

Curriculum Vitæ

Stephen Kane

Place and date of birth: Goulburn (Australia), 25th October, 1973.
Nationality: Australian

Contact Information

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Education

1996–2000: Ph.D. (Astrophysics) at the University of Tasmania, Australia.

Thesis topic: *“A Spectroscopic and Photometric Study of Gravitational Microlensing Events”*

Advisor: Dr. John Greenhill, Co-Advisor: Dr. Kailash Sahu.

1995: First Class Honours in Physics at Macquarie University, Australia.

Thesis topic: *“Radio Observations of a Galactic Extended Source”*

Advisor: Dr. Alan Vaughan.

1992–1994: Bachelor of Science majoring in Physics at Macquarie University, Australia.

Positions Held

2008–present: Staff Scientist at the NASA Exoplanet Science Institute, Caltech, USA.

2005–2007: Postdoctoral Associate at the University of Florida, USA.

2001–2005: Postdoctoral Research Fellow at the University of St Andrews, Scotland.

1996–1998: Research Assistant at the Space Telescope Science Institute, Baltimore, USA. Advisor: Dr. Kailash Sahu.

1994: Vacation work reducing spectroscopic data from the AAT using FIGARO.

Grants, Awards, and Scholarships

2007: AAS International Travel Grant, \$2,000

2007: Co-I, UCF/UF Space Research Initiative, \$245,000

2006: AAS International Travel Grant, \$1,000

2002–2007: Co-I, PPARC: Observational Astrophysics Rolling Grant, £805,000

1998–1999: Tasmania Research Scholarship. Awarded by the University of Tasmania.

1996–1998: Graduate Student Research Assistantship. Awarded by the Space Telescope Science Institute

Teaching Experience

- 2006–2007:** Lecturer of Second Year Astronomy course AST2037: *Life in the Universe*, University of Florida, USA (Teacher Evaluation 4.46/5.00)
- 2003–2005:** Lecturer of Third Year Astrophysics course AS3012: *Exoplanetary Science*, University of St Andrews, Scotland.
- 2001:** Teacher of Second Year Astronomy Tutorial Classes, University of St Andrews, Scotland.
- 2000:** Teacher of First Year Physics Tutorial Classes, University of Tasmania, Hobart, Australia.
- 1999–2000:** Physics Assignment Marker, University of Tasmania, Hobart, Australia.
- 1999:** Demonstrator in Physics Laboratory, University of Tasmania, Hobart, Australia.
- 1994–1995:** Demonstrator in Physics Laboratory, Macquarie University, Sydney, Australia.

Observing Experience

- Hobby-Eberly Telescope:** Queue scheduled radial velocity observations using the HET during NOAO semester 08A.
- Kitt Peak National Observatory:** Conducted radial velocity observations using the ET instrument mounted on the 2.1m and the 0.9m Coudé at KPNO, USA during 30th November–14th December, 2005.
- SuperWASP Multi-Camera Instrument:** Conducted optical wide-field observations using the SuperWASP multi-camera instrument at La Palma, Canary Islands during 8th–22nd August, 2004.
- South African Astronomical Observatory:** Conducted optical observations using the 1.0m at SAAO, South Africa during 27th August–2nd September, 2002; 5th–11th August, 2003; and 2nd–15th August, 2006.
- WASP0 Camera:** Conducted optical wide-field observations using the WASP0 camera at Kryoneri, Greece during 31st March–13th April, 2002.
- Cerro Tololo Inter-American Observatory:** Conducted optical observations using the 0.9m at CTIO, Chile during May, 1997; September, 1997; June, 1998; and October, 2008.
- Canopus Observatory:** Conducted optical observations using the 1.0m at CO, Australia during June–August, 1996; June–July, 1997; September, 1998; May, 2000; June, 2004; and November 2007.
- Australia Telescope National Facility:** Conducted radio observations using the Compact Array at ATNF, Australia during 18th–19th January, 1995.

Official Memberships

- 2009–present** International Astronomical Union (IAU)
- 1999–present** Astronomical Society of Australia (ASA)
- 1997–present** American Astronomical Society (AAS)
- 1994–present** Golden Key International Honour Society

Selected Skills

- Proficient with Unix/Linux and Microsoft Windows environments.
- Extensive expertise in astronomical data collection and reduction: photometric and spectroscopic.
- Proficient with data analysis using MIDAS and DoPHOT.
- Experienced with web design, graphics design, and HTML programming.
- Programming in Fortran, MIDAS, Tcl/Tk, C-shell, C, Java, IDL, and SuperMongo in a Unix/Linux environment.
- Extensive use of Monte-Carlo simulations for estimating expected results from various surveys.
- Developed software for a variety of applications including pipelined data reduction, modelling microlensing and radial velocity data, automated stellar classification, and transit detection algorithms.

Miscellaneous Activities

- Organiser of the Exoplanet Talk Series at the NASA Exoplanet Science Institute.
- Served on the NSF Proposal Review Panel for Exoplanets-A.
- Science development of the NASA Star and Exoplanet Database (NStED) and the Keck Observatory Archive (KOA) at the NASA Exoplanet Science Institute.
- Chairman of sessions during national and international exoplanet meetings.
- Supervision of graduate students at the University of Florida, USA.
- Organised exoplanet group meetings at the University of Florida, USA and lead science discussions.
- Interviewed by BBC television program “The Sky at Night” – episode entitled “Planet Quest” – broadcast on Monday, 4th October 2004.
- Referee on papers submitted to ApJ, MNRAS, A&A, PASP, and Ap&SS.
- Supervision of Summer Astronomy Students at the University of St Andrews, Scotland.
- Astronomy outreach activities to schools using the St Andrews University Mobile Planetarium.
- Public lectures on astronomy given at various venues.

Conferences and Workshops

- *Missions for Exoplanets: 2010-2020* Conference held in Pasadena (USA) 21st–23rd April, 2009.
- 213th Meeting of the American Astronomical Society held in Long Beach (USA) 5th–8th January, 2009.
- LCOGT Microlensing Workshop - *Fitting anomalous microlensing events - approaches and time constraints*, held Santa Barbara (USA) 10th–13th November, 2008.
- Cool Stars 15 - *Stellar Systems and the Sun*, held in St Andrews (Scotland) 21st–25th July, 2008.
- Exoplanet Forum 2008, held in Pasadena (USA) 29th–30th May, 2008.
- IAU Symposium 253 - *Transiting Planets*, held in Cambridge (USA) 19th–23rd May, 2008.
- *Exoplanet Science & Technology Fair*, held at JPL, Pasadena (USA) 22nd February, 2008.
- IAU Symposium 249 - *Exoplanets: Detection, Formation & Dynamics* held in Suzhou (China) 21st–26th October, 2007.
- *From Stars to Planets* Conference held in Gainesville (USA) 11th–14th April, 2007.
- 209th Meeting of the American Astronomical Society held in Seattle (USA) 5th–10th January, 2007.
- *Transiting Extrasolar Planets* Workshop held in Heidelberg (Germany) 25th–28th September, 2006.
- 207th Meeting of the American Astronomical Society held in Washington D.C. (USA) 8th–12th January, 2006.
- 2005 Winter Conference on Astrophysics - *Planet Formation and Detection* held in Aspen (USA) 6th–12th February, 2005.
- 8th International Conference of Bioastronomy - *Habitable Worlds* held in Reykjavik (Iceland) 12th–16th July, 2004.
- XIXth IAP Colloquium *Extra-solar Planets, Today and Tomorrow* held in Paris (France) 30th June–4th July, 2003.
- *Scientific Frontiers in Research on Extra-solar Planets* Conference held in Washington D.C. (USA) 18th–21st June, 2002.
- *Techniques for the Detection of Planets and Life Beyond the Solar System* Workshop held in Edinburgh (Scotland) 7th–8th November, 2001.
- 34th Meeting of the Astronomical Society of Australia held in Hobart (Australia) 3rd–7th July, 2000.
- 33rd Meeting of the Astronomical Society of Australia held in Sydney (Australia) 9th–13th July, 1999.
- 192nd Meeting of the American Astronomical Society held in San Diego (USA) 7th–11th June, 1998.
- *Planets Beyond the Solar System and the Next Generation of Space Missions* Workshop held in Baltimore (USA) 16th–18th October, 1996.
- *Astronomical Synthesis Imaging* Workshop held in Sydney (Australia) 26th–30th September, 1994.

Talks and Colloquia

- *Scanning the Parameter-Space of Exoplanets*, talk at Greater IPAC Science Symposium, Pasadena, USA on 22nd January, 2009.
- *The NASA Star and Exoplanet Database*, talk at LCOGT, Santa Barbara, USA on 13th November, 2008.
- *Constraining Orbital Parameters Through Planetary Transit Monitoring*, talk at Cerro Tololo Inter-American Observatory, La Serena, Chile on 15th October, 2008.
- *The NASA Star and Exoplanet Database*, talk at JPL, Pasadena, USA on 22nd February, 2008.
- *Transit Detection of Radial Velocity Planets*, colloquium at University of Tasmania, Hobart, Australia on 22nd November, 2007.
- *Observing Strategies for Extra-Solar Planet Detection*, talk at University of Florida, Gainesville, USA on 12th October, 2007.
- *Simulations for Multi-Object Spectrograph Planet Surveys*, colloquium at the Michelson Science Center, Pasadena, USA on 16th May, 2007.
- *Wanderers in the Celestial Sphere and Beyond*, public talk at the Museum of Natural History, Gainesville, USA on 12th April, 2007.
- *Simulations for Multi-Object Spectrograph Planet Surveys*, colloquium at University of North Dakota, Grand Forks, USA on 4th April, 2007.
- *Planets inside and outside of our Solar System*, public talk at the Museum of Natural History, Gainesville, USA on 9th November, 2006.
- *Simulations for Multi-Object Spectrograph Planet Surveys*, talk at University of Florida, Gainesville, USA on 16th October, 2006.
- *Detecting Transiting Exoplanets from Radial Velocity Surveys*, colloquium at South African Astronomical Observatory, Cape Town, South Africa on 17th August, 2006.
- *The Search for Other Worlds*, public talk at Alachua Astronomy Club, Gainesville, USA on 13th March, 2006.
- *10th Planet or Nth KBO?*, talk at University of Florida, Gainesville, USA on 16th September, 2005.
- *Cool Neptunes & Hot Jupiters: Planet Detection using Microlensing and Transits*, colloquium at University of Florida, Gainesville, USA on 7th September, 2005.
- *So Long and Thanks for all the Fish*, colloquium at University of St Andrews, St Andrews, Scotland on 17th May, 2005.
- *Planets outside our Solar System*, public talk at Newcastle Astronomical Society, Newcastle upon Tyne, England on 3rd March, 2005.
- *The Search for Other Worlds*, colloquium at University of St Andrews, St Andrews, Scotland on 2nd December, 2004.
- *The Hunt for Transiting Extra-solar Planets*, colloquium at University of Tasmania, Hobart, Australia on 17th June, 2004.
- *The WASP Experiment: Past, Present, and Future*, talk at University of St Andrews, St Andrews, Scotland on 2nd December, 2003.

- *The Search for Other Worlds*, public talk at ASTRA, Airdrie, Scotland on 12th September, 2003.
- *Transit Searches at the University of St Andrews*, colloquium at South African Astronomical Observatory, Cape Town, South Africa on 13th August, 2003.
- *Spectroscopy of Microlensed Sources*, talk at Space Telescope Science Institute, Baltimore, USA on 25th June, 2002.
- *Current Status of Planet Detection using Microlensing*, talk at University of St Andrews, St Andrews, Scotland on 17th July, 2001.
- *Spectroscopic Studies of Microlensed Sources Towards the Galactic Bulge*, talk at Astronomical Society of Australia meeting, Hobart, Australia on 5th July, 2000.
- *A Spectroscopic and Photometric Study of Gravitational Microlensing Events*, colloquium at University of Tasmania, Hobart, Australia on 22nd June, 2000.

Current Scientific Interests

Detection and Characterization of Extra-Solar Planets: This is my area of primary research. I currently use three different methods to search for exoplanets.

1. Microlensing - Gravitational microlensing is an exceptionally powerful tool for the detection of low-mass planets in the habitable zone of late to solar-mass stars. A number of planets have now been discovered using this technique including a sub-Neptune mass planet orbiting an M dwarf. I have been a core-member of the PLANET collaboration since 1996, whose primary goal is to use a network of telescopes to detect planetary anomalies in microlensing events.

2. Transits - Extra-solar planets may be detected by accurately measuring stellar brightness variations which result from the transit of a planet across the stellar disk. My work in this field includes both wide-field and narrow-field surveys for transiting planets as well as development of code for lightcurve modelling and transit detection algorithms. I am also a member of the SuperWASP consortium and have led the use of the WASP0 prototype instrument. Confirmed planets discovered using the SuperWASP instrument have been published, with many more transit candidates yet to be followed-up. I am PI on HET time to observe some of these candidates.

3. Radial Velocities - Observing the Doppler wobble of planet-bearing stars has by far been the most successful planet-hunting technique used thus far. My radial velocity code is able to perform fits to radial velocity data, calculate adaptive observing schedules, and produce transit ephemerides from the data. I currently collaborate with a radial velocity survey called MARVELS in which my data analysis led to the confirmation of the survey's first planet, HD 102195b. In addition, I am PI on a photometric survey of known planet-hosting stars in the southern hemisphere to search for transit signatures. This survey aims to constrain orbital parameters for these planets and quantify the transit probability of all planets compared with the observational biases of the two techniques.

Microlensing Anomalies: In addition to the detection of extra-solar planets, the study of anomalies in the light curves of gravitational microlensing events may be used as a tool for the study of stellar structure by, for example, obtaining multi-band photometry of the caustic-crossing of the stellar limb. I have also used the spectra of microlensing events obtained with the ESO 3.6m to conduct an investigation in Galactic extinction and kinematics which showed that microlensed sources are preferentially located on the far side of the Galactic bulge.

Automated Stellar Classification: Neural networks and databases of synthetic stellar spectra may be used to automatically classify large amounts of spectral data. I have applied code written by myself to perform this task for a number of datasets.

Variable Stars: The vast amount of photometric data obtained via the microlensing and transit surveys have yielded many new additions to variable star catalogues. I have a continuing interest in the distribution of variable stars, both in clusters and amongst field stars.

The Outer Solar System: I have a long-standing interest in the exploration of the outer solar system and the discovery and classification of Kuiper Belt Objects (KBOs). I have delivered a number of talks on this topic, particular on the definition of a planet and the implications to extra-solar planets.