

*Mailing Address:*

Voinovich School of Leadership and Public Service  
Environmental Studies  
1 Ohio University  
Building 22, The Ridges  
Athens, OH 45701

*Email:*

daviss6@ohio.edu,  
srosendavis@gmail.com

*Phone:*

724-322-9647 (cell), 740-597-1459  
(office), 740-593-1325 (office/lab)

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RESEARCH INTERESTS

Sustainable renewable energy systems

Carbon and nitrogen cycling in managed ecosystems

Crassulacean acid metabolism

Fosu S\*, **Davis SC**. 2024. Decadal change in soil carbon and nitrogen with a *Miscanthus x giganteus* crop on abandoned agricultural land in southeast Ohio. *GCB Bioenergy* 16: e137171.

<https://doi.org/10.1111/gcbb.13171>.

Perez-Pimienta JA, Méndez-Acosta HO, **Davis SC**, Tan DK. 2023. Editorial: The role of *Agave*

- Davis SC**, Abatzoglou JT, Lebauer DS. 2021. Expanded potential growing region and yield increase for *Agave americana* with future climate. *Agronomy* 11(11): 2109, <https://doi.org/10.3390/agronomy11112109>.
- Miller K, Herman T\*, Philipinanto D\*, **Davis SC**. 2021. Anaerobic digestion of food waste, brewery waste, and agricultural residues in an off-grid continuous reactor. *Sustainability* 13, <https://doi.org/10.3390/su13126509>.
- Saha N\*, McGaughy K\*, **Davis SC**, Reza MT. 2021. Assessing hydrothermal carbonization as sustainable home sewage management for rural counties: A case study from Appalachian Ohio. *Science of the Total Environment* 781, 146648.
- Iuliano B\*, Cartmill A, **Davis SC**, Kerr A, Perfecto I. 2021. Human Dimensions: Agroecology for just and sustainable food systems. *Bulletin of the Ecological Society of America* <https://doi.org/10.1002/bes2.1871>.
- Adjuik T\*, Rodjom AM\*, Miller KE, Reza MT, **Davis SC**. 2020. Application of hydrochar, digestate, and synthetic fertilizer to a *Miscanthus x giganteus* crop: Implications for biomass and greenhouse gas emissions. *Applied Sciences* 10: article 8953; doi:10.3390/app10248953.
- Jones AM\*, Zhou Y, Held M, **Davis SC**. 2020. Tissue composition of *Agave americana* L. yields greater carbohydrates from enzymatic hydrolysis than advanced bioenergy crops. *Frontiers in Plant Science* 11: article 654.
- Miller KE, Grossman E\*, Stuart BJ, **Davis SC**. 2020. Pilot-scale biogas production in a temperate climate using variable food waste. *Biomass and Bioenergy* 138: 105568.
- Davis SC**, Simpson J, Gil Vega KDC, Niechayev NA\*, van Tongerlo E\*, Hurtado Castano N, Dever LV, Búrquez A. 2019. Undervalued potential of crassulacean acid metabolism (CAM) for current and future agricultural production. *Journal of Experimental Botany Special Issue on CAM*. 70: 6521-6537. <https://doi.org/10.1093/jxb/erz223>
- Niechayev N\*, Jones A\*, Rosenthal D, **Davis SC**. 2018. A model of environmental limitations on production of *Agave americana* L. grown as a biofuel crop in semi-arid regions. *Journal of Experimental Botany*. 70: 6549-6559. <https://doi.org/10.1093/jxb/ery383>
- Davis SC**, Kloepfer J\*, Mayer J\*, Cushman J. 2018. Diversifying Agriculture with Novel Crop Introductions to Abandoned Lands with Suboptimal Conditions. *In* *Climate Change and Crop Production: Foundations for Agroecosystem Resilience*. Edited by N Benkeblia, CRC Press, USA. pgs 163-172. ISBN 9781138032347.
- Davis SC**, Straker KC\*, Rodjom A\*, Grossman E\*, Jones A\*, Miller KE. 2018. Mismatch of life-





**Davis SC, AE Hessel, and RB Thomas.**

*Extra studies:*

### SERVICE ACTIVITIES

- Grant Reviewer:* National Science Foundation; National Institute for Climate Change Research; Agriculture and Food Research Initiative, USDA; BBSRC, UK
- Editorial Service:* Guest Editor for Frontiers in Chemical Engineering (2023)  
Guest Editor for Agronomy (2020-21)  
Editorial Board member for Energies (2020-present)  
Editorial Board member for PLOS ONE (2012-2022)  
Editorial Advisory Board member for Global Change Biology Bioenergy (2014-2017)  
Guest Associate Editor for Global Change Biology Bioenergy (2011)
- Journal Reviewer:* Biofpr; New Phytologist; Nature Climate Change; Global Change Biology; Ecological Applications; Journal of Environmental Quality; Environmental Research Letters; Plant and Soil; Functional Ecology; GCB-Bioenergy; Journal of Environmental Management; Ecological Modeling; Tree Physiology; Applied Energy; Resources, Conservation & Recycling

Dialogues Task Force (2018-20); University Professional Ethics Committee (2018-20); Faculty Merit Evaluation Committee (2017-19); Deans Evaluation Committee, Ohio Univ. (2015); Search Committee for Director of Center for Public and Social Innovation (2015); Ridges Land Use Planning Subcommittee (2014, 2023); Search Committee for Faculty member in Environmental Studies (2014); Goldwater Scholars Review Committee (2013); Faculty Ethics Committee, Voinovich School, (2013); Graduate Affairs Committee, Dept. of Plant Biology, UIUC; Retreat Planning Committee, Energy Biosciences Institute, UC Berkeley

*Professional Memberships:* Ecological Society of America (current), American Society of Adaptation Professionals (current), American Geophysical Union, American Society of Plant Biologists, American Association for the Advancement of Sciences

*Service leadership positions:*

Chair of Baker and OURC Standing Committee (2023-24)

Co-Chair of Dean Search Committee (2023)

Chair of Agroecology Section at Ecological Society of America (2018-2020)

*Professional/Leadership Development:*

Faculty Learning Community on AI (Fall 2023)

NSF Innovation Corps Training, Great Lakes Region Hub (Sept 29 – Nov 17, 2023)

Visiting Professional at the National Renewable Energy Laboratory (2020)

Leadership Athens County (2019-



Annual Meeting), August 13, 2019. Louisville Convention Center, Louisville, KY. – *lead organizer and moderator.*

2018-2022 Open OHIO: \$134,835 (PD)

2018-2020 Supporting Renewable Energy Research and STEM Education in Rural Appalachian Ohio (AEP Foundation): \$250,000 (co-PI; PI Jen Bowman)

2017-2018 Reclaiming abandoned lands with coproduction of biofuels and high value bioproducts (Innovation Strategy): \$20,000 (PI)

2015-2016 Voinovich Collections Fellowship: \$1000 (PI)

2015-2016 Sustainable Housing through Holistic Waste Stream Management and Algal Cultivation (NSF 1230961): \$309,071 (co-PI; PI Ben Stuart)

2014-2016 Anaerobic digestion system for multiple services: energy, greenhouse gas reduction, waste remediation, fertilizer, and economic returns (1804 Fund): \$75,000 (PI)

2013-2017 *Agave* as a feedstock crop in the southwestern US (EBI): \$400,000 (PI)

2013-2014 *BP Biomass Handbook* (BP): \$17,208 (PI)

2014 Resolving age-mediated responses of forest carbon sequestration to climate change (OU Research Council): \$7979 (PI)

2013 Belowground carbon cycling response to climate change and forest age (OU Research Challenge Program): \$2500 (PI)

2013 Integrated supply chain analysis for a second-generation bioenergy industry (OU Research Challenge Program): \$3500 (PI)

2013 Developing environmentally compatible bioenergy production (OU Research Challenge Program): \$2500 (PI)

2012 *Agave* as a feedstock crop in the southwestern US (EBI): \$61,878 (PI)

2011-2012 Assessing the Carbon Footprint of Combined Corn and Cellulose Ethanol Production (EPA): \$15,000 (PI)

2010 Harvesting Carbon from Eastern US Forests workshop (EBI)

Maynard F\*, **Davis SC**. Potential for recycling nutrients from human waste streams to agricultural soils. Organized Oral Session: Waste recovery for improved nutrient use efficiency in human systems. Ecological Society of America 2022 Annual Meeting, August 13-19, 2022. Montreal, Canada.

**Davis SC**, Reza T, Rodjom A, Wilhelm J, Kruse N, Kauneckis D. Life-cycle framework for coproduction opportunities at the food-energy-water-waste nexus. INFEWS PI Workshop. Virtually hosted by Princeton University, February 9-11, 2022.

Herman T\* and **Davis SC**. The influence of emerging diets on bioenergy products. Session U23B: Organic Wastes Sciences as Convergent Research: Connecting Food, Energy, and Water System Sciences. American Geophysical Union 2021 Fall Meeting, December 14, 2021. Online and New Orleans, LA, USA.

**Davis SC**. Networking and Mentoring Beyond Knowledge Silos. Ecological Society of America Annual Meeting. Virtual, August 2-6, 2021.

Nungesser E, Miller KE, **Davis SC**. Biogas production and digestate quality of diet-influenced food waste in anaerobic digestion. Ecological Society of America Annual Meeting. Virtual, August 2-6, 2021.

**Davis SC**, LeBauer D. *Agave americana*: a resilient crop for hot and dry regions. Innovative Session: Earth, Agriculture, and Society: Toward Sustainable Development in the Anthropocene. American Geophysical Union

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**Davis SC.** Coproduction Opportunities. Emerging Coproduction Systems for Sustainable Rural Economies. May 23-24, 2018. Ohio University, Athens, OH.

**Davis SC.** Opportunities and challenges for developing novel agroecosystems with CAM crops. Biology of CAM Plants 2018. April 9-13, 2018. Desert Botanical Gardens, Phoenix, AZ. (invited)

Herman T and **Davis SC.** Using food waste and bioenergy crops to produce renewable natural gas. (1<sup>st</sup>

- Davis SC.** Introduction to World Café on Integrating Food, Energy and Water Systems to Eliminate Waste. 16<sup>th</sup> National Conference and Global Forum on Science, Policy and the Environment: The Food-Energy-Water Nexus. January 19-21, 2016. Washington, D.C.
- Filyaw T, **Davis S.** 2016. An examination of mycorrhizal symbiosis in forest grown American ginseng (*Panax quinquefolius*). Student EXPO, Ohio University, Athens, OH. April 6, 2016.
- Grossman E, Rodjom A, Miller K, **Davis S.** 2016. Giving life to waste: A review of anaerobic digestion. Student EXPO, Ohio University, Athens, OH. April 6, 2016.
- Niechayev N, **Davis S.** 2016. The environmental productivity and light response of *Agave americana*: a potential semi-arid biofuel feedstock. Student EXPO, Ohio University, Athens, OH. April 6, 2016. (Second place prize in Environmental Studies)
- Whittemore M, **Davis S.** 2016. Mapping and assessment of plant communities at Crane Hollow Nature Preserve. Student EXPO, Ohio University, Athens, OH. April 6, 2016. (First place in Environmental Studies)
- Davis SC,** Kuzmick ER, Niechayev N, Hunsaker D. 2015. Ecological benefits of Crassulacean Acid Metabolism (CAM) in agricultural production. Ecological Society of America Centennial Meeting. August 9-14, 2015, Baltimore, MD. (poster)
- Kuzmick ER, Miles D, **Davis SC.** Investigating the viability of *Agave americana* as a potential bioenergy feedstock and its relative impact on surrounding wildlife. Student Expo, Ohio University, Athens, OH. April 9, 2015. (poster)
- Kloepfer JE, **Davis SC,** Buckley G, Sinha G, Lucas R. Changes in ecosystem services of a street tree canopy over 24 years: A case study of Athens, Ohio. Student Expo, Ohio University, Athens, OH. April 9, 2015. (poster)
- Davis SC.** Land management and terrestrial carbon sequestration. Kanawha Project Panel Discussion. Athens, OH. March 21, 2015. (invited)
- Davis SC.** Sustainable landscapes in a changing climate. SOUL meeting, Ohio University, Athens, OH, November 12, 2015. (invited)
- Davis SC.** Sustainable bioenergy in a changing climate. Ecolunch in Department of Biological Sciences, Ohio University, Athens, OH. October 15, 2014. (invited)
- Davis SC.** Agave: a feedstock crop for a changing climate? 10<sup>th</sup> Annual Bioenergy Feedstocks Symposium. University of Illinois at Urbana-Champaign, Urbana, IL, September 24, 2014 (invited).
- Davis SC,** Miller K, Stuart B. *Finding an energy balance in anaerobic digestion.* NSF I/UCRC Center for the Sustainable Use of Greenhouse Gases Meeting; Columbus, OH; August 18, 2014.
- Davis SC,** Kuzmick E, Lebauer D, Long S. *Potential for converting light to liquid fuel using CAM crops in semi-*

Kloepfer JE and **Davis SC**. *The importance of urban forests: A tree canopy assessment of Athens to quantify ecosystem services*. Ohio University Student Expo; Athens, OH; April 10, 2014. (poster)

- Davis S.C.** Managing bioenergy agro-ecosystems for negative carbon emissions. GCEP Workshop on Energy Supply with Negative Carbon Emissions, Stanford University, June 15, 2012. (invited)
- Davis S.C.** Perspective on water cycling in ecosystem models. Water in Bioenergy Agro-ecosystems Workshop, Gleacher Center, Chicago, June 12-13, 2012. (invited)
- Davis S.C.** Managing bioenergy to mitigate climate change. IDEAS Bioenergy Symposium, UNC Charlotte, March 13-14, 2012. (invited)
- Parton W.J., **Davis S.C.**, Del Grosso S., Adler P.R., DeLucia E.H. Ecological modeling of bioenergy production systems using DayCent. Ecological Society of America 96<sup>th</sup> Annual Meeting, Austin, TX, August 7-12, 2011.
- Black C.K., **Davis S.C.**, Bernacchi C.J., DeLucia E.H. Heterotrophic respiration from soil increases with atmospheric carbon dioxide and temperature (poster). Ecological Society of America 96<sup>th</sup> Annual Meeting, Austin, TX, August 7-12, 2011.
- Duval, B.D., **Davis S.C.**, Parton W.J., Long S.P., DeLucia E.H. Greenhouse gas reduction with conversion from pasture to energy cane production. Ecological Society of America 96<sup>th</sup> Annual Meeting, Austin, TX, August 7-12, 2011.
- Davis S.C.**, Dohleman F.G., Long S.P. Global potential for *Agave* as a biofuel feedstock. Berkeley Bioeconomy Conference, March 24-25, 2011. (invited)
- Davis S.C.** Carbon dynamics: perspectives from ecosystem models. NSF INTERFACE Meeting: How do we improve earth system models? March 2-3, 2011. Captiva Island, FL. (invited)
- Davis S.C.**, Drake J.E., DeLucia E.H. Carbon sequestration in response to rising atmospheric CO<sub>2</sub> in active and abandoned pine plantations of the southeastern US (poster). American Geophysical Union Fall Meeting. December 13-17, 2010. San Francisco, CA.
- Davis S.C.**, W.J. Parton, S.J. Del Grosso, C. Keough, E. Marx, E. H. DeLucia. 2010. Second-generation biofuel feedstocks improve greenhouse gas economics of agriculture in the Mississippi watershed. 2<sup>nd</sup> Pan American Congress on Plants and Bioenergy, August 8-11, 2010, São Pedro, Brazil.
- Davis, S.C.** 2010 Carbon budgets of harvested ecosystems that vary in form and function: from monocultures to diverse deciduous forests. Ecological Society of America, August 1-6, 2010, Pittsburgh, PA, USA.
- Black C.K., **S.C. Davis**, C.J. Bernacchi, E. H. DeLucia. 2010. Response of soil respiration to ecosystem warming and elevated atmospheric carbon dioxide (poster). Ecological Society of America, August 1-6, 2010, Pittsburgh, PA, USA.
- Davis, S.** 2010. Greenhouse gas mitigation potential of bioenergy feedstock crops. Seventh Annual Bioenergy Feedstocks Symposium. Champaign, IL, January 11-12, 2010. (invited)
- Davis, S.**, T. Yannarell, M. Masters, K. Anderson-Teixeira, J. Drake, R. Darmody, R. Mackie, M. David, E. DeLucia. 2009. Restoration of soil organic carbon with cultivation of perennial biofuel crops (poster). American Geophysical Union. December 14-18, 2009. San Francisco, CA.
- Davis, S. C.** Tony C. Yannarell, Evan H. DeLucia. 2009. Carbon sequestration mediated by plant-soil-microbe interactions in tallgrass prairie communities (poster). American Society of Plant Biologists. Honolulu, HI, July 18-22, 2009.
- Kent, A. D., **S. C. Davis**, D. P. Keymer, N. R. Gottel. 2009. Ecology and exploitation of endophytic diazotrophic bacteria in biofuel crops. Energy Biosciences Institute Retreat. Champaign, IL, June 19-22, 2009.

- Yannarell, A. C., **S. C. Davis**, R. I. Mackie. 2009. Assessing the influence of two perennial grass biofuel crops on soil bacterial community composition. ASM, May 17-21, 2009.
- Davis, S. C.** Nitrogen budgets in a carbon-based economy. Department of Plant Biology Colloquium, Urbana, IL, April 3, 2009. (invited)
- Davis, S. C.** Sustainability of nutrient budgets in bioenergy agro-ecosystems. EBI Internal Discussion Seminar Series. March 6, 2009.
- Davis, S. C.** Nitrogen budgets in carbon based economy. Cary Institute of Ecosystem Studies, Millbrook, NY February 19, 2009. (invited)
- Davis, S.C.**, W.J. Parton, F.G. Dohleman, N R. Gottel, C. M. Smith, M. David, A. D. Kent and E.H. DeLucia. 2008. Projections of biofuel growth patterns reveal the potential importance of nitrogen fixation in *Miscanthus* productivity. American Geophysical Union Fall Meeting, San Fransisco, CA, December 2008. (invited)
- Davis, S.C.**, K.J. Anderson-Teixeira, E.H. DeLucia. 2008. Ecology, bioenergy, and life cycle analyses. Ecological Society of America. Milwaukee, WI, August 2008.
- Davis, S.C.**, K.J. Anderson-Teixeira, E.H. DeLucia. 2008. Ecology, bioenergy, and life cycle Analyses (poster). American Society of Plant Biologists Pan American Congress on Plants and BioEnergy. Merida, Mexico, June 2008.
- Davis, S.C.**, A.E. Hessel, R.B. Thomas. 2007. Productivity estimates of nitrogen-saturated forests with different harvesting histories: an adaptation of the PnET-CN model. Ecological Society of America Meeting, San Jose, CA, August 2007
- Davis, S.C.**, A. E. Hessel, R B. Thomas. 2007. Productivity of nitrogen saturated forests in the Central Appalachian region: an adaptation of the PnET-CN model (poster). Eberly College Poster Session, Morgantown, WV, May 2007.
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