

Jennifer L. Soong, PhD

Postdoctoral Fellow, Climate and Ecosystem Sciences Division
Lawrence Berkeley National Laboratory, Berkeley, CA, USA
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EDUCATION

- 2014** Ph.D., Ecology, Colorado State University, Fort Collins, CO
Dissertation: *Moving beyond mass loss: advancing understanding about the fate of decomposing leaf litter and pyrogenic organic matter in the mineral soil*
- 2007** B.A., Oberlin College, Oberlin, OH
Major- Biology; Major- Environmental Studies; Minor- Politics
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RESEARCH AND PROFESSIONAL EXPERIENCE

- Aug 2017- Present:* Post-Doctoral fellow, U.S. Department of Energy Lawrence Berkeley National Laboratory, Climate and Ecosystem Sciences Division. “*Belowground Biogeochemistry Scientific Focus Area*”.
Co-author the phase 2 project proposal including adding several new experiments to the ‘Biogeochemistry’ task; design and manage two novel whole soil warming experiments in forests and grasslands; collect measurements on biogeochemical responses to warming and water manipulations; employ isotope analyses to quantitatively track carbon transformations in the ecosystem; collaborate with the Geoscience, Microbial Ecology and Modeling tasks to coordinate research and integrate findings across disciplines; coordinate field and laboratory analyses; disseminate scientific results at scientific meetings and in scientific publications; mentor and supervise student interns; propose new research
- Jan 2015- Aug 2017:* Post-Doctoral researcher, University of Antwerp, Department of Biology, Center of Excellence PLECO (Plant and Ecosystems), European Research Council Synergy Grant “*Effects of phosphorus limitations on Life, Earth System and Society*”.
Investigated ecosystem biogeochemistry and soil organic matter formation in tropical forests of French Guiana; led a proposal on warming and nitrogen interactions affecting carbon transformations in an Icelandic grassland; co-supervised three graduate students; published over seven scientific papers thus far
- Fall 2014:* Instructor/program assistant, Soil and Crop Sciences Department, Colorado State University, Fort Collins, CO.
Co-taught the “Soils and Global Change” 400 level course, including designing the course curriculum, giving lectures, leading hands on learning exercises and assessing student performance
- 2009-2014:* PhD Graduate Research Fellow, Graduate Degree Program in Ecology, Natural Resource Ecology Laboratory, Colorado State University
Designed and carried out laboratory, greenhouse and field experiments to investigate the fate of decomposing leaf litter and pyrogenic organic matter in the soil and atmosphere; led field excursions and taught field and laboratory techniques; supervised several undergraduate and graduate students, as well as three K-12 teachers in research activities; participated in programmatic activities and scientific outreach; fully funded on a USDA National Needs Fellowship and an NSF Graduate Research Fellowship; published 11 scientific papers related to my PhD research
- 2008:* Research assistant- Colorado Wetlands Assessment Program, Colorado Natural Heritage Program, Fort Collins, CO
- 2007-2009:* Outdoor educator and Naturalist- YMCA of the East Bay at Camp Arroyo, Livermore, CA

AWARDS

DOE Belowground Biogeochemistry Scientific Focus Area (Co-Author, \$3.3 million)	2019-2022
Soil Systems Travel Award (800 CHF)	2019
Flemish Research Association lead agency grant-GOF2217N (Co-PI, €440,000)	2017-2020
National Science Foundation, Graduate Research Fellowship (\$166,720)	2011-2014
European Geophysical Union, Young Scientist's Travel Award (€500)	2014, 2015
Natural Resource Ecology Laboratory- Student Travel Award (\$1000)	2014
National Center for Atmospheric Research ASP- Summer Colloquium Scholarship	2013
4 th International Soil Organic Matter 2013, Nanjing, China, Poster Award	2013
Graduate Degree Program in Ecology- Student Travel Award	2013
Front Range Student Ecology Symposium- Poster Award	2013, 2010
Martin Luther King Jr. Scholarship, Colorado State University (\$9,000, plus tuition)	2011-2012
Front Range Student Ecology Symposium- Oral Presentation Award	2012
USDA National Needs (Ecosystem Science and Sustainability) Fellow (\$100,000)	2009-2011
Program of Research and Scholarly Excellent Award, Colorado State University (\$5000)	2009
Shansi Memorial Foundation Prize for research in Asia, Oberlin College, OH (\$1000)	2007

PUBLICATIONS

h-index: 14, citations: >700 (Source: Google Scholar, November 2019)

1. **Soong J.L.**, Fuchslueger L., Marañon-Jimenez S., Torn M.S., Janssens I.A., Peñuelas J., Richter A., (2020) Microbial carbon limitation- the need for integrating microorganisms into our understanding of ecosystem carbon cycling. *Global Change Biology*
2. Lavallee J.L., **Soong J.L.**, Cotrufo M.F. (2020) Conceptualizing soil organic matter into particulate and mineral associated forms to address global change in the 21st century. *Global Change Biology*.
3. Walker T.W.N., Janssens I.A., Sigurdsson B.D., Richter A., Peñuelas J., Leblans N.I.W., André H., Bahn M., Bartrons M., De Jonge C., Fuchslueger L., Gargallo-Garigga A., Gunnarsdottir G.E.G., Marañon-Jimenez S., Oddsdóttir E.S., Ostonen I., Poeplau C., Prommer J., Radujkovic D., Sardans J., Siggurðsson P., **Soong J.L.**, Vicca S., Wallander H., Weedon J.T., Verbruggen E. (*In Press*) A systemic decadal-scale overreaction to soil warming in a grassland ecosystem. *Nature Ecology and Evolution*
4. Bréchet L., Courtois E.A., Saint-Germain T., Janssens I.A., Asensio D., Ramirez-Rojas I., **Soong J.L.**, Van Langenhove L., Verbruggen E., Stahl C. (2019) Disentangling the drought and nutrient effects on soil CO₂ and CH₄ fluxes in a tropical forest. *Frontiers in Plant Science*
5. Courtois E.A., Stahl C., Burban B., Van den Berg J., Berveiller D., Bréchet L., **Soong J.L.**, Arriga N., Peñuelas J., Janssens I.A. (2019) Automatic high-frequency measurements of full soil greenhouse gas fluxes in a tropical forest. *Biogeosciences*. 16:785-796. doi.org/10.5194/bg-16-785-2019
6. Poeplau C., Don A., Six J., Kaiser M., Benbi D., Chenu C., Cotrufo M.F., Derrien D., Gioacchini P., Grand S., Gregorich E., Griepentrog M., Gunina A., Haddix M., Kuzyakov Y., Kühnel A., Macdonald L.M., **Soong J.L.**, Trigalet S., Vermeire M-L., Rovira P., van

- Wesemael B., Wiesmeier M., Yaesmin S., Yevdomikov I., Nieder R. (2018) Isolating soil organic carbon fractions with varying turnover rates- A comprehensive comparison of fractionation methods. *Soil Biology and Biochemistry* 125:10-26.
7. **Soong J.L.**, Marañón-Jiménez S., Cotrufo M.F., Boecks P, Bodé S., Guenet B., Peñuelas J., Richter A., Stahl C., Verbruggen E., Janssens I.A. (2018) Soil microbial CNP and respiration responses to organic matter and nutrient additions: Evidence from a tropical soil incubation. *Soil Biology and Biochemistry* 122:141-149
 8. Marañón-Jiménez S., **Soong J.L.**, Leblans N.I.W., Sigurdsson B.D., Peñuelas J., Richter A., Asensio D., Fransen E., Janssens I.A. (2018) Geothermally warmed soils reveal persistent increases in the respiratory costs of soil microbes contributing to substantial C losses. *Biogeochemistry* 138(3):245-260.
 9. Huang Y., Guenet B., Ciais P., Janssens I.A., **Soong J.L.**, Wang Y., Goll D., Blagodatskaya E., Huang Y. (2018) ORCHIMIC, a microbe-driven model for soil organic matter decomposition designed for large-scale applications. *Geoscientific Model Development* 11:2111-2138, <https://doi.org/10.5194/gmd-2017-325>
 10. Courtois E.A., Stahl C., Van den Berg J., Bréchet L., Van Langenhove L., Richter A., Urbina I., **Soong J.L.**, Peñuelas J., Janssens I.A., (2018) Spatial variation of soil CO₂, CH₄ and N₂O fluxes across topographical positions in tropical forests of the Guiana shield. *Ecosystems* 26(7): 1445-1458.
 11. Guenet B., Carmino-Serrano M., Ciais P., Tifafi M., Maignan F., **Soong J.L.**, Janssens I.A. (2018) Impact of priming on global carbon stocks. *Global Change Biology* 24(5):1873-1883; DOI:10.1111/gcb.14069.
 12. Verbruggen E., **Soong J.L.**, Pena R., Fernandez C.W. (2017) Mycorrhizal interactions with decomposers and impact on soil carbon storage. In: *Mycorrhizal mediation of soil: fertility, structure, and carbon storage*, First Edition, Editors: Johnson N.C., Gehring C., Jansa J. Elsevier Press, 2016 [Book Chapter]
 13. **Soong J.L.**, Dam M., Wall D.H., Cotrufo M.F. (2017), Fire in the tallgrass prairie: effects on soil communities and trophic transfers of carbon during litter and pyrogenic organic matter decomposition. *Functional Ecology* 31, 260-269 DOI:10.1111/1365-2435.12693
 14. **Soong J.L.** and Nielsen U.N., (2016) The role of microarthropods in emerging models of soil organic matter. *Soil Biology and Biochemistry* 102:37-39 doi:10.1016/j.soilbio.2016.06.020
 15. Campbell E.E., **Soong J.L.**, Parton W.J., Hobbs N.T., Cotrufo M.F., Paustian K. (2016), Tracking the fate of litter C into CO₂, microbial products and DOC by the Litter Decomposition and Leaching (LIDEL) model using a Hierarchical Bayesian approach to estimate parameters and variability. *Soil Biology and Biochemistry* 100,160-174
 16. McKee G.A., **Soong J.L.**, Caldron F.J., Borch T., Cotrufo M.F., (2016) An integrated spectroscopic and wet chemical approach to investigate grass litter decomposition chemistry. *Biogeochemistry*. 128(1) 107-123
 17. **Soong J.L.**, Vandegehuchte M.L., Horton A.J., Nielsen U.N., Deneff K., Shaw E.A., de Tomasel C.M., Parton W.J., Wall D.H., Cotrufo M.F., (2016) Soil microarthropods support ecosystem productivity and soil C accrual: evidence from a litter decomposition study in the tallgrass prairie. *Soil Biology and Biochemistry* 92, 230-238. doi: 10.1016/j.soilbio.2015.10.014
 18. Cotrufo M.F., **Soong J.L.**, Horton A.J., Campbell E.E., Haddix M.L., Wall D.H., Parton W.J., (2015) Soil organic matter formation from biochemical and physical pathways of litter mass loss. *Nature Geoscience* 8,776-779. doi:10.1038/ngeo2520
 19. **Soong J.L.**, Parton W.J., Calderon F.J., Campbell E.E., Cotrufo M.F. (2015) A new conceptual model on the fate and controls of fresh and pyrolyzed plant litter decomposition. *Biogeochemistry* 124(1):27-44. 10.1007/s10533-015-0079-2
 20. **Soong J.L.**, Cotrufo M.F. (2015) Annual burning of a tallgrass prairie inhibits C and N cycling in soil, increasing recalcitrant pyrogenic organic matter storage while reducing N availability. *Global Change Biology* 21:2321-2333, DOI: 10.1111/gcb.12832

21. **Soong J.L.**, Calderon F.J., Betzen J., Cotrufo M.F. (2014) Quantification and FTIR characterization of dissolved organic carbon and total dissolved nitrogen leaching from litter: a comparison of methods across litter types. *Plant and Soil* 385:125-137 DOI: 10.1007/s11104-014-2232-4
 22. **Soong J.L.**, Reuss, D., Pinney, C., Boyack, T., Haddix, M., Stewart, C.E., Cotrufo, M.F. (2014) Design and operation of a continuous ¹³C and ¹⁵N labeling chamber for uniform or differential, metabolic and structural, plant tissue isotope labeling. *Journal of Visualized Experiments*. e51117. doi:10.3791/51117
 23. Cotrufo, M.F., **Soong, J.L.**, Nguyen, T., Vandegehuchte, M.L., Deneff, K., Shaw, A.E., Sylvain, Z.A., de Tomasel, C.M., Nielsen, U.N., Wall, D.H. (2014) Naphthalene addition to soil surfaces: an effective method to suppress soil micro-arthropods with negligible direct effects on soil C dynamics. *Applied Soil Ecology* 74:21-29. DOI: 10.1016/j.apsoil.2013.09.008
 24. Porter E.M., Bowman W.D., Clark C.M., Compton J.E., Pardo L.H., **Soong J.L.** (2012) Interactive effects of anthropogenic nitrogen enrichment and climate change on terrestrial and aquatic biodiversity. *Biogeochemistry* 114:93-120. DOI: 10.1007/s10533-012-9803-3
 25. Frey M., **Soong J.**, Feaser J., Dishy S. (2008) Identifying control techniques for *Rumex acetosella* in the Presidio of San Francisco (California). *Ecological Restoration*. 26(2):107-109. DOI: 10.3368/er.26.2.109
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SUBMITTED PUBLICATIONS IN REVIEW

Soong J.L., Phillips C., Lenda C., Koven C., Torn M.S., (*In Revision*) CMIP5 models predict rapid and deep soil warming over the 21st century. *JGR Biogeosciences*

Soong J.L., Janssens I.A., Grau O., Margalef O., Stahl C., Van Langenhove L., Urbina I., Dourdain A., Ferry B., Freycon V., Herault B., Peñuelas J., Verbruggen E. (*In Revision*) Soil properties drive soil carbon stocks and aboveground productivity in phosphorus-poor Amazon tropical forests. *Scientific Reports*

Machmuller M.B., Mueller C.W., **Soong J.L.**, Boot C.M., Deneff K., Hoschen C., Cotrufo M.F. (*In Review*) Submicron investigation reveals the dynamic nature of soil organo-mineral interactions. *Nature Communications*

TEACHING EXPERIENCE

Invited guest lecturer- Climate Change, University of San Francisco, 2018

Invited guest lecturer- Microbial Ecology (2001WETMEC) University of Antwerp, 2016

Co-Instructor- Soils and Global Change (SOCR 400) Colorado State University, 2014

Teaching Assistant- Soil Ecology (SOCR 441) Colorado State University, 2013

Teaching Assistant- Stable Isotope Ecology (SOCR 670) Colorado State University, 2012, 2013

Teaching Assistant- Summer Soils Institute, Colorado State University, 2013, 2012, 2011, 2010

Curriculum development for NSF Research Experience for a Teacher (RET) program, 2012, 2011, 2010

Science Olympiad-Ecology instructor, Preston Middle School, 2009-2011

Outdoor Educator, YMCA of the East Bay, CA, 2007-2009

SYNERGISTIC ACTIVITIES

Member of Lawrence Berkeley Lab Inclusion, Diversity, Equity and Accountability committee on Recruitment and Hiring (2019- Present)

Mentor for graduate students: Xavier Riera, Antonio Valente, Teresita Gravina, Sabina Marciano, Qiang Li, Steven Dauwe, Lore Verrycke, Leandro Van Hoeveren, Niki Leblens, Kris Meus, Bart De Roeck, Bertold Marien, Rebecca Bevans, Blair Gomes

Mentor for undergraduate researchers: Logan Daniels, Jacob Betzen, Elisa Baebler, Michael Jurich, Isabelle Leoni, Mattias Janssens, Elien De Schutter, Blair Gomes

Associate Editor for the *Forest Soils* section of *Frontiers in Forests and Global Change*, 2018-present

Mentor for Department of Energy Scientific Undergraduate Laboratory Internship Spring 2019
NEON Soil Sensor Technical Working Group member 2018-2019

Convener at the American Geophysical Union Fall meeting, Biogeosciences, 2016, 2018, 2019
Imbalance-P junior scientist workshop organizer, 2016-2017

Organizer of the Graduate Degree Program in Ecology Graduate Student Forum, 2013-2014

Co-organizer for the Front Range Isotope Day meeting, Fort Collins, CO, 2013

Student Representative on the Executive Committee of the Graduate Degree Program in Ecology at Colorado State University, 2012-2013

Student Representative, Natural Resource Ecology Laboratory, Colorado State University, 2011-2012

Journal reviewer for: *Global Change Biology*, *Biogeochemistry*, *Soil Biology and Biochemistry*, *Plant and Soil*, *PLOS ONE*, *iForest*, *Ecology*, *Geoderma*

Research proposal referee for the government of Wales 2016; French National Research Agency 2017

Founding member of the Colorado State University chapter of Minorities in Agriculture Natural Resources and Related Sciences (**MANRRS**) 2009, vice-president 2009-2010, president 2010-2011, member from 2009-2014

Websites: <https://soongjennifer.wixsite.com/research> ; eesa.lbl.gov/profiles/jennifer-l-soong/

SELECTED SCIENTIFIC MEETING PRESENTATIONS (first author only)

Soong J.L. [INVITED KEYNOTE ADDRESS] SOM dynamics in fire prone landscapes. 7th International Symposium on Soil Organic Matter, Adelaide, Australia, October 2019

Soong J.L., Hicks Pries C.E., Torn M.S. Belowground biogeochemical responses to whole soil warming. 7th International Symposium on Soil Organic Matter, Adelaide, Australia, October 2019 (*oral presentation*)

Soong J.L., Hicks Pries C.E., Castanha C., Porras R.C., Torn M.S. Five years of warming the whole soil profile: Patterns in fluxes over time. Soil Science Society of America, International Soils Meeting. 2019. San Diego, CA, USA (*oral presentation*)

Soong J.L., Hicks Pries C.E., Castanha C., Porras R.C., Torn M.S. Four years of warming the whole soil profile: Patterns in fluxes over time. American Geophysical Union Fall meeting. 2018. Washington D.C, USA (*oral presentation*)

Soong J.L., Hicks Pries C.E., Castanha C., Porras R.C., Abramoff R., Georgiou K., Torn M.S. Four years of warming the whole soil profiles: LBNL TES SFA. Department of Energy Terrestrial Ecosystem Science PI meeting. Potomac, MD, USA. 2018

Soong J.L. [INVITED] Litter decomposition, nutrient recycling and soil organic matter formation in tropical forests. Imbalance-P fourth annual meeting. Lommel, Belgium. 2018 (*oral presentation*)

Soong J.L., Verbruggen E., Grau O., Penuelas J., Margalef O., Janssens I. Soil mineralogy determines forest life-history strategy and carbon cycling in humid tropical forests. American Geophysical Union Fall meeting. 2017. New Orleans, LA, USA.

Soong J.L. [INVITED] Drivers of soil organic matter dynamics in French Guiana. Imbalance-P third annual meeting. Paris, France. 2017 (*oral presentation*)

Soong J.L., Verbruggen E., Janssens I. Soil biogeochemical and fungal patterns across a precipitation gradient in the lowland tropical rainforests of French Guiana. American Geophysical Union Fall meeting. 2016. San Francisco, CA, USA.

Soong J.L., Janssens I. [INVITED] C:N:P:K stoichiometric constraints on litter and soil organic matter decomposition. Joint European Stable Isotope Users Meeting. 2016. Ghent, Belgium (*oral presentation*)

Soong J.L. Decomposition and soil carbon cycling. 2016. ForHot project meeting. Antwerp, Belgium (*oral presentation*)

Soong J.L. Soil carbon stocks and soil organic matter formation along the Guyafor network. 2016. Imbalance-P annual project meeting. Vienna, Austria (*oral presentation*)

Soong J.L., Parton, W.J., Calderon, F.J., Campbell, E.E., Cotrufo M.F. 'Partitioning of carbon fluxes between CO₂ and DOC during litter decomposition'. 5th International Symposium on Soil Organic Matter. 2015. Gottingen, Germany (*oral presentation*)

Soong J.L., Dam M., Wall D.H., Cotrufo M.F. 'Limited utilization of pyrogenic organic matter by soil microbes and nematodes reduced soil C and N cycling in tallgrass prairie soils with different fire history'. 5th International Symposium on Soil Organic Matter. 2015. Gottingen, Germany

Soong J.L., Vandegehuchte M.L., Horton A.J., Nielsen U.N., Deneff K., Shaw E.A., de Tomasel C.M., Parton W.J., Wall D.H., Cotrufo M.F. 'Soil microarthropods support ecosystem productivity and soil C accrual: evidence from a litter decomposition study in the tallgrass prairie'. European Geophysical Union. 2015. Vienna, Austria (*oral presentation*)

Soong J.L., Cotrufo M.F. 'Annual burning of a tallgrass prairie inhibits C and N cycling in soil, increasing recalcitrant pyrogenic organic matter storage while reducing N availability'. American Geophysical Union. 2014 Fall meeting. San Francisco, CA, USA

Soong J.L. [INVITED] 'Moving beyond mass loss: advancing understanding about the fate of decomposing leaf litter and pyrogenic organic matter into the mineral soil'. 2014. Department of Biology, University of Antwerp, Belgium (*oral presentation*)

Soong J.L., Parton W.J., Calderon F.J., Campbell N., Guilbert K., Cotrufo M.F. 'From litter decomposition to soil organic matter formation: using leaf traits to predict dissolved organic carbon leaching'. European Geophysical Union. 2014 Spring Meeting. Vienna, Austria (*oral presentation*)

Soong J.L., Parton W.J., Calderon F.J., Campbell N., Guilbert K., Cotrufo M.F. 'Quantifying litter decomposition losses to dissolved organic carbon and carbon dioxide'. American Geophysical Union 2013 Fall Meeting. San Francisco, CA, USA

Soong, J.L. [INVITED] 'Tracking the fate of pyrogenic organic matter decomposition in grassland soils: a stable isotope approach'. Front Range Isotope Day. 2013. Fort Collins, CO, USA (*oral presentation*)

Soong, J.L., Horton, A.J., Nielsen, U.N., Deneff, K., Vandegehuchte, M.L., Wall, D.H., Parton, W., Cotrufo, M.F. 'How do microarthropods impact soil carbon sequestration during litter decomposition in a tallgrass prairie?' National Center for Atmospheric Research, Advanced Studies Program Summer Colloquium: Carbon-climate connections in the earth system, 2013, Boulder, CO, USA

Soong, J. [INVITED] 'Black carbon in soils'. Northwest Agriculture and Forestry University. Yangling, China. 2013 (*oral presentation*)

Soong, J., Cotrufo, M.F. 'Tracking the fate of pyrogenic organic matter decomposition in grassland soils: a stable isotope approach'. 4th International Symposium on Soil Organic Matter 2013, Nanjing, China (*oral presentation*)

Soong J, Vandegehuchte M, Horton AJ, Nielsen UN, Deneff K, Wall DH, Parton W, Cotrufo MF. 'Tracking the fate of litter derived carbon: why does soil biodiversity matter?' EuroSoil 2012 meeting, Bari, Italy (*oral presentation*)

Soong J.L., and Cotrufo M.F. 'How are soil carbon dynamics affected by black carbon vs. litter inputs' EuroSoil 2012 meeting, Bari, Italy

Soong J, Deneff K, Nielsen U, Vandegehuchte ML, Parton W, Wall DH, Cotrufo MF. 'Biological mechanisms controlling loss vs. belowground storage of decomposing litter carbon: a stable isotope approach'. Front Range Student Ecology Symposium. 2012. Fort Collins, CO (*oral presentation*)

Soong J, Deneff K, Nielsen U, Vandegehuchte ML, Parton W, Wall DH, Cotrufo MF. 'Biological mechanisms controlling loss vs. belowground storage of decomposing litter carbon: a stable isotope approach'. American Geophysical Union 2011 Fall Meeting. San Francisco, CA (*oral presentation*)

Soong J., Nielsen U., Wall D.H., Parton W., Cotrufo M.F. 'Tracking litter derived carbon into soil and atmosphere using stable isotopes: examining the role of soil fauna'. Ecological Society of America 2011 Meeting. Austin, TX

Soong J, Stewart C, Reuss D, Pinney C, Cotrufo MF. 'A novel design for a dual stable isotope continuous labeling chamber: results on labeling efficiency and C and N allocation in *Andropogon gerardii*'. American Geophysical Union 2010 Fall Meeting, San Francisco, CA