Dr HEARNE Thomas S.

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Professional Experience

2020 **Université Paris-Saclay/CNRS** **Orsay, Fra**

Post-Doctoral Researcher at the Institut de Science Moleculaires d'Orsay (ISMO) – 01/12/2020 to now

- Working on the HEROES project: testing new heterodyne spectrometers on the AILES infrared beamline at the synchrotron SOLEIL
- Developing new microwave/mmwave experiments at ISMO

2017 - 2020 **Université de Rennes 1** **Rennes, Fra**

Post-Doctoral Researcher at the Institut de Physique de Rennes – 27/09/2017 to 27/09/2020

- Developed the CRESUCHIRP ERC project from its initiation
- Responsibilities included: designing and constructing a chirped-pulse microwave spectrometer, conducting rotational spectroscopy experiments, operation and maintenance of lasers and related equipment (excimer, Nd:YAG, dye, OPO), writing programs for instrumental interface, writing routines for data analysis, running computational fluid dynamics simulations, preparing and editing papers for publication, and presenting at international conferences
- Published 3 papers, one as first author (see publication list)
- Mentored doctoral students and M1/2 interns

2014 - 2017 **University of Western Australia** **Perth, Aus**

Laboratory demonstrator for physical chemistry and analytical chemistry courses

- Responsible for managing student safety and performance
- Marked laboratory reports and assignments of groups of up to 150 students

2017 **Scitech** **Perth, Aus**

Volunteer "SciGuide" in a team that delivered scientific education to visitors at a world-renowned interactive science museum, ran hands-on scientific activities with visitors of all ages

2010 - 2011 **Tall Poppy Tutors** **Perth, Aus**

Tutor in high-school mathematics, chemistry, physics, economics and English literature

- Set goals in academic performance for students, and helped them to achieve those goals

Skills

- Excellent physical chemistry knowledge and experience with a wide variety of spectroscopic techniques, including: EPR, mass, LIF, microwave/mm-wave, THz, FT-IR, and UV-Vis
- Adept at preparing and editing manuscripts for publication, posters and seminars
- B2-level working proficiency in French
- Proficient in mathematical and scientific software, such as the OpenFOAM computational fluid dynamics program, as well as programming in Python and LabView
- Organisation of scientific networks and conferences

Education

2014 - 2017 **University of Western Australia** **Perth, Aus**

PhD in Physical Chemistry – (BAC+9)

- Supervised by Prof Allan McKinley & Dr Duncan Wild
- Thesis Titled "An electron spin resonance investigation of astronomically relevant radicals"
- Granted an Australian Postgraduate Award and a UWA Safety-Net Top-Up scholarship
- Operated a large variety of laboratory equipment, including: Electron Paramagnetic Resonance (EPR) spectrometer, ultra-high vacuum system, liquid helium cryogenics, Nd:YAG laser and optics, mass spectrometer, and a Linux-based server running *ab initio* calculations
- Published 4 papers as 1st author in high-impact journals (see publication list)

2013 **University of Western Australia** **Perth, Aus**

Honours in Physical Chemistry (First Class) – (BAC+5)

- Honours project supervised by Prof Allan McKinley, titled "An electron spin resonance investigation of small magnesium radicals"
- Weighted average mark – 85/100

2009 - 2012 **University of Western Australia** **Perth, Aus**

Bachelor of Science/Bachelor of Arts Double Degree – (BAC+4)

- Majored in Chemistry and English with a weighted average mark of 74/100

2001 - 2008 **Aquinas College** **Perth, Aus**

High School Certificate – (BAC)

- *Proximae Accessit* with subject awards in Chemistry, Applicable Mathematics and Economics; TEE distinction in Chemistry; Caltex All Rounder Award; Tertiary Entrance Rank – 99.8

Interests

- Sport: rugby, cricket, golf, and football
- Trumpet and guitar, toured internationally with the Aquinas College Swing Band
- Travel, I enjoy presenting at conferences and would relish further opportunities abroad

Publication List

Published

Hearne, T. S.; Abdelkader Khedaoui, O.; Hays, B. M.; Guillaume, T.; Sims, I. R. A Novel Ka-Band Chirped-Pulse Spectrometer Used in the Determination of Pressure Broadening Coefficients of Astrochemical Molecules. J. Chem. Phys. 2020, 153 (8), 084201. https://doi.org/10.1063/5.0017978.

Hays, B. M.; Guillaume, T.; **Hearne, T. S.**; Cooke, I. R.; Gupta, D.; Abdelkader Khedaoui, O.; Le Picard, S. D.; Sims, I. R. Design and Performance of an E-Band Chirped Pulse Spectrometer for Kinetics Applications: OCS – He Pressure Broadening. J. Quant. Spectrosc. Radiat. Transf. 2020, 250, 107001. https://doi.org/10.1016/j.jqsrt.2020.107001.

Gupta, D.; Cheikh Sid Ely, S.; Cooke, I. R.; Guillaume, T.; Abdelkader Khedaoui, O.; **Hearne, T. S.**; Hays, B. M.; Sims, I. R. Low Temperature Kinetics of the Reaction Between Methanol and the CN Radical. *J. Phys. Chem. A* **2019**, *123* (46), 9995–10003. https://doi.org/10.1021/acs.jpca.9b08472

Hearne, T. S.; Karakyriakos, E.; Dunford, C. L.; Kettner, M.; Wild, D. A.; McKinley, A. J. A Matrix Isolation ESR Investigation of the MgCH Radical. *J. Chem. Phys.* **2019**, *151* (12), 124304. https://doi.org/10.1063/1.5119146

Hearne, T. S.; Wild, D. A.; McKinley, A. J. A Matrix Isolation ESR Investigation of Mg^{+}-N_2. *J. Chem. Phys.* **2019**, *150* (18), 184310. https://doi.org/10.1063/1.5090923

Hearne, T. S.; Yates, S. A.; Wild, D. A.; McKinley, A. J. Matrix Isolation ESR and Theoretical Study of ZnN. *J. Phys. Chem. A* **2019**, *123* (17), 3709–3717. https://doi.org/10.1021/acs.jpca.9b00601

Hearne, T. S.; Yates, S. A.; Wild, D. A.; McKinley, A. J. A Matrix Isolation ESR and Theoretical Study of MgN. *J. Chem. Phys.* **2017**, *147* (4), 044307. https://doi.org/10.1063/1.4993794