Annual Meeting
Hampton Inn and Suites Omaha
Omaha, Nebraska 68102
October 21-22

Multistate Research Project
Annual Station Publications Report

PROJECT NUMBER: NECC-2001 (formerly NECC-1501)

TITLE: Sustainable Farm Energy Production and Use

PROJECT DURATION: 10/01/2020 - 09/30/2025

EXPERIMENT STATION: Maryland

PARTICIPANTS: Drew Schiavone

REPORTING PERIOD**:** October 1, 2023 – September 30, 2024

REPORT DATE: October 18, 2024

PUBLICATIONS:

Dissertations, Theses (*Published*)
None

Books (*Published*)
None

Book Chapters (*Published*)
Ge, X., Tanvir, R.U., Hu, Z., Hassanein, A., **Lansing, S**., Yu, Z., Luo, H., Wang, Z.-W., Wan, C., Yang, L., Khanal, S.K., Li, Y., 2024. Rethinking anaerobic digestion for bioenergy and biopolymers production: Challenges and opportunities (Ch. 1). In Advances in Bioenergy: Conversion of waste and biomass to fuels and polymers, 1st Ed. (Vol 9). Elsevier. ISBN: 9780443295348. https://doi.org/10.1016/bs.aibe.2024.01.001.

Refereed Journal Articles (*Published*)
Schiavone, D., & Montross, M. (2024). Calibrating a heat transfer model for baled switchgrass using heat generation. *Journal of the ASABE*, 67 (*in press*). doi: 10.13031/ja.16055

Extension Publications (*Published*)
Schiavone, D., & Goeringer, P. (2024). Solar energy curriculum. *The University of Maryland Extension*, EC-2024-0710 (*in press*).

Schiavone, D. 2023. Working on Solar Wiring and Fusing. *The University of Maryland Extension*, EB-2023-0676. go.umd.edu/EB-2023-0676

Hassanein, A., Lansing, S., & Delp, D. (2024). A*naerobic Digestion* (EBR-2023- 0686). University of Maryland Extension. go.umd.edu/EBR-2023-0686.

Mahoney, K., Hassanein, A., & Lansing, S. (2024). *A Case Study: Anaerobic Digestion of Dairy Manure and Food Processing Waste with Renewable Energy, Composting and Manure Injection* (FS-2023-0694). University of Maryland Extension. go.umd.edu/FS-2023-0694.

Hassanein, A., Lansing, S., & Delp, D. (2024). *Using Thermochemical Processes to Handle Agricultural Waste* (FS-2023-0688). University of Maryland Extension. go.umd.edu/EBR-2023-0688

Hassanein, A., Lansing, S. & Delp, D. (2024). *Reducing Greenhouse Gas Emissions through Improved Manure Management* (FS-2023-0689). University of Maryland Extension. go.umd.edu/FS-2023-0689.

Felton, G., Lansing, S., Moss, A., & Klavon, K. (2014, updated 2024). *Anaerobic Digestion: Basic Process for Biogas* (FS-994). University of Maryland Extension. go.umd.edu/FS-994.

Popular Articles (*Published*)

Schiavone, D. (2024). Maryland Energy News [4 issues; 12 articles]. *The University of Maryland Extension.* July 15, 2024.

Invited Presentations (*without Proceedings*)

Lansing, S. (2024). Poultry Litter, Dairy, and Food Waste in Anaerobic Digestion systems. USDA-EPA's Inter-Agency Biogas Working Group. (Virtual). October 8, 2024.

Lansing, S. (2024). Anaerobic Digestion in Maryland. Clean Air Task Force (CATF)'s Land Systems Program. (Virtual). October 10, 2024.

Lansing, S. (2024). Water, Energy, Food and Ecosystem (WEFE) Nexus. 3rd Habitat Innovation Conclave 2024. Rampur, Nepal (Virtual). September 16, 2024.

Lansing, S. (2024). Anaerobic Digestion Trends in the United States: Food Waste Co-Digestion, Policy Barriers, and the Circular Economy (Keynote). Progress in Biogas. Stuttgart, Germany. September 2, 2024.

Lansing, S. (2024). Using Offsite Materials in a Farm Digester. USDA-NRCS East National Technology and Support Center (ENTSC) Technical Advisory Board Meeting. Harrisburg, PA. August 27, 2024.

Lansing, S. (2024). Food Systems and Renewable Energy. High School Teachers and REU Materials Engineering Interns. College Park, MD. July 24, 2024.

Lansing, S. (2024). Using Food Waste in Anaerobic Digestion Systems. Maryland Department of Environment Food Waste Prevention Webinar Series. April 6, 2024. Available at: https://www.youtube.com/watch?v=Oc14p-vD6p8

Lansing, S. (2024). Using Offsite Materials in a Farm Digester. Penn State University Anaerobic Digestion Operators Short Course. April 6, 2024.

Lansing, S. (2024). Biophysical Circular Bioeconomy. ASABE Circular Bioeconomy Day. Chicago, IL, March 28, 2024.

Schiavone, D. (2024). Solar energy [panel moderator]. *Poultry Grower Expo*. Princess Anne, MD. April 3, 2024.

Schiavone, D. (2024). UMD agrivoltaic initiatives [discussion panelist]. *Maryland Department of Agriculture (MDA), Agrisolar Summit*. Annapolis, MD. September 26, 2024.

Schiavone, D. (2024). Solar energy extension: Implementing solar on farms [*seminar*]. *Department of Environmental Science and Technology, University of Maryland*, College Park, MD. October 2, 2023.

Presentations (*without Proceedings*)

Lansing, S., Wang, Z., Zhang, X., Ding, L., Lin, Y., Li, Y., Ge, X., Yu, Z., Yu, F., Luo, A. (2023). Systematic Characterization of Variability in MSW Streams to Identify Critical Material Attributes for Fuel Production. Reimagine Waste: WARM Workshop. Raleigh, North Carolina. November 11, 2023.

Schiavone, D. (2024). Exploring solar: What should you know about solar energy? *Community Conversation on Large-Scale Solar*. Wye Mills, MD. August 26, 2024.

Non-Refereed Conference Publications (*Published*)

None

Posters (*without Proceedings*)

Schiavone, D. (2024). Developing energy extension and outreach initiatives in Maryland. Association of Natural Resource Extension Professionals (ANREP), National Conference 2024. Hershey, PA. May 6-8, 2024.

Reports

Schiavone, D., Goeringer, P., & Thilmany, E. (2024). Community-centered solar development engagement: Queen Anne's County, MD report. *The University of Maryland*, (*in press*).

Lansing, S., Dill, S., Everts, K. Hassanein, A., Hendricks, M., MacDonald, J., Moyle, J., Nunn, N., Potts, S., Rhodes, J., Ruppert, D., Semler, J, Thilmany, E., Alves, P.B.R., Bolster, B., Brito, H., Burnstein, E., Delp, D., Franceschi, R., Sanford, M., Wietelman, D., 2023. Maryland Animal Waste Technology Assessment and Strategy Planning. Final Report to the Maryland Department of Agriculture. Available at: https://go.umd.edu/AWTF. 116 pages.

Other Creative Works

Schiavone, D. (2023). How to design and configure code-compliant solar grounding [educational video]. *The University of Maryland Extension*. December 7, 2023; Duration: 21:19. Available at: https://youtu.be/NAxCGSNssYM

Schiavone, D. (2023). How to ensure safe and effective solar grounding [educational video]. *The University of Maryland Extension*. October 1, 2023; Duration: 15:55. Available at: https://youtu.be/_xOUEKehOFE

Annual Meeting
Hampton Inn and Suites Omaha
Omaha, Nebraska 68102
October 21-22

Multistate Research Project
Annual Station Publications Report

PROJECT NUMBER: NECC-2001 (formerly NECC-1501)

TITLE: Sustainable Farm Energy Production and Use

PROJECT DURATION: 10/01/2020 - 09/30/2025

EXPERIMENT STATION: Connecticut

PARTICIPANTS: Xiusheng (Harrison) Yang

REPORTING PERIOD**:** October 1, 2023 – September 30, 2024

REPORT DATE: October 8, 2024

PUBLICATIONS:

Dissertations, Theses (Published):
None

Books (Published):
None

Book Chapters (Published):
None

Refereed Journal Articles (Published):

Singh, A. K., McAvoy, R. J., Bravo-Ureta, B., & Yang, X., 2023. GREENBOX technology III: Financial feasibility for crop production in urban settings. Journal of ASABE 66:1379-1390

Huber, S., Papkov, G., Yang, X., Griffis, J., Jackson, K., Bauer, S., & Singh, A. K., 2024. Comparative analysis of *Lactuca sativa* growth using compost versus conventional soil. *Agricultural Sciences* (in press, accepted for publication in April 2024)

Dunn, R. E., Carroll, P. A., Tsegaye, S., Yang, X., Griffis, J. L., Papkov, G., Bauer, S., & Singh, A. K., 2024. Feasibility of plug production utilizing digestate from Home-Waste to Energy Systems (H-WEF). *Agricultural Sciences* (in press, accepted for publication in April 2024)

Non-Refereed Conference Publications (Published):

Griffith, M., G. Buss, P. Carroll, X. Yang, J. Griffis, B. Rosen, G. Papkov, S. Bauer, K. Jackson and A. Singh, 2024. Evaluating the Feasibility of Lettuce Crop Cultivation with Reclaimed Water Utilizing GREENBOX Technology. ASHS 2024 Conference, Honolulu, Hawaii

Buss, G., X. Yang, G. Papkov, S. Bauer, K. Jackson, A. Singh, P. Carroll, M. Griffith and J. L. Griffis, 2024. The Assessment of Different Growth Mediums for Plug Cultivation in a Controlled Environment. ASHS 2024 Conference, Honolulu, Hawaii

Huber, S., X. Yang, J. Griffis, G. Papkov, S. Bauer, K. Jackson and A. Singh, 2024. Comparative Analysis of Lettuce Growth Using Compost Versus Conventional Soil. ASHS 2024 Conference, Honolulu, Hawaii

Dunn, R., X. Yang, J. Griffis, G. Papkov, S. Bauer, A. Singh, P. Carroll and S. Tsegaye. Feasibility of Plug Production Utilizing Digestate from Home Water-Energy-Food Systems (H-WEF). ASHS 2024 Conference, Honolulu, Hawaii

Griffith, M., G. Buss, P Carroll, X. Yang, J. Griffis, B. Rosen, G. Papkov, S. Bauer, K. Jackson and A. Singh, 2024. A Comparative Study Analyzing Light Lengths for the Growth of Rex Butterhead Lettuce Utilizing GREENBOX Technology. ASHS 2024 Conference, Honolulu, Hawaii

Annual Meeting
Host: University of Nebraska – Lincoln
Meeting location: Omaha, NE
October 21, 2024

Multistate Research Project
Annual Station Accomplishments Report

PROJECT NUMBER: NECC-2001 (formerly NECC-1501)

TITLE: Sustainable Farm Energy Production and Use

PROJECT DURATION: 10/01/2020 - 09/30/2025

EXPERIMENT STATION: New Jersey

PARTICIPANTS: Al Go, Charles Gould, Satish Joshi

REPORTING PERIOD**:** October 1, 2023 – September 30, 2024

REPORT DATE: October 9, 2024

PUBLICATIONS:

Patent Application:
None.

Dissertations, Theses (Published):
Miller, Helen. 2023. *A Decision Support System to Evaluate the Economic Feasibility of Solar Technology on Dairy Farms*. Department of Biosystems and Agricultural Engineering, Michigan State University.

Books (Published):
None.

Book Chapters (Published):
None.

Refereed Journal Articles (Published):
None.

Abstracts of Papers Presented at Professional Meetings (Published):
None.

Symposium Proceedings Articles (Published):
None.

Popular (Trade Journal) Articles (Published):
None.

Presentations (Papers):
None.

Other Creative Works:
Articles released through MSU Extension News:
Agrivoltaics: The best kept secret in Michigan
Agrivoltaic opportunities: Grow crops in solar energy systems
Agrivoltaic opportunities: Grazing livestock in solar energy systems

Agrivoltaic presentation given during the Michigan Public Service Commission May 15th Renewable Energy and Energy Storage Facility Siting meeting. The video recording of Gould's presentation can be found here and a hard copy of his presentation can be found here.

NECC-2001 Annual Meeting
University of Nebraska
Omaha, NE (also Online)
21 October, 2024

Multistate Research Project
Annual Station Publications Report

PROJECT NUMBER:	NECC-2001
TITLE:	Sustainable Farm Energy Production and Use
PROJECT DURATION:	Oct 01 2020 – Sept 30- 2025
EXPERIMENT STATION:	Nebraska
PARTICIPANTS:	F. John Hay
REPORTING PERIOD**:**	Oct 01, 2022– Sept 30, 2024
REPORT DATE:	21 October, 2024

PUBLICATIONS:

Dissertations, Theses (Published)

Books (Published)

[none]

Book Chapters (Published)

[none]

Refereed Journal Articles (Published)

Symposium Proceedings Articles (Published)

Popular Articles (Published)

Presentations (Papers)

Other Creative Works

Workshop Sponsor

Solar Design and Installation – Installers Workshop. February 16-17, 2024. Omaha, Nebraska, Green Tech
Solar Desing and Installation Workshop. August 15-16, 2024. Lincoln, Nebraska.
Solar Agrivoltaic Study Tour – June 20-22, 2024, Denver Colorado
4-H Solar Workshop, June 15, 2014, Otoe County Extension, Syracuse, NE

Workshop Participant

Hay, F. J., 2024. OPPD Sustainability Camp, July 10-14, Metro Community College. Omaha, NE.
Hay, F. J., 2024. Build A Hut Train the Trainer Workshop, Douglas Sarpy County Extension, Omaha, NE
Hay, F. J., 2024. Osher Lifelong Learning Institutes Residential Solar, University of Nebraska Lincoln, Lincoln, NE.
Hay, F. J., 2024. Wired for Wind Lincoln Northeast High School. Lincoln, NE.

Refereed Journal Articles (Pending)

Hay, F., (2024) Nebraska Climate Report (Energy Chapter), In Review

Annual Meeting
Host: University of Nebraska – Lincoln
Meeting location: Omaha, NE
October 21, 2024

Multistate Research Project
Annual Station Accomplishments Report

PROJECT NUMBER: NECC-2001 (formerly NECC-1501)

TITLE: Sustainable Farm Energy Production and Use

PROJECT DURATION: 10/01/2020 - 09/30/2025

EXPERIMENT STATION: New Jersey

PARTICIPANTS: David Specca, A.J. Both

REPORTING PERIOD**:** October 1, 2023 – September 30, 2024

REPORT DATE: October 9, 2024

OBJECTIVES (included as a reminder):

1. Prepare a survey report on the "regional farm energy status and outlook"
2. Identify research, education, and extension opportunities and needs for the topic of farm energy
3. Prepare joint proposals for funded projects in farm energy research, education, and Extension

METHODS (please include your accomplishments where appropriate):

Objective 1: Survey Report
No activities to report.

Objective 2: Identify Opportunities
The Rutgers Agrivoltaics Program continues to investigate funding opportunities for its work on agrivoltaics. The team is interested in partnering with university, Extension, private, and commercial entities when applying for funding opportunities.

Members of the Rutgers Agrivoltaics program have been involved in launching the Regional University Network for Agrivoltaics that focuses on agrivoltaics activities across the Northeast. The most recent meeting was held at Rutgers University on September 30, 2024. This network aims to inform research and Extension personnel at participating institutions, share experiences, and develop outreach materials for stakeholders.

Annual Meeting
Host: University of Nebraska – Lincoln
Meeting location: Omaha, NE
October 21, 2024

Multistate Research Project
Annual Station Accomplishments Report

PROJECT NUMBER: NECC-2001 (formerly NECC-1501)

TITLE: Sustainable Farm Energy Production and Use

PROJECT DURATION: 10/01/2020 - 09/30/2025

EXPERIMENT STATION: New Jersey

PARTICIPANTS: David Specca, A.J. Both

REPORTING PERIOD**:** October 1, 2023 – September 30, 2024

REPORT DATE: October 9, 2024

PUBLICATIONS:

Patent Application:
Singer, J., S.R. Pejman, A.J. Both, D. Specca, and M.J. Grzenda. U.S. Application 18/236,765 filed on August 22, 2023. Title: Plant-safe electrospray water and nutrient delivery system.

Dissertations, Theses (Published):
None.

Books (Published):
None.

Book Chapters (Published):
None.

Refereed Journal Articles (Published):
Sereshkeh, S.R.P., B. Llumiquinga. S. Bapatla, M.J. Grzenda, D. Specca, A.J. Both, and J. Singer. 2024. Staticaponics: Electrospray delivery of nutrients and water to the plant root zone. Journal of Electrostatics 128:103902. https://doi.org/10.1016/j.elstat.2024.103902

Abstracts of Papers Presented at Professional Meetings (Published):
Both, A.J. 2024. High tunnel and hoop house construction. Abstract in the Proceedings of the 69th New Jersey Agricultural Convention and Trade Show. February 7.

Symposium Proceedings Articles (Published):
Both, A.J., B. Bamka, T. Besançon, D.P. Birnie, III, C. Burgher, D. Giménez, S. Guran, M. Kornitas, P. Nitzsche, D. Robinson, W.R. Rucker, E. Schoolman, D. Specca, K. Sullivan, D. Ward, M. Westendorf, and A. Wyenandt. 2024. Lessons learned from three agrivoltaics

installations in New Jersey. Submitted for the Proceedings of the Agrivoltaics World Conference, June 11-13, 2024, Denver, CO.

Popular (Trade Journal) Articles (Published):
None.

Presentations (Papers):
None.

Other Creative Works:
Both, A.J. 2024. Measuring and controlling light. Presentation at Cultivate'24, Columbus, OH. July 13.

Both, A.J., B. Bamka, D.P. Birnie, III, C. Burgher, D. Giménez, S. Guran, R. Mata-Barboza, M. Kornitas, P. Nitzsche, D. Robinson, W.R. Rucker, E. Schoolman, S. Sorrels, D. Specca, K. Sullivan, D. Ward, M. Westendorf, and A. Wyenandt. September 30, 2024. Rutgers Agrivoltaics Program Ribbon-Cutting Ceremony and the Rutgers Animal Farm.

Workshop Sponsor:
Both, A.J. 2024. High tunnels. Hosted a session at the 69th New Jersey Agricultural Convention and Trade Show. February 7.

Both, A.J., B. Bamka, T. Besançon, D.P. Birnie, III, C. Burgher, D. Giménez, S. Guran, M. Kornitas, P. Nitzsche, D. Robinson, W.R. Rucker, E. Schoolman, D. Specca, K. Sullivan, D. Ward, M. Westendorf, and A. Wyenandt. October 23-24, 2024. Hosting of the NECC-2001 Annual Meeting and Tour.

Refereed Journal Articles (Pending):
Menon, R., A.J. Both, F. You. 2024. A life cycle assessment and techno-economic analysis of plant factories. Under review for publication in the *Journal of Cleaner Production*.

NECC-2001 Annual Meeting
University of Nebraska
Omaha, NE (also Online)
21 October, 2024

Multistate Research Project
Annual Station Publications Report

PROJECT NUMBER:	NECC-2001
TITLE:	Sustainable Farm Energy Production and Use
PROJECT DURATION:	Oct 01 2020 – Sept 30- 2025
EXPERIMENT STATION:	Pennsylvania
PARTICIPANTS:	Daniel Ciolkosz, plus Dan Brockett, Matthew Svetz, Joe Conklin, Dana Ollendyke, Tom Beresnyack, Jude Liu, Christine Costello
REPORTING PERIOD**:**	Oct 01, 2022– Sept 30, 2024
REPORT DATE:	21 October, 2024

PUBLICATIONS:

Dissertations, Theses (Published)

Atsyo, S. 2023. Experimental Study of the Variation in Friction Coefficient and Adhesion Force of Corn Stover Particles of Different Anatomical Origins and Moisture Contents. M.S. Thesis. The Pennsylvania State University. University Park, PA.

Falluyi, M. 2024. Evaluation of Hydrothermal Hydrogen Production Efficeincy of Forest-Based Biomass. M.S. Theses. The Pennsylvania State University. University Park, PA.

McVey, T. 2024. Cotreatment-Assisted Anaerobic Digestion of Poultry Manure and Switchgrass. Ph.D. Dissertation. The Pennsylvania State University. University Park, PA.

Books (Published)

[none]

Book Chapters (Published)

[none]

Refereed Journal Articles (Published)

Asif, M., Farid, M. U., Nasir, A., Anjum, S. A., & Ciolkosz, D. E. (2024). Techno-economic analysis of biomass pelletization as a sustainable biofuel with net-zero carbon emissions. Biomass Conversion and Biorefinery, 1-14.

Naziemiec, M., Elias, R., Antheswaran, R., and Ciolkosz, D. (2024). Evaluation of Vacuum Drying on Aroma Quality of Dried Hops. Applied Engineering in Agriculture. 40(4): 475-482. Doi: 10.13031/aea.15971.

Sygula, E., Ciolkosz, D., and Bialowic, A. (2024). The significance of structural components of lignocellulosic biomass on volatile organic compounds presence on biochar - a review. Wood Science and Technology. 58(2024). 1-28. https://doi.org/10.1007/s00226-024-01557-y

Rahman, M. M., Henriksen, U. B., & Ciolkosz, D. (2023). Startup process, safety and risk assessment of biomass gasification for off-grid rural electrification. Scientific reports, 13(1), 21395.

Symposium Proceedings Articles (Published)

Popular Articles (Published)

Ciolkosz, D., Hile,M., Lazarus, W., and Musgrave, G. (2023). Renewable Natural Gas from Manure and Grasses. Business Opportunity Plan for "Sleeping Squirrel Farm". Penn State Extension. The Pennsylvania State University. University Park, PA.

Ciolkosz, D. 2023. Heating Fuel Prices Mixed This Year. Penn State Extension Renewable and Alternative Energy Newsletter (online). https://extension.psu.edu/heating-fuel-prices-mixed-this-year – published 14 Dec. 2023.

Ciolkosz, D. 2023. Anaerobic Digestion and Extension. Penn State Extension Renewable and Alternative Energy Newsletter (online). https://extension.psu.edu/anaerobic-digestion-and-extension – published 05 Dec. 2023.

Ciolkosz, D. 2024. Wood to Gasoline on the Horizon? Penn State Extension Renewable and Alternative Energy Newsletter (online). https://extension.psu.edu/wood-to-gasoline-on-the-horizon - 8 July, 2024

Ciolkosz, D. 2024. MASBio Discussions: Biomass Feedstocks for Bioenergy and Bioproducts. Penn State Extension Renewable and Alternative Energy Newsletter (online). https://extension.psu.edu/masbio-discussions-biomass-feedstocks-for-bioenergy-and-bioproducts - 12 Feb 2024

Ciolkosz, D. 2024. Is it Time for Grass Heat in the Keystone State? Penn State Extension Renewable and Alternative Energy Newsletter (online). https://extension.psu.edu/is-it-time-for-grass-heat-in-the-keystone-state - 16 Aug 2024.

Svetz, M. 2024. Policy Landscape of Anaerobic Digestion. Penn State Extension Article (online). https://extension.psu.edu/policy-landscape-of-anaerobic-digestion

Fathel, S. 2024. Case Study of Switchgrass Bedding and Bioenergy Production. Penn State Extension Article (online). https://extension.psu.edu/case-study-of-switchgrass-bedding-and-bioenergy-production

Fathel, S. 2024. Exploring the Potential of Biochar for Improving Anaerobic Digestion. Penn State Extension Article (online). https://extension.psu.edu/exploring-the-potential-of-biochar-for-improving-anaerobic-digestion

Presentations (Papers)

Ciolkosz, D. 2024. Emerging Trends in Anaerobic Digestion. Presented at 2024 Northeast Agricultural and Biological Engineers Conference (NABEC). 17-18 July, 2024. State College, PA.

Other Creative Works

Workshop Sponsor

Ag Progress Days Energy Showcase. August 13, 2024. Rock Springs, PA. Penn State College of Agricultural Sciences and Penn State Extension. https://agsci.psu.edu/apd

Penn State Biorenewables Symposium. Penn State Center for Biorenewables. 18-19 April, 2024. State College, PA. https://www.huck.psu.edu/institutes-and-centers/center-for-biorenewables/seminars-and-workshops

Biogas Short Course. Penn State Extension. 04-05 April, 2024. State College, PA. https://iee.psu.edu/events/renewable-natural-gas-opportunities-short-course-0

Renewable Energy Academy: Applied Energy Efficiency for Homes and Businesses. Workshop. Penn State Extension. 13 November, 2024. State College, PA. https://extension.psu.edu/renewable-energy-academy-applied-energy-efficiency-for-homes-and-businesses

Large-Scale Solar in Pennsylvania: 2024 General Update. Webinar. Penn State Extension. Recorded 15 Feb., 2024

Agrivoltaics and Large-Scale Solar. Webinar. Recorded 16 Nov, 2024. https://extension.psu.edu/large-scale-solar-in-pennsylvania-2024-general-update

Unlocking the Power of Hydrogen for Energy, Industry, and Agriculture. Webinar. Penn State Extension. Recorded 18 Jan, 2024. https://extension.psu.edu/unlocking-the-power-of-hydrogen-for-energy-industry-and-agriculture

CChange Winter Webinar Series:

- C-CHANGE Grass2Gas: Reimagining Anaerobic Digestion for the Future. Webinar. Penn State Extension. Recorded 14 Nov, 2023. https://extension.psu.edu/c-change-grass2gas-reimagining-anaerobic-digestion-for-the-future
- C-CHANGE Grass2Gas: Profitability of Mixed Feedstock Anaerobic Digesters. Webinar. Penn State Extension. Recorded 12 Dec 2023. https://extension.psu.edu/c-change-grass2gas-profitability-of-mixed-feedstock-anaerobic-digesters
- C-CHANGE Grass2Gas: Life Cycle of Biomass to Biogas - The Bigger Picture. Webinar. Penn State Extension. Recorded 16 Jan, 2024. https://extension.psu.edu/c-change-grass2gas-life-cycle-of-biomass-to-biogas-the-bigger-picture
- Anaerobic Digester Virtual Tour. Webinar. Recorded 24 Jul, 2024. https://extension.psu.edu/anaerobic-digester-tour
- Exploring the Policy Landscape for Livestock Anaerobic Digesters. Webinar. Penn State Extension. Recorded 20 Feb, 2024. https://extension.psu.edu/exploring-the-policy-landscape-for-livestock-anaerobic-digesters

Workshop Participant

Ciolkosz, D. 2024. Solar Power for the Farm. Ag Progress Days Energy Showcase. August 13-15, 2024. Rock Springs, PA.

Ciolkosz, D. 2024. Visions of Grass to Gas, or The C-Change Project. USDA NRCS ENTSC Meeting. 28 August, 2024. Harrisburg, PA.

Ciolkosz, D. 2024. Energy Opportunities for Dairy. Bovine Banter Podcast Series. Penn State Extension. https://extension.psu.edu/bovine-banter

Ciolkosz, D. 2024. Grass to Gas Approaches for Anaerobic Digestion. C-Change Grass to Gas Podcast Series. Penn State Extension. https://extension.psu.edu/c-change-grass2gas

Biogas Extension Panel Discussion. Anaerobic Digestion on the Farm Conference. Nov 4-6, 2023. Ames, IA. https://www.biorenew.iastate.edu/event/2023/anaerobic-digestion-farm-conference

Refereed Journal Articles (Pending)

Tripathi, J. ,Ciolkosz, D. (2024). Characterization of Changes in Torrefied Cellulose and Their Relationship with Glucose Yield: A Mechanistic Study. Cellulose. Accepted pending revisions.

Asif, M., Ciolkosz, D., Farid, M., Ghafoor, A., Nadeem, M., Muhayodin, F., Arslan, C., and Nasir, A. (2024). Modeling Biomass Supply Chains: Uncertainty and its Characterization. In preparation.

Li, Y., Yi, H., Ciolkosz, D., Puri, V., Boney, J. (2024). Measurement of Temporal and Spatial Variations in Pressure in the Pelletization Process. Powder Technology. Submitted for Publication (Manuscript POWTEC-D-24-03728).

Valentin, M., Bialowic, A., Ciolkosz, D. (2024). Influence of Inoculum to Substrate Ratio on Biomethane Production by Anaerobic Digestion of Biomass. Environmental Microbiology Reports. Submitted for publication.

Liu, J., Collins, A., and Ciolkosz, D. (2024). Technology and Equipment for Industrial Hemp Harvesting and in-field Processing. Submitted for publication.