

Si Gao

Department of Environmental Studies
California State University - Sacramento
6000 J Street, Sacramento, CA 95819
s.gao@csus.edu

PROFESSIONAL APPOINTMENTS

- 2022 – **Assistant Professor**, Department of Environmental Studies, College of Social Sciences & Interdisciplinary Studies, California State University, Sacramento, CA, USA
- 2021 – 2022 **Postdoctoral Scholar**, Department of Life & Environmental Sciences, College of Natural Sciences, University of California, Merced, CA, USA
- 2021 – 2022 **Courtesy Faculty**, Department of Forest Engineering, Resources & Management, College of Forestry, Oregon State University, Corvallis, OR, USA
- 2020 – 2021 **Postdoctoral Scholar**, Department of Forest Ecosystems & Society, College of Forestry, Oregon State University, Corvallis, OR, USA
- 2017 – 2020 **Graduate Research Assistant**, Department of Forest Management, W.A. Franke College of Forestry & Conservation, University of Montana, Missoula, MT, USA
- 2016 – 2017 **Graduate Research Assistant**, School of Environmental & Forest Sciences, College of the Environment, University of Washington, Seattle, WA, USA

EDUCATION

- 2020 Ph.D. Forest & Conservation Sciences. University of Montana, Missoula, MT, USA
- 2016 M.Sc. Environmental & Forest Sciences. University of Washington, Seattle, WA, USA
- 2014 B.Sc. Environmental Science. China Agricultural University, Beijing, China

PUBLICATIONS

Peer-reviewed journal articles:

- 2022 B.P. Harrison, **S. Gao**, M. Gonzales, T. Thao, E. Bischak, T.A. Ghezzehei, A.A. Berhe. G. Diaz & R.A. Ryals. Dairy manure co-composting with wood biochar plays a critical role in meeting global methane goals. *Environmental Science & Technology* 56(15): 10987-10996.
- 2022 **S. Gao** & T.H. DeLuca. Rangeland application of biochar and rotational grazing interact to influence soil and plant nutrient dynamics. *Geoderma* 408: 115572.
- 2022 S. Wen, Y. Tian, S. Ouyang, M. Song, X. Li, Y. Zhang, **S. Gao**, X. Xu & Y. Kuzyakov. High frequency of extreme precipitation increases *Stipa grandis* biomass by altering plant and microbial nitrogen acquisition. *Biology and Fertility of Soils* 58: 63-75.

- 2021 **S. Gao** & T.H. DeLuca. Influence of fire retardant and pyrogenic carbon on microscale changes in soil nitrogen and phosphorus. *Biogeochemistry* 152: 117-126.
- 2020 T.H. DeLuca, M.J. Gundale, R.J. Brimmer & **S. Gao**. Pyrogenic carbon generation from fire and restoration fuel treatments. *Frontiers in Forests and Global Change* 3: 24.
- 2020 **S. Gao** & T.H. DeLuca. Biochar alters nitrogen and phosphorus dynamics in a western rangeland ecosystem. *Soil Biology and Biochemistry* 148: 107868.
- 2020 Q. Tan, T. Hao, **S. Gao**, X. Liu, G. Wang & Q. Yu. Soil organic carbon turnover recovers faster than plant diversity in grassland ecosystems when high loading nitrogen addition is ceased: Derived from soil ¹⁴C evidences. *Global Ecology and Conservation* e01229.
- 2019 **S. Gao** & T.H. DeLuca. Use of microdialysis to assess short-term soil soluble N dynamics with biochar additions. *Soil Biology and Biochemistry* 136: 107512.
- 2019 **S. Gao**, T.H. DeLuca & C.C. Cleveland. Biochar additions alter phosphorus and nitrogen availability in agricultural ecosystems: A meta-analysis. *Science of the Total Environment* 654: 463-472.
- 2018 **S. Gao** & T.H. DeLuca. Wood biochar impacts soil phosphorus dynamics and microbial communities in organically-managed croplands. *Soil Biology and Biochemistry* 126: 144-150.
- 2017 **S. Gao**, K. Hoffman-Krull & T.H. DeLuca. Soil biochemical properties and crop productivity following application of locally produced biochar at organic farms on Waldron Island, WA. *Biogeochemistry* 136(1): 31-46.
- 2016 **S. Gao**, K. Hoffman-Krull, A.L. Bidwell & T.H. DeLuca. Locally produced wood biochar increases nutrient retention and availability at agricultural soils of the San Juan Islands, USA. *Agriculture, Ecosystems & Environment*, 233: 43-54.
- 2016 **S. Gao** & T.H. DeLuca. Influences of biochar on soil nutrient transformations, nutrient leaching, and crop yield. *Advances in Plants & Agriculture Research*, 4(5): 00150.

Peer-reviewed book chapters:

- 2019 T.H. DeLuca, M.R.A. Pingree & **S. Gao**. Assessing soil biological health. Pp 25-49. In: Busse, M., Giardina, C., Morris, D. & Page-Dumroese, D. (Eds.), *Global Change and Forest Soils: Cultivating Stewardship of a Finite Natural Resource*. Elsevier. ISBN: 9780444639981.
- 2019 T.H. DeLuca & **S. Gao**. Use of biochar in organic farming. Pp 397-426. In: Chandran, S.C., Thomas, S. & Unni, M.R. (Eds.), *Organic Farming: New Advances Towards Sustainable Agricultural Systems*. Springer. ISBN: 9783030046569.

RESEARCH AWARDS & GRANTS

- 2021 Facilities Integrating Collaborations for User Science (FICUS) **Award** at DOE Office of Science National User Facilities. “Interactions between soil microbial communities and soil organic matter

- dynamics along a climatic and vegetation gradient in the continental United States*". Award **co-PI**. PI: Jessica Miesel at Michigan State University, \$142,031
- 2020 Washington State Department of Commerce Forest Products Financial Assistance Program **Grant**. "*Biochar technologies and application for forest health enhancement and carbon sequestration*". Co-authored. PI: Tom DeLuca at Oregon State University, \$37,200
- 2020 USDA-NIFA McIntire-Stennis Forestry Research **Grant**. "*Evaluation of ecosystem carbon benefits of wood biochar in rangeland ecosystems*". Co-authored. PI: Tom DeLuca at the University of Montana, \$20,118
- 2016 Amazon Catalyst **Grant** at the University of Washington. "*Sustainable charcoal: How charcoal changes the way we think about soil fertility*". Grant **co-PI**. PI: Tom DeLuca at the University of Washington, \$60,000

ACADEMIC AWARDS & SCHOLARSHIPS

- 2020 Postdoc Association's Professional Development **Award** at Oregon State University, \$150
- 2019 Associated Students' Research & Creative **Scholarship** at the University of Montana, \$1,000
- 2019 Clarence and Martha Almen Memorial **Scholarship** at the University of Montana, \$1,200
- 2018 College of Forestry and Conservation **Scholarship** at the University of Montana, \$10,000

RESEARCH PRESENTATIONS

Invited talks:

- 2022 T.H. DeLuca & **S. Gao**. *Climate change, forests, fire, and soil health*. **Co-authored invited talk** at the San Juan Island Forest Health Collaborative (virtual).
- 2021 **S. Gao**. *Locally produced wood biochar in the US Northwest: Influence on soil nitrogen and phosphorus*. **Invited talk** at the Environ-lunch Seminar, University of California, Merced (virtual).
- 2020 **S. Gao**. *Fire retardant and pyrogenic carbon on microscale changes in soil nutrients*. **Invited talk** at the Cascadia Wildfire and Urban Smoke Workshop, Portland State University (virtual).
- 2020 **S. Gao**. *Influence of fire retardant and biochar on microscale changes in soil nutrient fluxes*. **Invited talk** at the 9th Annual Postdoc Research Symposium at the Oregon State University (virtual).
- 2020 **S. Gao**. *Biochar in the Northwestern US: Impacts on ecosystem carbon and nutrients*. **Invited talk** at the Communities of Excellence, Environment and Sustainability Symposium, University of Montana, Missoula, MT, USA.
- 2019 **S. Gao**. *Wood biochar application in agricultural and forest ecosystems of the western US: Impacts on soil N and P dynamics*. **Invited talk** at the Institute of Applied Ecology, Chinese Academy of Sciences, Shenyang, China.

- 2018 T.H. DeLuca & **S. Gao**. *Connections to natural soil carbon: Can prescribed fire help restore charcoal to forest soils?* **Co-authored invited talk** at the Forest Biomass and the Bioeconomy Workshop, Vancouver, WA, USA.
- 2017 **S. Gao**. *Biochar, organic farming, and soil health at Waldron Island, WA, USA*. **Invited talk** at the San Juan Islands Agricultural Summit, Friday Harbor, WA, USA.
- 2016 **S. Gao** & T.H. DeLuca. *Locally produced biochar interacts with organic fertilizer to improve nutrient availability and agroecosystem nutrient use efficiency at San Juan Islands, WA, USA*. **Invited talk** at the San Juan Islands Agricultural Summit, Friday Harbor, WA, USA.

Contributed presentations:

- 2022 B.P. Harrison, **S. Gao**, M. Gonzales, T. Thao, L. Hale, T. Ghezzehei & R. Ryals. *Methane emissions during biochar co-composting are driven by biochar application rate and aggregate formation*. **Contributed talk** at the American Geophysical Union Annual Meeting, Chicago, IL, USA.
- 2022 **S. Gao**, B.P. Harrison, M. Gonzales, T. Thao, T. Ghezzehei, A.A. Berhe, G. Diaz & R. Ryals. *Locally produced organic amendments on soil health and greenhouse gas fluxes in agroecosystems of Central California, USA*. **Contributed poster** at the Soil Ecology Society Biennial Meeting, Richland, WA, USA.
- 2022 M. Gonzales, **S. Gao** & A.A. Berhe. *The influences of organic amendments on soil carbon dynamics in Central Valley, California, USA*. **Contributed poster** at the 8th International Symposium on Soil Organic Matter, Seoul, South Korea.
- 2022 B.P. Harrison, **S. Gao**, M. Gonzales, T. Thao, A.A. Berhe, T. Ghezzehei & R. Ryals. *Reducing methane emissions from dairies using biochar*. **Contributed poster** at the Soil Ecology Society Biennial Meeting, Richland, WA, USA.
- 2022 D. An, D. Hollenbeck, **S. Gao** & Y. Chen. *A field study of soil biochar treatment response using small unmanned aerial systems (sUAS)*. **Contributed paper** at the 2022 International Conference on Unmanned Aircraft Systems, Dubrovnik, Croatia.
- 2021 **S. Gao** & T.H. DeLuca. *Pyrogenic carbon buffers excess nutrient fluxes in forest soils exposed to fire retardant chemicals*. **Contributed poster** at the Ecological Society of America (ESA) 2021 Annual Meeting (virtual).
- 2021 B.P. Harrison, **S. Gao**, M. Gonzales, T. Thao, A.A. Berhe, T. Ghezzehei & R. Ryals. *Reducing methane emissions from dairies using biochar*. **Contributed poster** at the UC Global Climate Leadership Council Spring Meeting.
- 2020 **S. Gao** & T.H. DeLuca. *Wood biochar alters soil nitrogen and phosphorus dynamics in a western rangeland ecosystem*. **Contributed talk** at the 2020 ASA, CSSA, and SSSA International Annual Meeting (virtual).
- 2020 **S. Gao** & T.H. DeLuca. *Use of microdialysis to assess short-term soil soluble N dynamics with biochar additions*. **Contributed poster** at the Ecological Society of America (ESA) 2020 Annual Meeting (virtual).

- 2018 **S. Gao**, T.H. DeLuca & K. Hoffman-Krull. *Locally produced wood biochar alters soil phosphorus dynamics and microbial communities in organically-managed croplands of western WA, USA*. **Contributed talk** at the Ecological Society of America (ESA) 2018 Annual Meeting, New Orleans, LA, USA.
- 2017 **S. Gao**, T.H. DeLuca & A.L. Bidwell. *The intersection of sustainable forestry and farming: Locally produced wood biochar increases soil nutrient availability and plant productivity of the San Juan Islands, USA*. **Contributed talk** at the Ecological Society of America (ESA) 2017 Annual Meeting, Portland, OR, USA.
- 2016 **S. Gao**, T.H. DeLuca, K. Hoffman-Krull & A.L. Bidwell. *Locally produced wood biochar increases nutrient retention and availability in agricultural soils of the San Juan Islands, WA, USA*. **Contributed poster** at the US Biochar Initiative (USBI) 2016 Annual Meeting, Corvallis, OR, USA.
- 2015 **S. Gao**. *Biochar as a soil amendment for sustainable agriculture in the Pacific Northwest*. **Contributed talk** at the Graduate Student Symposium of the School of Environmental & Forest Sciences at the University of Washington, Seattle, WA, USA.

TEACHING CERTIFICATE

- 2021 Certificate of Participation in *Principles of Pedagogy*. Center for Engaged Teaching and Learning in Teaching Commons, University of California, Merced.

TEACHING EXPERIENCE

- 2018 Teaching assistant, *Watershed Hydrology*, NRSM 385, University of Montana, Missoula
- 2017 Instructor, *Environmental Science and Resource Management*, ESRM 429, University of Washington, Seattle

MENTORING EXPERIENCE

Graduate students:

- 2021 B. Harrison, Environmental Systems (Ph.D.), University of California, Merced, CA
- 2021 T.Thao, Environmental Systems (Ph.D.), University of California, Merced, CA
- 2021 M. Gonzales, Environmental Systems (Ph.D), University of California, Merced, CA
- 2021 K. McCool, Sustainable Forest Management (M.Sc.), Oregon State University, Corvallis, OR
(Served on committee)

Undergraduate students:

- 2021 M. Quintana, Environmental Engineering, University of California, Merced, CA
- 2020 J. Blunn, Soil Science & Forest Restoration, Oregon State University, Corvallis, OR

- 2017 A. Lieu, Biochemistry & Environmental Studies, University of Washington, Seattle, WA
- 2016 T.Wang, Environmental Science & Resource Management, University of Washington, Seattle, WA
- 2016 W.Johnstone, Biology & Environmental Science and Resource Management, University of Washington, Seattle, WA

RECOGNITION IN MEDIA

- 2018 “Time for another look at biochar?” on *TimberWest* by *Jack Petree*
https://forestnet.com/TWissues/2018_july_august/guest.php
- 2017 “Is biochar a game-changer for sustainable farms?” on *Civil Eats* by *Anna Guth*
<https://civileats.com/2017/06/12/is-biochar-a-game-changer-for-sustainable-farms/>

PROFESSIONAL SERVICE

Professional judging & session moderator served for:

- American Society of Agronomy: Environmental Quality Section, 2021
- Soil Science Society of America: Forest, Range & Wildland Soils Division, Soil Fertility and Plant Nutrition Division, Soil Biology and Biochemistry Division, 2020, 2021

Peer-review provided for (70+ reviews):

- Applied Soil Ecology
- Agronomy Journal
- Archives of Agronomy and Soil Science
- Biological Agriculture & Horticulture
- Biogeochemistry
- Biology and Fertility of Soils
- BioResources
- Carbon Balance and Management
- Communications Earth & Environment
- Ecological Applications
- Environmental Science and Pollution Research
- Fire Ecology
- Frontiers in Environmental Science
- Global Change Biology Bioenergy
- Geoderma
- International Journal of Environmental Science and Technology
- Journal of Integrative Agriculture
- Journal of Soils and Sediments
- Pedobiologia
- Pedosphere
- Plant and Soil
- PLoS ONE
- Phytton
- Science of the Total Environment
- Scientific Reports
- Soil Biology and Biochemistry
- Soil and Tillage Research
- SN Applied Sciences

PROFESSIONAL AFFILIATIONS

- American Geographical Union
- Ecological Society of America
- International Biochar Initiative
- Soil Science Society of America
- Soil Ecology Society
- Xi Sigma Pi Honor Society Alpha Chapter