MALCOLM C. A. WHITE

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https://malcolmw.github.io/homepage

TECHNICAL STRENGTHS

Computer Languages	Python, C/C++, Fortran, Mathematica, Bash
Software & Tools	SLURM, Parallel computing (MPI), LaTeX, TensorFlow

EDUCATION

University of Southern California *August 2016 - August 2021*
Ph.D. in Geological Sciences
Department of Earth Sciences

Carleton University *September 2007 - May 2013*
B.Sc. in Computational Geophysics
Department of Earth Sciences

EMPLOYMENT

2021 **Sattler College**—*Boston, Massachusetts, USA*
Adjunct Professor

Massachusetts Insitute of Technology—*Cambridge, Massachusetts, USA*
Postdoctoral Associate

2016 **University of Southern California**—*Los Angeles, California, USA*
Research/Teaching Assistant

2013 **Scripps Institution of Oceanography**—*La Jolla, California, USA*
Seismic Analyst

2011 **Pacific Geoscience Center**—*Sidney, British Columbia, Canada*
Research Assistant

2010 **Geological Survey of Canada**—*Ottawa, Ontario, Canada*
Research Assistant

GRADUATE COURSEWORK (SELECTED)

2020 **Advanced Mechanics**
Newtonian formulation of dynamics; Hamilton's principle; Lagrangian formulation; rigid body motion; Hamiltonian formulation; Hamilton-Jacobi theory; vibrations.

Advanced Seismology

Advanced methods of theoretical seismology for studying the generation of seismic waves from natural and artificial sources and the propagation through realistic earth models.

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.

TEACHING

2021 **Statistics and Data Science**
How does one appropriately gain insights from a data set without being misled? This course covers the elementary principles of data description, hypothesis testing, and regression. The course begins with an introduction to probability and random variables. It then moves into statistics, having students run practical analyses on data sets from medicine, elections, and business.

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

2021 **Tectonics**—*Article reviewer*
Geophysical Journal International—*Article reviewer*
Physics of the Earth and Planetary Interiors—*Article reviewer*
Pure and Applied Geophysics—*Article reviewer*
Seismological Research Letters—*Article reviewer*

2020 **Geophysical Journal International**—*Article reviewer*
Public Library of Science (PLOS) One—*Article reviewer*

SOCIETIES

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

SPEAKING ENGAGEMENTS

2021 **Catalog Update (2008-2020): A Detailed Earthquake Catalog for the San Jacinto Fault Zone Region in Southern California**
Seismological Society of America Annual Meeting

From Raw Seismic Waveforms to Detailed Seismicity and Traveltime Tomography around the 2019 M7.1 Ridgecrest, CA Earthquake
Seismological Society of America Virtual Tomography Sessions: Cutting-edge Methods and Applications in Seismic Tomography

2020 **Detailed traveltime tomography and seismicity around the 2019 M7.1 Ridgecrest, CA, earthquake using dense rapid-response seismic data**
American Geophysical Union Annual Meeting

Seismic velocity structure of the Ridgecrest, CA region from traveltime tomography
United States Geological Survey—Earthquake Science Center Seminar

Seismic velocity structure of the Ridgecrest, CA region from local earthquake traveltime tomography
Southern California Earthquake Center Community Velocity Model Workshop

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 zone**

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
Massachusettes 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

PEER-REVIEWED PUBLICATIONS

2022 **White, M. C. A.**, Sharma, K., Li, A., Satish Kumar., T. K., & Nakata, N. (In Preparation) FastMapSVM: Classifying abstract objects using the FastMap algorithm and Support-Vector Machines

Jiang, C., Zhang, P., **White, M. C. A.**, Pickle, R., & Miller, M. S. (2022). A Detailed Earthquake Catalog for Banda Arc–Australian Plate Collision Zone Using Machine-Learning Phase Picker and an Automated Workflow. *The Seismic Record, 2*(1), 1–10. doi: 10.1785/0320210041

2021 **White, M. C. A.**, Fang, H., Catchings, R. D., Goldman, M. R., Steidl, J. H., & Ben-Zion, Y. (2021). Detailed traveltime tomography and seismic catalogue around the 2019 M w7.1 Ridgecrest, California, earthquake using dense rapid-response seismic data. *Geophysical Journal International, 227*(1), 204–227. doi: 10.1093/gji/ggab224

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., Tytell, 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

PUBLISHED DATA SETS

2021 **White, M. C. A.** Ben-Zion, Y., Vernon, F. L. (2021), Detailed earthquake catalog for the San Jacinto Fault Zone in southern California (2008-2020), Mendeley Data, doi: 10.17632/7ywkdx7c62

White, M. C. A., Fang, H., Catchings, R. D., Goldman, M. R., Steidl, J. H., Ben-Zion, Y. (2021), Ridgecrest, CA seismic velocity models, Mendeley Data, doi: 10.17632/gv33tgvt5f

White, M. C. A., Fang, H., Catchings, R. D., Goldman, M. R., Steidl, J. H., Ben-Zion, Y. (2021), 2019 Ridgecrest, CA earthquake aftershock catalog, Mendeley Data, doi: 10.17632/x8v5wkbj6r

CONFERENCE PROCEEDINGS

2021 **White, M. C. A.**, & Nakata, N. (2021). FastMapSVM: Classifying seismograms using FastMap and Support-Vector Machines. S31A-02 presented at 2021 Fall Meeting, AGU, New Orleans, LA, 13-17 December.

White, M. C. A., Ben-Zion, Y., & Vernon, F. L. (2021, 08). A Detailed Earthquake Catalog for the San Jacinto Fault-Zone Region in Southern California and the period 2008-2020. Poster Presentation at 2021 SCEC Annual Meeting.

White, M. C. A., Ben-Zion, Y., & Vernon, F. (2021). Catalog Update: A Detailed Earthquake Catalog for the San Jacinto Fault Zone Region in Southern California. *Seismological Research Letters, 92*(2B), p. 1430. doi: 10.1785/0220210025

2020 **White, M. C. A.**, Fang, H., Catchings, R. D., Goldman, M. R., Steidl, J. H., & Ben-Zion, Y. (2020). Detailed traveltime tomography and seismicity around the 2019 M7.1 Ridgecrest, CA, earthquake using dense rapid-response seismic data. S070-08 presented at 2020 Fall Meeting, AGU, San Francisco, CA, 1-17 December.

Fang, H., **White, M. C. A.**, Lu, Y., van der Hilst, R. D., & Ben-Zion, Y. (2020). Regional seismic velocity models for Southern California based on travel time tomography with Poisson Voronoi cells parameterization. S070-04 presented at 2020 Fall Meeting, AGU, San Francisco, CA, 1-17 December.

Luckie, T., Gase, A., Jacobs, K., **White, M. C. A.**, Henrys, S. A., Okaya, D. A., Van Avendonk, H. J., Bangs, N. L., Barker, D. H. N., Bassett, D., Kodaira, S., Arai, R., Fujie, G., & Yamamoto, Y. (2020). P-wave velocity structure of the northern Hikurangi margin from travel time tomography. T017-0010 presented at 2020 Fall Meeting, AGU, San Francisco, CA, 1-17 December.

White, M. C. A., Fang, H., Catchings, R. D., Goldman, M. R., Steidl, J. H., & Ben-Zion, Y. (2020). Detailed traveltime tomography and seismicity around the 2019 M7.1 Ridgecrest, CA, earthquake using dense rapid-response seismic data. Poster Presentation at 2020 SCEC Annual Meeting.

Catchings, R. D., Goldman, M. R., **White, M. C. A.**, Qiu, H., & Ben-Zion, Y. (2020). Results from dense nodal-array recordings of the 2019 Ridgecrest Sequence aftershocks. Oral Presentation at 2020 SCEC Annual Meeting.

2019 **White, M. C. A.**, Fang, H., van der Hilst, R. D., & Ben-Zion, Y. (2019). The distribution of microseismicity correlates closely with velocity structure in the San Jacinto fault-zone region of Southern California. S21C-07 presented at 2019 Fall Meeting, AGU, San Fransisco, CA, 9-13 December.

Nakata, N., Fang, H., **White, M. C. A.**, & Pitarka, A. (2019). Shallow crustal heterogeneity in Southern California estimated from earthquake coda waves. Poster Presentation at 2019 SCEC Annual Meeting.

White, M. C. A., Ben-Zion, Y., & Vernon, F. L. (2019). Focal Mechanisms of Microseismicity in the San Jacinto Fault Zone Region of Southern California. *Seismological Research Letters, 90*(2B), p. 1042. doi: 10.1785/0220190061

2018 **White, M. C. A.**, Ben-Zion, Y., & Vernon, F. L. (2018). Detailed seismic catalog for the San Jacinto fault zone region (2008-2016) from automated processing of raw waveform data. Poster Presentation at 2018 SCEC Annual Meeting.

2017 **White, M. C. A.**, Ross, Z. E., Vernon, F. L., & Ben-Zion, Y. (2017). A Detailed Automatic Seismicity Catalog (1998-2015) for the San Jacinto Fault Zone Region. *Seismological Research Letters, 88*(2B), p. 569. doi: 10.1785/0220170035

White, M. C. A., Ross, Z. E., Ben-Zion, Y., & Vernon, F. L. (2017). A detailed, automatically-derived, seismicity catalog for the San Jacinto fault zone (1998-2016). Poster Presentation at 2017 SCEC Annual Meeting.

2016 **White, M. C. A.**, Ross, Z. E., Vernon, F. L., & Ben-Zion, Y. (2016). A detailed automatic 1998-2015 earthquake catalog of the San Jacinto fault zone region. Poster Presentation at 2016 SCEC Annual Meeting.

2015 **White, M. C. A.**, Ross, Z. E., Vernon, F. L., & Ben-Zion, Y. (2015). A Large Scale Automatic Earthquake Location Catalog in the San Jacinto Fault Zone Area Using An Improved Shear-Wave Detection Algorithm. S11A-2775 presented at 2015 Fall Meeting, AGU, San Francisco, CA, 14-18 December.

White, M. C. A., Ross, Z. E., Reyes, J. C., Vernon, F. L., & Ben-Zion, Y. (2015). An Improved Algorithm for Automatic Picking of Seismic S-wave Arrivals in Continuous Data with Application to the San Jacinto Fault Zone. *Seismological Research Letters, 86*(2B), p. 731. doi: 10.1785/0220150017

Ben-Zion, Y., Vernon, F. L., Ozakin, Y., Zigone, D., Ross, Z., Meng, H., **White, M. C. A.**, Reyes, J. C., Hollis, D., & Barklage, M. (2015). Basic Wave Propagation Results from a Highly-Dense Seismic Array on the San Jacinto Fault Zone. *Seismological Research Letters, 86*(2B), p. 594. doi: 10.1785/0220150017

2014 Vernon, F. L., Reyes, J. C., **White, M. C. A.**, Davis, G. A., Meyer, J. C., Sahakian, V. J., Mancinelli, N. J., Ben-Zion, Y., Zigone, D., Harris, C. W., Liu, X., Qiu, H., Share., P.-E., Ozakin, Y., Hollis, D., & Barklage, M. (2014). Observations at a San Jacinto Fault Zone site (Sage Brush Flat) Using a Nodal Seismic High Frequency Array. T11F-08 presented at 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

Tytell, J. E., Cox, T. A., **White, M. C. A.**, Martynov, V. G., Eakins, J., & Vernon, F. L. (2014). The ANF Catalog of Central United States Seismicity. S51A-4381 presented at 2014 Fall Meeting, AGU, San Francisco, CA, 15-19 December.

2013 Mulder, T., Brillon, C., Bentkowski, W., **White, M. C. A.**, Rosenberger, A., Rogers, G. C., Vernon, F. L., & Kao, H. (2013). Analysis of the 2012 Oct 27 Haida Gwaii Aftershock Sequence. S32A-08 presented at 2013 Fall Meeting, AGU, San Francisco, CA, 9-13 December.

2011 Mulder, T., Brillon, C., Bentkowski, W., **White, M. C. A.**, Rosenberger, A., Rogers, G. C., Vernon, F. L., & Kao, H. (2011). WaveHRL: a high resolution, modular seismic event system and its application to the L'Aquila 2009 earthquake sequence. S32A-08 presented at 2011 Fall Meeting, AGU, San Francisco, CA, 5-9 December.