to lead research making meaningful connections between satellite-scale observations and the nanometer-scale magneto-mineralogical properties of extra-terrestrial rocks was key to this major accomplishment.

For these reasons, Professor Catherine Johnson is awarded the 2019 Price Medal in Geophysics.