

Amy C. Moser – Curriculum Vitae

Department of Earth, Atmospheric, and Planetary Sciences
Massachusetts Institute of Technology
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PROFESSIONAL EXPERIENCE

NSF Postdoctoral Research Fellow January 2023-present
Massachusetts Institute of Technology | Cambridge, MA
University of Wisconsin-Madison | Madison, WI

- Mentors: Dr. Matěj Peč, Dr. Chloë Bonamici

EDUCATION

Ph.D., Earth Science December 2022

Certificate in College and University Teaching
University of California, Santa Barbara (UCSB) | Santa Barbara, CA

- Dissertation: “Dating Deformation with Titanite”
- Adviser: Dr. Bradley R. Hacker

M.Sc., Geology 2017

Utah State University | Logan, UT

- Thesis: “Spatiotemporal Evolution of Pleistocene and Late Oligocene–Early Miocene Deformation in the Mecca Hills, Southernmost San Andreas Fault Zone”
- Advisers: Dr. James P. Evans, Dr. Alexis Ault

B.A., Geosciences, *Summa Cum Laude* with honors in Earth and Environment 2014

Franklin and Marshall College (F&M) | Lancaster, PA

- Thesis: “Structural Analysis of Seemingly Anomalous Groundwater Flow at Boiling Springs, Pennsylvania”
- Adviser: Dr. Robert Walter

RESEARCH

PUBLICATIONS

Hoover, W.F., Condit, C.B., Lindquist, P.C., **Moser, A.C.**, Guevara, V.E., 2022, Episodic Slow Slip Hosted by Talc-Bearing Metasomatic Rocks: High Strain Rates and Stress Amplification in a Chemically Reacting Shear Zone: Geophysical Research Letters, v. 49, e2022GL1083 doi.org/10.1029/2022GL101083.

Cawood, T.K., **Moser, A.C.**, Borsook, A., and Rooney, A.D., 2022, New Constraints on the Timing and Character of Laramide Deformation, Fluid Flow, and Pegmatite Emplacement in Southeastern California: GSA Bulletin, v. 134, no. 11–12, p. 3221–3241, doi.org/10.1130/B36251.1.

Moser, A.C., Hacker, B.R., Gehrels, G.E., Seward, G.G.E., and Kylander-Clark, A.R.C., 2022, Linking Titanite U-Pb Dates to Coupled Deformation and Dissolution–Reprecipitation: Contributions to Mineralogy and Petrology, v. 40, no. 3, p. 1–27. doi.org/10.1007/s00410-022-01906-9.

Moser, A.C., Ault, A.K., Stearns, M.A., Evans, J.P., and Guenther, W.R., 2021, Late Oligocene–Early Miocene Detachment Faulting in Crystalline Basement, Mecca Hills, CA, Documented with Zircon (U–Th)/He Date-eU-Visual Radiation Damage Patterns: Tectonics, v. 40, no. 9, p. 1–24, doi.org/10.1029/2021TC006809.

Ault, A.K., Guenther, W.R., **Moser, A.C.**, Miller, G.H., and Refsnider, K.A., 2018, Zircon Grain Selection Reveals (De)coupled Metamictization, Radiation Damage, and He Diffusivity: Chemical Geology, v. 490, p. 1–12, [doi:10.1016/j.chemgeo.2018.04.023](https://doi.org/10.1016/j.chemgeo.2018.04.023).

PUBLICATIONS, *continued*

Moser, A.C., Evans, J.P., Ault, A.K., Bradbury, K.K., and Janecke, S.U., 2017, (U–Th)/He Thermochronometry Reveals Pleistocene Punctuated Deformation and Synkinematic Hematite Mineralization in the Mecca Hills, Southernmost San Andreas Fault Zone: Earth and Planetary Science Letters, v. 476, p. 87-99. [doi:10.1016/j.epsl.2017.07.039](https://doi.org/10.1016/j.epsl.2017.07.039).

PUBLICATIONS, *in review*

Moser, A.C., Lusk, A.D., Attia, S., and Garber, J.M., (*in review*), Titanite Petrochronology Reveals Secular Temperature and Fluid Evolution During Ductile Deformation: An Example from Late Cretaceous Shear Zones in the Eastern Transverse Ranges. for *G-cubed*. (*manuscript available upon request*)

PUBLICATIONS, *in preparation*

Moser, A.C., Schwartz, J.J., Klepeis, K.K., Cottle, J.M., Seward, G.G.E., Kylander-Clark, A.R.C, Hacker, B.R., (*in prep*) Titanite Deformation Chronometry Reveals Miocene Amphibolite-Facies Deformation Along the Alpine Fault System, New Zealand. for *Journal of Metamorphic Geology*. (*manuscript available upon request*)

GRANTS, AWARDS, AND FELLOWSHIPS

- NSF-EAR Postdoctoral Fellowship (\$180,000) 2022
- Alex Johnson Memorial Award for Outstanding Student Mentoring | UCSB 2022
- AGU Outstanding Student Presentation Award 2021
- G.K. Gilbert Award for Best Colloquium Talk, Department of Earth Science | UCSB 2021
- Peggy Dearth Wormington Field Studies Award | UCSB (\$1,000) 2021
- Earth Science Graduate Opportunity Award | UCSB (\$2,150) 2020
- Graduate Student Association Excellence in Teaching Award | UCSB 2020
- Most Helpful Graduate Student (vote by graduate student peers) | UCSB 2020
- Mucker's Coterie TA of the Year (undergraduate-voted TA award) | UCSB 2019
- Mineralogical Society of America Student Research Grant (\$5,000) 2018
- Chancellor's Doctoral Fellowship | UCSB 2017–2022
- Geological Society of America Student Research Grant (\$2,400) 2016
- American Association of Petroleum Geologists Student Research Grant (\$2,750) 2016
- Association for Women Geoscientists Research Scholarship (\$1,000) 2016
- College of Science M.Sc. Student Researcher of the Year | Utah State 2016
- Department of Geology Outstanding Graduate Researcher | Utah State 2016
- GDL Foundation Fellowship (\$5,000) 2015
- Rawsley Science Prize (all-school science award) | F&M 2014
- Geology Award | F&M 2014
- Richard A. Shephard '56 Award in Mineralogy and Petrology | F&M 2014
- Lloyd S. Yeakel Memorial Award in Geology and Sedimentology | F&M 2014
- Phi Beta Kappa Academic Honor Society 2014

INVITED TALKS AT CONFERENCES (*not repeated in abstract list*)

***Moser, A.C.**, Lusk, A.D., Attia, S., 2022, Dating Deformation with Titanite: An Example From Cretaceous Shear Zones in Joshua Tree National Park: Rocky Mountain/Cordilleran Geological Society of America Joint Meeting, Abstract 2-1.

***Moser, A.C.**, Hacker, B.R., Cawood, T.K., Gehrels, G.G., Lusk, A.D., Attia, S., 2021, U–Pb Dates from Dynamically Recrystallized Titanite Directly Constrain Timing of Crystal-Plastic Deformation: American Geophysical Union Fall Meeting, Abstract V22A-05.

MEETING ABSTRACTS

Hoover, W.F., Condit, C.B., **Moser, A.C.**, Lindquist, P.C., and Guevara, V.E., 2022, The Role of Metasomatism in Episodic Tremor and Slow Slip: Stress and Strain Rate Variations in a Chemically Reacting Shear Zone: Geological Society of America Annual Meeting, Abstract 186-3.

MEETING ABSTRACTS, *continued*

- Hoover, W.F., Condit, C.B., **Moser, A.C.**, Guevara, V.E., and Lindquist, P.C., 2022, Stress and Strain Rate Variations in a Chemically Reacting Shear Zone: The Role of Metasomatism in Producing Slow Slip and Tremor: Goldschmidt Conference, Abstract 12360.
- Moser, A. C.**, Hacker, B.R., Stoner, R. K., & Gehrels, G.E., 2019, Dating Dynamic Recrystallization: Microstructural Geochronology of Titanite: Geological Society of America Annual Meeting, Abstract 217-2.
- Cawood, T.K., Moser, A.C., and Borsook, A., 2019, Laramide Thrusting in SE California: New Age Constraints From Late Syn-Kinematic Pegmatites and Accessory Mineral Petrochronology: Geological Society of America Annual Meeting, Abstract 217-12.
- Moser, A.C.**, Hacker, B.R., and Schwartz, J. J., 2018, Directly Dating High-Temperature Deformation: Dynamic Recrystallization and U–Pb Resetting of Titanite: American Geophysical Union Fall Meeting, Abstract V33E-0284.
- Moser, A.C.**, Ault, A.K., Evans, J.P., Reiners, P.W., Stearns, M., and Guenther, W.R., 2017, Using Zircon (U-Th)/He Damage-Diffusivity Patterns to Quantify Detachment-Related Basement Exhumation in the Mecca Hills, CA: American Geophysical Union Fall Meeting, Abstract T13A-0487.
- Ault, A.K., Guenther, W.R., **Moser, A.C.**, Miller, G.H., Refsnider, K.R., 2017, (De)coupled Zircon Metamictization, Radiation Damage, and He Diffusivity: American Geophysical Union Fall Meeting, Abstract T12A-06.
- Moser, A.C.**, Evans J.P., Ault, A.K., Janecke, S.U., and Bradbury, K.K., 2016, Spatiotemporal Evolution of San Andreas Fault-Related Deformation in the Mecca Hills, Southern California, From Integrated Fault Zone Characterization and Low-Temperature Thermochronology: Geological Society of America Annual Meeting, Abstract 25-6.
- Evans, J.P., Bradbury, K.K., **Moser, A.C.**, Janecke, S.U., and Forand, D.H., 2016, The Development of Inner Damage Zones Around Faults and Their Relationship to Seismic Attributes in Faults: A Virtuous Feedback Amongst Seismicity, Fluid Flow, Heat, Alteration, and Deformation: Geological Society of America Annual Meeting, Abstract 25-1.
- Moser, A.C.**, Evans, J.P., Ault, A.K., Janecke, S.U., Bradbury, K.K., and Clausnitzer, S.M., 2015, Structural, Geochemical, and Thermal Evolution of the Southern San Andreas and Parallel Subsidiary Faults in the Mecca Hills, Southern California: American Geophysical Union Fall Meeting, Abstract T41A-2862.
- Bradbury, K.K., Evans, J.P., **Moser, A.C.**, Schulthies, S.A., 2015, Structural and Geochemical Characterization of Fault-Related Deformation in the Northeastern Block of the Southern San Andreas Fault, Mecca Hills, Southern California: American Geophysical Union Fall Meeting, Abstract T54B-01.
- Evans, J.P., Bradbury, K.K., **Moser, A.C.**, Springer, S., Forand, D., and Jacobs, J., 2015, Analysis of San Andreas Fault Zone Composition and Structure: Systematic Mineralogic and Structural Studies: Geological Society of America Annual Meeting, Abstract 74-5.
- Moser, A.C.**, Evans, J.P., Ault, A.K., Janecke, S.U., Bradbury, K.K., and Clausnitzer, S.M., 2015, Structural, Geochemical, and Thermal Evolution of the Southern San Andreas and Parallel Subsidiary Faults in the Mecca Hills, Southern California: Southern California Earthquake Center Annual Meeting, Abstract 274.
- Bradbury, K.K., Evans, J.P., **Moser, A.C.**, Schulthies, S.A., 2015, Structure and Mineralogical Characterization of Multiple Fault Traces in Painted Canyon Area, Mecca Hills, Southern San Andreas Fault System, California: Southern California Earthquake Center Annual Meeting, Abstract 258.
- Moser, A.**, Walter, R.C., Bechtel, T.D., Ismat, Z., and Potter, N., 2014, Investigation of Structural Control of Seemingly Anomalous Groundwater Flow at Boiling Springs, Pennsylvania: Geological Society of America Northeastern Section Meeting, Abstract 8-15.

MEETING ABSTRACTS, *continued*

Grand Pré, C.A., Walter, R.C., Merritts, D.J., **Moser, A.C.**, Bernhardt, C., Potapova, M., and Hilgartner, W.B., 2012, A High-Resolution Multi-Proxy Record of Late Pleistocene and Holocene Climate Change from Great Marsh, Southeastern PA: Geological Society of America Annual Meeting, Abstract 145-4.

INVITED SEMINAR TALKS

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| Williams College, Geosciences Department | 2022 |
| University of Michigan, Petrology Seminar | 2022 |
| Oberlin College, Department of Geosciences | 2022 |
| Denison University, Earth and Environmental Sciences Department | 2021 |
| Pennsylvania State University, Hard Rock Café seminar | 2020 |
| University of Southern California, Lithospheric Dynamics seminar | 2019 |
| Franklin and Marshall College, Department of Earth and Environment | 2017 |

LABORATORY EXPERIENCE

Electron Beam Facility | UCSB 2017–present

- Proficient using FEI Quanta 400f field-emission scanning electron microscope for EBSD, BSE, SE, CL, and EDS analyses
- Proficient using Oxford Instruments CHANNEL 5 software for microstructural data acquisition and reduction
- Experience with WDS X-ray mapping and quantitative element spot analyses using Cameca SE-100 electron microprobe

Laser-Ablation Split-Stream (LASS) Facility | UCSB 2017–present

- Proficient using Chromium 2 software, Photon Machines 193 nm excimer laser, Nu Instruments Plasma HR-ES multi-collector ICP, Agilent 7700x quadrupole mass spectrometer for laser-ablation split stream analyses of U-Th-Pb isotopes and trace-elements
- Proficient in U-Th-Pb and trace-element data reduction using Lolite and Igor Pro

Rock crushing and mineral separation | UCSB and Utah State 2015–present

- Experience with jaw crusher, mini jaw crusher, water table, Frantz magnetic separator, and heavy liquids mineral separation techniques
- Proficient in target mineral selection, epoxy mount preparation and polishing for laser-ablation analyses and noble gas extraction

Arizona Radiogenic Helium Dating Laboratory | University of Arizona 2016

- Operated noble gas extraction line for apatite, zircon, and hematite (U-Th)/He analyses

FIELD RESERACH EXPERIENCE

Eastern Transverse Ranges, Joshua Tree National Park, Southern California 2021

- Geologic mapping of Cretaceous ductile shear zones and associated aplite dikes
- Target sample collection for deformation chronometry and thermobarometry

Cargo Muchacho Mountains, Southern California 2020

- Geologic mapping of Cretaceous shear zones and associated ore deposits
- Target sample collection for titanite deformation chronometry

Ivrea-Verbano Zone, Italy 2019

- Sample collection and field descriptions of lower-crustal metapelites and metabasites

Coast shear zone, British Columbia and Alaska 2018, 2019

- Oriented sample collection
- Outcrop-scale structural characterization and analysis
- Target sample collection for titanite deformation chronometry

San Andreas fault zone, Southern California 2014–2016

- Outcrop-scale structural characterization and analysis of fault damage zones
- Target sample collection for apatite and zircon (U-Th)/He thermochronology

PROFESSIONAL FIELD TRIPS, FIELD CLASSES, AND SHORT COURSES

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| Field Petrology of Ophiolitic Crust (Semail Ophiolite, Oman) UCSB | 2019 |
| Architecture and Evolution of the Crust during Continental Arc Magmatism: A Transect Through the Coast Mountains Batholith GSA Thompson Field Forum | 2018 |
| Structural and Stratigraphic Concepts Applied to Basin Exploration ExxonMobil | 2014 |
| Field Camp, SW Montana and NE Wyoming University of Houston | 2013 |
| Constraints on the Kinematics of Alpine Fault Zone Deformation University of Otago | 2013 |

TEACHING, MENTORING, AND OUTREACH**COURSES TAUGHT** (as instructor of record)

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| Earth 2, Physical Geology UCSB | 2020 |
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TEACHING ASSISTANTSHIPS

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| Earth 118, Summer Field Geology UCSB | 2019 |
| Earth 104B, Field Methods UCSB | 2018, 2019 |
| Earth 102C, Metamorphic Petrology UCSB | 2018 |
| Earth 6, Mountains, Boots, and Backpacks UCSB | 2017 |
| GEOL 5200, Field Camp Utah State | 2016 |
| GEOL 3700, Structural Geology Utah State | 2016 |
| GEO 110, The Dynamic Earth F&M | 2011, 2013 |

MENTORING

Undergraduate thesis students mentored | UCSB

- Michelle Chambers (now SEM operator at EAG Laboratories) 2021–2022

Undergraduates mentored in formal mentoring program (GEMSS) | UCSB

- Jillian Allison (now a graduate student in the Bren School, UCSB) 2020–2022
- Emily Gates (now a graduate student at Western Washington University) 2020–2021
- Keli McGuire (now an Environmental Scientist at GHD) 2020–2021

Undergraduate Laboratory Assistants Mentored | UCSB

- Alaina Rosenthal-Guillot 2020
- Roxana Lagunas (now at USGS Kansas Water Science Center) 2019–2020

OUTREACH

Guest speaker, Laguna Blanca School Science Research Program 2019, 2020

Graduate student participant on panel for post-graduate opportunities in Earth Science

- UC Santa Barbara 2017–2019
- Santa Barbara City College 2019
- Occidental College 2018
- Utah State University 2015

SERVICE**UCSB DEPARTMENT OF EARTH SCIENCE**

Member, UC Santa Barbara Department of Earth Science URGE Pod 2021

- <https://urgeoscience.org/pods/ucsb-earth-science/>

Co-chair, Geoscience Enrichment and Mentoring for Students by Students (GEMSS) 2020–2021

- Created peer mentoring program in UCSB Department of Earth Science
- Organized, moderated panels on geoscience careers and applying to graduate school

Member, Student Committee for Justice, Equity, Diversity, and Inclusion 2020–2021

Co-president, Royal Geological Society of Goleta 2019–2020

- Served as liaison between Earth Science faculty and graduate students

MEETING SESSIONS CONVENED

American Geophysical Union Fall Meeting 2021

- Co-convenor: “Zooming in to see the big picture: Using nano- to micro-scale observations to better understand tectonic processes”

Geological Society of America Annual Meeting 2019

- Co-convenor: “How old, how long, and how fast: Establishing the absolute timing, duration and rates of mid- to lower-crustal deformation”

INSTITUTIONAL PRESENTATIONS

Speaker at TEDxUSU *Lift* – <https://www.youtube.com/watch?v=wDkH7Qpu6V4&t=12s> 2016

Speaker at Ignite USU – <https://www.youtube.com/watch?v=H26wMxB8Z2c> 2016

PROFESSIONAL ORGANIZATIONS

Geological Society of America

American Geophysical Union

Mineralogical Society of America

PetroNet

ADDITIONAL WORK EXPERIENCE

Earth Science Intern, Chevron Corporation – Houston, TX 2015