

MALCOLM C. A. WHITE

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<https://malcolmw.github.io/homepage>

PERSONAL STATEMENT

My research interests span the spectrum of computational methods in seismology—from observational problems, like elastic-wave-phase detection; to forward problems, like modeling propagating wavefronts; and inverse problems, like locating earthquakes—and how to synthesize these to investigate structural and mechanical properties of the Earth’s subsurface.

TECHNICAL STRENGTHS

Computer Languages	Python, C/C++, Fortran, Mathematica, Bash
Software & Tools	Antelope, GnuCash, L ^A T _E X, Excel

EDUCATION

University of Southern California	<i>August 2016 - Present</i>
PhD in Earth Sciences	Overall GPA: 3.45/4.0
Department of Earth Sciences	

Carleton University	<i>September 2007 - May 2013</i>
BSc in Computational Geophysics	Honours
Department of Earth Sciences	

EMPLOYMENT

2013	Scripps Institution of Oceanography — <i>La Jolla, California, USA</i> <i>Seismic Analyst</i>
2011	Pacific Geoscience Center — <i>Sidney, British Columbia, Canada</i> <i>Research Assistant</i>
2010	Geological Survey of Canada — <i>Ottawa, Ontario, Canada</i> <i>Research Assistant</i>

TEACHING

2018	The Nature of Scientific Inquiry Examination of the scientific process: what constitutes science; evolution of ideas about the nature of space, time, matter, and complexity; paradigm shifts in the biological and earth sciences. Lecture, 3 hours; laboratory, 2 hours.
	Earthquakes

Causes of earthquakes and nature of large faults; earthquake hazard and risk; world's great earthquakes; understanding the Richter scale. Lecture, 3 hours; laboratory, 2 hours.

2017 | **The Nature of Scientific Inquiry**

EDITORIAL REVIEW ACTIVITY

2020 | **Geophysical Journal International**—*Article reviewer*

SOCIETIES

2020 | **American Geophysical Union
Seismological Society of America**

PEER-REVIEWED PUBLICATIONS

- 2020 | **White, M. C. A.**, Fang, H., Nakata, N., & Ben-Zion, Y. (2020). PyKonal: A Python package for solving the Eikonal equation in spherical and Cartesian coordinates using the Fast Marching Method. *Seismological Research Letters*, 91(4), 2378–2389. doi: 10.1785/0220190318
- 2019 | **White, M. C. A.**, Ben-Zion, Y., & Vernon, F. L. (2019). A Detailed Earthquake Catalog for the San Jacinto Fault-Zone Region in Southern California. *Journal of Geophysical Research: Solid Earth*, 124, 6908–6930. doi: 10.1029/2019JB017641
- 2017 | Burdick, S., Vernon, F. L., Martynov, V., Eakins, J., Cox, T., Tyttell, J., ... van der Hilst, R. D. (2017). Model Update May 2016: Upper-Mantle Heterogeneity beneath North America from Travel-Time Tomography with Global and USArray Data. *Seismological Research Letters*, 88(2A), 319–325. doi: 10.1785/0220160186
- 2016 | Ross, Z. E., Ben-Zion, Y., **White, M. C.**, & Vernon, F. L. (2016). Analysis of earthquake body wave spectra for potency and magnitude values: implications for magnitude scaling relations. *Geophysical Journal International*, 207(2), 1158–1164. doi: 10.1093/gji/ggw327
- Ross, Z. E., **White, M. C.**, Vernon, F. L., & Ben-Zion, Y. (2016). An Improved Algorithm for Real-Time S -Wave Picking with Application to the (Augmented) ANZA Network in Southern California. *Bulletin of the Seismological Society of America*, 106(5), 2013–2022. doi: 10.1785/0120150230
- 2015 | Ben-Zion, Y., Vernon, F. L., Ozakin, Y., Zigone, D., Ross, Z. E., Meng, H., ... Barklage, M. (2015). Basic data features and results from a spatially dense seismic array on the San Jacinto fault zone. *Geophysical Journal International*, 202(1), 370–380. doi: 10.1093/gji/ggv142

- 2014 | Astiz, L., Eakins, J. A., Martynov, V. G., Cox, T. A., Tytell, J., Reyes, J. C., ... Vernon, F. L. (2014). The Array Network Facility Seismic Bulletin: Products and an Unbiased View of United States Seismicity. *Seismological Research Letters*, 85(3), 576–593. doi: 10.1785/0220130141

GRADUATE COURSEWORK (SELECTED)

- 2020 | **Selected Topics in Computational Physics**
Algorithmic Techniques in Artificial Intelligence and Machine Learning
- Numerical Analysis and Computation**
Linear equations and matrices, Gauss elimination, error estimates, iteration techniques; contractive mappings, Newton's method; matrix eigenvalue problems; least-squares approximation, Newton-Cotes and Gaussian quadratures; finite difference methods.
- 2017 | **Probability for Electrical and Computer Engineers**
Rigorous coverage of probability, discrete and continuous random variables, functions of multiple random variables, covariance, correlation, random sequences, Markov chains, estimation, and introduction to statistics.
- Methods of Computational Physics**
Introduction to algorithm development. Integration of ordinary differential equations; chaotic systems; molecular dynamics; Monte Carlo integration and simulations; cellular automata and other complex systems.
- Introduction to Digital Signal Processing**
Fundamentals of digital signal processing covering: discrete time linear systems, quantization, sampling, Z-transforms, Fourier transforms, FFTs and filter design.
- 2016 | **Methods of Theoretical Physics**
Vector analysis; infinite, asymptotic Fourier series; complete sets; Dirac delta function; Fourier, Laplace transforms; Legendre functions; spherical harmonics; Sturm-Liouville theory; orthogonal polynomials; gamma-factorial function; complex variables.

SPEAKING ENGAGEMENTS

- 2020 | **Hierarchical crustal traveltime tomography in Southern California: Insights and perspectives**
University of Southern California—Lithospherics Dynamics Seminar
- 2019 | **Microseismicity correlates strongly with velocity structure in the San Jacinto fault zoner**
American Geophysical Union Annual Meeting
- Focal mechanisms of microseismicity in the San Jacinto fault-zone region of Southern California**

Seismological Society of America Annual Meeting

Focal mechanisms of microseismicity in the San Jacinto fault-zone region of Southern California

Lamont-Doherty Earth Observatory—Seismology Student Workshop

Illuminating the San Jacinto fault-zone region of Southern California with a new earthquake catalog

Massachusetts Institute of Technology—Friday Informal Seminar Hour

2018 **Illuminating seismogenic structures in the San Jacinto Fault Zone**

Brown University—Geophysics Seminar

Seismicity in the San Jacinto fault zone: automatically deriving a decade-long catalog of earthquake hypocenters from scratch

University of Southern California—Lithospheric Dynamics Seminar