

# Dr. Micheline Campbell

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## Professional Summary

I have a PhD in speleothem palaeo-climatology and am currently employed as a research associate at the University of New South Wales, contributing to the Australian Research Council Discovery Project “Reconstructing Australia’s fire history from cave stalagmites”. I have strong data and field science skills and have developed a research skillset applicable to a broad range of topics within the environmental sciences. My PhD research focused on stalagmite-based climate proxy records and associated karst geomorphology and groundwater hydrology, and since then I have worked in the surface hydrology and palaeoclimate-water security nexus. I am hoping to continue my career in physical geography by securing a position where I can apply skills I have developed in a meaningful way and contribute to the development of the next generation of geographers.

## Education

- Aug 2014 - **PhD (Geography)**, *School of Agriculture and Environment, The University of Western Australia*, Perth, Western Australia, Australia.
  - Thesis: **Speleothem-based palaeo-climate research: Methodology, applications, and insight from the Snowy Mountains, southeast Australia**
  - Supervisors: JN. Callow, H. McGowan, G. McGrath, H. Wong
- Jul 2013 - **BA (Hons, 1st Class) (Geography)**, *School of Geography, Planning, and Environmental Management, The University of Queensland*, Brisbane, QLD, Australia.
  - Thesis: **The Drip Hydrology of a Speleothem from the Yarrangobilly Caves, NSW, Australia**
  - Supervisors: H. McGowan, JN. Callow
- Feb 2010 - **BA (Geography and Spanish)**, *The University of Queensland*, Brisbane, QLD, Australia.
  - Dec 2012

## Experience

### Research

- Jun 2021 - **Research Associate**, *School of Biological, Earth and Environmental Sciences, University of New South Wales*, Sydney, NSW, Australia.
  - present
  - Contributing to the ARC Discovery Project “Reconstructing Australia’s fire history from cave stalagmites”

- Jul 2020 - **Postdoctoral Researcher**, *School of Geography, University College Dublin*,  
Jun 2021 *Dublin/Brisbane, QLD, Ireland/Australia.*
- Contributing to the project 'Using Palaeo-climate Proxies for Water Security Planning'
  - Undertook the majority of data science tasks for the development of a new database of Australian climate proxy data
- Feb 2020 - **Scientist**, *Land and Water Science Unit, QLD Dept. of Natural Resources*,  
Jul 2020 *Mining and Energy, Rockhampton, QLD, Australia.*
- Analysed sugar cane trash trial data in relation to nutrient and sediment transport.
  - Found that a significant proportion of the variation of sediment transported in cane paddock runoff can be described by soil type and cane trash cover.
  - This was a short term 5-month contract
- Aug 2019 - **Research Assistant**, *School of Agriculture and Environment, University of*  
Dec 2019 *Western Australia, Perth, WA, Australia.*
- Miscellaneous data analysis tasks
- Aug 2014 - **PhD Researcher**, *School of Agriculture and Environment, University of*  
Jul 2019 *Western Australia, Perth, WA, Australia.*
- Developed two new palaeo-climate proxy records for south east Australia
  - Showed that the climate of the LIG had similar significant periodicities to present, suggesting our long term climate patterns (e.g. PDO) will continue as temperatures increase with climate change.
  - Used social network analysis to advance our understanding of methodologies applied in the speleothem palaeo-climate proxy community and the development of the field over time.
  - Demonstrated that LA-ICP-MS and LA-ICP-AES of trace elements in speleothem calcite produce comparable results

### Teaching

- 2018 **Tutor: Geographies of a Global City**, *School of Agriculture and Environment, The University of Western Australia, Perth, WA, Australia.*
- 2018 **Course Co-Coordinator and Lecturer: Catchment and River Processes**, *School of Agriculture and Environment, The University of Western Australia, Perth, WA, Australia.*
- 2014–2018 **Tutor: Catchment and River Processes**, *School of Agriculture and Environment, The University of Western Australia, Perth, WA, Australia.*

Teaching contributions include the delivery and creation of content for undergraduate and masters level units, both in the classroom/laboratory and in the field. Catchment and River Processes, which I taught into since its inception at UWA, consistently achieved high student ratings, including in 2018 when it received a score of 3.7/4. This placed it in the 70<sup>th</sup> percentile of UWA courses.

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## Funding and Scholarships

- 2023 **ANSTO 24 hours of beamtime on the XFM line at the Australian Synchrotron (experiment 19157).**
  - \$32 784
- 2022 **ANSTO 48 hours of beamtime on the XFM line at the Australian Synchrotron (experiment 17897).**
  - \$65 568
- 2022 **ANSTO 144 hours of beamtime on the IRM line at the Australian Synchrotron (experiment 17905).**
  - \$196 704
- 2022 **ANSTO 48 hours of beamtime on the IRM line at the Australian Synchrotron (experiment 18777).**
  - \$65 568
- 2021 **Australian Institute of Nuclear Science and Engineering Early Career Researcher Grant.**
  - \$10 000
- 2021 **University of New South Wales UNSW Science Covid-19 Strategic Support Grant.**
  - \$4 000
- 2018 **Australian Institute of Nuclear Science and Engineering Travel grant.**
  - \$1 000
- 2017 **Australian and New Zealand Geomorphological Group Travel grant.**
  - \$300
- 2016 **University of Western Australia Travel grant.**
  - \$1 850
- 2015–2018 **Australian Institute of Nuclear Science and Engineering Postgraduate Research Award Stipend.**
  - \$7 500pa
- 2015–2018 **Australian Institute of Nuclear Science and Engineering Postgraduate Research Award Analytical Budget.**
  - \$10 000pa
- 2014–2018 **Australian Government Research Training Program Stipend.**
  - \$26 000pa
- 2014–2015 **Snowy Hydro Ltd. Stipend.**
  - \$5 000pa
- 2014 **University of Western Australia Stipend.**
  - \$3 000

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## Publications

1. Cahill, N., Croke, J., Campbell, M., Hughes, K., Vitkovsky, J., Kilgallen, J. E., & Parnell, A. (2023). A Bayesian time series model for reconstructing hydroclimate from multiple proxies. *Environmetrics*, *n/a*(*n/a*), e2786. <https://doi.org/10.1002/env.2786>
2. Croke, J., Vítkovský, J., Hughes, K., Campbell, M., Amirnezhad-Mozhdehi, S., Parnell, A., Cahill, N., & Dalla Pozza, R. (2021). A palaeoclimate proxy database for water security planning in Queensland Australia. *Scientific Data*, *8*(1), 292. <https://doi.org/10.1038/s41597-021-01074-8>
3. McGowan, H., Campbell, M., Callow, J. N., Lowry, A., & Wong, H. (2020). Evidence of wet-dry cycles and mega-droughts in the Eemian climate of southeast Australia. *Scientific Reports*, *10*(1), 1–10. <https://doi.org/10.1038/s41598-020-75071-z>
4. McGowan, H., Callow, J. N., Soderholm, J., McGrath, G., Campbell, M., & Zhao, J. (2018). Global warming in the context of 2000 years of Australian alpine temperature and snow cover. *Scientific Reports*, *8*(1), 4394. <https://doi.org/10.1038/s41598-018-22766-z>
5. Campbell, M., Callow, J., McGrath, G., & McGowan, H. (2018). Co-authorship analysis of the speleothem proxy-climate community: working together to tackle the big problems. *International Journal of Speleology*, *47*(2), 165–172. <https://doi.org/10.5038/1827-806X.47.2.2159>
6. Campbell, M., Callow, J. N., McGrath, G., & McGowan, H. (2017). A multimethod approach to inform epikarst drip discharge modelling: Implications for palaeo-climate reconstruction. *Hydrological Processes*, *31*(26), 4734–4747. <https://doi.org/10.1002/hyp.11392>

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## Conference Presentations (presenting only)

### Talks

- Dec 2022 **Towards the development of fire proxies in speleothems using geochemical signatures in ashes from bushfires**, *2022 AQUA Biennial, Adelaide, Australia*, Campbell, M., McDonough, L., Naeher, S., Treble, P., Grierson, P., Sinclair, D., Howard, D., Baker, A..
- Feb 2022 **Reconstructing Australia's fire history from cave stalagmites**, *13th International Conference on Southern Hemisphere Meteorology and Oceanography, New Zealand (online)*, Campbell, M., McDonough, L., Kosarac, N., Treble, P., Baker, A.
- Nov 2021 **Applying an open access palaeoclimate database for Australia, climate reconstructions, and water security planning in Queensland**, *Seminar Panel, Australia*, Croke, J., Vitkovsky, J., Hughes, K., Campbell, M., Dalla Pozza, R.

Feb 2017 **A geophysical approach to inform epikarst drip discharge modelling: Implications for palaeo-climate reconstruction**, *Australian and New Zealand Geomorphological Group 17th Biennial Conference, Greytown, New Zealand*, Campbell, M., Callow, J.N., McGrath, G.S., McGowan, H.A.

#### Posters

Dec 2022 **Stalagmites as high-resolution archives of past fire severity**, *Synchrotron User Meeting, Melbourne, Australia*, Campbell, M., McDonough, L., Treble, P., Baker, A., Howard, D., Hankin, S.

Jul 2022 **Stalagmites as high-resolution archives of past fire severity**, *Climate Change, The Karst Record IX, Innsbruck, Austria*, Campbell, M., McDonough, L., Treble, P., Baker, A., Howard, D., Hankin, S.

Dec 2021 **Speleothems as palaeofire archives - a synthesis and meta-analysis of data and methods**, *American Geophysical Union, Fall Meeting, New Orleans, USA (online)*, Campbell, M., Treble, P., McDonough, L., Baker, A., Kosarac, N.

Nov 2021 **Speleothem 14C is unlikely to be impacted by wildfire - case studies from Western Australia and Tasmania**, *Accelerator Mass Spectroscopy 15th International Conference, Sydney, Australia*, Campbell, M., McDonough, L., Kosarac, N., Treble, P., Markowska, M., Baker, A., Hua, Q.

Apr 2018 **Climate patterns in South-east Australia: the Last Interglacial vs. the last 2K**, *20th EGU General Assembly, Vienna, Austria*, Campbell, M., Callow, J.N., McGowan, H.A., McGrath, G.S., Wong, H.

Feb 2017 **First Insights of the Eemian Hydroclimate of the Snowy Mountains, Australia**, *Australian and New Zealand Geomorphological Group 17th Biennial Conference, Greytown, New Zealand*, Campbell, M., Wong, H., McGrath, G.S., McGowan, H.A., Callow, J.N.

Dec 2016 **First Insights of the Eemian Hydroclimate of the Snowy Mountains, Australia**, *American Geophysical Union, Fall Meeting, San Francisco, USA*, Campbell, M., Wong, H., McGrath, G.S., McGowan, H.A., Callow, J.N.

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#### Service

Nov 2022 - **UOW Honours thesis examiner.**  
Nov 2022

Jul 2022 - **Session Co-Chair, Climate Change the Karst Record IX.**  
Jul 2022 ○ Co-Chair for session 'Cave Monitoring'

- Aug 2021 - **Executive Committee Member, Australasian Quaternary Association.**  
 Present ○ IT and communications  
 ○ Organising committee for AQUA's inaugural mentoship program
- Aug 2017 - **Participant, Science in Schools Program.**  
 Aug 2017 ○ Travelled to a regional town to share some love for science with primary school kids
- Jan 2016 - **Co-Convenor, SEE LearnR Workshop.**  
 Mar 2016 ○ Organised a short series of 'Introduction to R' courses for the students and staff of the School of Earth and Environment  
 ○ Presented 'Introduction to ggplot2'  
 ○ Presented 'Introduction to R'
- Feb 2015 - **Postgraduate representative to the School of Earth and Environment.**  
 Jul 2017 ○ Led the organisation of 2 annual symposia for postgraduate students within the school.  
 ○ Reported student concerns to the School administration  
 ○ Support and troubleshooting for new students
- Oct 2014 - **Guest presenter, ENVT2221: Global Climate Change and Biodiversity.**  
 Oct 2014 ○ Presented 'Palaeo-climate and Stalagmites' for 2nd-year Biology students at UWA

## Completed Peer Reviews

- 2022 Paleooceanography and Paleoclimatology.  
 2021 Geology.

## Professional Development

- 2022 Science Meets Parliament. Online  
 2020 Advanced R Workshop. The University of Queensland, Australia  
 2020 Intermediate R Workshop. The University of Queensland, Australia  
 2018 Weathering Climate Change: How have humans coped with climate change-and how will we continue to do so. The University of Western Australia, Australia  
 2018 Masterclass in Creating Opportunities and Developing your Research Skills. The University of Western Australia, Australia  
 2016 Synthesis II - From dynamics of structure to function of complex networks. TU Dresden, Germany  
 2016 Water on Earth: origin, reservoirs, and its global cycle. The University of Western Australia, Australia  
 2016 Fundamentals of the analysis of networks. The University of Western Australia, Australia  
 2014 Writing and publishing in scientific journals. The University of Western Australia, Australia

## Professional Memberships

- Aug 2021 - European Geosciences Union.  
 Present

Jul 2021 - Australasian Quaternary Association.  
Present

Jul 2021 - American Geophysical Union.  
Present

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## Referees