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### Education

Ph.D. Energy and Resources, University of California, Berkeley, 1994  
M.S. Energy and Resources, University of California, Berkeley, 1990  
B.S. Conservation and Resource Studies, Highest Honors, University of California, Berkeley, 1984

### Professional Positions

Program Domain Head and Senior Advisor (since 2015), Lawrence Berkeley National Lab, 2001-Present  
Senior Scientist, Climate and Ecosystem Sciences Division, Lawrence Berkeley National Lab, 2013-Present  
Associate Adjunct Professor, Energy and Resources, U.C. Berkeley, 2005-Present  
Staff Scientist, Earth Sciences Division, Lawrence Berkeley National Laboratory, 2005-2013  
Scientist, Earth Science Division, Lawrence Berkeley National Laboratory, 1998-2005  
Post-Doctoral Fellow, U.C. Irvine and Stanford University, 1994-1998  
Graduate Research Assistant, Energy and Resources Group, U.C. Berkeley, 1986-1994  
Research Principal Investigator, Rocky Mountain Biological Laboratory, Colorado, 1991-1993  
Science Intern, Lawrence Livermore National Laboratory, 1985-1986

### Fellowships and Honors

Berkeley Lab Director's Award for Exceptional Achievement in Science, 2017  
Union Fellow, American Geophysical Union, 2017  
Women @ The Lab award, 2015  
Honorary Doctorate, University of Zurich, Faculty of Mathematics and Natural Sciences, 2015  
Secretary of Energy Outstanding Mentor Award, 2008  
Presidential Early Career Award for Scientists and Engineers, 2003  
DOE Early Career Award for Scientists and Engineers, 2003  
Earth System Science Post-Doctoral Fellowship, 1994-1997  
NASA Global Change Doctoral Fellowship, 1991-1994  
Switzer Environmental Fellowship, 1990-1992  
Graduate Opportunity Fellowship, U.C. Berkeley, 1986-87

### Peer-reviewed Publications (*\*indicates student or post doc*)

Hicks Pries, C.E., B.N. Sulman, C. West, C. O'Neill, E. Poppleton, R.C. Porras, C. Castanha, B. Zhu, D.B. Wiedemeier, and M.S.Torn. 2018. Root litter decomposition slows with soil depth. *Soil Biology and Biochemistry* 125: 103-114. <https://doi.org/10.1016/j.soilbio.2018.07.002>

Feldman, D.R., W.D. Collins, S.C. Biraud, M.D. Risser, D.D. Turner, P.J. Gero, J. Tadić, D. Helmig, S. Xie, E.J. Mlawer, T.R. Shippert, M.S. Torn. 2018. Observationally derived rise in methane surface forcing mediated by water vapour trends. *Nature Geoscience* 11(4): 238-243. doi:10.1038/s41561-018-0085-9

Taş, N., E. Prestat, S. Wang, Y. Wu, C. Ulrich, T. Kneafsey, S.G. Tringe, M.S. Torn, S.S. Hubbard, J.K. Jansson. 2018. Landscape topography structures the soil microbiome in arctic polygonal tundra. *Nature Communications* 9(1): 777. <https://doi.org/10.1038/s41467-018-03089-z>

Porras, R.C., C.E.H. Pries, M.S. Torn, P.S. Nico. 2018. Synthetic iron (hydr) oxide-glucose associations in subsurface soil: Effects on decomposability of mineral associated carbon. *Science of The Total Environment* 613, 342-351

Hicks Pries\*, C.E., C. Castanha, R.C. Porras, C. Phillips, M.S. Torn. 2018. Response to Comment on "The whole-soil carbon flux in response to warming." *Science* 359 (6378), eaao0457

Smith, P., S. Lutfalla, W.J. Riley, M.S. Torn, M.W.I. Schmidt, J-F Soussana. 2018. The changing faces of soil organic matter research. *Eur J Soil Sci*, 69: 23–30. doi:10.1111/ejss.12500

- Castanha, C., B. Zhu, C.D. Hicks Pries, K. Georgiou, and M.S. Torn. 2018. The effects of heating, rhizosphere, and depth on root litter decomposition are mediated by soil moisture. *Biogeochemistry* 137(1-2): 267–279. <https://doi.org/10.1007/s10533-017-0418-6>
- Abramoff\*, R., X. Xu, M. Hartman, S. O'Brien, W. Feng, E. Davidson, A. Finzi, D. Moorhead, J. Schimel, M. Torn, M. A. Mayes. 2018. The Millennial model: in search of measurable pools and transformations for modeling soil carbon in the new century. *Biogeochemistry* 137(1-2): 51–71. <https://doi.org/10.1007/s10533-017-0409-7>
- Novick, K.A., J.A. Biederman, A.R. Desai, M.E. Litvak, D.J.P. Moore, R.L. Scott, M.S. Torn. 2018. The AmeriFlux network: A coalition of the willing. *Agricultural and Forest Meteorology* 249:444-456. 15Feb2018. <https://doi.org/10.1016/j.agrformet.2017.10.009>
- Grant, R. F., Mekonnen, Z. A., Riley, W. J., Arora, B., & Torn, M. S. 2017. Mathematical modelling of arctic polygonal tundra with ecosys: 2. Microtopography determines how CO<sub>2</sub> and CH<sub>4</sub> exchange responds to changes in temperature and precipitation. *Journal of Geophysical Research: Biogeosciences*, 122, 3174–3187. <https://doi.org/10.1002/2017JG004037>
- Grant, R.F. Z.A. Mekonnen, W.J. Riley, B. Arora, and M.S. Torn. 2017. Microtopography Determines How Active Layer Depths Respond to Changes in Temperature and Precipitation at an Arctic Polygonal Tundra Site: Mathematical Modelling with Ecosys. *Journal of Geophysical Research – Biogeosciences*. DOI: 10.1002/2017JG004035
- Phillips, T.J., S.A. Klein, H-Y. Ma, Q. Tang, S. Xie, I.N. Williams, J.A. Santanello, D.R. Cook, and M.S. Torn. Using ARM Observations to Evaluate Climate Model Simulations of Land-Atmosphere Coupling on the U.S. Southern Great Plains. *Journal of Geophysical Research: Atmospheres*. DOI 10.1002/2017JD027141
- Georgiou\*, K., R.Z. Abramoff, J. Harte, W.J. Riley, M.S. Torn. 2018. Publisher Correction: Microbial community-level regulation explains soil carbon responses to long-term litter manipulations. *Nature communications* 9 (1), 173
- Georgiou\*, K., R.Z. Abramoff, J. Harte, W.J. Riley, M.S. Torn. 2017. Microbial community-level regulation explains soil carbon responses to long-term litter manipulations. *Nature Communications*, 8 (1): 1223.
- Bagley\*, J.E., L. M. Kueppers, D. P. Billesbach, I. N. Williams, S. C. Biraud, M. S. Torn. Using ARM Observations to Evaluate Climate Model Simulations of Land-Atmosphere Coupling on the U.S. Southern Great Plains, *JGR-Atmospheres*, online article ID JGRD53860; DOI: 10.1002/2017JD026740
- Raz-Yaseef\*, N., J. Young-Robertson, T. Rahn, V. Sloan, B. Newman, C. Wilson, S.D. Wullschleger, M.S. Torn. 2017. Evapotranspiration across plant types and geomorphological units in polygonal arctic tundra. *Journal of Hydrology*, 553: 816-825, <https://doi.org/10.1016/j.jhydrol.2017.08.036>.
- Raczka\*, B., S.C. Biraud, E.J. Dlugokencky, J.R. Ehleringer, C. Lai, J.B. Miller, D.E. Pataki, S. Saleska, M.S. Torn, B.H. Vaughn, R. Wehr, D.R. Bowling. Does vapor pressure deficit drive the seasonality of  $\delta^{13}\text{C}$  of the net land-atmosphere CO<sub>2</sub> exchange across the United States? *Journal of Geophysical Research-Biogeosciences*, 10.1002/2017JG003795.
- Hicks Pries\*, C.E., J.A. Bird, C. Castanha, P.J. Hatton, and M.S. Torn. 2017. Long term decomposition: the influence of litter type and soil horizon on retention of plant carbon and nitrogen in soils. *Biogeochemistry* Online May 27, 2017, DOI 10.1007/s10533-017-0345-6
- Kueppers, L.M., Conlisk, E., Castanha, C., Moyes, A. B., Germino, M.J., de Valpine, P., Torn, M.S. and Mitton, J.B. 2016. [Print date 6/1/2017] Warming and provenance limit tree recruitment across and beyond the elevation range of subalpine forest. *Glob Change Biology* 23 (6): 2383-2395, doi:10.1111/gcb.13561
- Porras, R.C., C.E. Hicks Pries, K.J. McFarlane, P.J. Hanson, and M.S. Torn. 2017. Association with pedogenic iron and aluminum: effects on soil organic carbon storage and stability in four temperate forest soils. *Biogeochemistry* 133: 333-345. doi:10.1007/s10533-017-0337-6
- Ku\*, Y., I.N. Williams, J.E. Bagley, M.S. Torn, and L.M. Kueppers. 2017. Representing winter wheat in the Community Land Model (version 4.5). *Geoscientific Model Development (Online)*, 10(5).
- Pastorello, G., D. Papale, H. Chu, C. Trotta, D. Agarwal, E. Canfora, D. Baldocchi, and M. Torn. 2017. A new data set to keep a sharper eye on land-air exchanges. *Eos*.
- Hicks Pries\*, C.E., C. Castanha, R. Porras, and M.S. Torn. 2017. The whole soil carbon flux in response to warming. *Science* 2017; eaal1319 DOI: [10.1126/science.aal1319](https://doi.org/10.1126/science.aal1319)
- Berhe, A.A. and M.S. Torn. 2017. Erosional redistribution of topsoil controls soil nitrogen dynamics *Biogeochemistry* 132: 37. doi:10.1007/s10533-016-0286-5

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- Williams\*, I.N., Y. Lu, L.M. Kueppers, W.J. Riley, S.C. Biraud, J.E. Bagley, and M.S. Torn. 2016. Land-atmosphere coupling and climate prediction over the U.S. Southern Great Plains, *J. Geophys. Res. Atmos.*, 121, 12,125–12,144, doi: [10.1002/2016JD025223](https://doi.org/10.1002/2016JD025223)
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- Raz-Yaseef\*, N. D.P. Billesbach, M. L. Fischer, S. C. Biraud, S.A. Gunter, J.A. Bradford, and M.S. Torn. 2015. Vulnerability of crops and native grasses to summer drying in the US Southern Great Plains. *Agriculture, Ecosystems & Environment* 213: 209-218
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### **Books and Book Chapters**

- Torn, M.S., C.W. Swanston, C. Castanha, S.E. Trumbore. 2009. Storage and turnover of natural organic matter in soil. In: *IUPAC Series on Biophysico-chemical Processes in Environmental Systems; Volume 2- Biophysico-chemical processes involving natural nonliving organic matter in environmental systems*. Series Editors: P. M. Huang and N. Senesi. N., John Wiley & Sons, Inc., Hoboken, New Jersey, USA *LBNL-810E*
- Jensen, D.B., M.S. Torn, and J. Harte. 1993. In *Our Own Hands: A Strategy for Conserving California's Biological Diversity*, University of California Press, Los Angeles. 290 pp
- Harte, J., M.S. Torn, and D.B. Jensen. 1992. The nature and consequences of indirect linkages between climate change and biological diversity. In: *Global Warming and Biological Diversity*, R.L. Peters and T.E. Lovejoy, eds. Yale University Press, New Haven. pp. 325-343

### **Selected Non-Refereed Publications**

- Berg, L, M.S. Torn, D. Turner, Y, Zhang. Study of land-atmosphere-cloud interactions in the Atmospheric System Research (ASR) Program. White paper prepared for the DOE ASR program. June 26, 2015
- Bailey, V., P. Hanson, J. Jastrow, M.S. Torn, and D. Stover. Data-model needs for belowground ecology. A summary report from the Terrestrial Ecosystem Science (TES) mini-workshop. May 8, 2014. Report date December 4, 2014
- Williams, J.H., B. Haley, F. Kahrl, J. Moore, A.D. Jones, M.S. Torn, H. McJeon. 2014. Pathways to deep decarbonization in the United States. The U.S. report of the Deep Decarbonization Pathways Project of the Sustainable Development Solutions Network and the Institute for Sustainable Development and International Relations.
- Torn, M., S. Biraud, and W.J. Riley. 2014. Project 1: Atmospheric Carbon: Measurements and analyses of the carbon cycle, including AmeriFlux. White paper prepared per request from BER CESD. June 30, 2014.
- Torn, M.S., I. Williams, L.M. Kueppers, and S. Biraud. 2014. Project 2: Land Surface Forcing and Land-Atmosphere Interactions. White paper prepared per request from BER CESD. June 30, 2014
- Feldman, D., M.S. Torn, W. Collins, and S. Biraud. 2014. Project 3: Measured CO<sub>2</sub> and CH<sub>4</sub> Radiative Forcing and Climate Model Implications. White paper prepared per request from BER CESD. June 30, 2014
- Torn, M.S., E. Brodie, P. Nico, N. Tas Baas, C. Castanha, C. Pries, and B. Zhu. 2014. LBNL TES SFA on Belowground Carbon Cycling—Long Term Vision. July 7, 2014. White paper prepared per request from BER CESD
- Wang, J., T. Miura, A. Kato (2014), Radiometric validation of satellite vegetation indices using flux tower measurements. 2014 IEEE International Geoscience and Remote Sensing Symposium (IGARSS), (conference proceedings) July 13-18,2014. Quebec, Canada (<http://www.igarss2014.org/default.asp>)

- Trumbore, S., M. Torn, and L. Smith. 2011. Constructing a database of terrestrial radiocarbon measurements, *Eos Trans. AGU*, 92(43), 376, doi:10.1029/2011EO430006. Published 25 October 2011
- Ekstrom, J.A., S.C. Moser, M.S. Torn. 2010. Barriers to adaptation: A diagnostic framework. Report to the California Energy Commission for Project Greenhouse Gas Abatement and Climate Change. April 30, 2010. 80 pp
- Fingerman, K.R., M.S. Torn, and D.M. Kammen. 2010. Water impacts of biofuel extend beyond irrigation. e-Letter. **Science**. 3 February 2010
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- Kerr, A. and M.S. Torn. 2008. Greenhouse Gas Inventory Methods. A report for the Climate Change Research Plan Update, California Energy Commission.
- Oldenburg, C.M. and M.S. Torn (and workshop participants). 2008. Biologically Enhanced Carbon Research Needs and Opportunities. Whitepaper prepared for the Energy Biosciences Institute
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- Farrell, A.E., A.C. Kerr, A.R. Brandt, M.S. Torn, and G. Franco. 2004. Research Roadmap for Greenhouse Gas Inventory Methods. Prepared for the California Energy Commission PIER (Public Interest Energy Research) program.
- Hanneman, M. and M.S. Torn. 2003. Review Chapter. In: Global Climate Change and California: Potential Implications for Ecosystems, Health, and Economy. California Energy Commission.
- Torn, M.S., C. Masiello, I. Basile-Doelsch, N. Bijoor, and R. Sutton. 2002. Mineral control of carbon storage in Andisols: Case studies and applications to other soils. In: Kleber, M., P. Bartoli, and O. Arnauds. Mineralogy related features and processes common to European Andosols. COST ACTION 622: "Soil Resources of European Volcanic Systems" Manderscheid, Germany, April 24-28, 2002. (conference proceedings). LBNL-53797 Ext. Abs
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- Barnes, F.J., S.M. Benson, and M.S. Torn, co-chairs. 2002. DOE Water Cycle Research Strategy. December 2001. U.S. Department of Energy, Office of Science, Office of Biological and Environmental Research. DOE-SC-0043
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- Torn, M.S., E. Mills, and J.S. Fried. 1999. Will climate change spark more wildfire damage? Contingencies: American Academy of Actuaries. July/August p. 34-43. LBNL Report No. 42592
- Torn, M.S. 1994. Environmental Controls over Methane Flux from Ecosystems and the Potential for Feedbacks with Climatic Change. Ph.D. Dissertation, University of California, Berkeley
- Torn, M.S. 1993. Global Warming and Upwelling Ecosystems. In: California Sea Grant: Biennial Report of Completed Projects, 1988-1990. California Sea Grant College, U.C. San Diego.
- Jensen, D.B., M.S. Torn, and J. Harte. 1991. In Our Own Hands: A strategy for conserving biological diversity in California. California Policy Seminar, Berkeley, CA. 220 pp
- Torn, M.S. 1990. The Threats to Biological Diversity in California. Masters Thesis, Energy and Resources Group, U.C. Berkeley. 65 pp
- Torn, M.S., J.E. DeGrange, and J.H. Shinn. 1988. The Effects of Acidic Deposition on Alberta Agriculture: A review. Acid Deposition Research Program. Calgary, Alberta. 160 pp

### **Selected Synergistic and Professional Activities, 1999-2015**

#### Service to Berkeley Lab:

- Division Professional Staff Committee 2015-Present
- Climate and Ecosystem Sciences Division Council 2015-Present (ESD Division Council (2001–2015))
- Program Domain Lead, Biosphere-Atmosphere Interactions, 2015-Present (was Program co-head, Climate and Carbon Sciences, 2003-2015)
- Lab-wide recognition committee, 2014-Present
- Scientist search committees
- Post doc search committees
- Chair, Earth Sciences Division diversity committee, 2003-2006

#### Service to UC Berkeley:

- ERG Curriculum committee 2015-Present
- UCB ERG Executive Committee (2003–2005 as affiliate; 2006–Present as core member)
- Mentor, President's post doctoral fellows, 2014-2016
- Faculty Search Committee member, 2015-2016

#### Lead and PI, AmeriFlux Management Project, 2012-Present

PI: Belowground Carbon Cycling Scientific Focus Area (TES SFA), 2010-Present

PI: Land-Atmosphere Interactions, ASR, 2014-Present

Co-PI: Next Generation Ecosystem Experiment – Arctic, 2011-Present

Area team lead for USGCRP, Earth observation system (EOA) 2016

Guest-editor, AmeriFlux 20<sup>th</sup> Anniversary Issue, Agriculture and Forest Meteorology Journal, 2016-2017

Selected briefings on the Carbon Sink in 2016: Sharlene Weatherwax (July 19), annual BER S&T presentation (Oct. 5), Tom Steyer (Aug 18); Sustainable solutions development network, IIASA, Austria (Oct 20)

Selected briefings in 2017: Climate and the Carbon Sink. Presentation to State Senator Stern, September 27, 2017; Carbon, Land, and Water in California. Presentation to the Strategic Growth Council. Berkeley Lab, November 27, 2017; Land Carbon Sequestration. presentation to Strategic Growth Council staff. Berkeley Lab, November 5, 2017

Chair, AGU Town Hall on AmeriFlux, 2013, 2014, 2015, 2017

Chair, AGU Town Hall on Negative Emissions Technologies, 2016

Co-organizer, FLUXNET international workshop, Berkeley, CA, June 2017

Co-organizer, Joint North American Carbon Program (NACP) – AmeriFlux Principle Investigators meeting, Washington DC, March 2017

Co-organizer, International Year of Soil workshop, March 2016 (could not attend workshop)

Invited participant: Workshop to establish a Global Science and Data Network for Coastal Blue Carbon, Menlo Park, 2016. Presented observations from AmeriFlux perspective.

Co-organizer, 5<sup>th</sup> North American Carbon Program Principle Investigators meeting (PIM5) Washington DC, January 2015. Delivered one of two opening keynote talks.

Invited participant: Workshop on old soil organic matter, Hamburg, Germany, October 2015

Co-convenor and Co-chair, AGU sessions (oral and poster): Carbon, Water, and Energy Exchange in Grassland and Cropland Ecosystems, Fall Meeting 2004. Modeling and observation of ecosystem, carbon cycle and energy system feedbacks in the Earth's climate, Fall Meeting 2006. Soils: Mechanisms of Carbon Stabilization and Response to Climate Change II, Fall Meeting 2007. Long-term networks for ecosystem GHGs fluxes: applications and development, Fall 2013. RePresenting soil carbon dynamics in global land models to improve future IPCC assessments, Fall 2014. Understanding the processes that affect soil organic matter decomposition by linking process-rich experiments and models, Fall 2014. Ideas in Terrestrial Biochemistry: Tell the Story, Ditch the PowerPoint, Fall 2014. Macrosystem Ecology: Thresholds in Ecological Processes and Response across Temporal and Spatial Scales, Fall 2015. 20 Years of Eddy Flux Research in AmeriFlux and EuroFlux: History, Highlights, and Future Directions, 2016. Advances and Opportunities in Forecasting and Data-Model Integration: Approaches for Reducing Complexity and Improving Predictive Understanding in Biogeochemical Models of the Earth System I, Fall 2017. Integration of Ecosystem Research Infrastructures for Multiscale Analysis II, Fall 2017.

Co-Chair or organizer, AmeriFlux Principal Investigators meeting, 2014-2016

Organizing Committee, Bouyoucos Conference on "A Path to Improved Understanding of Complex Soil Systems." Berkeley, Spring 2014

Co-organizer, Land-atmosphere interactions breakout session, ASR/ARM Science Team meeting 2014

Founding member, International Soil Experiment Network, 2013-Present

International Advisory Board, University Research Priority Program on 'Global Change and Biodiversity', University of Zurich, Switzerland, 2013-Present

Organizing committee with Alain Plante (Chair), Josh Schimel, and Anthony Aufdenkampe, SOM6, The Sixth International Workshop on Soil Organic Matter Stabilization and Destabilization, Kiawa Resort, SC, (was not able to attend) October 2014

User Working Group member, Carbon Dioxide Information Analysis Center (CDIAC), 2013

IPCC chapter lead for US government review (Chapter 26: North America), 2013

Co-convenor with Ingrid Kögel-Knabner of Goldschmidt 2013 session 18b, Climate Change and SOM storage and decomposition. Florence, Italy, August 2013

Rapporteur: Moving wire analysis workshop, Lawrence Livermore National Lab, 9-10 Feb 2012

Co-organizer, DOE Workshop: Strategies to Promote Integrated Experiment-Model Approaches to Terrestrial Ecosystem Study, Washington DC, March 19-21, 2012

Lead Organizer, Terrestrial Radiocarbon Database international workshop, Berkeley, CA, July 20-21, 2011

Invited participant, NASA Carbon Monitoring System workshop. 13-14 July 2010 Boulder CO

Science Steering Group, North American Carbon Program (NACP) of the U.S. Global Change Research Group, 2005-2010

Planning meeting, the Carbon Summit, National Academies, January 28-29, 2009

Invited participant, DOE next generation ecosystem experiment, February 2009

Rapporteur, meeting on Arctic Tundra Deep Warming: a Possible DOE Next-Generation Climate Change Ecosystem Experiment, July 2009

Invited participant, JGI Soil metagenomics initiative meeting, July 2009

Invited participant, DOE-NSF Workshop on Coordinated Approaches to Address Long-Term Issues in Global Change Experiments, August 2009

Rapporteur and invited participant, The Lake Constance think tank on global change and feedback from organic carbon dynamics: Defining research visions on how to quantify the molecular-level mechanisms driving soil organic matter turnover, Ittingen, Switzerland, October 2009

Workshop participant, Exploring science needs for the next generation of climatic change and elevated CO<sub>2</sub> experiments in terrestrial ecosystems, Crystal City, VA, April 14-18, 2008

Invited participant, ARM Climate Research Facility Workshop Report, October 2008

Rapporteur, Gradients and Transects session, NACP PI meeting, January 25, 2007

Testified for California Air Resources Board to US EPA hearing on AB32 waiver, May 30, 2007

Convened workshop for Energy Biosciences Institute (EBI) on research needs for biologically enhanced carbon sequestration in terrestrial and geologic reservoirs. Co-convenor: Curt Oldenburg. Berkeley, October 29, 2007. Co-author of whitepaper to EBI.

Organizing committee and session chair, China-US Climate Change Conference, Berkeley, CA, May 2006

Advisory Board, Reviewer, Carbon Dioxide Information Analysis Center (CDIAC), 2005  
 Member, ARM Science Team, surface flux working group  
 Co-Chair, Continental Synthesis Task Force, Science Steering Group, (NACP), 2005  
 Contributing writer and reviewer, California Climate Change: Science Report to Governor on Impacts and Adaptation Options. Convened by California Energy Commission, EPA, and ARB, **2006**  
 National Technical Advisory Committee, DOE National Institute for Global Environmental Change, 2003-2005  
 Science advisor, Union of Concerned Scientists assessment of climate change and wildfire impacts in California, 2005  
 Invited participant, Interagency workshop on Ecosystem Chapter of the US Climate Change Science Plan, Spring, 2004  
 Invited participant and rapporteur, NSF NEON Biogeochemistry Workshop, Boulder, July 2004  
 Session leader, NSF-sponsored workshop on soil respiration: Carbon Respiration from Terrestrial Ecosystems (CaRTE), 2004  
 Lead Author, Road map for non-CO<sub>2</sub> greenhouse gas inventories in California, California Energy Commission. 2003-2004  
 Writing Team, Rapporteur, North American Carbon Program workshop & implementation plan, 2003  
 Co-Author, Review Chapter of California Energy Commission Climate Change Assessment, 2003  
 Co-author, white paper on Biogeosciences in NSF. White Paper title “Linking Ecological Biology and Geoscience. Report to the National Science Foundation, April 4, 2002”  
 Co-chair and author, DOE Water Cycle Dynamics and Prediction Program plan, 2001  
 Co-organizer NSF workshop for research in joint geosciences and biosciences. Madison, WI, 2001  
 Co-author NSF workshop on the Terrestrial Carbon Cycle, June 2000. White Paper title: “The changing carbon cycle: A terrestrial focus”  
 Co-author DOE Terrestrial Ecosystems Research Facilities white paper, 2000  
 Guest Instructor workshop on “Monitoring, Evaluation, Reporting, Verification and Certification of CO<sub>2</sub> Emissions,” LBNL Energy and Environmental Technologies Division, 2000  
 Invited Panelist California Energy Commission Workshop on Climate Change Science, June 1999  
 Co-author Agricultural and grassland ecosystems, appendix to “Working paper on carbon sequestration science and technology,” Office of Science and Office of Fossil Energy, DOE 1999  
 Interviewer, Switzer Environmental Fellowship  
 Interviewer, Compton Foundation Fellowship  
 Reviewer Atmospheric Environment, Biogeochemistry, Chemosphere, Climatic Change, Ecological Applications, Geoderma, Global Biogeochemical Cycles, Global Change Biology, Journal of Geophysical Research, Limnology and Oceanography, Nature, Oecologia, Soil Science Society of America Journal  
 Proposal Reviewer DOE, NSF, WESTGEC, EPA, EMSL  
 Proposal Panel Member DOE-TCP, DOE-NICCR  
 Mentor, ERULF, SULI, GREF, Pre-teacher training, and Mickey Leland programs

### **Courses Taught**

Masters Seminar (ER292B, C, D, E) Co-convenor, Fall 2012, Spring 2013-2017  
 Quantitative Aspects of Global Environmental Problems (Energy and Resources 102) University of California, Berkeley, Spring 2006, Spring 2009 (co-taught), Spring 2011  
 Climate Change Adaptation: policies, politics, and metrics (Energy and Resources 298), University of California, Berkeley, Spring 2010  
 Food Systems (Energy and Resources 298), University of California, Berkeley, Fall 2008, Spring 2009  
 Climate Change Impacts and Adaptation (Energy and Resources 290), University of California, Berkeley, Fall 2007, Fall 2008  
 Environmental Aspects of Biofuels (Energy and Resources 290N) University of California, Berkeley, Spring 2007  
 The Root-Ecosystem Interface. Co-taught with Todd Dawson. Department of Integrative Biology, University of California, Berkeley. Spring 2002. Course number: IB 250  
 Biogeochemistry: Carbon and Nitrogen Cycles (Environmental Science 320), Colorado College, Spring 1996.  
*(Visiting Professor)*

## **Other Teaching Experience**

Seminar Leader on Climate Change, Environmental Leadership Forum, UC Berkeley, July 13, 2011  
Guest Lecturer, Monterey Institute of International Studies, February 2008, October 2008, November 2009, October 2011  
Guest Lecturer at UCB, ER201, Fall 2006, 2007, 2008, 2009, 2010, 2011, 2012; 2013. PH268 Spring 2008, 2009, 2010  
Guest Lecturer, UC Merced, Fall 2009  
Guest Lecturer UC Berkeley, UC Irvine, LBNL, 1991-1994, 1995, 1999-2000  
Guest Instructor, workshop on “Monitoring, evaluation, reporting, verification and certification of CO<sub>2</sub> emissions” organized by Ed Vine, LBNL Energy and Environmental Technologies Division, 2000  
Lecturer Environmental and Cultural Aspects of Energy, Workshop for Native American College Instructor, Native American Renewable Energy Education Project, Summer 1996  
Guest Lecturer Stanford University, 1999  
Teaching Assistant Quantitative Aspects of Global Environmental Problems (Energy and Resources 102) University of California, Berkeley, Spring 1987

## **Invited Presentations, 1999-2018**

Pathways to Deep Decarbonization in the United States, The Earth's Carbon Cycle in the 21st Century: Climate, Ecosystems, and Energy: A symposium honoring Susan Trumbore, Benjamin Franklin Medalist in Earth and Environmental Science, University of Delaware, Newark, DE, April 18, 2018.  
Afforestation & Reforestation as negative emissions technologies. Environmental Defense Fund Science Day Fort Baker, Golden Gate National Recreation Area, January 30, 2018.  
Pathways to Deep Decarbonization in the United States. Berkeley Lab Division Director's Meeting, Berkeley, CA, January 18, 2017  
Ecological Aspects of Bio-Energy Production. Presented at the Workshop on Bio-Energy with Carbon Capture and Storage, convened by the National Academy of Sciences Committee on Developing a Research Agenda for Carbon Dioxide Removal and Reliable Sequestration, Irvine, CA, October 23, 2017.  
BECCS: The Climate and Environmental Context (Torn and Sanchez) and Processes and Near-Term Opportunities (Sanchez and Torn). Presented to the WaferX kick-off meeting in Missoula, Montana, via Zoom, October 11, 2017.  
Soils and the Global Carbon Cycle, Princeton University, Princeton, NJ, September 19, 2017  
North American Flux Networks, Fluxnet Workshop, Berkeley, CA, June 7 2017  
Three Perspectives on the Global Carbon Cycle: Soil, Atmosphere, and Energy, at the 20th Annual Environmental Chemistry and Microbiology Student Symposium, Penn State University, April 21, 2017  
In the Arctic, Gallery opening for Paul Nicklen, Polar Obsession, Brower Center, Berkeley, February 16, 2017  
Ecological aspects of large-scale bioenergy with CCS (BECCS); Carbon Dioxide Removal/Negative Emissions Technologies Workshop, Berkeley CA, Feb 8, 2017  
Panelist: Climate smart agriculture, Low Emissions Solutions Conference, COP22, Marrakech, November 14-16, 2016  
The Urgent Need to Predict, Protect, and Enhance the Global Carbon Sink, Global Change and Biodiversity: Integrating Mechanisms of Interactions, Feedbacks and Scale: URPP Global Change and Biodiversity Conference, Monte Verità Conference Center, Ascona, Switzerland, 28 August – 01 September 2016.  
Enhancing the Global Carbon Sink, Big Ideas Summit, Washington DC, April 22, 2016  
Invited panelist, Philomathia Forum, UC Berkeley, February 18, 2016  
Invited panelist, The Most Urgent Untold Environmental Stories of Our Time, Switzer Fellows as scientists and leaders presenting their work. Wild and Scenic Film Festival, Nevada City, January 16, 2016  
Climate warming and soil carbon cycling: Emergent responses across time and space. Ecological Society of America meeting. August 10, 2015  
News from a whole-profile soil warming experiment. Margaret Torn and TES SFA team. ESS PI Meeting, Potomac, MD, April 29, 2015

Three Perspectives on the Global Carbon Cycle: Soil, Atmosphere, and Energy. University of Zurich, Zurich. April 24, 2015

DOE Ngee – Arctic Land-Atmosphere Interactions. Margaret Torn and the Ngee Arctic Team. ARM/ASR Joint PI Meeting. Vienna, VA, March 18, 2015

Natural and Working Lands in California’s future GHG balance. Advancing Natural and Working Lands to Achieve California’s Climate Goals, Sacramento, CA, February 25, 2016.

The Implications of Deep Reductions in Greenhouse Gas Emissions for Carbon Cycle Science. Margaret Torn, Andy Jones, Jim Williams, Ben Haley, Jack Moore. Keynote speaker for North American Carbon Program, Washington, DC. January 26, 2015

Ecological Limits to Terrestrial Carbon Dioxide Removal. Margaret Torn, L. Smith, D. Sanchez, U. Mishra, J. Williams. AGU Fall Meeting, San Francisco, CA, December 16, 2014

The Effect of a Warmer Climate on Soil Carbon Cycling: Emergent responses across time and space scales. Margaret Torn, TES SFA team (Caitlin Hicks Pries, Biao Zhu, Claire Phillips, et al.), Ngee-Arctic team (Baptiste Dafflon, Lydia Smith, Susan Hubbard et al.), and iSEN team. Soil Science Society of America (SSSA) meeting, Long Beach, CA, November 3, 2014

DOE Next Generation Ecosystem Experiments: a tale of two Ngees. LBNL Biosciences Retreat. Doubletree Marina. October 28, 2014

Invited panelist “Panel Discussion Session” on the future directions and international efforts. Complex Soil Systems Conference, Berkeley, Sept 3-5, 2014

The Effect of a Warmer Climate on Soil Carbon Cycling: Emergent responses across time and space scales. Jennifer Harden and Margaret Torn. Complex Soil Systems Conference, Berkeley, Sept 3-5, 2014

The International soil experiment network. Margaret Torn and Jennifer Harden. Complex Soil Systems Conference, Berkeley, Sept 3-5, 2014

Looking a little deeper: A new experiment warming forest soil to 1 m deep. Margaret Torn, Caitlin Hicks Pries, Biao Zhu, Eoin Brodie, Peter Nico, Bill Riley, Neslihan Tas, and Claire Phillips. Ecological Society of America, Sacramento, CA. August 12, 2014

Process understanding on soil dynamics along the vertical profile, presented at the NSF RCN workshop on Representing soil carbon dynamics in global land models to improve future IPCC assessments, Breckenridge, CO. June 12, 2014

Mysteries of the deep: soil response to climate change. Kaplan Workshop on Biogeochemistry, Sdot Yam, Israel. May 27, 2014

Soil warming and the vulnerability of old soil organic carbon. DOE SBR/TES PI Meeting, Bolger Center, Bethesda, MD, May 14, 2013

Connecting soil organic matter residence time with SOM molecular structure. EMSL session of the TES/SBR PI Meeting, Potomac, MD, May 6, 2014

Opening talk at the AmeriFlux PI meeting, Potomac, MD, May 5, 2014

What happens to Earth's climate when the permafrost thaws? Science in the Theater. Berkeley, CA. April 22, 2013

Carbon – Ecosystems – Climate, and Technology path to deep greenhouse gas reductions by 2050. University of Zurich, Zurich, Switzerland. April 15, 2013

Pathways to 2050: Modeling a Low-Carbon Future. United Nations Sustainable Development Solutions Network. New York City, NY. April 9, 2013. (co-presented with Jim Williams)

The Terrestrial Carbon Cycle: Implications for Climate Feedbacks and Mitigation. Life Sciences Seminar, Life Sciences Division, Berkeley Lab. January 8, 2013

A radiocarbon database for improving understanding of global soil carbon dynamics (with L. Smith, S.E. Trumbore, J. Harden, T. Baisden, L. Nave, and D. Agarwal). AGU Fall Meeting, San Francisco, CA, December 7, 2012

Two Aspects of Soils in Global Change: Challenges for models. SOM-5 Unifying concepts of organic matter (de-)stabilization in terrestrial and aquatic systems. Ascona, Switzerland. October 9, 2012

Terrestrial Ecosystem Science SFA. Environmental Microbiology Program, Berkeley Lab. September 5, 2012

Linking new process understanding with Ecosystem carbon models. Terrestrial Ecosystem Science PI meeting, Washington, DC, April 24, 2012

Integrating mechanisms into soil carbon models for global simulations. Invited presentation at AGU Fall Meeting, San Francisco, CA, December 15, 2011

Secrets of the Soil, Science at the Theater series, Berkeley Repertory Theater, Berkeley California, November 7, 2011

Soil carbon dynamics in a changing world: Shifting paradigms? Soil Science Zvieri, University of Zurich, Sept 29, 2011

Soil carbon dynamics in a changing world: Shifting paradigms? SOM 2010, Hyères, France, September 22, 2011

Trees in Mountain Alpine Zones? And other potential warming impacts & mitigations. Barrow Arctic Research Center. August 20, 2011

Video Interview about Ngee in Barrow, Alaska, August 19, 2011, <http://youtu.be/KIvUXoqC9g4>

Teacher at international Environmental Leadership Forum, July 13, 2011

Sit down with Sabin, July 6, 2011: <http://www.youtube.com/BerkeleyLab#p/a/u/0/QTvYAsG2RVE>

Terrestrial Carbon Dioxide Removal: Ecological Limits and Impacts. Modeling and Policy of CO<sub>2</sub> Removal from the Atmosphere, International Center for Climate Governance, Venice, Italy, May 30-31, 2011 (Margaret Torn, Lydia Smith, and Andy Jones)

Empirical perspective: Soil Carbon Cycle. INTERFACE Workshop, Captiva Island, FL, March 2, 2011

Carbon Cycling in Terrestrial Ecosystems Research Challenges and Opportunities. Department of Energy Subsurface Biogeochemical Research workshop, Washington, DC, March 28-31, 2010

Isotopic Disequilibria in <sup>13</sup>CO<sub>2</sub> fluxes in the U.S. Southern Great Plains. Invited presentation at AGU Fall Meeting, San Francisco, CA, December 18, 2009

Global change and feedback from organic carbon dynamics: Defining research visions on how to quantify the molecular-level mechanisms driving soil organic matter turnover. Soil Science Zvieri, University of Zurich, October 7, 2009

Climate Change Science and GHG Emissions Reduction Modeling. European Commission's Learning and Development Unit, Brussels, Belgium. September 29, 2009. (Presented by Jim Williams)

Workshop Presentations for Department of Energy and presentations for the Berkeley Lab Directorate, various dates in 2009

Soil Carbon Vulnerability and Black Carbon Stability. Invited presentation at AGU Fall Meeting, San Francisco, CA, December 16, 2008

The Direct Effects of land use and land cover change for Biofuels. Workshop on Measuring and Modeling the Lifecycle GHG Impacts of Transportation Fuels. EDF-ERG-EBI. Berkeley, CA, July 1-2, 2008

Effects of erosion on CO<sub>2</sub> and N<sub>2</sub>O fluxes accompanying land use change. Greenhouse Gas Emissions from Biofuels Workshop, Berkeley, CA, June 9-10, 2008. Sponsored by EBI

Mission and Discovery: Big Science and Little Science at a National Laboratory. Invited talk for the German-American Conference on Organization, Research Management, and Science Policy, How Do We Know What We Know about Climate Change? University of California, Berkeley, April 24-26, 2008

Ecosystem feedbacks in the climate system and the role of soils. Environmental Engineering Seminar, University of California, Berkeley, February 29, 2008

CLASIC Carbon Air. The CLASIC workshop. March 26-27, Norman, Oklahoma, 2008

Linking the Response of Annual Grasslands to Warming and Altered Rainfall Across Scales of Gene Expression, Species, and Ecosystem, invited presentation at AGU Fall Meeting, San Francisco, CA, December 14, 2007

Annual Grassland Response to Altered Precipitation and Temperature: genes, species, and ecosystem, invited talk in "Ecosystem responses to experimental warming and other global climate change factors," Ecological Society of America annual meeting, San Jose, CA, August 8, 2007

Isotope research opportunities, FACE Workshop, Oak Ridge, TN, June 6, 2007



Ecosystem-Climate Interactions, Poster and flash slide presentation, German American Frontiers of Science, Kavli Frontiers of Science, National Academy of Sciences, Irvine, CA, June 1, 2007

Speaker at Earth Day rally on Sproul Plaza, UC Berkeley, April 20, 2007

Belowground Carbon Cycling and Root Modeling, Enriched Background Isotope Study workshop, New Orleans, LA, April 12, 2007

Climate Change: In your lifetime. Presented to the American Junior Academy of Sciences, Lawrence Berkeley National Laboratory, February 15, 2007

The Risk of Climate Change: What it Means for California. First Friday Forum, Lafayette, California February 2, 2007

Asymmetries in Climate Change Feedbacks: Why the Future may be Hotter Than you Think. AGU Fall Meeting, San Francisco, CA, December 12, 2006

From Mechanisms to Models. Final talk for the Second International Conference on Mechanisms of Soil Organic Matter Stabilization. Asilomar, CA, October 13, 2006

Climate Change: Facing the Impacts Now. Santa Rosa Jr College, Arts and Lectures Series. Santa Rosa, CA, October 11, 2006

TCP Soil Carbon Research, for the DOE/BER (BERAC) Carbon Cycle Research Review, Washington DC, Oct 4-6 2006, with contributions from J. Jastrow, R. Matamala, E. Paul, S. Morris, C. Garten, and P. Hanson

Regional Analysis: ARM, for the DOE/BER (BERAC) Carbon Cycle Research Review, Washington DC, Oct 4-6 2006

Climate Change Feedbacks and the Future Role of Soils. USGS Western Colloquium. Menlo Park, CA, August 14, 2006

Local Impacts of Global Warming, Presented to representatives from Alameda county and all its cities for the ICLEI Alameda Kickoff, Berkeley, CA, June 15, 2006

Next Generation Soil Carbon Models: Lessons from Isotopic Studies. Keynote address for the German Soil Priority Program 1090, Mechanisms of Soil Organic Matter Stabilization. Thurnau, Germany, March 21, 2006

Are roots the source of all soil organic matter? Results from isotopic experiments in two temperate forests, AGU Fall meeting, San Francisco, 2005

Women in Science. Panel discussion for Girls, Inc Alameda, Women of the 21<sup>st</sup> Century Club. Alameda, CA, July 19, 2005

An Annual Grassland Exploration of Scaling from Genomes to Ecosystem Function. Program for Ecosystem Research Workshop, Flagstaff, AZ, April 12, 2005

Climate-Ecosystem Feedbacks: Observational Needs and Opportunities: A scoping project for the US Climate Change Science Program. Program for Ecosystem Research Workshop, Flagstaff, AZ, April 12, 2005

EBIS Microbial Carbon Cycling rates and substrates. Enriched Background Isotope Study Workshop, Livermore, CA, January 20, 2005

Modeling wildfire and changing climates. Fire Ecology Seminar. University of California, Berkeley. September 2004

Soil Carbon Dynamics in Two Novel Cases: The Historic Russian Archives and the Tennessee Burp. Informal Seminar. University of Zurich, Switzerland. May 2004

Climate Change: Bringing it Back Home. Berkeley Lab Friends of Science Lecture Series. Berkeley City Main Library, April 26, 2004

Biotic and biogeochemical feedbacks to climate change. AGU fall meeting, San Francisco, CA, December 2002. Presented by John Harte

Applications of Radiocarbon to Terrestrial Carbon Research. Martin Luther University, April 30, 2002, Halle, Germany

Mineral control of carbon storage in Andisols: Case studies and applications to other soils. European Union workshop. COST ACTION 622: "Soil Resources of European Volcanic Systems" Manderscheid, Germany, April 24-28, 2002. \*Keynote address

Historic Russian Soil Collection Soil Carbon in the Russian Steppe. Workshop on Mechanisms of Soil Carbon Storage, UC Santa Barbara, December 3-4, 2001

Quantifying the Importance of Belowground Plant Allocation for Sequestration of Carbon in Soil. DOE Science Team Meeting, Argonne National Laboratory, IL. October 29-31, 2001

Using  $^{13}\text{C}$  and  $^{14}\text{C}$  in Elevated  $\text{CO}_2$  Experiments to Understand Soil Carbon Cycling in Grasslands. Workshop on Mechanisms of Soil Carbon Storage, UC Santa Barbara, December 3-4, 2001

Using  $^{13}\text{C}$  and  $^{14}\text{C}$  in Elevated  $\text{CO}_2$  Experiments to Understand Soil Carbon Cycling and Microbial Activity in Grassland. Isotopes in Ecology and the Earth Sciences at UC Berkeley; Berkeley Center for Stable Isotope Biogeochemistry, Berkeley, CA, August 2000

Ecological Complexity and Climate Change; California Energy Commission Workshop on Climate Change Science, Sacramento, CA, June 1999

Mineral Control of Soil Organic Matter Storage and Turnover. Center For Accelerator Mass Spectrometry Seminar Series, Lawrence Berkeley National Laboratory, 1999

**Current Grants, Principal investigator**

1. Terrestrial Ecosystem Science Scientific Focus Area, DOE BER 2010-2017
2. Atmospheric System Research, three projects, DOE BER 2014-2017
3. The AmeriFlux Network Management Project, DOE BER 2012-2015

**Current Grants, Co-investigator:**

1. Atmospheric Radiation Measurement Program: Carbon Cycle infrastructure. PI Sébastien Biraud
2. Next Generation Ecosystem Experiment (NGEE) – Arctic. Lead PI is Stan Wullschleger at ORNL.
3. UC Catalyst project: “UC Consortium for Drought and Carbon Management” UC Riverside (PI Samantha Ying), UC Davis (Kate Scow, Sanjai Parikh) LBL (Eoin Brodie, Peter Nico, William Riley), UC Merced (Asmeret Berhe, Teamrat Ghezzehei)
4. University-led NASA/DOE project: PI Dennis Baldocchi, UCB. TES Funding. “Connecting AmeriFlux to the Globe, Extending the Partnership with the Global Flux Network, FLUXNET”

**Postdoctoral Research Advisors:**

Susan Trumbore, Peter Vitousek, Chris Field

**Thesis Advisors:**

John Harte, F. Stuart Chapin, III, Pamela Matson, John Holdren

**Postdoctoral Research Associates:**

Rose Abramoff, Jeff Bird, Julia Gaudinski, Simon Davis, Caroline Masiello, Chris Swanston, Lara Kueppers, Karis McFarlane, Federico Maggi, Jen Aminzade, Ian Williams, Umakant Mishra, Naama Raz Yaseef, Biao Zhu, Caitlin Hicks Pries, Jenny Soong

**Serve(d) as reader, mentor, and/or collaborator for graduate students:**

Amber Kerr, Andrew Crane-Droesch, Asmeret Asefaw Berhe, Ian Bolliger, Danielle Svelha Christianson, Daniela Cusack, Kevin Fingerman, Katerina Georgiou, Karen Hammes (University of Zurich), Stacy Jackson, Kripa Jaganathan, Andrew Jones, Maren Kahle (Martin Luther University, FRG), Laurie Koteen, Bernardo Maestrini (University of Zurich), Rich Plevin, Nimisha Singh (University of Zurich), Emma Shepherdson, Erika Marin-Spiotta (DOE GREF Mentor), Rebecca Sutton, Craig Rasmussen (UC Davis), Lydia Smith Vaughn, Zack Subin, Bettina Weibel (University Zurich), Grace Wu, Erika Zavaleta (Stanford), John Zobitz (DOE GREF Mentor)

**Mentored Undergraduate, High School, and Teacher Interns (with name of Mentorship Program), in chronological order:**

Diane Kenski (ERULF), Pallavi Shukla (Mickey Leland), Erin Hanlon (Science Undergraduate Laboratory Internship, SULI), Braulia Sapien (Pre-Service Teacher Training, PST), Laura Wells (PST), Laura Huppert (Piedmont High School; Winner, Regional Science Fair and Intel International Science Fair in March 2005)

with our project); Francesca Mia Hopkins (Environmental Science Senior Thesis, UCB; then Earth Sciences Division post baccalaureate fellow), Amy Morris (PST); Ryan Smith (PST); Alec Boyd; Chris Denn; Rachel Porras (SULI); Lynn Murphy (DOE Academy for Creating Teacher Scientists); Palermo Cuartero (Community College Initiative, CCI), Alfredo Hernandez (Community College Initiative); Kai Orans (Piedmont High), Julia Siegrist (Zurich), Caitlin O'Neill (SULI), Julia Gratton (Whitman College)

**Professional Affiliations**

American Geophysical Union