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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-

Bioenergy and Sustainability: bridging the gaps. Edited by Mendes Souza G, Victoria RL, Joly CA, Verdade LM., SCOPE, FAPESP. Paris, France.

Davis SC, Ming R, Lebauer D, Long SP. 2015. Toward systems-level analysis of agricultural production from crassulacean acid metabolism (CAM): scaling from cell to commercial production. New Phytologist 208: 66-72.

Yang X, Cushman, Borland, Edwards, Wullschleger, Tuskan, Owen, Griffiths, Smith, De Paoli, Weston, Cottingham, Hartwell, **Davis S** *et al.* 2015. A roadmap for research on crassulacean acid metabolism (CAM) to enhance sustainable food and bioenergy production in a hotter, drier world. New Phytologist 207:491-504.

Cushman JC, **Davis SC**, Yang X, Borland AM. 2015. Development and use of bioenergy feedstocks for semi-arid and arid lands. Journal of Experimental Botany 66: 4177-4193 doi:10.1093/jxb/erv087.

Lin T, Rodriguez L, **Davis SC**, Khanna M, Yogendra S, Grift T, Long S, Ting KC. 2015. Biomass feedstock preprocessing and long-distance transportation logistics. GCB Bioenergy, doi: 10.1111/gcbb.12241.

Hudiburg T, **Davis SC**, Parton WJ, DeLucia EH. 2015. Bioenergy crop greenhouse gas mitigation potential under a range of management practices. GCB Bioenergy 7: 366-374, doi: 10.1111/gcbb.12152.

Bagley JE, **Davis SC**, Georgescu M, Hussain MZ, Miller J, Nesbitt SW, VanLoocke A, Bernacchi CJ. 2014. The biophysical link between climate, water, and vegetation in bioenergy agro-ecosystems. Biomass and Bioenergy 71:187-201.

Davis SC, LeBauer D, Long S. 2014. Light to liquid fuel: theoretical and realized energy conversion efficiency of plants using Crassulacean Acid Metabolism (CAM) in arid conditions. Journal of Experimental Botany (special issue: C4-CAM) 65: 3471-3478.

O'Keefe K, Springer CJ, Grennell J*, **Davis SC.** 2014. Biofuel Development from Cellulosic Feedstocks)5 a)Tlu

Davis SC, AE Hessl, 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 Geophysicmen

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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. (1st

Davis SC. Introduction to World Café on Integrating Food, Energy and Water Systems to Eliminate Waste. 16th 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? 10th 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, 1012. (invited)

Davis S.C. Managing bioenergy to mitigate climate change. IDEAS Bioenergy Symposium, UNC Charlotte,-2 (s)-1 (W)1 (o)6 (r)-1 (k)1 (s)-1 (h)-1 (o)-1 (p)-1 (,)-1 (N)-1 (o)-1 (r)-1 (t)-1 (h)-1 ()-1 (C)-1 (a)-1 (r)-1 (o)-1 (l)-1 (i)-1 (n)-1 (a)-1 (,)-1 (J)-1 (u)-1 (n)-1 (e)-1 ()-1 (1)-1 (2)-1 (-)-1 (1)-1 (3)-1 (,)-1 (2)-1 (0)-1 (1)-1 (2)-1 (.)-1 (()-1 (i)-1 (n)-1 (v)-1

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. Hessl, 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. Hessl, 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.
