

## John L. Field

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Environmental Sciences Division  
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### RESEARCH INTERESTS

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I study land-based mitigation and carbon management, including sustainable bio-based feedstock production and carbon-negative end uses such as BECCS and biochar. My work to date has primarily focused on evaluating the environmental performance of bio-based systems in both advanced- and developing-country settings. I have studied a variety of biomass feedstock sources including switchgrass, winter oilseeds, agricultural residues, and beetle-killed trees, synthesizing ecological processes knowledge and spatial carbon cycle modeling results into emissions accounting and life cycle assessment frameworks for decision support purposes. I am particularly interested in coupling granular bioenergy assessments with integrated assessment models and earth system models for a more wholistic view of how innovations in bio-based technologies could affect the future evolution of the energy system and the global climate. I am a coauthor of the Second State of the Carbon Cycle Report and the Fifth US National Climate Assessment produced by the US Global Change Research Program.

### PROFESSIONAL APPOINTMENTS

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- 2021 – present **R&D Staff Member**, Bioresource Science & Engineering Group, Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN.
- 2021 – present **Research Associate**, Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO.
- 2015 – 2021 **Research Scientist**, Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO.

### EDUCATION

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- 2008 – **Ph.D.**, Dept. of Mechanical Engineering, Colorado State University, Fort Collins, CO.
- 2015 Co-Advisors: Drs. Bryan Willson (Dept. Mech. Eng.) & Keith Paustian (Dept. Soil & Crop Sci.)  
Dissertation ([hdl.handle.net/10217/167235](https://hdl.handle.net/10217/167235)): Towards the systematic identification of low-cost ecosystem-mediated carbon sequestration opportunities in bioenergy supply chains.
- 2000 – 2005 **B.Sc.**, Dept. of Mechanical & Aerospace Engineering, Case Western Reserve University, Cleveland, OH. Advisor: Joseph Prahl

### PEER-REVIEWED JOURNAL ARTICLES

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Google Scholar profile: <https://goo.gl/fPU9Wr>

- 2023 Masum M.F.H., **Field J.L.**, Geller D., George S., Miller J., Mulvaney M.J., Nana S., Seepaul R., Wright D., Dwivedi P. (2023) Supply Chain Optimization of Sustainable Aviation Fuel

- from Carinata in the Southeastern United States. *Renewable and Sustainable Energy Reviews*, 171, 113032. <https://doi.org/10.1016/j.rser.2022.113032>
- 2022 **Field J.L.**, Zhang Y., Marx E., Boote K., Easter M., George S., Hoghooghi N., Johnston G., Masum M.F.H., Mulvaney M.J., Paustian K., Seepaul R., Swan A., Williams S., Wright D., Dwivedi P. (2022) Modeling yield, biogenic emissions, and carbon sequestration in southeastern cropping systems with winter carinata. *Frontiers in Energy Research*, 10, 837883. <https://doi.org/10.3389/fenrg.2022.837883>
- Karami O., Dwivedi P., Lamb M., **Field J.L.** (2022) Economics of Crop Rotations with and without Carinata for Sustainable Aviation Fuel Production in the SE United States. *Frontiers in Energy Research*, 10, 830227. <https://www.frontiersin.org/articles/10.3389/fenrg.2022.830227>
- Nguyen T.H., **Field J.L.**, Kwon H., Hawkins T.R., Paustian K., Wang M.Q. (2022) A new multi-product landscape-LCA approach to evaluate natural climate solutions and sustainable intensification in a working corn-soybean landscape. *Journal of Cleaner Production*, 354, 131691. <https://doi.org/10.1016/j.jclepro.2022.131691>
- Howe A., Bonito G., Chou M.Y., Cregger M.A., Fedders A., **Field J.L.**, Martin H.G., Labbé J.L., Mechan-Llontop M.E., Northen T.R., Shade A., Tschaplinski T.J. (2022) Frontiers and opportunities in bioenergy crop microbiome research networks. *Phytobiomes Journal*, 6 (2), 118–126. <https://apsjournals.apsnet.org/doi/10.1094/PBIOMES-05-21-0033-MR>
- 2021 **Field J.L.** (2021) Revisiting “Additional Carbon”: Tracking Atmosphere–Ecosystem Carbon Exchange to Establish Mitigation and Negative Emissions from Bio-Based Systems. *Frontiers in Climate– Negative Emission Technologies*, 3, 603239. <https://doi.org/10.3389/fclim.2021.603239>
- Khanna M., Chen L., Basso B., Cai X., **Field J.L.**, Guan K., Jiang C., Lark T.J., Richard T.L., Spawn-Lee S.A., Yang P., Zipp K.Y. (2021) Redefining Marginal Lands for Bioenergy Crop Production. *GCB Bioenergy*, 13 (10), 1590-1609. <https://doi.org/10.1111/gcbb.12877>
- George S., Seepaul R., Geller D., Dwivedi P., DiLorenzo N., Altman R., Coppola E., Miller S., Bennett R., Johnston G., Streit L., **Field J.**, Csonka S., Philippidis G., Marois J., Small I., Wright D. (2021) A regional inter-disciplinary partnership focusing on the development of a carinata-centered bioeconomy. *GCB Bioenergy*, 13 (7), 1018-1029. <https://doi.org/10.1111/gcbb.12828>
- Bagdon B.A., Nguyen T.H., Vorster A., Paustian K., **Field J.L.** (2021) A model evaluation framework applied to the Forest Vegetation Simulator (FVS) in Colorado and Wyoming lodgepole pine forests. *Forest Ecology and Management*, 480, 118619. <https://doi.org/10.1016/j.foreco.2020.118619>
- 2020 **Field J.L.**, Richard T.L., Smithwick E.A., Cai H., Laser M.S., LeBauer D.S., Long S.P., Paustian K., Qin Z., Sheehan J.J., Smith P., Wang M.Q., Lynd L.R. (2020) Robust paths to net greenhouse gas mitigation and negative emissions *via* advanced biofuels. *Proceedings*

- of the National Academy of Sciences*, 117 (36), 21968-21977.  
<https://doi.org/10.1073/pnas.1920877117>
- 2018 **Field J.L.**, Evans S.G., Marx E., Easter M., Adler P.R., Dinh T., Willson B., Paustian K. (2018) High-resolution techno-ecological modelling of a bioenergy landscape to identify climate mitigation opportunities in cellulosic ethanol production. *Nature Energy*, 3, 211–219.  
<https://doi.org/10.1038/s41560-018-0088-1>
- Nocentini A., **Field J.L.**, Monti A., Paustian K. (2018) Biofuel production and soil GHG emissions after land-use change to switchgrass and giant reed in the U.S. Southeast. *Food and Energy Security*, 7, e00125. <https://doi.org/10.1002/fes3.125>
- Nguyen T.H., Cook M., **Field J.L.**, Khuc Q.V., Paustian K. (2018) High-resolution trade-off analysis and optimization of ecosystem services and disservices in agricultural landscapes. *Environmental Modelling & Software*, 107, 105–118.  
<https://doi.org/10.1016/j.envsoft.2018.06.006>
- Whitaker J., **Field J.L.**, Bernacchi C.J., Cerri C.E.P., Ceulemans R., Davies C.A., DeLucia E.H., Donnison I.S., McCalmont J.P., Paustian K., Rowe R.L., Smith P., Thornley P., McNamara N.P. (2018) Consensus, uncertainties and challenges for perennial bioenergy crops and land use. *GCB Bioenergy*, 10, 150–164. <https://doi.org/10.1111/gcbb.12488>
- 2016 **Field J.L.**, Marx E., Easter M., Adler P.R., Paustian K. (2016) Ecosystem model parameterization and adaptation for sustainable cellulosic biofuel landscape design. *GCB Bioenergy*, 8, 1106–1123. <https://doi.org/10.1111/gcbb.12316>
- Field J.L.**, Tanger P., Shackley S.J., Haefele S.M. (2016) The economic and environmental sustainability of rice hull gasification in Cambodia. *Applied Energy*, 177, 612–624.  
<https://doi.org/10.1016/j.apenergy.2016.05.100>
- 2013 **Field J.L.**, Keske C.M.H., Birch G.L., DeFoort M.W., Cotrufo M.F. (2013) Distributed biochar and bioenergy coproduction: a regionally specific case study of environmental benefits and economic impacts. *GCB Bioenergy*, 5, 177–191. <https://doi.org/10.1111/gcbb.12032>
- Tanger P., **Field J.L.**, Jahn C.E., DeFoort M.W., Leach J.E. (2013) Biomass for thermochemical conversion: targets and challenges. *Frontiers in Plant Biotechnology*, 4, 218. <https://doi.org/10.3389/fpls.2013.00218>
- Sparrevik M., **Field J.L.**, Martinsen V., Breedveld G.D., Cornelissen G. (2013) Life cycle assessment to evaluate the environmental impact of biochar implementation in conservation agriculture in Zambia. *Environmental Science & Technology*, 47, 1206–1215.  
<https://doi.org/10.1021/es302720k>

#### PEER-REVIEWED BOOK CHAPTERS

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- 2018 Campbell E.E., **Field J.L.**, Paustian K. (2018) Chapter 5: Modelling soil organic matter dynamics as a soil health indicator, In *Managing soil health for sustainable agriculture*, Ed D. Reicosky. Cambridge, UK: Burleigh Dodds Science Publishing.  
<https://doi.org/10.1201/9781351114585>

**MANUSCRIPTS IN PROGRESS**

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- In revision Stauffer H., Richard T.L., Webb E., **Field J.L.**, Clark R. Optimizing Biomass Storage Facility Configuration to Minimize Supply Chain Risk and Vulnerability. (in revision at *Biofpr*)
- In prep. Bagdon B.A., Nguyen T.H., Vorster A., Paustian K., **Field J.L.** An accessible, data-intensive approach for robust regional calibration of the Forest Vegetation Simulator. (anticipated submission to *Forest Ecology and Management*)
- Kline K.L., Corr C., Efroymson R.A., **Field J.L.**, Inman D., Kemanian A., Lark T., Singh N., Taheripour F., Vazhnik V. A systematic approach to defining reference scenarios when assessing effects of land management. (anticipated submission to *Nature Sustainability*)

**TECHNICAL REPORTS**

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- 2018 Marcotullio P.J., Bruhwiler L., Davis S., Engel-Cox J., **Field J.**, Gately C., Gurney K.R., Kammen D.M., McGlynn E., McMahon J., Morrow W.R. III, Ocko I.B., Torrie R. (2018). Chapter 3: Energy systems. In *Second State of the Carbon Cycle Report (SOCCR2): A Sustained Assessment Report*. [Cavallaro N., Shrestha G., Birdsey R., Mayes M.A., Najjar R.G., Reed S.C., Romero-Lankao P., Zhu Z. (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 110-188, <https://doi.org/10.7930/SOCCR2.2018.Ch3>
- Shrestha G., Cavallaro N., Birdsey R., Mayes M.A., Najjar R.G., Reed S.C., Romero-Lankao P., Gurwick N.P., Marcotullio P.J., **Field J.** (2018) Preface. In *Second State of the Carbon Cycle Report (SOCCR2): A Sustained Assessment Report*. [Cavallaro N., Shrestha G., Birdsey R., Mayes M.A., Najjar R.G., Reed S.C., Romero-Lankao P., Zhu Z. (eds.)]. U.S. Global Change Research Program, Washington, DC, USA, pp. 5-20, <https://doi.org/10.7930/SOCCR2.2018.Preface>
- Sanchez D.L., **Field J.L.**, Lehmann J., Zelikova J., Aines R., Pett-Ridge J., Mba-Wright M., Hayes D., Lucas M., Funk, J. (2018). Chapter 5: Hybrid Biological and Engineered solutions, in *Building a New Carbon Economy: An Innovation Plan*, New Carbon Economy Consortium. <https://carbon180.org/newcarboneyconomy/>
- 2011 Karve P., Prabhune R., Shackley S., Carter S., Anderson P., Sohi S., Cross A., Haszeldine S., Haefele S., Knowles T., **Field J.L.**, Tanger P. (2011) *Biochar for Carbon Reduction, Sustainable Agriculture and Soil Management (BIOCHARM)*. Asia-Pacific Network for Global Change Research. Final report No. ARCP2009-12NSY-Karve. <http://www.apn-gcr.org/resources/items/show/1563>

**COMPETITIVE GRANTS & FELLOWSHIPS**

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- 2023 – **Principal Investigator**, “Decarbonizing Energy Through Collaborative Analysis of Routes and Benefit: Sustainable Fuels and Feedstocks”. **US Dept. of Energy**; Office of Energy Efficiency & Renewable Energy (EERE); Strategic Analysis (SA) Team. (\$275,000 sub-award on \$6,000,000 total project award)
- 2025

- 2022 – **Principal Investigator**, “Belowground Processes for Durable Soil Carbon”. **Oak Ridge National Laboratory**; Laboratory Directed Research & Development (LDRD) funding through the Transformational Decarbonization Initiative. (\$494,000 total project award)
- 2022 **Principal Investigator**, “Decarbonizing Energy Through Collaborative Analysis of Routes and Benefit: Sustainable Fuels and Feedstocks”. **US Dept. of Energy**; Office of Energy Efficiency & Renewable Energy (EERE); Strategic Analysis (SA) Team. (\$135,000 sub-award on \$750,000 total project award)
- 2021 – **Principal Investigator**, “High-Resolution Plant Productivity Data for Improved Bioenergy Assessment”. **Oak Ridge National Laboratory**; Laboratory Directed Research & Development (LDRD) Strategic Hire funding. (\$276,000 total project award)
- 2020 – **Principal Investigator**, “Agent-based Modeling for the Multi-objective Optimization of Energy Production Pathways”. **US Dept. of Energy**; Office of Energy Efficiency & Renewable Energy (EERE); Bioenergy Technologies Office (BETO). (\$1,000,000 total project award)
- 2018 – **Principal Investigator**, Economics & Sustainability team, Center for Bioenergy Innovation (CBI, <https://cbi.ornl.gov/>). **US Dept. of Energy**; Office of Science Office of Biological and Environmental Research (BER); Genomic Science program. Center led by Oak Ridge National Laboratory. (\$350,000 sub-award)
- 2017 – **Project Director**, “Reconciling Economic and Biophysical Perspectives on Marginal Land for Sustainable Bioenergy Crop Production”. **US Dept. of Agriculture**; National Institute of Food & Agriculture (NIFA) Foundational Program; Bioenergy, Natural Resources, and Environment (BNRE) area. Includes collaborators at U. California, Berkeley (D. Zilberman) and the USDA Agricultural Research Service (P.R. Adler). (\$499,000 total award)
- 2015 Sustainability Leadership Fellowship, School of Global Environmental Sustainability (SoGES), Colorado State University, Fort Collins, CO.
- 2011 C2B2-Chevron Graduate Fellowship, Colorado Center for Biofuels and Biorefining, Boulder, CO. (\$8,000)
- 2009 – NSF IGERT Fellow, Multidisciplinary Approaches to Sustainable Bioenergy program, Colorado State University. (3 years of tuition support and stipend)

## MEDIA COVERAGE

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- 2022 Fairley, P. How to rescue biofuels from a sustainable dead end. *Nature*. Nov. 16, 2022. <https://doi.org/10.1038/d41586-022-03649-w>
- 2021 “John Field: Modeling ecosystems to combat climate change.” *Oak Ridge Today*. Sept. 28, 2020. <https://www.ornl.gov/news/john-field-modeling-ecosystems-combat-climate-change>
- 2020 “Biofuels are a controversial climate solution. Could they still help save the planet?” *Grist*. Sept. 11, 2020. <https://rb.gy/0llstq>

- “Switching to switchgrass – will DOE and USDA funding turn switchgrass into a Rockstar biofuel feedstock?” *Biofuels Digest*. Sept. 27, 2020. <https://rb.gy/ddrsts>
- “CO<sub>2</sub> removal to halt warming soon would be a gargantuan undertaking.” *Ars Technica*. Aug. 27, 2020. <https://rb.gy/fvzpgj>
- “Advanced biofuels show promise for replacing some fossil fuels.” Colorado State University *SOURCE* news site. Aug. 24, 2020. <https://rb.gy/hnpggo>
- 2018 “More sustainable: The Digest’s 2018 multi-slide ABLC guide to intensification response & landscape design in bioenergy production.” Presentation featured in *Biofuels Digest*. <https://goo.gl/sg24Yk>
- “Switchgrass: Potentially more sustainable source of biofuel.” Tech Beat, *Tribology & Lubrication Technology*. June, 2018.
- “On the road to development.” *BIOENERGY Magazine*. Apr., 2018.
- “Biofuels can help solve climate change, especially with a carbon tax.” *The Guardian*, Climate Consensus blog series. Mar. 14, 2018. <https://goo.gl/Kbv5SK>
- “How biofuels from plant fibers could combat global warming.” Colorado State University *SOURCE* news site. Feb. 26, 2018. <https://goo.gl/9V9tTo>
- Hilst, F. Location, location, location. *Nature Energy*. Feb. 19, 2018. <https://doi.org/10.1038/s41560-018-0094-3>

#### INVITED TALKS

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- 2022 “Will land sink reversal make drawdown more challenging?” Fifteenth Integrated Assessment Modeling Consortium (IAMC) Annual Meeting, College Park MD, November 28, 2022.
- “Inferring commercial-scale yield potential from CBI switchgrass common garden data.” Annual Science Meeting of the Center for Bioenergy Innovation, Asheville NC, June 21, 2022.
- “Building Carbon with Carinata.” 9<sup>th</sup> Annual Carinata Biomaterials Summit, University of Florida (virtual), April 26, 2022. <https://sparc-cap.org/conference-2022/>
- “Assessing the Role of Soils in Carbon-Negative Bioenergy Landscapes.” BETO workshop on Bioenergy’s Role in Soil Carbon Storage (virtual), March 29, 2022. <https://www.energy.gov/eere/bioenergy/bioenergys-role-soil-carbon-storage-workshop-speaker-bios>
- “Sustainable US Biomass Potentials.” Co-presented with Kline K., Langholtz M. & Singh N. to the Energy Futures Initiative Workshop on Bioenergy with Carbon Capture & Storage (virtual), March 16, 2022.
- 2021 “Carbon Sequestration & GHG Mitigation in Carinata Cropping Systems.” Genetic Engineering and Society Colloquium, North Carolina State University (virtual), Nov. 23,

2021. <https://ges-center-lectures-ncsu.pinecast.co/episode/4aba0c0a/john-field-using-ethiopian-mustard-for-aviation-fuel-and-carbon-sequestration>

“Soil carbon implications from the production of low-carbon transportation fuels.” Presentation to National Academies of Science, Engineering, and Medicine ad-hoc committee on Current Methods for Life Cycle Analyses of Low-Carbon Transportation Fuels in the United States (virtual). Aug. 31, 2021.

<https://www.nationalacademies.org/event/08-31-2021/current-methods-for-life-cycle-analyses-of-low-carbon-transportation-fuels-in-the-united-states-meeting-4-part-ii>

“Carbon Sequestration & GHG Mitigation in Carinata Cropping Systems.” Carinata Biomaterials Summit 2021 (virtual), Jul. 20, 2021.

“Contentious Topics for Nature-based Solutions, Bioenergy, CDR & BECCS.” Co-presented with Kline K. & Langholtz M. to the World Wildlife Foundation International Training on Nature-based Solutions (virtual), Jul. 15, 2021.

“Pathways to net greenhouse gas mitigation and negative emissions via advanced biofuels: Evaluating technology potentials and risks.” MIT Energy Initiative Spring Symposium on Bioenergy with Carbon Capture and Storage (virtual), Massachusetts Institute of Technology, Cambridge, MA. Jun. 8, 2021.

<https://energy.mit.edu/springsymposium/>

2020 “Robust paths to net greenhouse gas mitigation and negative emissions via advanced biofuels.” Dept. of Chemical and Biological Engineering seminar series (virtual), Colorado State University, Fort Collins, CO. Nov. 12, 2020.

“Ecosystem modeling for regional-scale assessment of soil emissions under energy crops.” Carinata Biomaterials Summit 2020, University of South Florida, Tampa, FL. Feb. 27, 2020.

2019 “Ecosystem Modeling to Clarify the Climate Benefits of Bioenergy.” Seminar at Oak Ridge National Laboratory, TN. Oct. 18, 2019.

“Biochar, Carbon-Negative Bioenergy & Soils.” Society of Environmental Journalists 29<sup>th</sup> Annual Conference, Fort Collins, CO. Oct. 12, 2019. <https://www.sej.org/initiatives/sej-annual-conferences/AC2019-main>

“Dedicated Land Use for CO<sub>2</sub> Removal.” Research to Action: The Science of Drawdown, hosted by The Pennsylvania State University, State College, PA. Sept. 17, 2019. <https://drawdown.psu.edu/event/workshop-7-beyond-zero-emissions-carbon-capture-utilization-and-sequestration>

“Soil Carbon, Bioenergy & CO<sub>2</sub> Drawdown.” 2019 Innovator Summit, Innovation Institute for Food and Health, Davis, CA. May 21, 2019. <https://foodaghealth.solutions/2019-innovator-summit-event-summary/#tab-id-2>

“Evaluating Advanced Energy Crop Varieties on Marginal Lands: A Modeling Workflow.” Joint Bioenergy Research Center Workshop, Chicago, IL. May 3, 2019.

- 2018 “BANR—The Bioenergy Alliance Network of the Rockies.” CAAFI Biennial General Meeting & Integrated ASCENT Symposium, Washington, DC. Dec. 4-6, 2018.
- “How Can Ecosystem Process Models Inform Bioenergy Assessments?” Seminar at Oak Ridge National Laboratory, TN. Nov. 12, 2018.
- “Ecosystem Emissions in Bioenergy Production: Intensification Response & Landscape Design.” ABLC Global meeting, San Francisco, CA. Nov. 9, 2018.  
<http://biofuelsdigest.com/ablcglobal/index.php/agenda/>
- “Ecosystem Modeling to Address Fundamental Bioenergy Mitigation Critiques.” LCA XVIII conference, hosted by the American Center for Life Cycle Assessment, Fort Collins, CO. Sept. 25, 2018. <https://aclca.org/lca-xviii/>
- “Assessing & Optimizing the Biogenic Emissions Footprint of Feedstock-Sheds.” Summit on Realizing the Circular Carbon Economy, Golden, CO. July 24, 2018.  
<https://www.energy.gov/eere/bioenergy/summit-realizing-circular-carbon-economy-agenda>
- 2017 “Using the DayCent Model to Estimate Soil Carbon and GHG Fluxes for Bioenergy Assessments and the Annual U.S. GHG Emissions inventory”. Coordinating Research Council Workshop on Transportation Fuel Lifecycle Assessment, Argonne National Laboratory, IL. Oct. 25, 2017.
- “Bioenergy from Beetle-Kill Wood: the BANR project.” 21st Century Energy Transition Symposium, Fort Collins, CO. Oct. 18, 2017. <http://cercsymposium.org/symposium-2017/agenda-2017/>
- “How Can Ecosystem Process Models Inform Bioenergy Assessments?” Crop Residues for Advanced Biofuels Workshop, hosted by the American Society of Agronomy, Sacramento, CA. Aug. 15, 2017. <https://www.agronomy.org/meetings/crop-residues>
- “What Can Ecosystem Models Tell Us About Carbon-Negative Bioenergy?” Beyond Carbon Neutral Seminar Series, co-hosted by the University of Michigan School for Environment and Sustainability, School of Natural Resources and Environment, Erb Institute, and Energy Institute, Ann Arbor, MI. Feb. 9, 2017.  
[https://seas.umich.edu/events/beyond\\_carbon\\_neutral\\_seminar\\_series\\_2](https://seas.umich.edu/events/beyond_carbon_neutral_seminar_series_2)
- 2016 “Bioenergy Alliance Network of the Rockies: Lifecycle Assessment Overview.” 2<sup>nd</sup> Northwest Wood-Based Biofuels + Co-Products Conference, Seattle, WA. May 4, 2016.  
<https://nararenewables.org/2016-nwbcc-proceedings/>
- 2015 “High-Resolution Ecosystem Modeling for Bioenergy Feedstock Sustainability Assessment.” Energy Biosciences Institute seminar series, Berkeley, CA. Apr. 28, 2015.
- “The Bioenergy Alliance Network of the Rockies.” Inside Energy ‘Spark!’ community event, Fort Collins, CO. Apr. 14, 2015. <http://insideenergy.org/2015/04/17/ie-questions-what-is-spark/>



**CONFERENCE PAPERS PRESENTED**

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- 2018 **Field J.L.**, Bagdon B., Nguyen T., Vorster A., Paustian K. “A Framework for Quantifying Climate Outcomes of Beetle-Killed Forest Biomass Utilization.” LCA XVIII conference, hosted by the American Center for Life Cycle Assessment, Fort Collins, CO. Sept. 26, 2018.
- Field J.L.**, Paustian K. “Sustainable Feedstocks for Carbon-Negative Bioenergy: A Landscape Design Case Study.” International Conference on Negative CO<sub>2</sub> Emissions, Gothenburg, Sweden. May 22, 2018.
- 2013 **Field J.L.**, Dinh T., Easter M., Marx E., Tryner J., Alder P., Paustian K. “Biofuels on the Landscape: Modeling to Balance the Environmental Footprint of Feedstock Production on Marginal Lands.” In *New Crops: Bioenergy, Biomaterials, and Sustainability*, Proceedings of the Joint Annual Meeting of the Association for the Advancement of Industrial Crops and the USDA National Institute of Food and Agriculture Washington, D.C., October 12-16, 2013. <https://hort.purdue.edu/newcrop/proceedings2015/>
- 2011 Evans S.G., **Field J.L.** “A technology-specific methodology for evaluating the GHG mitigation potential of advanced improved cookstoves.” 12th International Conference on Indoor Air Quality and Climate, Austin, TX. June 6, 2011.

**OTHER CONFERENCE PARTICIPATION**

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- 2021 “An accessible, data-driven approach for robust regional FVS calibration for improved stand structure and carbon density modeling” Virtual presentation at the American Geophysical Union Fall Meeting (New Orleans, LA). Dec. 15, 2021. <https://www.essoar.org/doi/abs/10.1002/essoar.10509958.1>
- “Modeling the yield, biogenic emissions, and soil carbon sequestration outcomes of Brassica carinata grown in the southeastern US as a winter cash crop and sustainable aviation fuel feedstock” Virtual poster presentation at the American Geophysical Union Fall Meeting (New Orleans, LA). Dec. 15, 2021. <https://www.essoar.org/doi/abs/10.1002/essoar.10509957.1>
- “Simulating landscape-scale impacts of switchgrass nitrogen use efficiency.” Poster presented at the Biological Systems Science Division Principal Investigators Meeting (virtual). Feb. 22, 2021.
- 2020 “Sustainable intensification or natural climate solutions? Case studies assessing opportunities for land-based biological carbon mitigation on former & current agricultural lands.” Virtual presentation at the American Geophysical Union Fall Meeting (virtual). Dec. 7, 2020. <https://www.youtube.com/watch?v=-jTgS-nRJyl>
- 2019 “Modeling the Climate Mitigation Potential of Beetle-Kill-to-Biofuel/Biochar Systems: Bioenergy Alliance Network of the Rockies (BANR).” Presentation at the American Geophysical Union Fall Meeting, San Francisco, CA. Dec. 11, 2019
- 2018 “Reconciling Economic & Biophysical Perspectives on Marginal Land for Sustainable Bioenergy Crop Production.” Presentation at the USDA/NIFA 2018 Climate and Agroecology Project Directors Meeting, Washington, DC. Dec. 7, 2018.

- “Assessing Contributions from Biogenic Emissions to the Biofuel Lifecycle: A Landscape Design Case Study.” Presentation at the LCA XVIII conference, hosted by the American Center for Life Cycle Assessment, Fort Collins, CO. Sept. 26, 2018.
- 2016 “Beetle-Kill to Biochar: Good Climate Sense?” Presentation at Biochar 2016, hosted by the US Biochar Initiative, Corvallis, OR. Aug. 23, 2016.
- 2014 “Ecosystem Modeling to Identify Low-Cost GHG Mitigation Opportunities in Heterogeneous Bioenergy Landscapes.” Presentation at the American Society of Agronomy, Crop Science Society of America & Soil Science Society of America International Annual Meetings, Long Beach, CA. Nov. 3, 2014.
- 2013 “Biofuels on the Landscape: Modeling to Balance the Environmental Footprint of Feedstock Production on Marginal Lands.” Presentation at the American Society of Agronomy, Crop Science Society of America & Soil Science Society of America International Annual Meetings, Tampa, FL. Nov. 4, 2013.
- 2012 “Bioenergy Landscape Design to Minimize the Environmental Impacts of Feedstock Cultivation.” Presentation at the American Geophysical Union Fall Meeting, San Francisco, CA. Dec. 7, 2012.
- “Liming Effects and Winter Wheat Yield Response in Biochar-Amended Agricultural Soils.” Presentation at the American Society of Agronomy, Crop Science Society of America & Soil Science Society of America International Annual Meetings, Cincinnati, OH. Oct. 22, 2012.
- “Soil Biogeochemical Modeling for Optimal GHG-Mitigating Biomass Feedstocks.” Presentation at the American Society of Agronomy, Crop Science Society of America & Soil Science Society of America International Annual Meetings, Cincinnati, OH. Oct. 22, 2012.

## RESEARCH MANAGEMENT EXPERIENCE

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- 2019 – **Principal Investigator** on “A Landscape-Based LCA Analysis for Sustainable Feedstock Production”. Funded by Argonne National Laboratory (ANL), contract No. 9-P127-P-00212-00 (\$60,000 award)
- 2017 – **Principal Investigator** on a project to model energy crop cultivation on abandoned agricultural land. Funded by the Stanford Global Climate & Energy Project (GCEP), “Sustainable Transportation Energy with Net Negative Carbon Emissions” project led at University of Minnesota (\$150,000 sub-award)
- 2016 **Principal Investigator** on a project to model corn stover collection for bioenergy applications. Funded by the USDA Agricultural Research Service (ARS) Pasture Systems and Watershed Management Research Unit (\$15,000 sub-award)
- 2013 – **Project Manager** for the Bioenergy Alliance Network of the Rockies (BANR, <http://banr.nrel.colostate.edu/>), a USDA National Institute of Food and Agriculture (NIFA) Coordinated Agricultural Project (CAP) in collaboration with four other universities, the US Forest Service Rocky Mountain Research Station, and industrial affiliates Cool Planet

Energy Systems and Confluence Energy. Participated in initial proposal development, and currently leading ecosystem modeling and lifecycle assessment tasks within the project. (\$9,800,000 total project award)

2009 – **Graduate Research Assistant**, Natural Resource Ecology Laboratory, Colorado State University, Fort Collins, CO. Supported through USDA-NIFA project “Decision support tool for integrated biofuel greenhouse gas emission footprints.”

## MENTORING EXPERIENCE

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Postdoctoral level      **Yao Zhang:** ARS corn stover project (2016–2017)  
                                  **Ben Bagdon:** BANR project (2017–2020)  
                                  **Trung Nguyen:** BANR project (2017–2020); ANL landscape LCA project (2019–2020)

Graduate level      **Haley Stauffer** (The Pennsylvania State University): CBI project (2020–2021)

Undergraduate level      Research Experience for Undergraduates (REU), Colorado Center for Biorefining and Biofuels: **Abbie Tremblay** (Clemson University, summer 2011); **Thai Dinh** (Oklahoma State University, summer 2012, co-author on Field et al. 2018 *Nature Energy*); **José Milan** (University of Puerto Rico, summer 2015)  
                                  Sustainable Bioenergy Development Center fellowship, Colorado State University: **Jacqueline Marquez** (Colorado State University, Fall 2013 – Spring 2014)

## TEACHING EXPERIENCE

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2019      **ESS/ENGR 555: Life Cycle Assessment for Sustainability**, Cross-listed in the Dept. of Ecosystem Science & Sustainability and the College of Engineering, Colorado State University. Completely re-designed a previously offered course around open-source LCA software, and developed associated lectures, readings, and laboratory activities from scratch from a bioenergy LCA perspective. Taught spring 2019.

2012 – **AGRI 602: Bioenergy Policy, Economic, and Environmental Assessment**, College of Agriculture, Colorado State University. Co-taught interdisciplinary graduate-level course with topics including biogeochemistry, ecosystem modeling, lifecycle assessment, and integrated assessment. Instructor of record spring 2014 & fall 2015; teaching assistant in spring 2012 & 2013.

2012 – **AGRI 601: Introduction to Bioenergy Technology**, College of Agriculture, Colorado State University. Co-taught interdisciplinary graduate-level introductory course with topics including bioenergy feedstock sources, biogeochemistry, and lifecycle assessment. Instructor of record fall 2014; teaching assistant fall 2012 & 2013.

2008 – Graduate teaching assistant, MECH 486: Capstone Senior Design course, Dept. of Mechanical Engineering, Colorado State University (fall 2008 – spring 2009).

In addition, I have provided regular invited guest lectures for courses organized by a variety of colleagues, including:

- Biofuels and Bioenergy (ENGG 261), Thayer School of Engineering, Dartmouth College, and co-offered at the University of Campinas in Brazil (invited by Prof. Lee Lynd)
- Biocarbon Utilization & Sequestration (BAE 495/590), Dept. of Biological and Agricultural Engineering, North Carolina State University (invited by Prof. Joe Sagues)
- Foundations for Carbon/Greenhouse Gas Management (ESS 524), Dept. of Ecosystem Science and Sustainability, Colorado State University (invited by Prof. Rich Conant)
- Applications in Environmental Sustainability (GES 470), School of Global Environmental Sustainability, Colorado State University (invited by Dr. Katie Renwick)
- Energy Engineering (MECH 303), Dept. of Mechanical Engineering, Colorado State University (invited by Dr. Tim Vaughn)
- Soils and Global Change (SOGR 400), Dept. of Soil and Crop Sciences, Colorado State University (invited by Prof. Francesca Cotrufo)

## SERVICE

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Collaborative reports	<p>Author, Chapter 6: Land Use and Land Use Change, <i>Fifth National Climate Assessment (NCA5)</i>, U.S. Global Change Research Program (<a href="https://www.globalchange.gov/nca5">https://www.globalchange.gov/nca5</a>)</p> <p>Reviewer, <i>Current Methods for Life Cycle Analyses of Low-Carbon Transportation Fuels in the United States</i>, National Academies of Science, Engineering, and Medicine (2022) <a href="https://nap.nationalacademies.org/catalog/26402/current-methods-for-life-cycle-analyses-of-low-carbon-transportation-fuels-in-the-united-states">https://nap.nationalacademies.org/catalog/26402/current-methods-for-life-cycle-analyses-of-low-carbon-transportation-fuels-in-the-united-states</a></p> <p>Author, <i>Sustainably Sourcing Biomass Feedstocks for BECCS in the United States</i>, a whitepaper commissioned by The Energy Futures Initiative (in development)</p> <p>Author, Preface &amp; Chapter 3: Energy systems, <i>Second State of the Carbon Cycle Report (SOCCR2): A Sustained Assessment Report</i>, U.S. Global Change Research Program (2018)</p>
Panel service & proposal review	<p>US Dept. of Agriculture, National Institute of Food &amp; Agriculture (NIFA)</p> <p>US Dept. of Energy, Bioenergy Technologies Office (BETO)</p> <p>University of Tennessee SunGrant Initiative</p>

	North Dakota State University Center for Computationally Assisted Science and Technology
Academic journals	<p>Review Editor, <i>Frontiers in Climate – Negative Emissions Technologies</i></p> <p>Individual peer reviews for various journals including <i>Agronomy Journal</i>; <i>Applied Energy</i>; <i>Applied Engineering in Agriculture</i>; <i>BioResources</i>; <i>Communications Earth &amp; Environment</i>; <i>Ecological Applications</i>; <i>Ecological Engineering</i>; <i>Electronic Journal of Energy &amp; Environment</i>; <i>Energy Economics</i>; <i>Environmental Research Letters</i>; <i>Environmental Science &amp; Technology</i>; <i>Field Crops Research</i>; <i>Global Change Biology</i>; <i>Global Change Biology Bioenergy</i>; <i>International Journal of Lifecycle Assessment</i>; <i>Journal of Environmental Management</i>; <i>Nature Climate Change</i>; <i>Nature Sustainability</i>; <i>Pedosphere</i>; <i>Philippine Journal of Science</i>; <i>Soil Science Society of America Journal</i></p>
Conference organization	<p>Assisted with organization of the “Summit on Decarbonization of the Agriculture Sector.” Oak Ridge National Laboratory (virtual), Oak Ridge, TN. Sep. 21–22, 2021.</p> <p>Co-convener for “USBI/BANR 2019: From Biomass to Biochar &amp; Bioenergy – Bridging Science and Opportunities.” Joint meeting of the US Biochar Initiative and the Bioenergy Alliance Network of the Rockies, Fort Collins, CO. July 1–3, 2019. The conference was attended by 300 individuals and featured over 130 presentations and 18 industry exhibitors. <a href="https://biochar-us.org/conferences-events">https://biochar-us.org/conferences-events</a></p> <p>“Carbon Budgets for Ambitious Climate Goals and the Role of Large-Scale Carbon Negative Bioenergy/Carbon Removal in Meeting Them.” American Geophysical Union Fall Meeting, New Orleans, LA. Dec. 15, 2017. Session convened with Millar R., Zickfeld K. &amp; Richard T.L. <a href="https://agu.confex.com/agu/fm17/meetingapp.cgi/Session/32439">https://agu.confex.com/agu/fm17/meetingapp.cgi/Session/32439</a></p>
Legislative testimony	<p>Testimony before the Colorado State Senate Agriculture, Natural Resources, &amp; Energy subcommittee (February 23, 2016) and Colorado House of Representatives Transportation &amp; Energy subcommittee (March 9, 2016) regarding bill 16-007, <i>Concerning the Establishment of a Multiplier in the Renewable Energy Standard for Electricity Generated from Certain Types of Biomass to Provide an Incentive to Use Materials Located Within Areas that Have a High Risk of Wildfire</i>.</p>
Other	<p>Education Committee, Natural Resource Ecology Laboratory, Colorado State University (2016 – present)</p>

### RELATED PROFESSIONAL SKILLS

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Ecosystem modeling	CENTURY and DayCent process-based ecosystem models Forest Vegetation Simulator
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Life cycle assessment	GREET OpenLCA
Programming	Python programming language, including numpy, pandas, matplotlib, and plotly modules for data analysis and visualization  Jupyter Notebooks & Jupyter Lab  Databases (SQLite)  Code-sharing & version control— <a href="https://github.com/johnfield/">https://github.com/johnfield/</a> & <a href="https://code.ornl.gov/fieldjl">https://code.ornl.gov/fieldjl</a>  Open data repositories— <a href="https://figshare.com/authors/John_Field/4456810">https://figshare.com/authors/John_Field/4456810</a>
Science communication	Blogging: <ul style="list-style-type: none"> <li>• CSU School of Global Environmental Sustainability—<a href="http://blog.sustainability.colostate.edu/?q=john-field">http://blog.sustainability.colostate.edu/?q=john-field</a></li> <li>• CSU Natural Resource Ecology Laboratory—<a href="http://goo.gl/YthvEM">goo.gl/YthvEM</a></li> <li>• CSU Bioenergy IGERT—<a href="https://bioenergyigert.wordpress.com/author/john1field/">https://bioenergyigert.wordpress.com/author/john1field/</a></li> </ul>

#### WORKSHOP PARTICIPATION & OTHER TRAINING

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2022	<p>“Soils in the Climate Crisis: Modeling Microbiomes During Disturbance.” Virtual workshop hosted by Sandia National Laboratory. June 9, 2022.</p> <p>“5th Training Course on New Advances in Land Carbon Cycle Modeling.” Organized by the Luo Research Group, Northern Arizona University. May 16–27, 2022.</p> <p>“Rules of the Road for BECCS Deployment.” Energy Futures Initiative private workshop (virtual). March 17, 2022.</p>
2020	“Coordination & Research Assessment Meeting (CRAM II).” Joint Bioenergy Research Center workshop (virtual). May & June, 2020.
2015	“Bioenergy and Land Use Change: A Global Perspective” hosted by the Energy Technology Institute (ETI) Ecosystem Land Use Modeling (ELUM) project, Lancaster University, United Kingdom
2014	Global Sustainable Bioenergy Initiative (GSB) project planning meeting, Piracicaba, Sao Paulo, Brazil
2012	Biochar:Crossroads 1 <sup>st</sup> International Summer School on Biochar, Leibniz-Institut für Agrartechnik, Potsdam-Bornim, Germany
2011	<p>Biomass Supply Chain Modeling Workshop, National Renewable Energy Laboratory, Golden, CO</p> <p>Biomass Densification Workshop, Idaho National Laboratory, Idaho Falls, ID</p> <p>Rocky Mountain Biochar Initiative (RMBI) Spring Meeting, Colorado School of Mines, Golden, CO</p>

- 2010 Rice: Research to Production (RR2P) Short Course, International Rice Research Institute (IRRI), Los Baños, Philippines  
MASB IGERT policy training experience, Heinz Center for Science, Economics & Environment, Washington DC
- 2009 Conference for Sustainability IGERTs 2 (C4SI2), Arizona State University, Tempe, AZ  
North American Biochar 2009, hosted by the International Biochar Initiative and the Center for Energy & Environmental Security, University of Colorado, Boulder, CO

### NON-ACADEMIC EMPLOYMENT

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- 2005 – **Mechanical Engineer**, Protonex LLC, Broomfield, CO. Developed testing facilities and  
2008 protocols for small-scale solid oxide and direct methanol fuel cell systems, including balance-of-plant components.

### PROFESSIONAL MEMBERSHIPS

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- 2012 – American Geophysical Union, Biogeosciences Section & Global Environmental Change  
present Section
- 2012 – American Society of Agronomy, Crop Science Society of America & Soil Science Society of  
2014 America

**REFERENCES**

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**Lee R. Lynd**, Paul E. and Joan H. Queneau Distinguished Professor in Environmental Engineering Design and Adjunct Professor of Biology, Dartmouth College.

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