

CURRICULUM VITAE

Personal Data

Name	Jack Broderick Muir
Date of Birth	06/01/1992
Place of Birth	Wahroonga, NSW, Australia
Nationality	Australian
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Education

22/07/2015-Present	Doctor of Philosophy (Geophysics) California Institute of Technology, Pasadena CA
22/07/2015-14/06/2019	Master of Science (Geophysics) California Institute of Technology, Pasadena CA GPA 4.2/4.3
16/02/2010-16/12/2014	Bachelor of Philosophy (Science, Honours in Physics) Australian National University, Canberra ACT 1 st class honours with the University Medal, GPA 7.0/7.0

Honours and Awards

2015-2017	General Sir John Monash Scholarship
2015	Berkeley Fellowship (Declined)
2014	ANU University Medal in Physics
2014	Director of Science Education Commendation (ANU)
2014	Australian Society of Exploration Geophysicists ACT Branch Student Award
2014	ANU Dunbar Scholarship for Physics Honours
2013	Australian Meteorological and Oceanographic Society ACT Branch Student Award
2011, 2013	Dean's Science Commendation (ANU)
2010-2011, 2013	ANU National Merit Scholarship

Publications

- 2020 *Probabilistic lowermost mantle P-Wave tomography from hierarchical Hamiltonian Monte Carlo and model parametrisation cross-validation*,
J.B. Muir & H. Tkalčić, GJI, (2020) 223 (3): 1630–1643
<https://doi.org/10.1093/gji/ggaa397>
- 2020 *Geometric and level set tomography using ensemble Kalman inversion*
J.B. Muir & V.C. Tsai, GJI (2020) 220 (2): 967–980
<https://doi.org/10.1093/gji/ggz472>
- 2020 *Did Oldham Discover the Core After All? Handling Imprecise Historical Data with Hierarchical Bayesian Model Selection Methods*,
J.B. Muir & V.C. Tsai, SRL (2020) 91 (3): 1377–1383
<https://doi.org/10.1785/0220190266>
- 2017 *Rayleigh Wave H/V via Noise Cross-Correlation in Southern California*,
J.B. Muir & V.C. Tsai, BSSA (2017) 107 (5): 2021–2027
<https://doi.org/10.1785/0120170051>
- 2016 *Strong, Multi-Scale Heterogeneity in Earth's Lowermost Mantle*,
H. Tkalčić et al. Sci. Rep. (2016) 5: 18416
<https://doi.org/10.1038/srep18416>
- 2015 *Spherical Harmonic Analysis in the Geosciences via Bayesian Inference*,
J.B. Muir & H. Tkalčić, GJI (2015) 203 (2): 1164–1171
<https://doi.org/10.1093/gji/ggv361>
- 2012 *A single-probe-beam double-heterodyne polarimeter-interferometer for plasma Faraday rotation measurements*,
J. Howard et al. JINST (2012) 7 P07009
<https://doi.org/10.1088/1748-0221/7/07/p07009>

Invited Talks

- 2020 Parsimoniously introducing high-resolution local updates into the SCEC CVMs using a level-set approach,
Southern California Earthquake Center workshop on “Multi-scale seismic velocity models—Imaging and validation studies”
- 2020 Imaging the Los Angeles Basin using the July 5 2019 Mw 7.1 Ridgecrest Earthquake,
Oxford University
- 2019 Geometric and Level Set Tomography using Ensemble Kalman Inversion,
Australian National University
- 2017 Rayleigh Wave H/V via Noise Cross-Correlation in Southern California,
Los Alamos National Laboratory

Conference Presentations

- 2019 Wavefield Reconstruction and Surface Wave Tomography from LassoCV,
AGU fall meeting talk
- 2019 Visualising the Ridgecrest Earthquakes using Wavefield Reconstruction,
SCEC annual meeting poster

2018	Taming the tomographic null space using geometric and level set parameterizations of the Earth, AGU fall meeting talk
2018	Geometric and Level Set Tomography for Interface Detection in the Near Surface, SCEC annual meeting poster
2017	Wavefield Reconstruction using Compressive Sensing and Distributed Acoustic Sensing, AGU fall meeting poster
2016	Rayleigh Wave H/V via Noise Cross-Correlation in Southern California, AGU fall meeting talk
2015	Joint Bayesian Tomography of the Core-Mantle Boundary Topography and Lowermost Mantle Velocity, AGU fall meeting talk
2014	Spherical Harmonic Analysis via Bayesian Inference, AGU fall meeting poster
2013	Bayesian inference applied to the differential rotation of Earth's inner core, Australian Conference of Undergraduate Research poster
2012	A single-probe-beam double-heterodyne polarimeter-interferometer for plasma Faraday rotation measurements, Australian Conference of Undergraduate Research poster

General Audience Publications

2019	<i>Listening to the Heartbeat of our Planet</i> , Caltech Letters https://caltechletters.org/science/historical-seismology
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Funding Awarded

2020-2023	<i>Improving the Interpretability of Tomographic Images Using Geologically Motivated Parametrizations</i> National Science Foundation Award 2011079 (PI Victor C. Tsai, JBM wrote scientific justification of proposal) 255,859.00 USD
2020-2021	<i>Combining High-Resolution Local Models with the SCEC CVMS</i> Southern California Earthquake Center Award 20024 (PI Robert W. Clayton, JBM wrote scientific justification of proposal) 23,460.00 USD
2015-2017	Origin Energy Foundation / General Sir John Monash Scholarship 180,000.00 AUD

Teaching Assistantships

2020	Caltech Ge264 <i>Machine Learning in Geophysics</i>
2019	Caltech Ge111B <i>Field Geophysics B</i>
2018	Caltech Ge162 <i>Seismology</i>

2017 Caltech Ge111A *Field Geophysics A*

Internships & Intensives

07/2019	Dr. Lucy Jones Center for Science and Society Science Activation Workshop
06/2018	Gene Golub SIAM Summer School: Inverse Problems
11/2014-01/2015	Student Internship in Geophysics Australian National University
11/2013-01/2014	Student Fellowship in Astrophysics Australian Astronomical Observatory (AAO)
01/2012-01/2013	Year in Industry Internship in Condensed Matter Physics Australian Nuclear Science and Technology Organisation (ANSTO)
11/2011-01/2012	Summer Internship in Optics Australian National University
07/2011	Winter School in Astronomy Australian National University

Volunteer Activities & Roles

Reviewing	GRL, JGR: Solid Earth, GJI, BSSA
2016 - 2019	Caltech Graduate Student Council Academics Chair 2017-2018 Treasurer 2018-2019 Steering Committee 2017-2019
2015 - Present	Caltech Graduate Honor Council
2014	Australasian Conference for Undergraduate Research – Planning Committee

Professional Memberships & Roles

2016 - Present	Seismological Society of America
2014 - Present	American Geophysical Union
2014	Australian Society of Exploration Geophysicists

California Institute of Technology, Pasadena, CA, September 18, 2020