Associate Professor Carol Oliver PhD SFHEA

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| A person wearing glasses  Description automatically generated with low confidence | *Research profile:* <https://research.unsw.edu.au/people/associate-professor-carol-ann-oliver>  *Google scholar:* <https://scholar.google.com.au/citations?user=6UetsBkAAAAJ&hl=en>  *Linkedin:* <https://www.linkedin.com/in/drcarololiver/>  *E-mail:* [carol.oliver@unsw.edu.au](mailto:carol.oliver@unsw.edu.au)  *Address:* Room 5009, Building E26  University of New South Wales, NSW 2052  *Mobile:* 0417 477 612 |

I am an Education Focused (EF) track academic with research and online teaching expertise in science communication and astrobiology. Alongside extensive industry experience and research qualifications in science communication, I am recognised nationally and internationally for my pioneering technology-enabled online teaching. I have blazed new trails especially with Virtual Field Trips (VFTs), including developing these with MIT, Arizona State University (ASU), the University of Auckland, and UNSW. I am internationally recognised for my activities in the search for life elsewhere in the universe. My institutional, national, and international collaboration and leadership are well evidenced in my School and University positions, successful research supervision, appointment to prestigious national committees, contributions to space science thought leadership, and above all my entrepreneurial direction of multiple successful cutting-edge projects in space science in the past decade.

## Education

* PhD, University of New South Wales (2008)
* Master of Science Communication (by research), Central Queensland University (2003)

**Awards**

* Fellow of the UNSW Scientia Education Academy (2022-2026)
* Senior Fellow of the UK Higher Education Academy (2021 -)
* UNSW Vice Chancellor’s Award for Teaching Excellence (2022)
* Fellow of UNSW PLuS Alliance (2018 -)
* Elected member of the International Academy of Astronautics
* Academic and Research Network (AARNet) Award for Education Excellence (2014)
* The Australian Innovation Challenge finalist in education excellence (2013).
* Fulbright Symposium Science Education in Partnership, Hamilton Island, Great Barrier Reef (2002).
* American Field Service scholarship (1966-1967).

**Grants**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Title of Project and partners** | **Role** | **Funding Source** | **Start** | **Completion** | **Total $** |
| Redefining museum experience as an immersive networked narrative | CI | ARC Linkage | 2019 | 2022 | $466,150 |
| Digital assessment: empowering students and supporting teachers through innovative student-oriented educational practices | CI | Education Focused Foundation UNSW | 2018 | 2018 | $10,000 |
| Intelligent and Generic Cross- Platform Virtual Reality for Next Generation  Student Experiences: New Frameworks for Immersive Pedagogy | CI | SEIF#2 UNSW | 2015 | 2017 | $359,000 |
| *Scientia AVIE* multi-function integration: distributed data visualisation and robotic interaction functionality | CI | MREII UNSW | 2015 | 2016 | $99,055 |
| Enhancing a Large Online Course using Interactive Web Technology | CI | SEIF#2 UNSW | 2015 | 2016 | $278,000 |
| Smart Science Initiative | PI | Australian | 2013 | 2014 | $1,640,000 |
| (UNSW (lead), Flinders | Maths and |
| University, UWA, and | Science |
| technology partner Smart | Partnerships |
| Sparrow) | Program |
| The Mars Lab, UNSW (lead), University of Sydney, | PI | Broadband- Enabled | 2013 | 2015 | $2,900,000 |
| and Museum of Applied Arts  and Sciences. | Education and  Skills Services |
|  | Program  (DEEWR) |
|  | Program |
| Pathways to Space, UNSW (Lead), University of Sydney, the Museum of Applied Arts and Sciences, and Cisco | PI | Australian Space Research Program (DICCSRTE) | 2010 | 2013 | $987,573 |
| A Virtual Field Trip to the | CI | Australian | 2005 | 2006 | $119,500 |
| Pilbara, Western Australia | Schools |
| (Macquarie University in | Innovation in |
| partnership with NASA | Science, |
| Learning Technologies) | Technology |
|  | And Maths |
|  | Program |
| International Astronomical Union Symposium 213 (Macquarie University and  the Australia Telescope National Facility) | CI | International Astronomical Union | 1999 | 2002 | $30,000 |
| Science Education in | CI | Australian- | 2001 | 2002 | $20,000 |
| Partnership Symposium | American |
| (Macquarie University) | Fulbright |
|  | Association |
|  | | | | **TOTAL** | **$6,631,278** |

**Social Engagement, Global Impact and Leadership**

* **National leadership:**

1. Australia in Space Expert Working Group Report (as Chair) (2022).
2. As an expert and active contributor: A vision for space science and technology in Australia: Securing and advancing Australia’s interests through space research (Australian Academy of Science, (2017); Inspiring Australia—Expert Working Group on Developing Evidence Base for Science Engagement in Australia (2011); Decadal Plan for Australian Space Science: Building a national presence in space 2010-2019 (2010).

* **Global impact:** VFT development leading to Education Through eXploration (ETX) Centre at ASU. King’s College London in 2020 introduced a science communication course modelled on my UNSW courses. Arizona State University students now take my Science of Science Communication course (BEES6800, ASU course code TWC371) as part of their ASU degree. (2021-).
* **Social engagement:**

1. Astrobiology in prisons collaboration with Prof Charles Cockell, UK Centre for Astrobiology, Edinburgh University, UK (2022 -).
2. Co-Leading an international task group to update the International Academy of Astronautics SETI Committee post-detection protocols. These protocols have been adopted by the United Nations Committee on the Peaceful Uses of Outer Space, of which Australia is a signatory.

## Research students

## Current postgraduate students

## Clare Fletcher (PhD in astrobiology)

* + Helen Palmer (MPhil in space policy)

## Past PhD students and destinations

* Dr Isabelle Kingsley, 2022; Office of Women in STEM, UNSW.
* Dr Tara Djokic, 2020; UNSW, The Australian Museum.
* Dr Brett Biddington AM, 2019; UNSW; Australian Department of Defence.
* Dr Yi-Ling Hwong, 2018 UNSW; Postdoctoral Fellow Climate Change Research Centre, UNSW, followed by Marie Curie (IST-BRIDGE) Postdoctoral Fellow at the Institute of Science and Technology in Vienna, Austria.
* Dr Jennifer Fergusson, 2013; UNSW and the University of Technology Sydney.

## Past Honours students and destinations

* Mikayla Keen, BSc (Hons First Class) 2007, Macquarie University, CSIRO.
* Eric Dalgliesh, BSc (Hons First Class) 2007, Macquarie University, Atlassian.

## PhD Panel Chair

* Grace Nye Butler (marine biology – marine microplastics debris)
* Sukyur Sukyur (marine biology - seaweed)

## Professional experience:

2020 – 2022 Co-Lead Online Learning and Innovation Community of Practice UNSW

2017 – 2019 Postgraduate Coordinator (Candidature) BEES

2012 – 2018 Deputy Director, *Australian Centre for Astrobiology*, UNSW

2008 – 2010 Science communicator, *Australian Centre for Astrobiology*, UNSW

2002 – 2007 Executive Officer, *Australian Centre for Astrobiology*, Macquarie University 1994 – 2002 Science communicator, Western Sydney University

2000 – 2002 Producer and reporter, 2SER radio science show *Discovery*

1990 – 1994 Freelance science journalist, Australia

1988 – 1989 Personal Finance Editor *Your Money* Oracle Teletext Service 1979 – 1988 City, news and science reporter, Independent Television News 1977 – 1979 Deputy chief sub-editor *Portsmouth News*

1976 – 1977 Sub-editor and later deputy chief sub-editor *Portsmouth News*

1972 – 1976 Features editor, Lincolnshire Standard Newspaper Group 1971 – 1972 News reporter, *Havering Recorder*, Romford, Essex

## Mentee awards

* Student Outstanding Paper, Yi-Ling Hwong, American Geophysical Union.
* Three-Minute Thesis Competition, BEES, Yi-Ling Hwong.

## Learning and teaching

I designed, developed, implemented, and now teach four fully online courses as mentioned earlier. I regularly evaluate the courses using Moodle analytics and other measurement and maintain a close teacher-learner relationship with students. In 2022, my course satisfaction rate in all four of my courses was greater than 95%.

* + BEES2741 Introduction to Astrobiology (second year undergrad)
  + BEES6741 Astrobiology: Life in the Universe (postgrad and third year undergrad)
  + BEES2680 Introduction to Science Communication (second year undergrad)
  + BEES6800 The Science of Science Communication (postgrad and third year undergrad)

*Impact 1:*I began with just 26 students in BEES6741 in 2015 when I converted the course from face-to-face to fully online, doubling numbers to 52 in the first offering. My courses collectively serve around 250 undergraduate and postgraduate students a year.

*Impact 2:* BEES6800 was approved by Arizona State University in December 2020 for offering to ASU students as part of the PLuS Alliance partnership with UNSW. The first intake of ASU students into UNSW was in 2021.

*Impact 3:* BEES 6800 prompted King’s College London to send a professor to UNSW to co-develop a second-year course for online at UNSW (BEES2680) and face-to-face at KCL. Each version has about 40 students enrolling each year.

*Impact 4:* BEES2741 prompted the co-development of a New Zealand hot springs Virtual Field Trip with Prof Kathy Campbell and the University of Auckland in 2022. The VFT was incorporated into BEES2741 and to the University of Auckland’s astrobiology course. The latter adopted the pedagogy of BEES2741.

**Education and outreach projects**

**2010-2019:** A 140-square-metre Mars Yard was created at the Powerhouse Museum for the dual use of researchers and school students. It involved two grants for the Mars Yard - Pathways to Space (an in- person experience using the Mars Yard to explore Mars using rovers) followed by the Mars Lab (students planning Mars missions and driving experimental rovers on the Mars Yard from their classroom wherever that was in Australia or elsewhere in the world).

* + *Impact 1:* Four doctorates and four Masters theses arising from engineering and education research using the Mars Yard in a public space.
  + *Impact 2:* At least 5,000 primary and high school students across Australia and 1,000 international students engaged with science and engineering involving Mars missions.
  + *Impact 3:* At least 5,000 museum visitors to MAAS engaged in science and engineering through daily demonstrations with the rovers.
  + *Impact 4:* The Mars research rovers appeared at multiple public events outside of the museum to engage public audiences with Mars-related science and engineering.
  + *Impact 5:* At least 300 teachers from Sydney and beyond participated in Mar Yard-related teacher professional development.
  + *Impact 6:* The Mars Yard attracted a total of 25 international research scholars for up to six months at a time.
  + *Impact 7:* Multiple media interactions when astronaut Charles Bolden, then head of NASA, visited the Mars Yard twice at his request. Other VIP visitors included Bill Gates and the then US Ambassador to Australia, John Berry.
  + *Impact 8:* A group of Year 10 and Year 11 students researched with the project for eight months in collaboration with the Mars Student Imaging Project at Arizona State University. It resulted in a refereed science conference proceedings paper on predicting the location of hydrothermal systems on Mars. The two lead authors won scholarships to university based on the paper.
  + *Impact 9:* Space engineering and space science education papers arising - 15 journal papers, seven refereed conference proceedings papers, eight conference papers and one US Department of Defence report.
  + *Impact 10:* Multicast studio established linking multiple Australian high schools to NASA and Australian scientists. The studio made the Powerhouse Museum the leading Australian cultural institute in education video conferencing.
  + *Impact 11:* Mobile classroom and computing equipment from the Mars Yard project continues to provide education experiences for student across Australia.
  + *Impact 12:* Mobile classroom used to engage with Aboriginal students from the Cathy Freeman Foundation.
  + *Impact 13:* Post-doctoral position with NASA’s Jet Propulsion Laboratory for doctoral student whose thesis was based on Mars rover research using the Mars Yard.
  + *Impact 14:* Insights into how students see science and react to understanding the nature of scientific uncertainty transferred into my two astrobiology courses.

**Partners:** *UNSW, University of Sydney, Museum of Applied Arts and Sciences, and Cisco.*

**2016-2017:** An interactive Virtual Field Trip was created with a PhD student and iCinema for use as an assignment in my third-year astrobiology course, BEES6741, facilitated by a UNSW Scientia Education Investment Fund (SEIF) grant.

* + *Impact 1:* Demonstrated it was possible to teach non-geology students enough geology in four weeks for them to be able to explore a complex field environment. They visit ten sites, evaluate 60 pieces of evidence, and acquire an approximate idea of the sequence of events that allowed early microbial life to flourish in the area 3.48 billion years ago.
  + *Impact 2:* Provision of a handwritten field notebook in the Virtual environment resulted in 85% of the class being able to accurately explain the sequence of events that must have occurred, while the remainder had an approximately accurate understanding.

**Partners:** *Academics from UNSW Science, Arts and Medicine faculties and UNSW’s iCinema facility.*

**2013-2014:** Led the transfer of adaptive e-learning, a UNSW spin-off application, through development of modules in nanotechnology, medicine, climate change and astrobiology for Australian high schools.

* + *Impact 1:* 1,600 high school students across NSW, Tasmania, South Australia, and Western Australia engaged in science through adaptive e-learning.
  + *Impact 2:* CSIRO took up the project post-funding to produce more adaptive e-learning modules for high school students.

**Partners:** *UNSW, University of Western Australia, Flinders University, and technology partner Smart Sparrow.*

**2014-2015:** Evaluated the effects introducing adaptive e-learning into a large UNSW course, PHYS1160. UNSW Scientia Education Investment Fund (SEIF) grant.

* + *Impact 1:* Demonstrated that students did not watch the lectures provided online but relied on the slides as lecture notes as the key learning tool. The basis for change in approach was established.
  + *Impact 2:* Demonstrated when both lectures and slides were eliminated, the learning tool students used most became the adaptive e-learning, leading to a better grasp of course content.

**2009-2014:** Suite of web-based astrobiology Virtual Field Trips created for students and the public [vft.asu.edu](http://vft.asu.edu/)

* + *Impact 1:* Free public and student access to 25 immersive Virtual Field Trips to places of astrobiological interest around the world (with or without a guide for the VFTs – user choice).
  + *Impact 2:* The first six VFTs prompted interest from other universities who have partnered with the project to raise the number of VFTs to 25.
  + *Impact 3:* The VFT project prompted the formation of the Center for Education Through eXploration (ETX) at Arizona State University [etx.asu.edu.](http://etx.asu.edu/) The formation of ETX led to substantial ongoing NASA funding for ETX to provide innovation in education to K-12 teachers. A flagship fully online adaptive e-learning-based course, *HabWorlds*, was built by ETX and offered to ASU students<https://www.habworlds.org/about/>

**Partners:** *Arizona State University and MIT. I partnered as a collaborator in a US$6.5m NASA*

*Astrobiology grant to ASU’s Follow the Elements program that funded the VFTs.*

**2004-2007:** Pioneered the first immersive astrobiology-related Virtual Field Trip with NASA Learning Technologies. It was delivered to high schools across Australia using a DVD attached to Cosmos Magazine – 60% of Australian schools subscribed to the magazine at the time. The DVD was linked to a wiki website for access to further resources. It is archived at <http://pilbara.mq.edu.au/wiki/Main_Page>

* + *Impact 1:* The wiki website received almost 300,000 full page views in the first year.
  + *Impact 2:* The project prompted the later project in which 25 more VFTs were developed (see VFT development above).

**Partners:** *NASA Learning Technologies and Macquarie University.*

**Mentorship**

I undertake mentorship of postgraduate students and staff on a regular basis. In the past year these have (or currently) include:

* Learning and teaching in astrobiology and science communication
* Careers
* PhD and Masters in process (in addition to my students)
* Online learning and innovation (including making Virtual Field Trips)

## 

## UNSW learning and teaching contributions

* As a member of the UNSW CELEBS Community of Practice, I contributed the following video on the *Evaluation of a novel way to build online courses*, May 2019: <https://teaching.unsw.edu.au/celebs-video-17>
* TELT seminar, *Outcomes from transforming a face-to-face course to fully online*, February 2016: <https://teaching.unsw.edu.au/outcomes-transforming-face-face-course-fully-online>

# Professional service

* + Co-Chair of the Permanent SETI Committee, International Academy of Astronautics (2010 -)
  + Past member of the Australian Academy of Science’s National Committee for Space

and Radio Science (2017-2022).

* + Member of the Local Organising Committee COSPAR 2021, Sydney
  + Collaborator on Arizona State University’s NASA Astrobiology team Follow the elements (2009- 2014) <http://astrobiology.asu.edu/Astrobiology/People.html>
  + Past member of the NASA Astrobiology Institute Advent of Complex Life team
  + Past chair International Academy of Astronautics Study Group Future Directions in Space Education
  + Co-chair NASA Astrobiology Institute, Science Communication Roadmap Focus Group 2003-2005
  + Chair, Local Organising Committee, 2002 International Bioastronomy Conference, (Bioastronomy 2002: Life Among the Stars), Hamilton Island, Great Barrier Reef
  + Co-Chair, Australian-American Fulbright Symposium held in tandem with the International Bioastronomy Conference, Hamilton Island, Great Barrier Reef

# Workshops and public talks

* Astro 3D Writing Retreat for the Centre for Astronomy and Space Science researchers, **guest speaker** on ways to focus on the point of a journal paper and how to construct it using a proven story technique, UNSW May 2019.
* Australian Academy of Sciences, Shine Dome, Canberra public presentation – last in the 2017 monthly series of public talks on the Dawn of the Space Age. Talk entitled Australia’s role in the search for life on Mars. <https://www.youtube.com/watch?v=tFVAP6BZbGU&t=2361s>
* University of Western Sydney, Penrith Observatory May 2014 **–** Mum’s and kids’ night: “Women in astronomy” **invited speaker.**
* Astronomy from the Ground Up, Parkes radio telescope, May 2013, live cross to Mars Yard to demonstrate use of Mars rovers in variety of curriculum-related classroom activities for teachers from around Australia. **Invited speaker.**
* Sydney Skywatchers, Sydney Observatory, February 2013. Mars on Earth – Right here in Sydney, **invited speaker.**
* The National Science Communication Officers’ Forum, December 2010. Essential tools and approaches for developing communication strategies within scientific and technical research environments, **featured speaker.**
* Australian Science Communicators, University of New South Wales, June 2009. Presented an evidence-based science communication workshop for science journalists and science communicators. **Invited workshop leader**. See <http://www.asc.asn.au/blog/2009/08/24/nswscicomm_workshop/>
* Harley Wood Astronomy Winter School, Freemantle, July 2008, workshop for university students and researchers on how to communicate like cosmologist Carl Sagan. **Invited speaker.**

# Opinion pieces

September 2017, The Conversation. *Australia’s new national space agency will help students reach for the stars in STEM****,* C. Oliver (Invited)** [https://theconversation.com/australias-new-national-space-agency-will-](https://theconversation.com/australias-new-national-space-agency-will-help-students-reach-for-the-stars-in-stem-84702) [help-students-reach-for-the-stars-in-stem-84702](https://theconversation.com/australias-new-national-space-agency-will-help-students-reach-for-the-stars-in-stem-84702) (5,100 reads to February 2020).

December 2013, The Conversation. *To launch Australia into space, we need inspiration*, M. Walter, B.Biddington, **C. Oliver**, and R. Sach. [http://theconversation.com/to-launch-australia-](http://theconversation.com/to-launch-australia-into-space-we-need-inspiration-20722) [into-space-we-need-inspiration- 20722](http://theconversation.com/to-launch-australia-into-space-we-need-inspiration-20722) (4,100 reads to February 2020).

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# Publications

1. Kingsley, I., **Oliver, C.A.** & Slavich, E. (2019). Hidden in the figures: What students are telling us about the effectiveness of astrobiology outreach. *Astrobiology,* 19(9): 1103- 1116)
2. Hwong, Y., **Oliver, C.A.,** Van Kranendonk, M., & Seroussi, Y. (2016). What makes you tick? The psychology of social media engagement in space science communication. *Computers in Human Behaviour,* 68:480-492.
3. **Oliver, C.A.,** Fergusson, J., Kingsley, I., Oliver, J., Mahony, P. & Browne, C. (2015). The Mars Lab – Connecting authentic science with the classroom. *Scan Journal* (Department of Education NSW).
4. Dougherty, K., **Oliver, C.A.** & Fergusson, J. (2014). Pathways to Space: A mission to foster the next generation of scientists and engineers. *Acta Astronautica* (99) pp184-192.
5. Fergusson, J., **Oliver, C.A.** & Walter, M.R. (2012). Astrobiology outreach and the nature of science: The role of creativity. *Astrobiology*, **12**:12 (1143-1153).
6. **Oliver, C.A.** & Walter, M.R. (2009). Outback search for life on Mars*. Australasian Science* **30**:7 (18-21).
7. **Oliver, C.A.** & Fergusson, J. (2007). Astrobiology: A pathway to science literacy? 56th International Astronautical Congress*,* Fukuoka, Japan, October 16-21. *Acta Astronautica*, Elsevier **61 (**716-723)
8. **Oliver, C.A. (**2007). The Virtual Global Space Exploration Education Portal. *Acta Astronautica*, Elsevier **61** (548-552)
9. DeVore, E., **Oliver, C.A.**, Wilmoth, K.L. & Vozzo, L. (2004). Science Education in Partnership: The 2002 Australian-American Fulbright Symposium. *Advances in Space Research*, Elsevier **34** (2116-2120)
10. Shostak, G.S. & **Oliver, C.A.** (2000). Immediate Reaction Plan: A strategy for dealing with a SETI detection. *A new Era in Bioastronomy*, Astronomical Society of the Pacific Conference Series, **21** (635-640**).**
11. **Oliver, C.A.** (1997). Is there anybody out there? The search for extraterrestrial intelligence. *Australasian Science*, (28) 8:241-243

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# Published abstracts

# Bruce, G., Oliver, C., Taylor, W.L., Mead, C., Semken, S., Summons, R., Buxner, S. & Anbar, A.D. (2019). Advancing 25 years of digital innovation-exploring the evolution of 360 degree virtual

field trips from Apple’s human interface group to modern gamification and beyond. *GSA Annual Meeting*, Phoenix, Arizona.

1. Horodyskyj, L., Mead, C., **Oliver, C**. & Anbar, A.D. (2019). Teaching real science: A novel approach to engaging students in the scientific process. *GSA Annual Meeting*, Phoenix, Arizona.
2. Bruce, G., Taylor, W., Anbar, A.D., Semken, S.C., Buxner, S., Mead, C., El-Moujaber, E., Summons, R. & **Oliver, C.** (2016). Linking immersive virtual field trips with an adaptive learning platform. *American Geophysical Union Fall meeting*, San Francisco.
3. Bruce, G., Semken, S., Summons, R., Horodyskyj, L., Kotrc, B., Buxner, S., Swann, J., Klug- Boonstra, S., **Oliver, C.** & Anbar, A.D. (2015). Interactive technology enabling a virtual exploration of our evolving planet. *Astrobiology Conference***,** Chicago, 15-19 June.
4. Anbar, A.D., Bruce, G., Semken, S.C., Summons, R.E., Buxner, S., Horodyskyj, L., Kotrc, B., Swann, J., Klug Boonstra, S.L. & **Oliver, C.** (2014) Virtual exploration of Earth’s evolution, *American Geophysical Union* Fall meeting.
5. Bruce, G., Anbar, A.D., Semken, S.C., Summons, R.E., **Oliver, C.** & Buxner, S. (2014). iVFTs- immersive virtual field trips for interactive learning about Earth’s environment*. American Geophysical Union* Fall meeting.
6. Chan, R., Baloch, A., Chen, J., Epstein, J., Gleeson, S., Mac, L., McKinlay, W., Smith, J., Telalovic, B., Tran, S., Zhou, J., Stanger, J., **Oliver, C.A**. & Fergusson, J. (2012). Are ancient hydrothermal systems present in some types of Martian craters? *12th Australian Space Science Conference*, Melbourne, Australia, 24-26 September.
7. Fergusson, J., **Oliver, C.** & Walter, M. (2011). Engaging in science through astrobiology outreach*. American Geophysical Union Fall meeting* San Francisco.
8. **Oliver, C.A**., Walter, M.R. & Davies, P. (2008). How a novel international astrobiology education projected changed the understanding of science for almost half the participating students*. Astrobiology*, **8**:12.
9. Fergusson, J. and **Oliver, C.A.** (2006). Learning in authentic Earth and planetary contexts. *American Geophysical Union Fall meeting*, San Francisco.
10. **Oliver, C.A.** (2004). Public and media react to 2003/2004 Mars missions: A case for the internet as a primary source of astrobiology news. *International Journal of Astrobiology*.
11. **Oliver, C.A.**, Fergusson, J., Ryde, S., Anitori, R., Walter, M. & DeVore, E. (2004). High school students in an international NASA mission: Unexpected outcomes*.* International Bioastronomy Conference, Reyjavik, Iceland, July 12-16, *Astrobiology* (4) 2:232-308
12. Vozzo, L**., Oliver, C.A.,** Silburn, K. & Tweed, D. (2000). Science education using SETI as a context for the NSW Stage 4 and 5. *Bioastronomy Conference*, Hawaii, 1999.

**Book chapters**

1. **Oliver, C.** (in press). *The social brain and the neuroscience of storytelling*. In: A practical guide for students and teachers. Rowland S. and Kuchel L (Eds), Springer Nature.
2. **Oliver, C.** (in press). *Making note-taking memorable*. In: A practical guide for students and teachers. Rowland S. and Kuchel L (Eds), Springer Nature.
3. Kenderine, S; Yip, A; **Oliver, C**; Pather N; Sammut, C; Djokic T; Marcus, N; Ong A. (2021). *Designing multi-disciplinary Interactive virtual environments for next-generation Immersive Learning experiences: Case studies and future directions in astrobiology, anatomy, and cultural heritage*. In: Creative and Collaborative Learning through Immersion Interdisciplinary and International Perspectives, Springer Nature, <http://dx.doi.org/10.1007/978-3-030-72216-6_4>

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# Invited keynote and plenary presentations

* 1. **Oliver, C.A.** (2022).Virtual Field Trips made easy. Australian Universities Geoscience Educators Network annual meeting 4 Feb, Melbourne. Presented virtually.
  2. **Oliver, C.A.** (2016). New opportunities for teaching and learning in universities and high schools: Moving from the field to museums and into the digital space. *5th Australasian University Geoscience Educators Network (AUGEN) conference,* **Plenary speaker**
  3. **Oliver, C.A.** (2016). Adopting, adapting, adjusting: using technology in your teaching. *Science Teaching and Learning Colloquium*, Australian National University. **Keynote speaker.**
  4. **Oliver, C.A. (**2015). Transforming a face-to-face course to fully online. *UNSW Blended Learning Forum,* October. **Invited speaker.**
  5. **Oliver, C.A.** (2013). A live demonstration of controlling rover in Mars Yard at the Powerhouse. Sydney*, Digital Productivity Conference*, Brisbane, June**. Invited speaker.**
  6. **Oliver, C.A.** (2013). Mars Yard in the classroom, *57th Australian Information and Communications Technology in Education Committee meeting*, Brisbane, July. **Invited speaker.**
  7. **Oliver, C.A.** (2007). Australian space science education and outreach: laying the foundations? *7th Australian Space Science Conference*, Sydney, September 24-27. **Invited keynote speaker.**
  8. **Oliver, C.A.**, Fergusson, J., Bruce, G., Gaskins, T. & Evans, R. (2006). *The NASA-* Macquarie University Pilbara Education Project: Connecting the public to ‘science in the making’ via virtual reality and the Internet.**invited paper**, *American Geophysical Union Fall Meeting,* San Francisco, December 11-16.

# Scholarly reports

# (2022). Australian in Space: A decadal plan for Australian space science 2021-2030, Companion Document Expert Working Group report (as Chair of the working group). <https://www.science.org.au/files/userfiles/support/reports-and-plans/2022/companion-document-australia-in-space-a-decadal-plan-for-australian-space-science-2021-2030.pdf>

1. (2017). *A vision for space science and technology in Australia,* Australian Academy of Science, Canberra. (As expert contributor). [https://www.science.org.au/files/userfiles/support/documents/vision-space- science-technology-2017.pdf](https://www.science.org.au/files/userfiles/support/documents/vision-space-science-technology-2017.pdf)
2. (2011). *Inspiring Australia: Developing an Evidence Base for Science Engagement in Australia,* Department of Innovation, Industry, Science and Research. (As expert contributor). <https://www.industry.gov.au/data-and-publications/inspiring-australia-expert-working-group-reports>
3. (2010). *Decadal Plan for Australian Space Science*, Australian Academy of Science 2010-2019 Australian Academy of Science, Canberra. (As expert contributor). <https://www.science.org.au/supporting-science/science-policy-and-analysis/reports-and-publications/decadal-plan-australian>

# Conference presentations

# Oliver, C.A., Edwards, D., Hannah, G., Vu, T., Zheng, C., Sok, S., Hayes, N., Lu, X. & Cabanag, M. (2021). Putting immersive Virtual Field Trip creation into the hands of academics and students. *UNSW Education Festival*, 24 November.

1. Anbar, A., **Oliver, C.A.** & Hosman, L. (2019). Reimagining Education Though Exploration. *PLuS Alliance Symposium,* Arizona State University, Nov 12-13.
2. **Oliver, C.A.** (2018). Opportunities and challenges in a third level fully online astrobiology course.

*Australasian Astrobiology Conference*, Rotorua, July.

1. **Oliver, C.**A. (2017). Bobbie Vaile: A short life dedicated to SETI research. SETI Session II,

*International Astronautical Congress*, Adelaide, 25-29 September.

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