
Refereed Publications

- Charles H. Lineweaver, **Aditya Chopra** and Sarah R. N. McIntyre (2018), *The Evolution of Habitability: Characteristics of Habitable Planets*, in Vera M. Kolb (Ed.) *Handbook of Astrobiology*, Taylor & Francis
- Catherine Elder, Ali Bramson, Lauren Blum, Heather Chilton, **Aditya Chopra** et al. *OCEANUS: A high science return Uranus orbiter with a low-cost instrument suite* (2018) *Acta Astronautica*, 148, 1–11 (doi:[10.1016/j.actaastro.2018.04.019](https://doi.org/10.1016/j.actaastro.2018.04.019)).
- Sarah R. N. McIntyre, Charles H. Lineweaver, Colin P. Groves, **Aditya Chopra** (2017) *Global biogeography since Pangaea*, *Proc. R. Soc. Biol Sci.* 284, 1856 (doi:[10.1098/rspb.2017.0716](https://doi.org/10.1098/rspb.2017.0716)).
- **Aditya Chopra** and Charles H. Lineweaver (2017), *The cosmic evolution of biochemistry*, in Richard Gordon & Alexei Sharov (Eds.) *Habitability of the Universe before Earth*, Series: *Astrobiology: Exploring Life on Earth and Beyond* ([View on ScienceDirect](#)).
- **Aditya Chopra** and Charles H. Lineweaver (2016), *The Case for a Gaian Bottleneck: the Biology of Habitability*, *Astrobiology*, 16, 1, 7-22 (<http://bit.ly/gaianbottleneck>).
- **Aditya Chopra** (2016), *What is the history of elements in the Universe?*, Chapter Section in the *Astrobiology Primer 2.0.*, *Astrobiology*, 16, 8, 561-653 (<http://bit.ly/AstroBioPrimer2>).
- Charles H. Lineweaver and **Aditya Chopra** (2012), *Habitability of Earth and Other Earths: Astrophysical, Geochemical, Geophysical and Biological Limits on Planet Habitability*, *Annual Review of Earth and Planetary Sciences*, Vol. 40, 597-623 (<http://is.gd/annrevlc12>)
- Charles H. Lineweaver and **Aditya Chopra** (2012), *What can life on Earth tell us about life in the universe?* In J. Seckbach (Ed.), *Genesis - In The Beginning: Precursors of Life, Chemical Models and Early Biological Evolution*, 799-815, Springer. ISBN 978-94-007-2940-7. (<http://is.gd/etlife12>)
- **Aditya Chopra**, Charles H. Lineweaver, Jochen J. Brocks and Trevor R. Ireland (2010), *Palaeoecophylostoichiometrics: Searching for the Elemental Composition of the Last Universal Common Ancestor*, in *Australian Space Science Conference Series: 9th Conference Proceedings. Full Refereed Proceedings DVD*, National Space Society of Australia Ltd, ISBN 13: 978-0-9775740 (www.tinyurl.com/ACetal10)
- **Aditya Chopra** and Charles H. Lineweaver (2009), *The major elemental abundance differences between Life, the Oceans and the Sun*, in *Australian Space Science Conference Series: 8th Conference Proceedings. Full Refereed Proceedings DVD*, National Space Society of Australia Ltd, ISBN 13:978-0-9775740-2-5 (www.tinyurl.com/ACCL08)
- **Aditya Chopra** (2009), *What is Life made of?*, *The Australian National University's Undergraduate Research Journal*, Volume 1, 1-6, ISSN 1837-2872
- **Aditya Chopra**, John Baross and Charles H. Lineweaver (in prep.), *Early biospheres on Earth*.
- **Aditya Chopra** and Charles H. Lineweaver (in prep.), *A reference elemental composition of life*.
- **Aditya Chopra**, Charles H. Lineweaver, John Baross and Mike Mottl (in prep.), *Can elemental abundances be used to identify the most likely site for the origin of life?*

Conference Abstracts

- Aaron Bell, **Aditya Chopra**, William Fawcett, Rodd Talebi, Anamaria Berea, Chris Kempes, Daniel Angerhausen, Nathalie A. Cabrol, Massimo Mascaró (2018) *NASA Frontier Development Lab 2018 Using machine learning to study E.T. biospheres*. 32nd Conference on Neural Information Processing Systems (NIPS 2018), Montréal, Canada (poster, 8 December 2018).
- **Aditya Chopra**, Aaron Bell, William Fawcett, Rodd Talebi, Anamaria Berea, Chris Kempes, Daniel Angerhausen, Nathalie A. Cabrol, Massimo Mascaró (2018) *Exploring the coevolution of extraterrestrial atmospheres and alien biosphere*. Lorentz Center Workshop - A Roadmap for Universal Life, Netherlands (poster, 29 October 2018).
- **Aditya Chopra**, Aaron Bell, William Fawcett, Rodd Talebi, Anamaria Berea, Chris Kempes (2018) *What can Artificial Intelligence tell us about life in the universe?* 2018 Australian Space Sciences Conference in Goldcoast, Australia (talk, 25 September 2018).

- Catherine M. Elder, Ali M. Bramson, Lauren W. Blum, Heather T. Chilton, **Aditya Chopra**, et al. (2017), *New Frontiers-Class Missions to the Ice Giants*, Planetary Sci. Vision 2050 Workshop, LPI Contrib. No. 1989, id.[8147](#)
- Ali M. Bramson, Catherine M. Elder, Lauren W. Blum, Heather T. Chilton, **Aditya Chopra**, et al. (2017), *OCEANUS: A Uranus Orbiter Concept Study from the 2016 NASA/JPL Planetary Science Summer School*, 48th Lunar and Planetary Science Conference, LPI Contribution No. 1964, id.[1583](#)
- **Aditya Chopra** and Charles H. Lineweaver, *The Case of a Gaian Bottleneck: The Biology of Habitability (i.e. The Potential Non-Dominance of Abiotic Factors in Creating Circumstellar Habitable Zones)*. 2017 Astrobiology Science Meeting, USA (talk, #[3282](#)).
- **Aditya Chopra** and Charles H. Lineweaver, *Planetary habitability constrained by biology: The case for a Gaian Bottleneck*. 2016 Australasian Astrobiology Meeting, USA (talk, 12 July 2016).
- **Aditya Chopra** and Charles H. Lineweaver, *The Biology of Habitability*. 2016 Gordon Research Conference & Seminars on Origin of Life, USA (talk & poster, 17 January 2016). *Best talk prize.
- **Aditya Chopra** and Charles H. Lineweaver, *Is Habitability Constrained by Biology? The Case for a Gaian Bottleneck*. 2015 Australian Space Sciences Conference in Canberra, Australia (talk, 1 October 2015). *Best postgraduate oral presentation prize awarded.
- **Aditya Chopra** and Charles H. Lineweaver, *The Energetics and Evolution of Metabolism on Earth and Elsewhere*. 2015 Astrobiology Science Conference, Chicago, USA (poster, 18 June 2015).
- **Aditya Chopra** and Charles H. Lineweaver, *An Estimate of the Elemental Composition of LUCA*. 2015 Astrobiology Science Conference, Chicago, USA (talk, 16 June 2015).
- Charles H. Lineweaver and **Aditya Chopra**, *Is Habitability Constrained by Physics or Biology? The Case for a Gaian Bottleneck*. 2015 Astrobiology Science Conference, USA (talk, 15 June 2015).
- **Aditya Chopra** and Charles H. Lineweaver, *AIB - Aliens in Black*. 2014 Stromlo Student Christmas Seminars, Canberra, Australia (talk, 14 Nov 2014). *Best talk prize awarded.
- **Aditya Chopra** and Charles H. Lineweaver, *A reference elemental composition of life*. 2014 Origins Conference, Nara, Japan (talk, 10 July 2014).
- **Aditya Chopra** and Charles H. Lineweaver, *Can Elemental Abundances be Used to Identify the Most Likely Site for the Origin of Life?* 2014 Origins Conference, Nara, Japan (poster, 8 July 2014).
- Charles H. Lineweaver and **Aditya Chopra**, *The Abiogenesis Habitable Zone and the Energy Requirements for the Origin of Life*. The Search for Life Beyond the Solar System: Exoplanets, Biosignatures & Instruments in Tuscon, USA (poster, 16-21 March 2014).
- **Aditya Chopra** and Charles H. Lineweaver, *Creating the elemental composition of reference life*. 2013 Humboldt Colloquium in Sydney, Australia (talk, 18 October 2013).
- **Aditya Chopra** and Charles H. Lineweaver, *Creating the elemental composition of reference life*. 2012 Australian Space Sciences Conference in Melbourne, Australia (talk, 25 September 2012). *Best postgraduate oral presentation prize awarded.
- **Aditya Chopra** and Charles H. Lineweaver, *What am I made of?* 2012 Research School of Earth Sciences Student Conference in Canberra, Australia (talk, 20 September 2012).
- **Aditya Chopra** and Charles H. Lineweaver, *Can elemental abundances be used to identify the most likely site for the origin of life?* 34th International Geological Congress, Brisbane, Australia (talk, 9 August 2012).
- **Aditya Chopra** and Charles H. Lineweaver, *Elemental Composition of Life*. 2012 Astrobiology Science Conference, Atlanta, USA (talk, 19 April 2012).
- Charles H. Lineweaver and **Aditya Chopra**, *The Habitability Limits of Our Earth and Other Earths*. 2012 Astrobiology Science Conference, Atlanta, USA (talk, 19 April 2012).
- Charles H. Lineweaver and **Aditya Chopra**, *A more universal definition of life suggests that we have already detected extraterrestrial life*. 2012 Astrobiology Science Conference, Atlanta, USA (talk on behalf of C. Lineweaver, 15 April 2012).
- **Aditya Chopra** and Charles H. Lineweaver, *Can Elemental Abundances be Used to Identify the Most Likely Site for the Origin of Life?* 2012 Astrobiology Science Conference, Atlanta, USA (poster, 15 April 2012).
- **Aditya Chopra** and Charles H. Lineweaver, *What can the elemental abundances tell us about the site of the origin of life?* 2011 Australian Space Sciences Conference in Canberra, Australia (talk, 28 September 2011).
- Charles H. Lineweaver and **Aditya Chopra**, *What can life on Earth tell us about life in universe?* 2011 Australian Space Sciences Conference in Canberra, Australia (talk, 28 September 2011).

- **Aditya Chopra** and Charles H. Lineweaver, *Where did it happen?* 2011 Research School of Earth Sciences Student Conference in Canberra, Australia (talk, 22 September 2011).
- **Aditya Chopra** and Charles H. Lineweaver, *What do the elemental abundances tell us about the universality of life?* 2011 Origins Conference in Montpellier, France and the 2011 European Workshop on Astrobiology in Cologne, Germany (poster, July 2011). *Best poster prize awarded.
- **Aditya Chopra** and Charles H. Lineweaver, *Elemental insights into the site of the origin and early evolution of life on Earth.* 2011 Origins Conference in Montpellier, France and the 2011 European Workshop on Astrobiology in Cologne, Germany (poster, July 2011). *Best poster prize awarded.
- **Aditya Chopra** and Charles H. Lineweaver, *What do the elemental abundances tell us about the universality of life?* 2011 European Workshop on Astrobiology in Cologne, Germany (talk, 13 July 2011). *3rd prize awarded as part of the "Student Contest".
- **Aditya Chopra**, *Do the Elements Support a Hydrothermal Origin of Life?* 2011 Astrobiology Graduate Conference, Montana State University, Montana, USA (unable to present, 5th June 2011). Abstract published in *Astrobiology*, 2011, 11, 2, 369.
- **Aditya Chopra** and Charles H. Lineweaver, *What do the elemental abundances tell us about life in the universe?* 2011 UHNAI Astrobiology Winter School, Hawaii, USA (poster, 5 January 2011).
- **Aditya Chopra**, *How did we get here? From the Big Bang to the Big Ben.* 2010 Research School of Earth Sciences Student Conference in Canberra, Australia (talk, 7 October 2010).
- **Aditya Chopra** and Charles H. Lineweaver, *Stars to Planets to Life: An Elemental Scheme.* 2010 Australian Space Sciences Conference in Brisbane, Australia (talk, 28 September 2010).
- **Aditya Chopra** and Charles H. Lineweaver, *Sun → Earth → Crust → Biosphere → Life: What do the elemental abundances tell us?* 2010 Australian Earth Sciences Convention in Canberra, Australia (talk, 5 July 2010).
- **Aditya Chopra** and Charles H. Lineweaver, Jochen J. Brocks, Trevor R. Ireland & John Baross, *Evolution of the stoichiometry of the essential elements of life.* 2010 Australian Earth Sciences Convention in Canberra, Australia (poster, 5 July 2010).
- **Aditya Chopra** and Charles H. Lineweaver, *From stars to planets to life: What do the elemental abundances tell us?* 2010 Astrobiology Graduate Conf. in Tällberg, Sweden (talk, 14 June 2010).
- **Aditya Chopra** and Charles H. Lineweaver, *Sun → Earth → Crust → Life: Quantifying the elemental fractionations that led to life on Earth.* 2010 Astrobiology Science Conference in League City, Texas, USA (talk & poster, 27 April 2010).
- **Aditya Chopra** and Charles H. Lineweaver, *The stoichiometry of the essential elements of life.* 2010 Astrobiology Science Conference in League City, Texas, USA (poster, 27 April 2010).
- Charles H. Lineweaver, **Aditya Chopra** and Jochen J. Brocks, *The astrobiological implications of the debate between "deep homology" and "remarkable convergence".* 2010 Astrobiology Science Conference in League City, Texas, USA (talk, 28 April 2010).
- **Aditya Chopra**, Charles H. Lineweaver, Jochen J. Brocks, Trevor R. Ireland & John Baross, *Evolution of the stoichiometry of the essential elements of life.* 2010 Gordon Research Conference & Seminars on Origin of Life, Galveston, Texas, USA (poster, 10 January 2010).
- **Aditya Chopra** and Charles H. Lineweaver, *Determining elemental abundances in bacteria to 'follow the elements'* 2009 Aust. Space Sci. Conf., Sydney, Australia (talk, 29 September 2009).
- **Aditya Chopra** and Charles H. Lineweaver, *The major elemental abundance differences between Life, the Oceans and the Sun.* 2009 Research School of Biological Sciences Student Conference, Canberra, Australia (talk, 8 October 2009).
- **Aditya Chopra** and Charles H. Lineweaver, *What is life made of?* 2009 Astrobiology Graduate Conference, University of Washington, Seattle, USA (poster, 17th July 2009). Abstract published in *Astrobiology*, 2009, 9, 5, 520.
- **Aditya Chopra** and Charles H. Lineweaver, *The major elemental abundance differences between Life, the Oceans and the Sun.* 2009 Research School of Earth Sciences Student Conference, Canberra, Australia (talk & poster, 29 April 2009).
- **Aditya Chopra** and Charles H. Lineweaver, *The major elemental abundance differences between Life, the Oceans and the Sun.* 2008 Australian Space Science Conference, Canberra, Australia (poster, 29 September 2008).

Non-Refereed Publications

- **Aditya Chopra**, Aaron Bell, William Fawcett, Rodd Talebi, Daniel Angerhausen, Anamaria Berea, Nathalie A. Cabrol, Chris Kempes (2018) Exploring the co-evolution of extraterrestrial atmospheres and alien biospheres. NASA Frontier Development Lab Technical Memorandum.
- **Aditya Chopra**, Jesse Colangelo-Lillis, Lakew Selassie and Sara I. Walker (2010), "IQ" – The Independence Quotient, Research Proposal presented at 2010 Astrobiology Research Focus Group in Texas, USA.
- **Aditya Chopra**, Ivan Paulino-Lima, Jennifer Mobberley and Katarzyna Adamala (2009), Multiple bugs in Space, Research Proposal presented at 2009 Astrobiology Research Focus Group in Seattle, Washington, USA.
- **Aditya Chopra** (2008), *What is Life made of?*, Honours Thesis, Research school of Astronomy and Astrophysics, The Australian National University.
- **Aditya Chopra** (2008), *In the shadow of the Moon*, Planetary Geology Course Research, The Australian National University.
- **Aditya Chopra** (2008), *The deep origins of life*, Planetary Geology Course Research, The Australian National University.

Non-Conference Posters

- **Risk of asphyxiation with nitrogen - A silent killer.** Presented a poster targeted at undergraduate students on OH&S issues regarding use of liquid nitrogen in chemistry laboratories at the University of WA in Perth, Australia. *Poster awarded 2nd prize.
- **What is Life made of?** Presented correlations in the elemental composition of life and the Sun that can be used to study planetary and biological processes at the 2010 ANU ResearchFest competitions in Canberra, Australia. *Poster awarded 2nd prize.
- **How do mitochondria work?** Presented a poster at Rossmoyne Senior High School as part of the 2004 CSRIO Student Research Scheme on gene cloning and fluorescence tagging techniques to characterise the activity of transcription factor cDNA in Perth, Australia. **The project was awarded the major prize of 'Most promising Science Communicator'.*

Non-Conference Academic Talks

- Presented a talk at the NASA Frontier Development Laboratory at the SETI Institute entitled "Planetary Roulette: Gambling on Life and Death" (16 July 2018).
- Presented a talk in the Planetary Seminar Series at ANU entitled "OCEANUS: A high science return Uranus orbiter with a low-cost instrument suite" (22 May 2018).
- Presented an invited lecture on the Search for life beyond Earth to graduate students at the 2016 Harley Wood Winter School hosted by the Astronomical Society of Australia (2 July 2016).
- Presented a talk in the University of Washington Astrobiology Seminar Series entitled "The Case for a Gaian Bottleneck: the Biology of Habitability" (26 April 2016).
- Presented an invited lecture on presentation skills to RSES Masters students at ANU (16 August 2017, 2 March 2016 & 5 August 2015).
- Presented a talk in the University of Hawaii HIGP Seminar Series entitled "The Case for a Gaian Bottleneck: the Biology of Habitability" (10 February 2016).
- Presented a talk in the University of Hawaii Astrobiology Seminar Series entitled "Astrophysical, Geochemical and Biological Constraints on Habitability" (7 December 2015).
- Presented a talk in the RSES Seminar Series at ANU entitled "The Origin and Evolution of Life on a Pale Blue Dot " (6 November 2015).
- Presented an invited talk on presentation skills to Summer Students, ANU (7 January 2015).
- Presented an invited talk on presentation skills to students from Research School of Population Health, ANU (10 October 2014).
- Presented a talk on career pathways in science to Careers Advisors from high schools in ACT, during their visit to ANU (6 August 2014).
- Presented a talk at RSES, ANU entitled "Nobel Conversations" about my experiences at the 2013 Lindau Nobel Laureates Meeting (7 August 2013).

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- Presented a talk at a ANU Public Lecture hosted by the ANU Black Hole Society, Canberra, entitled "What can life on Earth tell us about life in the Universe" (31 July 2013).
 - Presented a talk at the Institute for Immunology and Infectious Diseases at Murdoch University, Perth, entitled "What can life on Earth tell us about life in the Universe" (17 July 2013).
 - Presented a talk in the RSES Seminar Series at ANU entitled "An elemental view of life and its environment" (13 December 2012).
 - Presented a talk in the Trends in Environmental Research Series at the University of Technology Sydney entitled "An elemental view of life and the habitability of the Earth" (24 October 2012).
 - Presented a talk discussing highlights from the Astrobiology Science Conference 2012 at the Planetary Science Institute Seminar Series at ANU (16 May 2012).
 - Presented a talk on the sites for the origin of life to members of the Geological Society of Australia-ACT Division (20 March 2012).
 - Presented a talk on career pathways in science to Careers Advisors from high schools in New South Wales, during their visit to ANU (7 June 2011).
 - Presented a talk to summer scholars at the Research School of Astronomy and Astrophysics at ANU on the topic 'Questions in Astrobiology' (19 January 2011).
 - Presented seminars on fractionation of elements through planetary and life processes that could be used to predict the composition of extraterrestrial life at the chemistry and astronomy departments at the University of Western Australia (22 and 24 September 2010) at the Research School of Earth Sciences at ANU (2 July and 10 June 2010).
 - Presented a talk to summer scholars at the Research School of Astronomy and Astrophysics at ANU on the origins of life (28 January 2010).
 - Presented the student project EARTHRISE (Education and Research Through Interesting Space Experiments) at the Stromlo Christmas Seminars (27 October 2009) and at the Research School of Earth Sciences Student Colloquium (10 October 2009) at ANU.
 - Presented a talk celebrating the 40th anniversary of the Apollo 11 Moon landing and discussed the origin of the Moon and origins of life at the Research School of Earth Sciences at ANU (14 July 2009)
 - Presented talks on the emerging role of graduate students in the field of astrobiology, at the Research School of Earth Sciences (11 August 2009) and at the Research School of Astronomy and Astrophysics (14 August 2009) at ANU.

Workshops

- SciCoder: The Australian Tour presented by ASTRO 3D, UNSW, 3-7 December 2018
- Planetary Crusts Workshop at the Research School of Earth Sciences, ANU (16 May 2015).
- SEERVI Planetary Science Workshop at ANU (28 September 2015) – talk presented on outreach.
- NECTAR Early Career Academic Retreat at the Mount Stromlo Observatory, ANU (3-4 June 2014).
- 2011 Astrobiology Winter School on Water and the evolution of life in the cosmos organised by University of Hawaii & NASA Astrobiology Institute (2-17 January 2011).
- 8th Annual Stromlo Student Christmas Seminars in Canberra, Australia (26 November 2010).
- "Workshop Without Walls on Molecular Paleontology and Resurrection", an online NASA Astrobiology Institute workshop (8-10 November 2010).
- Planetary Science and Astrobiology Workshop at ANU (9-10 June 2010).
- Elizabeth and Frederick White Conference on Nuclear Astrophysics in Canberra, Australia (24-25 August 2009).
- Developed novel research proposal in the 2010 Astrobiology Research Focus Group in Texas, USA (<http://sites.google.com/site/abscicon2010rfg/>, 23-25 April 2010).
- Developed novel research proposal in the 2009 Astrobiology Research Focus Group in Washington, USA (20-22 July 2009).
- "Earth's Extremophiles and Extraterrestrial Habitability", International Astrobiology Summer School in Santander, Spain (June 22-26, 2009).
- "New Frontiers & Tools in Astronomy", Harley Wood Winter School in Perth (3-6 July 2008).

Grant Activity

- \$700 from the organising committee to participate in the 2018 SciCoder workshop in Sydney, Australia.
- \$2300 from the SETI Institute and the local organising committee to present at the 2018 Lorentz Center Workshop - A Roadmap for Universal Life in Leiden, Netherlands.
- \$1500 from the SETI Institute and ANU to present at the 2018 Australian Space Science Conference in Goldcoast, Australia.
- \$5000 from the 34th International Geological Congress for field trip to Pilbara & Shark Bay in 2016.
- \$1500 from NASA JPL to participate in the 2016 Planetary Science Summer School (Uranus Mission Concept Study, mentored by Team-X at the Jet Propulsion Laboratory, California, USA).
- \$2300 from the organising committee to present a talk and poster at the 2016 Gordon Research Conference and Seminars on the Origin of Life in Galveston, USA.
- \$2700 to undertake an Executive Education Course (ANU Crawford School of Public Policy) in 2015.
- \$2500 from the Australian Academy of Science and ANU to participate at the 2014 Commonwealth Science Conference in India and 2015 Global Young Scientists Summit in Singapore.
- \$2500 from the Uwingu Fund and ISSOL to present at the 2014 Origins Meeting in Nara, Japan.
- \$6800 from the Aust. Academy of Sci. to participate in the 2013 Lindau Nobel Laureate Meeting.
- \$200 from the Humboldt Foundation to present at the Humboldt Colloquium in Sydney, Australia.
- \$700 from the local organising committee and ANU to present at the 2012 Australian Space Science Conference in Melbourne, Australia.
- \$2500 from the Astronomical Society of Australia and ANU to present at the 2012 Astrobiology Science Conference in Atlanta, USA.
- \$500 from the Geological Society of Australia to present at the 2012 IGC in Brisbane, Australia.
- \$600 from CSIRO and ANU to support education and outreach activities during the 2011 National Science Week Experimenton at the CSIRO Discovery Centre, Canberra, Australia.
- \$2500 from the Australian Centre for Astrobiology, International Society for the Study of the Origin of Life and Astrobiology Society, and ANU (Vice-Chancellor's HDR travel grant) to present at the 2011 Origins Conference in Montpellier, France.
- \$400 from the European Astrobiology Network Association to present at the 2011 European Workshop on Astrobiology in Cologne, Germany.
- \$400 from the ANU Student Recruitment Office to present to present guest lectures at 3 high schools in Perth, Australia.
- \$700 from ANU to cover travel expenses for field work to study hydrothermal vent fluids at the Kermadec Arc submarine volcanoes (off the coast of New Zealand) on-board *RV Tangaroa*.
- \$3500 from the LOC to participate in the 2011 Astrobiology Winter School in Hawaii, USA.
- \$100 from ANU to participate in a science communication workshop by the Australian National Centre for Public Awareness of Science in Canberra, Australia in 2010.
- \$400 from ANU and the organising committee to present at the 2010 Australian Space Science Conference in Brisbane, Australia.
- \$1600 from ANU for demonstration flights for the EARTHRISE program.
- \$3600 from the organising committee and ANU to present at the 2010 Astrobiology Graduate Conference in Tällberg, Sweden.
- \$550 from the Geological Society of Australia and ANU to present at the 2009 Australian Space Science Conference and 2010 Australian Earth Sciences Convention in Australia.
- \$2300 from ANU (Vice-Chancellor's HDR travel grant) and the NASA Astrobiology Institute to present a talk and poster at the 2010 Astrobiology Science Conference in Texas, USA.
- \$2000 from the organising committee to present a poster at the 2010 Gordon Research Conference and Seminars on the Origin of Life in Galveston, USA.
- \$2700 from the organising committee to present a poster at the 2009 NASA Astrobiology Graduate Conference in Washington, USA.
- \$3800 from ANU and the organising committee to attend the 2009 International Astrobiology Summer School in Santander, Spain.
- \$1100 by ANU to participate in the 2008 ASA Harley Wood Winter School in Perth, Australia.

Professional Development

- Completed Advanced First Aid, Mental Health First Aid, Applied Suicide Intervention Skills Training, MATE Trainer (Gender Violence Prevention and Education) in 2017.
- Completed the Executive Course offered by ANU Crawford School on "Policy processes for practitioners: an introduction" (25-27 May 2015).
- Science meets Policymakers - organised by Science & Technology Australia (11 February 2015)
- Graduate Teaching Program, a semester long course to develop teaching competencies and learn about pedagogy, organised by Research Student Development Centre, ANU (March-April 2012).
- Workshop on Research-led education at ANU, organised by College of Science, ANU (5 June 2012).
- Workshop on cross-disciplinary research at ANU, organised by Research Student Development Centre, ANU (21 March 2012).
- Workshop on journal article writing for scientists organised by Research Student Development Centre, ANU (24 August 2011).
- Workshop on Media skills for researchers organised by the Communications and External Liaison Office at ANU (6 September 2011).
- Science communication workshop run by the Australian National Centre for Public Awareness of Science (25 November 2010).
- Series of workshops during the ResearchFest week on scientific poster design and abstract writing organised by Research Student Development Centre, ANU (6-9 April 2010).
- Series of 6 workshops introducing teaching and tutoring organised by Research Student Development Centre, ANU (August-September 2010). Topics: student learning, small group facilitation, building confidence for teaching, marking and giving feedback and effective presentations for learning.
- Tutor Induction Workshop at ANU (5 March 2010).
- Series of workshops at ANU on effective counselling and pastoral care issues such as drugs & alcohol abuse, security awareness, violent situations, report writing and privacy and confidentiality (February 2010 & 2011).
- ANU Graduate Short Course in science communication (26-28 October 2009).
- Workshop on Gene Technology Regulations in Australia at University of Western Australia (2005).

Professional Organization Duties

- Invited workshop presenter & judge at the ANU Summer Scholar's 3 Minute Project (2018-19).
- Member of the 2017 ANU University Mental Health Advisory Group and UniSafe Committee.
- Member of organising committee for the Australian Space Science Conference (2012-2015).
- Invited presenter at the 2015 ANU Summer Scholar's Welcome (24 November 2015).
- Invited presenter at the 2014 ANU 3 Minute Thesis Launch event (12 June 2014).
- Invited panellist at four 2015 ANU HDR Student Welcome & Induction sessions.
- Master of Ceremonies: ANU Summer Scholar's 3 Minute Project Competition (Jan. 2014 & 2015).
- Invited panellist at the 2013 ANU Summer Scholar's 3 Minute Project Workshop (8 January 2014).
- Invited presenter at the 2013 ANU Summer Scholar's Welcome (28 November 2013).
- Invited Judge 3 Minute Thesis - ANU College of Engineering and Computer Science (30 July 2013).
- Member of the organising committee of the 2013 Australian Astrobiology Meeting (July 2013).
- Invited presenter at the 2013 ANU 3 Minute Thesis Showcase (15 May 2013).
- Invited Judge 2013 Summer Scholar Program - 3 Minute Project at ANU (16 January 2013).
- Panellist at "Why do a graduate degree?" event for Honours students at ANU (16 April 2013).
- Volunteer for the 2012 ResearchFest at ANU (June 2012).
- Member of the organising committee of the 2012 Australian Exoplanet Workshop (Dec. 2012).
- Student panellist at ResearchFest to provide advice to mid-phase PhD students (20 June 2012).
- Committee member of the Geological Society of Australia (ACT Division) (2011-2013).
- Organiser for the Planetary Science Institute Seminars at ANU (2011-2013).
- Co-organiser of the 2011 RSES Student Conference at ANU (September 2011).

- Student representative on the OH&S Committee at RSES, ANU (2011-2013).
- Member of the local organising committee for the 2011 Australian Space Science Conference hosted at ANU (26-29 September 2011).
- Co-Administrator for the [Stromlo Student Wiki](#) (2011-2014).
- Co-organiser for the Planetary Science & Astrobiology Workshop hosted at ANU (9-10 June 2010).
- Served as a member of the student panel at the 2008 College of Science Honours and PhD Information Evening, to provide feedback to prospective undergraduate students (11 Aug 2008).
- Served as the representative for the 3rd Year Planetary Geology Course at ANU in 2008.

Other Activities

- Contributor to Research School of Earth Science's blog at <http://www.uncirculation.com> and Astrobiology Magazine's Pale Blue Blog at <http://www.astrobio.net/paleblueblog/> in 2013.
- Project Assistant for 2011 and 2012 volume of the [ANU Undergraduate Research Journal](#) and on the editor selection panel in 2011.
- Participated in a research cruise to study submarine volcanoes on the Kermadec Arc, off the coast of New Zealand (on-board *RV Tangaroa*, 23 February – 21 March 2011, GNS expedition TAN1104).
- Member of the advisory group of the Mendeley reference management system marketing the software and assisting staff and students at ANU and providing feedback to the Mendeley development team (1 of 2 at ANU, since December 2011).
- Editor for 2010 Volume of the [ANU Undergraduate Research Journal](#) (on Honorarium).
- Implemented the Chemical Inventory System at the Research School of Earth Sciences (2011-12).
- Employed to complete Inventory Audit for at the Research School of Earth Sciences (2010-2011).
- Community Assistant at UniLodge@ANU since 2008 (on Honorarium), supporting the manager in administration of the Community Spirit Program and providing on-call assistance to residents with their I.T. issues. Other responsibilities include designing advertising material, building and operating websites, project management systems and leading the monthly newsletter and IT Support teams.
- Website Designer at Doha College, Qatar (2002-2004) Awarded an Information Technology Award for designing and constructing a website for the school offering its students a comprehensive learning environment via the internet. Supervised the web design team and managed the administration of the website.
- Project Coordinator for the KEO Program in Doha, Qatar (2002). Independently undertook a project promoting the international KEO program voted 'Project of the 21st Century' by UNESCO in schools and organised discussion groups for students to approach scientific and societal questions in an innovative way.

Teaching Experience

- Part of the STEM Professionals in Schools program run by CSIRO.
- Presented a guest lecture to ~30 students in a ANU Vice-Chancellor's Course (Unravelling Complexity) on our Grand Challenges Proposal on the limits of life (29 March 2018).
- Presented workshop on thesis writing and production using LaTeX and Adobe CC Suite (24/11/15).
- Presented a guest lecture to ~20 Year 11 students from Methodist Ladies College Sydney on the exoplanet revolution and the search for life beyond Earth (4 November 2014).
- Presented a guest lecture to ~80 Year 8 & 9 ACE Science class students at Melrose High School in Canberra, ACT on the exoplanet revolution and the search for life beyond Earth (03/15 & 06/14).
- Presented a lecture to ~50 students from Rivervally High School in Singapore and an Australian delegation of 2014 Science Olympiad competitors entitled "What can life on Earth tell us about life in the universe?" (27 May 2014 & 16 June 2014).
- Presented a guest lecture to ~70 Year 9 students at Rossmoyne Senior High School in Perth, WA on astrobiology topics (27 September 2013).
- Tutor for Advanced Physics course (Physics 1201) for First Year students at ANU (2013).
- Presented a guest lecture to ~40 Year 9 ACE Science class students at Melrose High School in Canberra, ACT on search for extra-terrestrial life (6 May 2013).

- Tutor for Advanced Physics courses (Physics 1101 & 1201) for First Year students at ANU (2012).
- ANU Graduate Teaching Program completed with merit (Semester 1, 2012).
- Presented a guest lecture to ~40 Year 10 ACE Science class students at Melrose High School in Canberra, ACT on planetary habitability (8 May 2012).
- Presented a guest lecture to ~20 Year 8 Science class students at Melrose High School in Canberra, ACT on life in extreme environments (20 October 2011).
- Presented a guest lecture to ~20 Year 12 Science class students at Trinity College in Perth, WA on life in extreme environments (1 July 2011).
- Presented a guest lecture to ~60 Year 12 Science class students at Methodist Ladies College in Perth, WA on life in extreme environments in particular hydrothermal vents (1 July 2011).
- Presented a guest lecture to ~20 Year 8 Science Extension class students at Rossmoyne Senior High School in Perth, WA on life in extreme environments (1 July 2011).
- Presented a guest lecture to ~30 Year 12 Human Biology class students at Rossmoyne Senior High School in Perth, WA on astrobiology (1 July 2011).
- Presented a guest lecture to ~60 Year 10 Science Discovery class at Rossmoyne Senior High School students in Perth, WA on life at hydrothermal vents (1 July 2011).
- Presented an invited "Future Focus" seminar to ~100 Year 11-12 students at Rossmoyne Senior High School students in Perth, WA. During this seminar I shared my experiences during my high school and undergraduate life.
- Presented a guest lecture to ~60 Year 10 Rossmoyne Senior High School students in Perth, WA on the planetary science topics (23 September 2010).
- Presented lectures to ~200 first year chemistry undergraduate students at the University Of Western Australia on the process of modern scientific research (31 March 2009).
- Mentored a 3rd Year Physics research student at RSES on a project examining thermodynamic requirements of possible biochemical reactions that could be used by life on Titan in 2009.
- Mentored a high school work experience student at RSAA on the process of scientific research and techniques for good science communication in 2009.

Outreach & Media

- Co-hosted a Reddit [Ask Me Anything](#) discussing the NASA FDL 2018 program on 23 October 2018.
- Interviewed by ABC Science for [article](#) on moons around rogue exoplanets on 11 October 2018.
- Interviewed by ABC Science for [article](#) on the search for extant life on Mars on 26 July 2018.
- Interviewed by Google Cloud for [social media coverage](#) of the NASA FDL 2018 on 16 July 2018.
- Contributed to Ask Fuzzy [article](#) in Canberra Times on why travel faster than speed of light is not possible on 8 July 2018.
- Interviewed for SBS Radio about the discovery of exoplanet K2-236 (June 22 2018, [9 minutes](#))
- Published two articles in Canberra Times on the history and importance of sodium chloride salt to life on Earth and beyond (10 & [17](#) June 2018).
- Co-hosted an event at the Australian Parliament House as part of the 2018 Stargazing World Record Night for federal politicians and their staffers (23 May 2018)
- Invited presentation entitled "Planetary Roulette: Gambling on Life and Death" for the launch event of the 2017 Planetary Coins Collection by the Royal Australian Mint on 31 October 2017.
- Invited presentation to the ANU Astronomy Society Networking Night on 11 May 2017.
- Interviewed for SBS Radio about the discovery of a potentially habitable planet around Proxima Centauri (31 August 2016, [7 minutes](#)).
- Interview about our paper on the Gaian Bottleneck:
 - Radio Adelaide by Louise Horobin (7 June 2016, [10 mins](#)).
 - KIRO Radio Seattle's Morning News with Dave Ross (1 Feb 2016, [5 mins](#))
 - SBS Radio (28 Jan 2016, [9 mins](#))
 - CJAD Radio Montreal News Talk 770 with Dan Riendeau (27 Jan 2016, [17 mins](#))
- Interviewed by Canberra Community Radio (15 November 2015, 20 minutes) and Australian New Express Daily (30 September 2015) about the recent discoveries of extant liquid water on Mars.

- Interviewed for SBS Radio about Australia's attempt at setting two Guinness world records for stargazing as part of National Science Week (17 August 2015, [7 minutes](#)).
- Presented a Public lecture entitled "Finding E.T. – Discovering Extraordinary Extra-Terrestrials" at the Mount Stromlo Observatory at ANU, in Canberra (24 July 2015).
- Presented a 3 minute video "Are We Alone" for the Inspire Australia Research Competition organised by the EMCR Forum (Australian Academy of Science) & Thinkable.org.
- Interviewed for SBS Radio about the first images for the New Horizons mission to Pluto (16 July 2015, [10 minutes](#)) & interviewed on Canberra Community Radio (19 July 2015, 20 minutes).
- Presented an invited lecture entitled "The Universe Is Teeming with Aliens (but they are all dead)" at the monthly meetings of the Canberra Astronomical Society (16 July 2015).
- Invited presentation to the the NSW Board of Studies, Teaching and Educational Standards (9 June 2015) about visions and strategies for science education in schools and broader society.
- Hosted a stargazing event for ~25 residents of Toad Hall at ANU (30 May 2015).
- Interviewed for SBS Radio about the two mysterious bright spots seen by the Dawn spacecraft on the surface of asteroid Ceres (26 May 2015, [8 minutes](#)).
- Interviewed for SBS Radio to discuss the history and successes of the Hubble Telescope over the last 25 years (29 April 2015, [10 minutes](#)).
- Interviewed for SBS Radio about the origin of the Earth's moon (28 April 2015, [9 minutes](#)).
- Interviewed for SBS Radio about the restart of the Large Hadron Collider at CERN (12 April 2015, [7 minutes](#)).
- Interviewed for SBS Radio about the possibility of subsurface liquid water ocean on Jupiter's moon Ganymede (23 March 2015, [7 minutes](#)).
- Interviewed for SBS Radio about Scholz's star which passed through our Solar System 70,000 years ago (10 March 2015, [8 minutes](#)).
- Interviewed for SBS Radio about the New Horizon Mission (1 February 2015, [8 minutes](#)).
- Interviewed for SBS Radio about Earth-like exoplanets discovered by Kepler Space Telescope (18 January 2015, [8 minutes](#)).
- Interviewed for SBS Radio about the the landing of the Rosetta mission's Philae probe on Comet 67P. (13 November 2014, [11 minutes](#)).
- Interviewed for SBS Radio about the Moonrise times (10 October 2014, 8 minutes).
- Interviewed for SBS Radio about the Rosetta spacecraft reaching the Comet 67P/Churyumov-Gerasimenko and its mission objectives (10 August 2014, 10 minutes).
- Interviewed for SBS Radio about Virgin Galactic's venture (9 June 2014, [10 minutes](#)).
- Invited to represent ANU at the Careers Expo in Perth (May 2014)
- Interviewed for SBS Radio about exoplanet Kepler-186f which was an Earth-sized planet in the habitable zone of its star discovered using the Kepler Telescope (27 April 2014, [10 minutes](#)).
- Interviewed for SBS Radio about the causes, sounds and peculiarities of large earthquakes in Chile and Japan (22 April 2014, [11 minutes](#)).
- Interviewed for SBS Radio about the search for flight MH 370 lost at sea using satellites and Doppler effect (30 March 2014, [10 minutes](#)).
- Interviewed for SBS Radio about the Giant Magellan Telescope and Australia's contribution to the international project (29 March 2014, [12 minutes](#)).
- Presented an invited lecture entitled "What can life on Earth tell us about life in the universe?" at the monthly meetings of the Canberra Astronomical Society (20 February 2014).
- Interviewed for SBS Radio about dip in solar activity during expected solar maximum of 2014 and the impact of solar activity on the Earth (1 February 2014, [10 minutes](#)).
- Interviewed for SBS Radio about the Rosetta spacecraft waking up after a deep slumber of 2.5 years and the science aims of the mission (25 January 2014, [13 minutes](#)).
- Interviewed for SBS Radio about pioneering scientist Cecilia Payne who discovered what elements stars are made of (6 January 2014, [12 minutes](#)).
- Interviewed for SBS Radio about the search and analysis of the 4.4 billion year old Martian meteorite "Black Beauty" reported by Humayun et al. in *Nature* (30 November 2013, [10 minutes](#)).
- Interviewed for SBS Radio about the life and times of the revolutionary scientist Johannes Kepler and our understanding of planetary motions (26 November 2013, [12 minutes](#)).

- Interviewed for SBS Radio about the results from the Kepler Telescope mission which suggested 20% of stars hosted an Earth-sized planet (19 November 2013, [11 minutes](#)).
- Interviewed for SBS Radio about cosmonauts at the International Space Station who went for a spacewalk with the 2014 Winter Olympics torch (9 November 2013, [12 minutes](#)).
- Interviewed for SBS Radio on the question whether there is ever a possibility of finding life on Mars and Venus (5 November 2013, [10 minutes](#)).
- Interviewed for SBS Radio on Earth's age and how scientists got to this number (26 October 2013, [11 minutes](#)).
- Interviewed for SBS Radio about the scientist, author and science communicator Carl Sagan (21 October 2013, [13 minutes](#)).
- Interviewed for SBS Radio about the correlation between bushfires and climate change (21 October 2013, [4 minutes](#)).
- Interviewed for SBS Radio about Prof Dan Shechtman, who won the Nobel Prize for Chemistry in 2011 for his discovery of quasicrystals (12 October 2013, [12 minutes](#)).
- Interviewed for SBS Radio about the 2013 Nobel Prizes for Medicine, Physics and Chemistry (11 October 2013, [10 minutes](#)).
- Invited to represent ANU at the Postgraduate & MBA Expo in Perth & Melbourne (September 2013)
- Interviewed for SBS Radio on Voyager 1 spacecraft reaching the edge of the Solar system's heliopause (17 September 2013, [8 minutes](#)).
- Presented a feature story on ABC Radio National's [The Science Show](#) hosted by Robyn Williams on our origin of life research on 4 May 2013 (12:45pm, 5 minutes).
- Presented a public lecture entitled "My 14 billion year search for E.T." as an invited speaker at Questacon's *100°C—Stories of 100 Canberra Scientists* event series during the Centenary of Canberra celebrations (4 May 2013).
- In a team of four students, co-hosted a stargazing event at the Australian Parliament House as part of the Science Meets Parliament event '[Masterclass in Astronomy](#)' under the guidance of Nobel Laureate Professor Brian Schmidt (17 September 2012).
- Presented a three minute talk in the 2012 "3 Minute Thesis Competition" at ANU and awarded 1st prize and audience favourite prize (18 June 2012).
- [ABC Science feature](#) news article on our 2012 review paper on planetary habitability (27 April 2012). The story was featured in the '*Best of abc.net.au*'.
Other stories: [ANU Media Release](#), [Canberra Times](#), [The Dailymail Online](#), [Daily Galaxy](#).
- Interviewed by Melanie Tait of ABC 666 Canberra Radio about our 2012 review paper on planetary habitability on 30 April 2012 (7 minutes - http://is.gd/annrev12_radio).
- Interviewed by Alex Sloan of ABC 666 Canberra Radio about the 2012 Venus Transit Event at the Mount Stromlo Observatory on 5 June 2012 (11:50am, 5 minutes).
- Presented a three minute talk in the 2012 [Astrobiology FameLab Online Competition](#) and participated in the associated online workshop (29 March 2012).
- Commentary on PNAS paper suggesting that life originate in geothermal ponds rather than in oceans by Armen Mulkidjanian et al. In an article written by Nicola Rowe for Cosmos on Tuesday 21 February 2012 (http://is.gd/cosmos_feb12).
- Interviewed by Colin Cozier of the Sydney Morning Herald about a supposed UFO identified near Mercury by a NASA solar observing satellite. A video news story entitled "UFO? Try digital blotch" on Thursday 8 December 2011 (2 minutes).
- Comments featured in SBS and ABC TV news stories on the 2011 Nobel Prize for Physics awarded to Brian Schmidt et al. on 5 October 2011.
- Passionately involved as a co-administrator for the voluntary student outreach program at the Research School of Astronomy and Astrophysics, ANU which offers fortnightly outreach nights to ~800 high school students every year from around Australia. We also support other public education and outreach activities such as University and Observatory Open Days (2008-2013).
- Demonstrated hands-on astronomy and planetary science activities at the National Science Week Experimentathon events hosted at the CSIRO Discovery Centre, Canberra (13-21 August 2011, 15, 14-22 August 2010 and 23 August 2009). Secured competitive funding from CSIRO of \$300 (\$600 as a team of students) to support the student-run activities.
- Organised a premiere screening of the movie *First Orbit* and led a discussion session on space activities on the 50th Anniversary of man's first orbit in space (12 April 2011) at UniLodge@ANU.

- Comment featured in a newspaper science article on the discovery of bacteria using arsenic instead of phosphorus titled 'Planet Arsenic' published in the Sydney Daily Telegraph on Friday 4 December 2010 by reporter Malcolm Holland ([pdf](#)).
- Interviewed by Sonya Feldhoff on the significance of the discovery of bacteria using arsenic instead of phosphorus on 891 ABC Radio Adelaide's Drive Program on Friday 4 December 2010 (9 minutes – <http://quicklink.anu.edu.au/6lln>).
- Interviewed by Ashley Hall on the significance of the discovery of bacteria using arsenic instead of phosphorus on ABC Radio National's The World Today Program on Friday 4 December 2010 (4 minutes – <http://quicklink.anu.edu.au/3k54>).
- Commentary on the discovery of bacteria using arsenic instead of phosphorus on the Australian Science Media Centre's Expert's Response on Friday 4 December 2010 (<http://quicklink.anu.edu.au/45fv>).
- Invited guest on the Fuzzy Logic Science Show on Canberra's Community Radio 2XX on Sunday 23 May 2010 (60 minutes – <http://quicklink.anu.edu.au/9gnk>).
- Newspaper science feature article on PhD research titled '*A recipe for evolution*' published in the Sunday Canberra Times 23 May 2010 by writer Nyssa Skilton (<http://tinyurl.com/CTimes10>).
- Presented astrobiology oriented public lecture leading up to the annual Earth Hour event entitled '*The Earth in an Hour*' at UniLodge@ANU (27 March 2010). The talk considered the planetary processes that shaped the Earth and the future of life on the planet.
- Initiated the EARTHRISE (Education and Research Through Interesting Space Experiments) program at ANU involving balloon borne near-space experiments (since 2010). The proposal was awarded a \$1600 seed grant by the RSAA and RSES for a demonstration flight. Planned experiments for missions include high-altitude photography and atmospheric profiling. Future missions may enable space, astronomy and planetary science based research by graduate and undergraduate students. The program will develop communication and project management skills for graduate students and will offer education and outreach activities for high school students. Graduate students at 4 Australian universities are involved in the program.
- Invited to represent ANU at the Post-graduate and MBA Expo in Perth, WA (23 September 2010) and as part of the College of Science sponsored marketing trip presented talks at Rossmoyne Senior High School and at the University of Western Australia.
- Invited speaker at an ANU residence's (Bruce Hall) High Table event (9 September 2009) themed '*Are we alone? An exploration into life and the universe*'.
- Presented invited astrobiology oriented public lectures titled 'In the Shadow of the Moon' at two residential halls at ANU (27 May 2009 at UniLodge@ANU and 3 June 2009 at Burgmann College) to ~100 residents. The talk celebrated the 40th anniversary of the Apollo 11 Moon landings and considered connections between the origin of the Moon and the life on Earth.
- Participated in a 'Dance your PhD' workshop at the 2009 Stromlo Christmas Seminars at ANU in which one of the dances performed won the physics category prize in an international competition by *Science Magazine* (<http://quicklink.anu.edu.au/hrud>).
- Invited guest on the Fuzzy Logic Science Show on Canberra's Community Radio 2XX on Sunday 20 December 2009 (60 minutes – <http://quicklink.anu.edu.au/09fr>).
- An article outlining Honours research was featured in the 2009 edition of the Australian National University's Undergraduate Science Guide and on the university's website.