



# 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

#### 2015–2018 **Department of Physics, Warwick University**

Coventry, United Kingdom

##### *Postdoctoral Research Fellow*

Repair and automation of a 1 m research telescope:

- Identified optical and mechanical faults and developed repair strategies.
- Developed hardware and low-level software interfaces for observatory systems.
- Designed and implemented data management and calibration pipeline.
- Developed web dashboards and tools using Python, Flask, and Django.

Identification of targets of interest in wide-area astronomical surveys:

- Developed a data analysis pipeline to clean observations from the iPTF survey and quantify photometric variability of stars from input catalogs.
- Developed a real-time analysis pipeline to detect transient astrophysical events and variable stars in the NGTS survey.

Acquired and analysed data of variable white dwarf stars.

#### 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.

### Contact

Department of Physics  
University of Warwick  
Gibbet Hill Road  
Coventry  
CV4 7AL  
UK

#### **mobile:**

+44 7481 178055

#### **work:**

+44 2476 151862

#### **email:**

p.chote@warwick.ac.uk

paul@chote.net

#### **skype:**

pchote

### Links

[linkedin.com/in/pchote](https://www.linkedin.com/in/pchote)

[github.com/pchote](https://github.com/pchote)

### Computing

#### **Operating systems:**

Linux, macOS, Windows

#### **Programming Languages:**

C, C#, Python, Bash,  
HTML, CSS, Javascript,  
Objective-C, Lua

#### **Display APIs:**

OpenGL, PGLOT,  
Matplotlib

#### **Embedded Systems:**

AVR, ARM

#### **Web Frameworks:**

Flask, Django, JQuery

#### **Grid Computing:**

SGE, Condor, DRMAA

#### **Version Control:**

Git, SVN

#### **Word Processing:**

L<sup>A</sup>T<sub>E</sub>X, Microsoft Office

- 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

- 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**  
Córscico, 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/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](http://adsabs.harvard.edu/cgi-bin/basic_connect?qsearch=Chote%2C+P)

### 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>

### Conference Presentations:

- 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

# Selected Software Projects

## 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.
- Triaging user feedback and bug reports into actionable tasks.
- Web development and maintenance.

## 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.

## NGTS transient object detection pipeline

 <https://github.com/pchote/ngtransients/>

A data-driven image analysis pipeline for detecting transient events and variable stars in the *Next Generation Transit Survey*. Currently under development and targeting the archive of historical data, but is designed for future deployment to the telescope to run in real time and drive automatic alerts for followup by other facilities.

Core Skills:

- Python development (including numpy and matplotlib).
- Working with large data sets.
- Performance sensitive software design and implementation.
- Distributed computing (Sun/Oracle Grid Engine).

## 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.