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 First Class Honours
2005 − 2007 **Bachelor of Science** in Mathematics and Physics

Experience

2015−2019 **Department of Physics, Warwick University**   Coventry, United Kingdom
Postdoctoral Research Fellow
- Identification and characterisation of space debris:
  - Developed hardware and software upgrades to repurpose the SuperWASP North telescope for observations of Low Earth Orbit (LEO) objects.
  - Developed a standalone 0.36m telescope system for Geosynchronous (GEO) satellite and debris observations.
  - Developed analysis pipeline for extracting light curves from trailed images.
  - Undertook a survey for faint GEO debris using 2.5m INT Telescope.
  - Undertaking survey of LEO and GEO rotation rates and optical signatures.
- Repair and automation of a 1m research telescope:
  - 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 tools using Python, Flask, and Django.
- Acquired and analysed data of variable white dwarf stars.
- Identified targets of interest in wide-area astronomical surveys.

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.

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Links
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 github.com/pchote

Computing
Operating systems:
Linux, macOS, Windows
Programming Languages:
C, C#, Python, Bash,
HTML, CSS, Javascript
Display APIs:
OpenGL, PGPLOT,
Matplotlib, Flot
Embedded Systems:
AVR, ARM
Web Frameworks:
Flask, Django, JQuery,
Bootstrap
Grid Computing:
SGE, Condor, DRMAA
Version Control:
Git, SVN
Word Processing:
LATEX, Microsoft Office

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**	Wellington, New Zealand

Summer Scholar: VUW Microlensing Group
- 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**	Wellington, New Zealand

Tutoring & Lab Development
- 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 – ongoing	**Open Source Software**

Core maintainer of the OpenRA project.
- 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.

Awards

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

Publications

First-author refereed publications:

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:

2016   **Long-term eclipse timing of white dwarf binaries: an observational hint of a magnetic mechanism at work**
Bours, M. C. P., et al. 2016, MNRAS, 460, 3873. DOI:10.1093/mnras/stw1203

           An asteroseismic constraint on the mass of the axion from the period drift of the pulsating DA white dwarf star L19-2
Córsico, A.H., et al. 2016, JCAP, 07, 036. DOI:10.1088/1475-7516/2016/07/036

           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

           GW Librae: Still Hot Eight Years Post-outburst
Szkody, P., et al. 2016, AJ, 152, 48. DOI:10.3847/0004-6256/152/2/48

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/mnrasl/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:

2018   **Oral Presentation**   Astodynamics Community of Interest Meeting #12, London, UK
Ongoing Observational Projects

2017   **Oral Presentation**   NGTS Project Meeting, Leicester, UK
GW Librae in NGTS

2016   **Oral Presentation**   20th European White Dwarf Workshop, Warwick, UK
The post-outburst pulsations of GW Librae

           Poster   20th European White Dwarf Workshop, Warwick, UK
The Warwick one-metre telescope

2012   **Oral Presentation**   18th European White Dwarf Workshop, Krakow, Poland
New Time-Series Observations of the Intriguing Object GW Librae

           Poster   18th European White Dwarf Workshop, Krakow, Poland
The Puoko-nui CCD Time-Series Photometer

2011   **Oral Presentation**   Royal Astronomical Society Conference, Wellington, NZ
High precision CCD time-series photometry

           Oral Presentation   New Zealand Institute of Physics Conference, Wellington, NZ
Time Series Photometry of Pulsating White Dwarf Stars

Other publications:

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`

Selected Software Projects

Warwick one-metre observatory software   ⊙ `https://github.com/warwick-one-metre/`
A collection of microservices and utilities that make up the control systems for the
Warwick one-metre telescope at the Roque de los Muchachos observatory on La
Palma. Low level daemons provide a standardized software interface (using Pyro
remote procedure calls) to the hardware components, with higher level daemons
implementing logic for environmental monitoring and observatory operation. Real
time image analysis feeds back into the closed-loop telescope control system.

Core Skills:
- Python development.
- Designing fault tolerant systems.
- Integrating software with complex hardware environments.
- Designing and deploying microservices.
- Real time data analysis.

OpenRA   ⊙ `https://github.com/OpenRA/OpenRA/`
A cross-platform GPL3 real time strategy engine for building games in the style of
the classic 2D/2.5D Command & Conquer titles. Community driven recreations of
Command & Conquer, *Red Alert*, and *Dune 2000* have a thriving online player base.

Core Skills:
- Advanced C# development (including LINQ, P/Invoke, reflection, codegen).
- OpenGL development.
- Gameplay and user interface design.
- Project management.
- Code review and mentoring.
- Continuous integration and deployment using Travis CI.
- Triaging user feedback and bug reports into actionable tasks.
- Web development and maintenance (PHP, Ruby, SQLite, HTML/Javascript/CSS).

Puoko-nui time-series photometer   ⊙ `https://github.com/pchote/Puoko-nui/`
                                         ⊙ `https://github.com/pchote/Karaka/`
Instrument control software for the Puoko-nui astronomical photometer instrument.
Interfaces with a frame-transfer CCD camera and GPS receiver to enable high-speed
image acquisition with precise absolute timing information for observing variable
astronomical phenomena.

Core Skills:
- C development.
- Linux kernel driver development / maintenance.
- Embedded C development (AVR microcontroller).
- Designing real-time systems.
- Integrating software with complex hardware environments.

More projects with source code available at `https://github.com/pchote/`

References

Available on request.