Jason Neal

Astronomer/Programmer

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jason-neal

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Skills

Overview

Programming

$0\ LOC$ ——————→ $5000\ LOC$

Python (numpy, matplotlib, etc.)

Matlab • LaTeX

IRAF • HTML • R • SQL (SQLAlchemy)

Projects

eniric - Software to compute the theoretical Radial Velocity precision of stellar spectra. Submitted to The Journal of Open Source Software.

spectrum-overload - Spectrum object with overloaded operators to manipulate stellar spectra. Experimentation with Python classes.

Baraffe tables - Interpolate table of stellar evolutionary models to given stellar mass.

DanielAndreasen/SWEETer-Cat - Flask app to revitalize the SWEET-Cat database.

Education

2014 - present — **Phd., Astronomy (thesis submitted)** — University of Porto, Portugal
Phd::Space Fellowship - Fundação para a Ciência e a Tecnologia

2013 - 2014 — **MSc., Physics with Distinction** — University of Otago, New Zealand
Research Master's Scholarship - University of Otago

2009 - 2012 — **BSc., Physics (Honours 1st Class)** — University of Otago, New Zealand
GPA: 8.0/9.0

Research

2014 - 2018 — **Astronomy: Phd. Candidate** — University of Porto, Portugal
Thesis: Towards planetary atmospheres: new data reduction methods in the near-infrared.
- **Tools**: IRAF, Python (pytest, numpy, pandas, matplotlib, scikit-learn, joblib, flask, SQLAlchemy)

2012 - 2014 — **Space Physics** — University of Otago, New Zealand
My Honours and Masters research was focused on the satellite measurements of high energy protons and electrons interacting with Earths magnetic field.
- **Tools**: Matlab

Experience

2014 - Present — **Ph.D Student** — Center of Astrophysics University of Porto
- Reduction/processing of near-infrared spectra (from the CRIRES spectrograph)
- Attempted the detection of exoplanet atmospheres though a differential subtraction method.
- Model fitting with synthetic spectral models
- Calculating the theoretical radial velocity precision of near-infrared stellar spectra.

2015 - 2017 — **Summer school monitor** — University of Porto
- Monitor for the 11^{th}-13^{th} Editions of the Physics summer school. Project: Detecting and characterizing extrasolar planets. Instructing groups of 3-5 high school aged students though planet detection tasks.

2013 - 2014 — **Lab Demonstrator** — University of Otago
- Lab demonstrator for undergraduate courses PHSI170 (Sun Earth Universe) and PHSI191 (Health Science prerequisite).

2011 - 2014 — **Amateur Astronomy** — Dunedin Astronomical Society
- Dunedin Astronomical Society (DAS) member.
- Gave two presentations at the DAS meeting nights.
  - One class for their "Amateur Astronomy" course.
  - One on my Honours and Masters research.
- Attempted the detection of asteroid occultations.
- Organized the roster of volunteers for the Sunday public nights at the Dunedin Observatory in 2014.
- Developed flight hardware and software for a high-altitude balloon mission with the Dunedin Space Programme.

Publications (first author)

Neal, J. J., C.J. Rodger, M. A. Clilverd , N. R. Thomson , T. Raita , T Ulich (2015), *Long-term Determination of Energetic Electron Precipitation into the Atmosphere from AARDDVARK Subionospheric VLF Observations*, J. Geophys. Res., 120, 2194–2211, doi:10.1002/2014JA020689

Neal, J. J., C. J. Rodger, and J. C. Green (2013), *Empirical determination of solar proton access to the atmosphere: Impact on polar flight paths*, Space Weather, 11, 420-433, doi:10.1002/swe.20066

+ 2 currently in review and 1 in preparation.

Presentations

Neal, J. J., Figueira, P., Santos, N. C., Melo, C. (2016) *Towards exoplanetary atmospheres: new data reduction techniques for the nIR*, XXVI Encontro Nacional de Astronomia e Astrofísica, Aveiro, Portugal

Other Contributions

S. Ulmer-Moll, P. Figueira, **J. J. Neal**, N. C. Santos and M. Bonnefoy, 2018, *Telluric correction in the near-infrared: Standard star or synthetic transmission?*, Astronomy and Astrophysics, arXiv:1811.0895

J. Lillo-Box, A. Leleu, H. Parviainen, P. Figueira, M. Mallonn, A. C. M. Correia, N. C. Santos, P. Robutel, M. Lendl, H. M. J. Boffin, J. P. Faria, D. Barrado and **J. Neal**, 2018, *The TROY project. II. Multi-technique constraints on exotrojans in nine planetary systems*, Astronomy and Astrophysics, 618 A42

A. Santerne, B. Brugger, D. J. Armstrong, V. Zh. Adibekyan, J. Lillo Box, H. Gosselin, A. Aguichine, J.-M. Almenara, D. Barrado, S. C. C. Barros, E. Delgado Mena, O. Demangeon, J. P. S. Faria, P. Figueira, S. Hojjatpanah, **J. J. Neal**, N. C. Santos, S. G. Sousa), 2018, *An Earth-sized exoplanet with a Mercury-like composition*, New Astronomy, 2, 23

S. C. C. Barros, H. Gosselin, D. Bayliss, E. Delgado Mena, B. Brugger, A. Santerne, D. J. Armstrong, V. Zh. Adibekyan, J. D. Armstrong, D. Barrado, O. Demangeon, J. P. S. Faria, P. Figueira, S. Hojjatpanah, **J. J. Neal**, N. C. Santos, S. G. Sousa), 2017, *Precise masses for the transiting planetary system HD 106315 with HARPS*, Astronomy and Astrophysics, 608, 14

Figueira, P. Adibekyan, V. Z. and Oshagh, M. and **Neal, J. J.** and Rojas-Ayala, B. and Lovis, C. and Melo, C. and Pepe, F. and Santos, N. C. and Tsantaki, M. (2016), *Radial velocity information content of M dwarf spectra in the near-infrared*, Astronomy and Astrophysics, 586 A101

Rodger, C. J., **J. J. Neal**, M. A. Clilverd, and T. Raita, (2014) *Investigating electron precipitation event characteristics and drivers: combining BARREL-inspired measurements from Antarctica and Canada*, 31st General Assembly of the International Union of Radio Science, Beijing, China. (talk)

Rodger, C. J., **J. J. Neal**, M. A. Clilverd, and T. Raita (2014) *Remote sensing space weather events through ionospheric radio: latest update from the AARDDVARK network*, 31st General Assembly of the International Union of Radio Science, Beijing, China. (talk)

Posters

Ulmer-Moll S., Figueira, P., **Neal, J. J.**, Santos N. C. (2017) *Near-infrared spectra and telluric correction, how to deal with it?*, XXIX Canary Islands Winter School Application of Radiative Transfer, Canary Islands, Spain.

Neal, J. J., Figueira, P., Santos, N. C., Melo, C. (2016), *Towards Exoplanet Atmospheres: new data reduction for the nIR*, IVth Azores International Advanced School in Space Sciences, Azores Islands, Portugal

Neal, J. J., C. Rodger, J. Green and I. Whittaker, (2014) *Empirical determination of solar proton access to the polar atmosphere*. Geophysical Research Abstracts, Vol. 16, EGU2014-12381.

Clilverd, M. A., C. J. Rodger, **J. J. Neal**, K. Cresswell-Moorcock and the AARDDVARK Team (2014) *Remote sensing space weather events through ionospheric radio: The AARDDVARK network*, HP4.3, 31st General Assembly of the International Union of Radio Science, Beijing, China .

Neal, J. J., C. J. Rodger, and J. C. Green (2013), *Empirical determination of solar proton access to the polar atmosphere*, SS3p1-035, International CAWSES-II Symposium, Nagoya, Japan

Neal, J. J., C. J. Rodger, M. A. Clilverd, and T. Raita (2013), *Long term determination of variations in energetic electron precipitation into the atmosphere using AARDDVARK*, SS3p2-074, International CAWSES-II Symposium, Nagoya, Japan