

COURTNEY CRAWFORD

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CAREER HISTORY

University of Sydney Postdoctoral Research Assistant, with Tim Bedding	<i>July 2022 - present</i>
Louisiana State University, Baton Rouge Ph.D. in Physics, Advised by Geoffrey C. Clayton	<i>Graduation: May 2022</i>
University of Oklahoma, Norman B.S. in Astrophysics	<i>Graduation: May 2018</i>

TEACHING & SUPERVISION

Courses Taught ASTR 1109: Stellar Astronomy Lab (4 semesters, LSU)

Current Students

- **Jasmyn Curry**
(*Second Year SSP, sole-supervisor*)
Spectroscopy of pulsations in RCB stars
- **Josh Ferguson**
(*Second Year SSP, sole-supervisor*)
Dipole mode suppression in the Kepler red giant sample
- **George Feng**
(*Second Year SSP, co-supervisor with Tim Bedding*)
A red giant in the Pleiades cluster
- **Haonan Li**
(*Honours student, sole-supervisor*)
Anomalous peaks and potential tertiary systems found via Kepler oscillating star data
- **K.R. Sreenivas**
(*PhD Student, co-supervisor with Tim Bedding, 2023-present*)
Asteroseismology of red giants
- **Lea Schimak**
(*PhD Student, co-supervisor with Tim Bedding, 2023-present*)
Asteroseismology of binary red giants

Past Students

- **Nikita Nikultsev**
(*Honours student, sole-supervisor, 2023 Sem 1 & 2*)
Merging With MESA: Modelling DY Pers by Fusing White Dwarfs
- **Maxwell Bennett**
(*Honours student, co-supervisor with Tim Bedding, 2023 Sem 1 & 2*)
Photometry in Crowded Stellar Fields with NASA's TESS Mission
- **Noah Smith & Nayan Gallego Sivaraman**
(*First Year SSP, co-supervisor with Helen Johnston, 2023 Sem 2*)
Analysis of the emission from Low Mass X-ray Binary A0620-00 over 6 years

- **Caleb Clark**
(*Second Year SSP, sole-supervisor, 2023 Sem 1*)
An automated pipeline to find RCB dust declines
- **Amelie Reid**
(*Summer Project, co-supervisor with Tim Bedding and Ben Montet, 2023 Summer*)
Searching the Gaia and TESS data for delta Scuti stars
- **Yifan Chen**
(*Third Year Dalyell, co-supervisor with Tim Bedding and Yaguang Li, 2022 Sem 2*)
Automated detection and refinement of asteroseismic parameters in 16,000 stars
- **Alexander Jephtha**
(*First Year SSP, co-supervisor with Tim Bedding and Yaguang Li, 2022 Sem 2*)
A search for oscillating wide binaries
- **Cameron Davidson**
(*First Year SSP, co-supervisor with Tim Bedding and Yaguang Li, 2022 Sem 2*)
Verifying the low-mass Kepler red giants

RESEARCH OVERVIEW

University of Sydney

Postdoctoral Research Assistant, Current Work

July 2022 - present

Sydney, NSW

- Asteroseismology
- Detailed study of high-mass pulsating red giants in the Kepler field
- The first major study of pulsations of Hydrogen-deficient Carbon stars

Louisiana State University

Graduate Research Assistant

August 2018 - May 2022

Baton Rouge, LA, USA

- Optical spectroscopy of R Coronae Borealis and Hydrogen-deficient Carbon Stars
- Stellar Classification in the style of the MK classification system
- Modeling post-WD-merger objects that are believed to form R Coronae Borealis Stars

The University of Oklahoma

Research Assistant

October 2016 - May 2018

Norman, OK, USA

- Categorizing white dwarf galactic populations using their kinematic properties
- Utilizing atmospheric model fits to optical photometry to constrain the temperatures of white dwarf candidates
- Identifying the coolest and oldest stars in galactic disk and halo populations, leading towards age estimates for the respective galactic populations

SERVICE AND OUTREACH

Sydney Institute for Astronomy (SIfA) Seminar Organization

Organizer

2023-present

- Coordinated weekly seminar series, including speaker invitations and scheduling.
- Implemented new strategies to enhance seminar attendance and engagement among department members

MESA Down Under Workshop

Teaching Assistant

2024

- Collaborate with team members to write workshop materials and activities
- Created website to host lab materials and instructions
Local Organizing Committee Member
- Managing the audiovisual system during the workshop

- Involved in setup and teardown of the workshop space

9th Australian Exoplanet Workshop

2023

Local Organizing Committee Member

- Managed the audiovisual system during the workshop, ensuring smooth operation of presentations and discussions.

Physics & Astronomy Graduate Student Organization

2019-2021

President

2020-2021 US Academic Year

- Facilitated once monthly meetings with graduate student body
- Garnered opinions on graduate student issues and presented potential solutions
- Championed revisions to department qualifying exam with a focus on diversity, equity, inclusion, and accessibility

Vice President

2019-2020 US Academic Year

- Acted as liaison between faculty and graduate students with once monthly meetings
- Assumed the role of the president when they were not able to be present

Science Olympiad

2020

Instructor

- Instructed students in the “Reach for the Stars” Program about extrasolar astronomy
- Performed all instruction fully online for middle school students
- Students came first in the state and 31 out of 60 groups in their first year competing at Nationals

Astronomy on Tap, Baton Rouge

2018-2022

Emcee, Organizer

2020-2022

- Coordinated monthly events, including speaker invitations and scheduling.
- Hosted the event itself, focusing on entertainment and education

Staff Member

2018-2020

- Helped with setup and teardown of the event
- Worked at the merch booth

Public Night at Landolt Observatory

2018-2020

Volunteer

- Manned one of the telescopes for public viewing

Girls Day at the Museum

2019,2020

Physics Booth Organizer, Volunteer

- Interacted with K-2 age young girls to foster an interest in science
- Built and facilitated use of stomp rockets for the activity

SUCCESSFUL OBSERVING AND COMPUTING PROPOSALS

National Computational Merit Allocation Scheme

2024

Asteroseismic Modelling of Massive Stars

- Proposal Number: id91
- Investigators: May Gade Pedersen (PI), **Courtney Crawford**

SIH HPC Allocation Scheme

2024

Asteroseismic Modelling of Massive Stars

- Proposal Number: id91
- Investigators: May Gade Pedersen (PI), **Courtney Crawford**

- AAT/Veloce** 2024
High resolution spectroscopy for abundance studies of HdC stars located in diverse Galactic sub-structures with AAT/Veloce
- Proposal Number: A/2024A/07
 - Investigators: Ashley Ruiter (PI), **Courtney Crawford**, Jamie Soon, Nicolas Rodriguez, Ivo Seitenzahl
- SIH HPC Allocation Scheme** 2023
Advancing Stellar Properties by Modelling Stellar Oscillations
- Proposal Number: ht06
 - Investigators: Tim Bedding (PI), **Courtney Crawford**, Yaguang Li
- Keck/HIRES** 2023
Asteroseismology of the highest-mass Kepler red giant stars
- Proposal Number: 2023B-07
 - Investigators: Yaguang Li (PI), **Courtney Crawford**
- AAT/Veloce** 2022
Projected Rotational Velocities of Delta Scuti Stars
- Proposal Number: O/2023A/3001
 - Investigators: Investigators: **Courtney Crawford**, Tim Bedding, Mike Ireland, Dan Huber
- AAT/Veloce** 2022
High resolution spectroscopy for abundance studies of HdC stars with AAT/Veloce
- Proposal Number: A/2022B/12
 - Investigators: Investigators: Ashley Ruiter (PI), **Courtney Crawford**, Jamie Soon, Nicolas Rodriguez, Ivo Seitenzahl
- CTIO/KOSMOS** 2019
Search for the coldest Magellanic RCB stars; The early supergiant phase after WD merger
- Proposal Number: NOAO 2019B-0044
 - Investigators: Geoffrey Clayton (PI), Patrick Tisserand, **Courtney Crawford**
- Gemini/NIRI** 2017
J and H Photometry of Ultracool White Dwarfs *Accepted: Band 3*
- Proposal Number: NOAO-2018A-N0184
 - Investigators: **Courtney Crawford** (PI), Kyra Dame, Dr. Jeffrey Munn, Dr. Mukremin Kilic

REFEREED PUBLICATIONS

The highest mass Kepler red giants - I. Global asteroseismic parameters of 48 stars (2024)

C. L. Crawford et al. MNRAS, Volume 528, Issue 4, pp.7397-7410

Identifying 850 δ Scuti pulsators in a narrow Gaia colour range with TESS 10-min full-frame images (2024)

A. Read, T. R. Bedding ; P. Mani, B. T. Montet, **C. Crawford**, D. R. Hey, Y. Li, S. J. Murphy, M. G. Pedersen, J. Kruger MNRAS, Volume 528, Issue 2, pp.2464-2473

A simple method to measure numax for asteroseismology: application to 16,000 oscillating Kepler red giants (2024)

K. R. Sreenivas, T. R. Bedding, Y. Li, D. Huber, **C. L. Crawford**, D. Stello, J. Yu MNRAS (in press)

HdC and EHe stars through the prism of Gaia DR3: 3D distribution and Gaia's chromatic PSF effects (2024)

P. Tisserand, C. L. Crawford, J. Soon, G. C. Clayton, A. J. Ruiter, I. R. Seitenzahl A&A (in press)

HdC and EHe stars through the prism of Gaia DR3: Evolution of RV amplitude and dust formation rate with effective temperature (2024)

P. Tisserand, C. L. Crawford, J. Soon, G. C. Clayton, A. J. Ruiter, I. R. Seitenzahl A&A (in press)

A spectral classification system for hydrogen-deficient carbon stars (2023)

C. L. Crawford et al. MNRAS, Volume 521, Issue 2, pp.1674-1699

TESS Observations of the Pleiades Cluster: A Nursery for δ Scuti Stars (2023)

T. R. Bedding, S. J. Murphy, C. L. Crawford, D. R. Hey, D. Huber, H. Kjeldsen, Y. Li, A. W. Mann, G. Torres, T. R. White, G. Zhou ApJL, Volume 946, Issue 1, id.L10, 9 pp.

Peculiar R Coronae Borealis Stars: Strontium-Rich Stars and the s-Process (2022)

C. L. Crawford et al. A&A, Volume 667, id.A85, 8 pp.

R Coronae Borealis and dustless hydrogen-deficient carbon stars likely have different oxygen isotope ratios (2022)

V. Karambelkar, M. M. Kasliwal, P. Tisserand, G. C. Clayton, C. L. Crawford, et al. A&A, Volume 667, id.A84, 12 pp.

The dawn of a new era for dustless HdC stars with GAIA eDR3 (2022)

P. Tisserand, C. L. Crawford, G. C. Clayton, A. J. Ruiter, V. Karambelkar, M. S. Bessel, I. R. Seitenzahl, M. M. Kasliwal, J. Soon, T. Travouillon A&A, Volume 667, id.A83, 22 pp.

R Coronae Borealis Star Evolution: Simulating 3D Merger Events to 1D Stellar Evolution Including Large-scale Nucleosynthesis (2021)

B. Munson, E. Chatzopoulos, J. Frank, G. C. Clayton, C. L. Crawford, P. A. Denissenkov, F. Herwig ApJ, Vol 911, Issue 2, id.103

Modelling R Coronae Borealis stars: effects of He-burning shell temperature and metallicity (2020)

C. L. Crawford et al. MNRAS, Vol 498, Issue 2, p.2912-2924

The age of the Galactic stellar halo from Gaia white dwarfs (2019)

M. Kilic, P. Bergeron, K. Dame, N. C. Hambly, N. Rowell, C. L. Crawford. MNRAS, Vol 482, Issue 1, p.965-979

CONFERENCE PRECEEDINGS

The Highest Mass Kepler Red Giants

C. L. Crawford et al. TASC7/KASC14 2023

Spectral Classification of Hydrogen-deficient Carbon Stars using Principal Component Analysis

C. L. Crawford et al. ASA ASM 2023

An MK-like Optical Spectral Classification Scheme for Hydrogen Deficient Carbon Stars and R Coronae Borealis Variables

C. L. Crawford AAS #240

3-d Mapping The Distribution Of R Coronae Borealis Stars

C. L. Crawford et al. AAS #238, id. 323.03

The Effect of Helium Burning Shell Temperature on Models of R Coronae Borealis stars in MESA

C. L. Crawford et al. AAS #236, id. 331.02

Modeling Low Metallicity R Coronae Borealis Stars With MESA
C. L. Crawford presented at Understanding Dust 30 Years After CCM

REFERENCES

Dr. Timothy Bedding

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Professor

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Associate Professor

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Dr. Geoffrey Clayton

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Ball Family Distinguished Professor

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