



Paul Chote

Curriculum Vitae

Education

Victoria University of Wellington (VUW), New Zealand

- 2011 – 2014 **Doctor of Philosophy** in Physics
- 2009 – 2010 **Master of Science** in Physics with Distinction
- 2008 – 2009 **Bachelor of Science** in Physics with Honours (1st Class)
- 2005 – 2007 **Bachelor of Science** in Mathematics and Physics

Experience

2015–current **Department of Physics, Warwick University**

Coventry, United Kingdom

Postdoctoral Research Fellow

I have been involved in a variety of projects during my time at Warwick, including:

- **Phantom Echoes 2 (2021 – ongoing)**

Part of an international collaboration studying the launch of the Mission Extension Vehicle 2 and its docking with Intelsat 10-02 in Geostationary orbit.

- Developed and demonstrated an end-to-end procedure to observe and recover orbital custody of an object undergoing electric propulsion based on stale TLE information.
- Designed and undertook an extensive observation campaign to obtain a large number of high-quality light curves during the MEV-2 RPO phase.
- Developed reduction pipelines to extract and calibrate high-cadence single- and multi-colour photometric data.

- **The threat from space debris in low earth orbit: understanding and mitigating the risk (2020 – ongoing)**

Co-investigator on a successful *Challenge Lead Applied Systems Programme* (CLASP) project investigating new techniques for identifying and characterising space debris in Low Earth Orbit.

- Developed and installed a new robotic telescope facility.
- Designed and coordinated manufacture of bespoke mechanical components.
- Developed software control for the telescope hardware and data acquisition.

- **Improving debris detection and tracking in the next generation of EU GEO monitoring sensors (2020)**

Co-investigator on a successful *EUSST* project comparing data analysis techniques on a unique data set consisting of simultaneous small- and large-aperture telescope observations.

- Investigated morphological characteristics of tumbling debris light curves.
- Developed and bench-marked a proof of concept image stacking algorithm.

- **GEOMON (2019 – 2020)**

Subcontractor on a successful *DASA* project developing a new concept for a Geostationary orbit monitoring system.

- Coordinated documentation and delivery of an archival data set.
- Iterated development and benchmarked performance of the data reduction pipelines previously developed in the *Precision light curves of LEO and GEO objects* project.

- **Precision light curves of LEO and GEO objects (2019 – 2020)**

Developed observational programmes and reduction pipelines for the purpose of identifying and characterising space debris in both Low Earth Orbit (LEO) and Geosynchronous (GEO) orbits.

- Developed hardware and software upgrades to repurpose the SuperWASP North telescope for observations of LEO objects.
- Developed a standalone 0.36m telescope system for GEO satellite and debris observations.
- Developed analysis pipeline for extracting light curves from trailed images.
- Undertook surveys of LEO and GEO rotation rates and optical signatures.

Contact

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- **Warwick One-metre telescope (2015 – ongoing)**

Lead the repair and redevelopment of a 1 metre research telescope based at the Roque de Los Muchachos observatory on the Canary Island of La Palma.

- Identified optical and mechanical faults and developed repair strategies.
- Developed hardware and low-level software for observatory systems.
- Designed and implemented data management and calibration pipeline.
- Developed web dashboards and monitoring tools.

- **Gravitational-wave Optical Transient Explorer (2015 – ongoing)**

Supported the development of new optical survey telescopes based in La Palma and Australia.

- Advised on operational and safety procedures.
- Identified optical and mechanical faults and contributed to the development of repair strategies.
- Developed and maintain the common observatory weather and monitoring infrastructure.
- Contributed to the physical installation and ongoing hardware maintenance.

- **White Dwarf Research (2015 – 2018)**

Involved in a range of research projects focused around White Dwarf and compact binary star systems.

- Obtained observational data using professional telescopes in Spain, Chile, New Zealand.
- Developed custom reduction pipelines for extracting and analysing light curves of variable objects.
- Identified targets of interest in wide-area astronomical surveys.
- Authored and contributed to refereed journal papers.

- **Teaching Support (2017 – ongoing)**

Tutored lab sessions for undergraduate Physics modules.

- PX150 (Physics Programming Workshop)
- PX277 (Computational Physics)

2014–2015

School of Chemical and Physical Sciences, VUW

Wellington, New Zealand

Research Assistant: 2D X-Ray Dosimeter Development

- Developed a 2D readout instrument for X-Ray sensitive films, adapting a 3D printer to hold a scanning laser and photon counting electronics.
- Characterised system properties including resolution, linearity, and noise levels.
- Created and characterised X-ray sensitive films in the lab.

2011 – 2014

School of Chemical and Physical Sciences, VUW

Wellington, New Zealand

PhD. Research: CCD Time-Series Photometry of White Dwarf Stars

- Developed two high-speed CCD time-series photometer instruments for use with 0.6 – 2.1 m research telescopes in New Zealand and the USA.
- Created a CCD data reduction pipeline for real-time analysis and visualisation.
- Acquired time-series photometry of variable white dwarf (WD) targets.
- Analysis of targets included identification of WD pulsation modes, investigation of pulsation stability, and the consideration of convection effects.

2009 – 2010

School of Chemical and Physical Sciences, VUW

Wellington, New Zealand

MSc. Research: A Semi-Analytical Model for Gravitational Microlensing

- Investigated techniques for calculating gravitational microlensing light curves.
- Developed and implemented a computationally efficient semi-analytical model for simulating gravitational microlensing events with up to four lens bodies.
- Implemented model support for orbital motion effects in the source, lens, and observer systems.

Summer 2008

Research School of Astronomy and Astrophysics, Australian National University

Canberra, Australia

Summer Scholar: RSAA Instrumentation Group

- Worked with the team commissioning a new integral field spectrograph for the 2.3 m telescope at Siding Spring Observatory.
- Tested and documented an optical stimulus assembly that was used to simulate the telescope optics during instrument verification tests.
- Reduced archival CCD data using IRAF.

Summer 2007	School of Chemical and Physical Sciences, VUW <i>Summer Scholar: VUW Microlensing Group</i>	Wellington, New Zealand
	<ul style="list-style-type: none"> Adapted modelling code to run on University of Canterbury's BlueFern supercomputer and the VUW Condor computing grid. Compared the benefits of the available computing resources, and determined that the best results could be obtained with the local Condor grid. Investigated the impact of three lens masses on model light curves. 	
2007 – 2015	School of Chemical and Physical Sciences, VUW <i>Tutoring & Lab Development</i>	Wellington, New Zealand
	<ul style="list-style-type: none"> Demonstrated / tutored undergraduate laboratories (usually 2 – 10 students per session) across most of the core physics curriculum at VUW. Developed a time-series photometry experiment using a CCD camera and LEDs driven by a microcontroller to mimic variable stars. Developed a numerical simulation experiment investigating light bending around black holes and gravitational microlensing. Overhauled and modernized several existing experiments. Co-supervised research project students. 	
2010 – current	Open Source Software <i>Core maintainer of the OpenRA project.</i>	
	<ul style="list-style-type: none"> Open source game engine recreating classic Command & Conquer RTS titles. Designed and implemented many of the core engine systems. Performed code review and mentoring of new contributors. Performed project management, public relations, and other community roles. Member of the <i>C&C Community Council</i> advising Electronic Arts and Petroglyph Games during the development of the <i>Command & Conquer™ Remastered Collection</i> computer game. 	

Awards

2018	Merit Award Award for exceptional performance during the 2017 – 2018 year.	University of Warwick
2017	Merit Award Award for exceptional performance during the 2016 – 2017 year.	University of Warwick
2016	Merit Award Award for exceptional performance during the 2015 – 2016 year.	University of Warwick
2014	Royal Society Marsden Scholarship Funding for tuition fees and a stipend during a 3 year PhD degree.	Royal Society of NZ
	Victoria Doctoral Completion Award Awarded for successful PhD completion within the scheduled time allocation.	Victoria University of Wellington
2009	Victoria Master's Scholarship Awarded based on academic merit to fund tuition fees and a stipend during a 1 year masters degree.	Victoria University of Wellington
2008	VUW Graduate Award Awarded on the basis of academic merit to support graduate degree study.	Victoria University of Wellington
	Mike Collins Scholarship in Physics	Victoria University of Wellington
2005	Ormond Wilson Scholarship J Mills Family Scholarship Award for Dux of Karamu High School in 2004.	Victoria University of Wellington J Mills Family Trust

Publications

First-author refereed publications:

- 2021 **NGTS and HST insights into the long-period modulation in GW Librae**
Chote, P., et al. 2021, MNRAS, 502, 581. doi:10.1093/mnras/staa4015
- 2016 **The post-outburst pulsations of the accreting white dwarf in the cataclysmic variable GW Librae**
Chote, P., and Sullivan, D.J. 2016, MNRAS, 458, 1393. doi:10.1093/mnras/stw421
- 2014 **Puoko-nui: a flexible high-speed photometric system**
Chote, P., et al. 2014, MNRAS, 440, 1490. doi:10.1093/mnras/stu348
- 2013 **Time series photometry of the helium atmosphere pulsating white dwarf EC 04207-4748**
Chote, P., et al. 2013, MNRAS, 431, 520. doi:10.1093/mnras/stt180

Selected co-authored refereed publications:

- 2021 **DebrisWatch I: A survey of faint geosynchronous debris**
Blake, J. A., et al. 2021, AdSpR, 67, 360. doi:10.1016/j.asr.2020.08.008
- The Pulsating White Dwarf G117-B15A: Still the Most Stable Optical Clock Known**
Kepler, S. O., et al. 2021, ApJ, 906, 7. doi:10.3847/1538-4357/abc626
- 2020 **An ultra-massive white dwarf with a mixed hydrogen-carbon atmosphere as a likely merger remnant**
Hollands, M. A., et al. 2020, NatAs, 4, 633. doi:10.1038/s41550-020-1028-0
- V1460 Her: a fast spinning white dwarf accreting from an evolved donor star**
Ashley, R. P., et al. 2020, MNRAS, 499, 149. doi:10.1093/mnras/staa2676
- 2019 **The PDS 110 observing campaign - photometric and spectroscopic observations reveal eclipses are aperiodic**
Osborn, H. P., et al. 2019, MNRAS, 485, 1614. doi:10.1093/mnras/stz283
- Multiwavelength observations of the EUV variable metal-rich white dwarf GD 394**
Wilson, D. J., et al. 2019, MNRAS, 483, 2941. doi:10.1093/mnras/sty3218
- 2018 **The Next Generation Transit Survey (NGTS)**
Wheatley, P. J., et al. 2018, MNRAS, 475, 4476. doi:10.1093/mnras/stx2836
- VLA radio observations of AR Scorpii**
Stanway, E. R., et al. 2018, A&A, 611, 66. doi:10.1051/0004-6361/201732380
- 2017 **Multiband photometry and spectroscopy of an all-sky sample of bright white dwarfs**
Raddi, R., et al. 2017, MNRAS, 472, 4173. doi:10.1093/mnras/stx2243
- White Dwarf Rotation as a Function of Mass and a Dichotomy of Mode Line Widths: Kepler Observations of 27 Pulsating DA White Dwarfs through K2 Campaign 8**
Hermes, J. J., et al. 2017, ApJS, 232, 23. doi:10.3847/1538-4365/aa8bb5
- 2016 **High-speed Photometry of the Disintegrating Planetesimals at WD1145+017: Evidence for Rapid Dynamical Evolution**
Gänsicke, B. T., et al. 2016, ApJ, 829, 82. doi:10.3847/2041-8205/818/1/L7
- Outbursts in Two New Cool Pulsating DA White Dwarfs**
Bell, K. J., et al. 2016, ApJ, 818, L7. doi:10.3847/0004-637X/829/2/82
- 2015 **Insights into internal effects of common-envelope evolution using the extended Kepler mission**
Hermes, J. J., et al. 2015, MNRAS, 451, 1701. doi:10.1093/mnras/stv1053
- A Second Case of Outbursts in a Pulsating White Dwarf Observed by Kepler**
Hermes, J. J., et al. 2015, ApJ, 810, L5. doi:10.1088/2041-8205/810/1/L5
- 2014 **Radius constraints from high-speed photometry of 20 low-mass white dwarf binaries**
Hermes, J. J., et al. 2014, ApJ, 792, 39. doi:10.1088/0004-637X/792/1/39
- Found: the progenitors of AM CVn and supernovae .Ia**
Kilic, M., et al. 2014, MNRAS, 439, L26. doi:10.1093/mnras/slt151
- 2012 **HST and Optical Data Reveal White Dwarf Cooling, Spin, and Periodicities in GW Librae 3-4 Years after Outburst**
Szkody, P., et al. 2012, ApJ, 753, 158. doi:10.1088/0004-637X/753/2/158

Full list available at http://adsabs.harvard.edu/cgi-bin/basic_connect?qsearch=Chote%2C+P

Conference Presentations:

2021	MEV-2 RPO Observation Campaign PHANTOM ECHOES 2 Post-Campaign Workshop, Virtual	Oral Presentation
2020	Understanding the optical variability in light curves of objects in Low Earth Orbit Physics of Remote Sensing Program Review, Virtual	Oral Presentation
	Precision Optical Light Curves of LEO and GEO Objects GNOSIS Precision SSA Workshop, Virtual	Oral Presentation
2019	Precision Optical Light Curves of LEO and GEO Objects Advanced Maui Optical and Space Surveillance Technologies Conference 2019, Hawaii, USA	Poster
2018	Ongoing Observational Projects Astrodynamics Community of Interest Meeting #12, London, UK	Oral Presentation
2017	GW Librae in NGTS NGTS Project Meeting, Leicester, UK	Oral Presentation
2016	The post-outburst pulsations of GW Librae 20th European White Dwarf Workshop, Warwick, UK	Oral Presentation
	The Warwick one-metre telescope 20th European White Dwarf Workshop, Warwick, UK	Poster
2012	New Time-Series Observations of the Intriguing Object GW Librae 18th European White Dwarf Workshop, Krakow, Poland	Oral Presentation
	The Puoko-nui CCD Time-Series Photometer 18th European White Dwarf Workshop, Krakow, Poland	Poster
2011	High precision CCD time-series photometry Royal Astronomical Society Conference, Wellington, NZ	Oral Presentation
	Time Series Photometry of Pulsating White Dwarf Stars New Zealand Institute of Physics Conference, Wellington, NZ	Oral Presentation

Other publications:

2019	Precision Optical Light Curves of LEO and GEO Objects Chote, P., Blake, J. A., Pollacco, D, Technical Paper. https://ui.adsabs.harvard.edu/abs/2019amos.confE..52C
2015	Simulating the photometric study of pulsating white dwarf stars in the physics laboratory Chote, P., and Sullivan, D.J. 2015. https://arxiv.org/abs/1502.01767
2014	CCD Time-Series Photometry of White Dwarf Stars Chote, P. 2014, PhD. Thesis, Victoria University of Wellington. http://researcharchive.vuw.ac.nz/handle/10063/3512
2011	A Semi-Analytical Model for Gravitational Microlensing Chote, P. 2011, MSc. Thesis, Victoria University of Wellington. http://researcharchive.vuw.ac.nz/handle/10063/1890

References

Available on request.