



Matthew Willson (1990-2022)

Stefan Kraus and colleagues remember a charismatic colleague whose career in observational astronomy ended far too soon.

AUTHORS

Prof. Stefan Kraus, University of Exeter, who supervised Matthew Willson's PhD work; Prof. Doug Gies (Georgia State University); Prof. Stuart Jefferies (Georgia State University); Dr Olivier Absil (University of Liège); and Prof. Stewart Boogert (Royal Holloway).

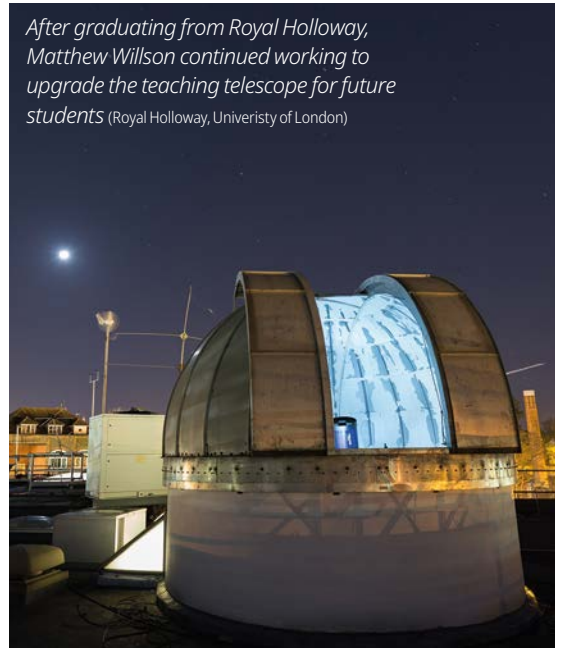
High angular resolution astronomy has suffered a great loss with the sudden death of Dr. Matthew Willson at age 31. Matthew was visiting his long-time girlfriend Katherine Shepard (a PhD student in astronomy at Georgia State University in Atlanta) when he was struck by a stray gunshot that entered the apartment where he was staying. He died in hospital a few days later on 18 January 2022. This tragic and premature end to the life of such a promising young scientist has devastated his many colleagues on both sides of the Atlantic.

Matthew Willson was born in London on 18 March 1990. He loved the stars from his earliest years, and, blessed with an amazing memory, he was on his way to a lifetime of learning. He began his formal life in astrophysics as a student (2008–12) at Royal Holloway, University of London, just down the road from his childhood home. There he worked with Stewart Boogert on the design, construction, and calibration of a spectrometer for use with the university's 30cm telescope. He led students on many cold evenings, teaching telescope use and wrestling equipment into operation for programmes of photometry and spectroscopy.

After graduating with an MSci degree, Matthew continued working with Boogert on upgrading the teaching telescope for future students. During this period, he became a fully integrated member of the department, making friends with PhD students and post-doctoral researchers alike. The accelerator physics and dark matter research groups took Matthew under their collective wing, and he maintained strong ties with the department long after his departure.

Matthew entered the PhD programme at the University of Exeter in 2013 and embarked on a high spatial resolution imaging program to search for evidence of planet formation within evolved protoplanetary discs (working with Stefan Kraus). He was a passionate observational astronomer and used a broad range of high-angular-resolution imaging techniques to detect asymmetric disk structures potentially caused by embedded exoplanets and to search for direct emission from young planets. His observational work included sparse aperture masking interferometry with the Keck/NIRC2 and VLT/NACO instruments, and spectral differential imaging observations with VLT/SPHERE-ZIMPOL. Matthew's PhD work using sparse aperture masking doubled the number of companion candidates detected around transitional disks with this method and examined how disk emission affects


After graduating from Royal Holloway, Matthew Willson continued working to upgrade the teaching telescope for future students (Royal Holloway, University of London)



companion detections. Earlier studies had pointed out that disk structures can mimic companions, but Matthew's systematic study derived diagnostics to help to distinguish between disk structure and companion detections. He graduated from Exeter in summer 2017.

Matthew then headed to Atlanta, USA, to join the Remote Sensing Group for Space Sciences at Georgia State University led by Stuart Jefferies. He continued his interests in achieving diffraction-limited imaging from ground-based optical telescopes. Matthew developed methods using wave front sensor data to reconstruct images by accounting for turbulence at multiple levels in the atmosphere, and showed how this can restore images over fields of view larger than a single isoplanatic patch.

His expertise in wavefront sensor analysis then took him to the PSILab group led by Olivier Absil of the STAR Institute at University of Liège (October 2019). Matthew took up the challenge of adapting a state-of-the-art wavefront sensing technique, known as PSI, to the context of the METIS instrument for the Extremely Large Telescope at the European Southern Observatory. He found that PSI could be used to reduce the harmful effects of instrumental aberrations and water vapour turbulence on the performance of exoplanet imaging with METIS, which is a key step towards the first direct detection of Earth-like exoplanets in the mid-infrared. He was preparing a publication to summarize his ideas at the time of his death.

Matthew made friends wherever he travelled in his journey in astronomy. His quick wit, infectious smile and gentle nature contributed to him being a much-loved member of his various research groups. He was a devoted fan of Liverpool Football Club and passionate in his enthusiasm for all things related to football and rugby. Matthew will be deeply missed by his family, friends, colleagues, and the students he inspired at Royal Holloway, Exeter, Georgia State University, and University of Liège. He will be remembered as a pioneer and explorer in the realm of imaging young planets. 

Deaths of Fellows

Chris Hall

Born 31 May 1953
Elected 8 November 1974
Died August 2021

Brian Mellors

Born 23 February 1932
Elected 8 October 2004
Died January 2022

David Saxon

Born 27 October 1945
Elected 8 October 2004
Died 23 January 2022

Fredric Taylor

Born 24 September 1944
Elected 10 July 1981
Died December 2021