

Taniya RoyChowdhury, Ph.D.

RESEARCH SCIENTIST

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[Google Scholar Citation](#)

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SUMMARY

- Soil Carbon Scientist with 10+ years of field and laboratory research experience in diverse ecosystems including agricultural lands, wetlands, and permafrost regions
- Over 25 published papers focused on soil microbial processes, greenhouse gas dynamics, carbon sequestration and nutrient cycling.
- Expertise in microbiome characterization, biogeochemical quantification integrated across scales from the laboratory to the field, and application for targeted land use management using soil nutrient modeling frameworks
- Strong understanding of terrestrial ecosystem models, microbial process integration and validations therein
- Strong scientific credentials in data analysis covering a range of analytical methods, advanced microbiological and molecular biology techniques, and stable isotope probing applied in diverse soils

WORK EXPERIENCE

Research Scientist, Woodwell Climate, Falmouth, MA

2022 - Present

Role:

- Work across scales from the pedon to the globe applying a mix of field, laboratory, and computer simulation methods.
- Apply and communicate basic insights from soil science and biogeochemistry to the critical applied question of how we can better manage soil to meet sustainable development goals.
- Collaborate with the broader scientific and conservation communities, and private sector companies to provide the knowledge and tools necessary to implement nature-based climate mitigation strategies.

Research Soil Scientist, USDA-ARS, Davis, CA

2020 - 2022

Project: Microbial Nutrient Use Efficiency in Recycled Almond Orchards of California

- **GOAL 1:** Target and decipher soil microbial processes that minimize the burden of inorganic fertilizer in soils and emission of greenhouse gases by manipulating almond orchards
- **GOAL 2:** Determine soil carbon sequestration potentials and microbial nitrogen use efficiency of the native soil microbial community in response to woodchip addition, i.e., recycled tree biomass

- **RESPONSIBILITIES:** Lead design and execution of experiments in the field and laboratory including field sampling and *in situ* measurements and controlled microcosm studies; Data analysis, publication, and outreach with growers
- **TECHNIQUES 1:** Decipher the microbial candidates of interest by combining stable isotope probing and high-throughput sequencing technologies in parallel with targeted qPCR techniques for specific genes to understand the outcome of such *in situ* manipulations
- **TECHNIQUES 2:** Study soil metabolome profiles to link microbial identity with function using state-of-the-art high-resolution mass spectrometry and chromatography
- **EXTERNAL COLLABORATIONS:** Competitive grant for soil metabolomics and metatranscriptomics from the Environmental and Molecular Science Laboratory, U.S. Department of Energy, Richland, WA

Principal Faculty Specialist, University of Maryland, MD **2018 - 2020**
Project: Soil Microbiology & Molecular Biogeochemistry of Wetland Carbon Cycle

- **GOAL 1:** Identify soil microbial candidates that drive successful establishment of ecosystem functioning in natural versus restored wetlands of the Delmarva Bay region, MD
- **GOAL 2:** Determine soil potentials for carbon sequestration, methane production and oxidation
- **RESPONSIBILITIES:** Lead project development, experimental design and execution in the field and laboratory including soil sampling, measurement of *in situ* fluxes of carbon dioxide and methane gasses and laboratory microcosm studies; data analysis, publication, and outreach
- **TECHNIQUES 1:** High-resolution measurements of gas fluxes using gas chromatography
- **TECHNIQUES 2:** Application of Next-Generation Sequencing where I extracted DNA from soil samples subjected to stable isotope probing using ¹³C-labeled acetate and sequenced the “heavy DNA” for the marker gene 16S rRNA to probe the active bacterial community driving methane biogeochemistry
- **TECHNIQUES 3:** Quantification of key metabolites using stable isotope enabled NMR techniques to target microbial pathways involved in methane production
- **EXTERNAL COLLABORATIONS:** Worked closely with climate scientists at NASA to integrate soil gas flux data towards modifications of the DNDC model applied to wetland ecosystems; also worked with soil scientists at the USDA-ARS at Beltsville, MD to establish Eddy Covariance towers in the field for measurements of carbon dioxide and methane fluxes

Postdoctoral Researcher, Pacific Northwest National Laboratory, WA **2015 - 2017**
Project: Soil Microbiomes in Transition

- **GOAL 1:** Develop methods (wet lab and sequence data analysis) to elucidate the metagenome, metatranscriptome, and metabolome in soils from diverse ecosystems and soil properties like texture, carbon content and land use
- **GOAL 2:** Lead hypothesis-driven studies in critical ecosystems like wetlands, permafrost, and drought-affected croplands to understand shifts in the soil microbiome under critical stressors linked to climate change

- **RESPONSIBILITIES:** Lead project development, experimental design and execution in the field and laboratory including soil sampling, measurement of *in situ* fluxes of carbon dioxide and methane gasses and microcosm studies; data analysis, publication, and outreach
- **TECHNIQUES 1:** Application of Next-Generation Sequencing by extracting DNA and RNA from soil samples subjected to diverse climate change scenarios, and sequenced for marker genes, metagenomics and metatranscriptomics
- **TECHNIQUES 2:** Analysis of sequence data using supercomputing facilities and current methods to test hypothesis related to the soil microbiome shifts
- **TECHNIQUES 2:** High-resolution characterization of soil metabolome by combining carbon chemistry data generated by FTICR-Mass Spectrometry with untargeted metabolites by GC-Mass Spectrometry
- **COLLABORATIONS:** Worked in interdisciplinary projects that optimizes use of DOE resources with close collaborations with instrument scientists and data scientists

Postdoctoral Researcher, Oak Ridge National Laboratory, TN 2012 - 2015
Project: Carbon biogeochemistry of Permafrost Ecosystems in the Arctic

- **GOAL 1:** To enable quantitation of greenhouse gas (carbon dioxide and methane) processes in soils in the Alaskan Arctic impacted by permafrost thaw to further improve climate and Earth System Models for future climate scenario predictions
- **RESPONSIBILITIES:** Lead research in method development for characterization of permafrost (frozen soil) properties including soil microbial characteristics and physical (soil texture, water content, carbon and iron content and temperature) thresholds that shift carbon sequestration potentials in these vulnerable ecosystems
- **TECHNIQUES 1:** Use hydraulic drilling to collect intact soil cores and set up temperature controlled anoxic microcosm studies to simulate field conditions in the laboratory
- **TECHNIQUES 2:** High-resolution measurements of gas fluxes using gas chromatography
- **TECHNIQUES 3:** Soil DNA extraction and quantitative PCR for methane oxidation genes
- **COLLABORATIONS:** Worked in interdisciplinary projects that optimizes use of DOE resources with close collaborations with modelers and data scientists

SCIENTIFIC EXPERTISE

Soil Science	Microbiology	Microbial Ecology	Ecosystem Science	Carbon Biogeochemistry
Stable Isotope Biogeochemistry	Agroecosystems	Climate Smart Practices	Land use management	Permafrost
Carbon Sequestration	Methane	Global Change	Nutrient Cycling	Wetlands

TECHNICAL SKILLS

Soil DNA, RNA, Metabolite, Protein isolation	Pure Culture Soil Carbon characterization	Molecular Biology Stable isotope probing	High-Throughput Sequencing (Illumina MiSeq, HiSeq, NextSeq)	PLFA qPCR
Soil physico-chemical characterization Statistics	Gas Chromatography (FID, TCD, ECD) R Programming Language	Liquid Chromatography Analytical Chemistry	Metagenomics, Metatranscriptomics, Metabolomics Sequence data analysis	Python

SOFT SKILLS

Mentoring & Skill Development	Leadership	Public Speaking & Presentations	Organization & Coordination	Team Building
Time Management	Technical Writing	Environmental Stewardship	Excellent Team Player	Ability to adapt to shifting priorities

PROFESSIONAL PREPARATION

A. Education

2012	Ph.D. in Soil Microbiology, The Ohio State University, Advisor: Prof. Richard P. Dick
2005	M.S. in Agricultural Chemistry & Soil Science, University of Calcutta, India Advisor: Prof. Ashim Chowdhury
2003	B.S. in Chemistry (Honors), University of Calcutta, India

B. Other Appointments

2008-2011	Graduate Teaching Associate, Soil Science, The Ohio State University, OH
2007-2008	University Fellow, Soil Science, The Ohio State University, OH
2005-2006	Post-Masters Research Fellow, Microbiology, University of Calcutta, Kolkata, India

C. Workshops and Certification

2019	NSF-sponsored workshop on “Deciphering the Microbiome”
2016	EcoGeo: Workshop on “Introduction to Environmental Omics” at University of Hawaii, sponsored by the US National Science Foundation
2015	Genomic Data Science Certification offered by Coursera
2013	5 th Annual Soil Metagenomics Meeting at Argonne National Laboratory

RESEARCH, SCHOLARLY AND PROFESSIONAL ACTIVITIES

A. Recognition and Awards

2014	American Society of Microbiology Science Teaching Fellowship
2011	Edward J. Ray Travel Award for Scholarship and Service, Council of Graduate Students, The Ohio State University
2011	Young Scientist Travel Award, International conference on “Enzymes in the Environment”, Bad Nauheim, Germany
2010	Rhonda and Paul Sipp Wetland Research Award, The Ohio State University
2007	University Fellowship, The Ohio State University
2005	First in First Class, Gold Medalist, University of Calcutta, India

B. Grants

In review	<p>Department of Energy (DoE) Environmental and Molecular Science Lab User Award for large scale metatranscriptomics and metabolomics study in soils FUNDING AMOUNT EQUIVALENT: TBD PIs: RoyChowdhury, T. and Poret-Peterson, A. (Lead PI) Project title: “Molecular controls of microbial nitrogen use efficiency in agricultural soils” Role: Conceptualization of study, framing experimental design, sample preparation and analysis, data analysis and publication, mentoring</p> <p>Department of Energy (DoE) Environmental and Molecular Science Lab User Award for large scale metatranscriptomics and metabolomics study in soils FUNDING AMOUNT EQUIVALENT: TBD PIs: RoyChowdhury, T. and Rippner, D. (Lead PI) Project title: “Elucidating soil microbial contributions to drought tolerance and root morphology in grapes” Role: Conceptualization of study, framing experimental design, sample preparation and analysis, data analysis and publication, mentoring</p>
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- 2021 Department of Energy (DoE) Environmental and Molecular Science Lab
User Award for exploratory metatranscriptomics and metabolomics study in soils
FUNDING AMOUNT EQUIVALENT: \$75,001
 PIs: **RoyChowdhury, T.** and Poret-Peterson, A. (Lead PI)
 Project title: “Microbial nitrogen use efficiencies and their molecular controls in carbon sequestering soils?”
Role: Conceptualization of study, framing experimental design, sample preparation and analysis, data analysis and publication, mentoring
- 2020 Department of Energy (DoE) Environmental and Molecular Science Lab
User Award for large scale metabolomics study in soils
FUNDING AMOUNT EQUIVALENT: \$54,291
 PIs: **RoyChowdhury, T.** and Yarwood, S.A. (Lead PI)
 Project title: “Does Geochemical Legacy Select for Soil Microbial Members in Establishing Wetland Functions?”
Role: Conceptualization of study, framing experimental design, sample preparation and analysis, data analysis and publication, mentoring
- 2015 Pacific Northwest Laboratory, DoE: **Lab Directed Research Development Fund**
FUNDING AMOUNT: \$1,50,000
 Authors: Diefenderfer, H., Hess, N., Bailey, V.L. Fang, Y, **RoyChowdhury, T.**
 Project title: ‘Cultivation of halophytic plant communities for biofuels: potential for mitigating climate-change effects on greenhouse-gas emissions.’
Role: Contributed by developing specific hypotheses and writing sections of the experimental design targeted to understand impacts of elevated salinity on the rhizosphere microbial community
- 2014 DoE Stanford Synchrotron Radiation Lab **User Award for utilization of EXAFS**
 Authors: Herndon, E.M. (PI), Gu, B., **RoyChowdhury, T.**, Mann, B.
 Project title: “Investigating the role of Fe in organic matter decomposition in Arctic tundra soils.”
Role: Contributed to experimental design and execution
- 2011 School of Environment and Natural Resources, OSU, **SEED Minigrant**
 Authors: **RoyChowdhury** (PI), Dick, R.P.
 Project title: “Engineering controlled incubation chambers for stable isotope labeling of soil methanotrophs using ¹³CH₄.”
- 2010 School of Environment and Natural Resources, The Ohio State University, **SEED Minigrant**

Authors: **RoyChowdhury** (PI), Dick, R.P.

Project title: “Improving redox-probes for *in situ* measurements in wetland site to monitor relationship between redox and methane biogeochemistry.”

C. Scientific Reviewing and Editorial Experience

1. **Guest Editor: Frontiers in Microbiology, 2022**
2. **Ad hoc manuscript reviews for scientific journals, including** *Applied & Environmental Microbiology, Ecological Engineering, Environmental Microbiology, Environmental Science & Technology, Journal of Geophysical Research-Biogeosciences, PLoS One, mBio, Microbial Ecology, mSystems, Soil Biology & Biochemistry, Soil Systems*
3. **Ad hoc reviewer for proposals and panelist (Program in Parenthesis)**
 - 2022: U.S. Department of Energy: FICUS Joint Genome Institute – EMSL Proposal Panel
 - 2020, 2019: U.S. Department of Energy: Joint Genome Institute, New Investigator Community Science Program
 - 2019: U.S. Department of Energy Office of Science, Office of Biological and Environmental Research (Terrestrial Ecosystem Sciences Program 2019)
 - 2018: U.S. Department of Energy Office of Science (Science Graduate Student Research)
 - 2018: U.S. Department of Energy: (Joint Genome Institute, Community Science Program)
 - 2017: U.S. Department of Agriculture (AFRI-NIFA): Climate and Land Use Call)
 - 2016: U.S. National Science Foundation (Arctic Observing Network, 2016)

D. Synergistic activities

Memberships held in professional organizations

International Society of Microbial Ecology; American Society of Microbiology (Maryland and DC Branches); Early Career Professional Committee of the American Geophysical Union; Wetland Soils and Soil Biology Committee, and Francis Clark Lectureship Award Committee of the Soil Science Society of America

Member of the Ecological Society of America

Chair, Social and Communications Committee, ORNL Post-doctoral Association

Conference session organization and editorial roles

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| 2018 | Convener & Chair for Session on: “Toward unifying principles for wetland restoration in light of chemical and microbial ecology.”, American Geophysical Union Fall Meeting |
| 2015 | Convener for Symposium on: “Integrating Omics and Geochemical knowledge to explore soil microbial community and nutrient dynamics.” Soil Science Society of America Annual Meeting |

- 2014 Convener & Chair for Session on: “Integrating Omics and Geochemical knowledge to explore soil microbial community and nutrient dynamics.” American Geophysical Union Fall Meeting
- 2013 Convener & Chair for Session on: “Linking geochemical and microbial effectson organic matter dynamics in cold ecosystems.” American Geophysical Union Fall Meeting
- 2013 Editor: Newsletter of the Association for Women in Soil Science

E. Publications (Mentee/student authorships are marked by ***)

[Google Scholar Citations](#)

- In prep* **RoyChowdhury, T.**, Stratton, K., Hoyt, D., Young, R., Chaevien, C.,***White, K., ***Hamovit, N., Yarwood,S.A. Isotopic probing of wetland soil metabolome. *Frontiers in Soil Science. Special Topic: Methods in Soil Science (INVITED)*
- RoyChowdhury, T.**, Hoyt, D., ***White, K., ***Hamovit, N., Akob, D., Yarwood,S.A. Elucidating the acetotrophic metabolome in soils from a natural and restored wetland using stable isotope probing. *Frontiers in Microbiology*.
- In review* **RoyChowdhury, T.**, Bramer, L.M., McCue, L.A., ***Elder, E.K., Hoyt, D.A., Bailey, V.L. Wetland metatranscriptomes provide insights into key redox biogeochemistry. *Microbiome*.
- Diefenderfer, H.L., Gunn, C.M., Cullinan, V.I., Weishenhorn, P., **RoyChowdhury, T.**, Borde, A.B. Microbially mediated nitrous oxide emissions with sea level rise. *Communications Earth & Environment*
- Shaffer-Nothias-Thompson et al. and the Earth Microbiome Project (500) Consortium. Multi-omics profiling of Earth’s biomes reveals that microbial and metabolite composition are shaped by the environment. *Nature Microbiology*.
- 2022 **RoyChowdhury, T.**, Bramer, L., Brown, J., Kim, Y.-M., Metz, T. O., Hoyt, D., McCue, L.A., Diefenderfer, H.L., Bailey, V.L. Soil metabolomics predict microbial taxa as biomarkers of moisture status in soils from a tidal wetland. *Microorganisms. Special Issue: Advances in Soil Microbiome. In press*
- 2021 Patel, K.F., Fansler, S., Campbell, T., Bond-Lamberty, B., Smith, P.A., **RoyChowdhury, T.**, McCue, L.A., Bailey, V.L. (2021). Soil texture and environmental conditions influence the biogeochemical responses of soils to drought and flooding. *Commun Earth Environ* **2**, 127. <https://doi.org/10.1038/s43247-021-00198-4>
- Metz, T., Xu, C., Couvillion, S., Sontag, R., Isern, N., Maezto, Y., Lindemann, S., **RoyChowdhury, T.**, Zhao, R., Morton, B., Moore, R., Jansson, J., Bailey, V., Mouser, P.J., Romine,M., Frederickson, J. (2021). MetFish: A metabolomics pipeline for studying microbial communities in chemically extreme environments. *mSystems*.

- 2020 **RoyChowdhury, T.**, Berns, E.C., Moon, Ji-Won, Gu, B., Liang, L., Wullschleger, S.D, Graham, D.E. Temporal, Spatial and Temperature controls on methanogenesis and organic carbon mineralization in Arctic soils from high-centered polygons. *Frontiers in Microbiology. Special issue on the Microbial Communities of Polar and Alpine Soils*
- McClure, R., Lee, J.-Y., **RoyChowdhury, T.**, Bottos, E.M., White III, R.A., Kim, Y.-M, Nicora, C.D., Metz, T.O., Hofmockel, K.S., Jansson, J.K., Song, H.-S. Integrated network modeling approach defines key metabolic responses of soil microbiomes to perturbations. *Scientific Reports*. <https://doi.org/10.1038/s41598-020-67878-7>
- 2019 **RoyChowdhury, T.**, Lee, J.-Y., Bottos, E.M., White III, R.A., Bramer, L., Brown, J., Zucker, J., Kim, Young-Mo, Brislawn, C.J., Fansler, S.J., Metz, T.O., McCue, L.A., Callister, S.J., Song, H.-S., Jansson, J.K. Metaphenomic responses of a native prairie soil microbiome to moisture perturbations. *mSystems*. doi: 10.1128/mSystems.00061-19
- ***Vera-Gargallo, B., **RoyChowdhury, T.**, Brown, J., Fansler, S.J., Duran-Viseras, A., Sanchez-Porro, Bailey, V.L., Ventosa, A., Jansson, J.K., Ventosa, A. Spatial distribution of prokaryotic communities in hypersaline soils. *Scientific Reports*.
- 2018 Zheng, J., **RoyChowdhury, T.**, Yang, Z., Gu, B., Wullschleger, S.D, Graham, D.E. Impacts of temperature and soil characteristics on methane production and oxidation in Arctic tundra. *Biogeosciences*. doi: 10.5194/bg-15-6621-2018.
- Carrie, N.D., Burnum-Johnson, K.E., Nakayasu, E.S., Casey, C.P., White III, R.A., **RoyChowdhury, T.**, Kyle, J.E., Kim, Y.-M., Smith, R.D., Metz, T.O., Jansson, J.K., Baker, E.S. The MPLEx protocol for multi-omic analyses of soil samples. *J. Visualized Experiments*. doi: 10.3791/57343
- 2017 **RoyChowdhury, T.**, Bramer, L., Hoyt, D., Kim, Y.-M., Metz, T. O., McCue, L.A., Diefenderfer, H.L., Jansson, J.K., Bailey, V.L. Temporal dynamics of CO₂ and CH₄ loss potentials in response to rapid hydrological shifts in tidal freshwater wetland soils. *Ecological Engineering*. doi.org/10.1016/j.ecoleng.2017.06.041
- Herndon, E.M., AlBashaireh, A., Singer, D., **RoyChowdhury, T.**, Gu, B., Graham, D.E. Influence of iron redox cycling on organo-mineral associations in Arctic tundra soil. *Geochimica et Cosmochimica Acta*. 15: 210-231 <https://doi.org/10.1016/j.gca.2017.02.034>
- J.K., Preheim, S.P., Bailey, K.L., Robeson II, M.S., **RoyChowdhury, T.**, 20 other authors, Elias, D.A. Temporal manipulation of natural microbial communities using in-field bioreactors. *Environmental Science & Technology*. *Environmental Science & Technology*. <https://doi.org/10.1021/acs.est.6b04751>
- 2016 Schädel, C., Bader, M.K.F., Schuur, E.A.G. **RoyChowdhury, T.**, et al. Potential carbon

emissions dominated by carbon dioxide from thawed permafrost soils. *Nature Climate Change*
doi:10.1038/nclimate3054

White III, R.A., Bottos, E., **RoyChowdhury, T.**, Zucker, J.D., Brislawn, C.M., Nicora, C.D., Fansler, S.J., Glaesemann, K.R., Glass, K., Jansson, J.K. Molecule long-read sequencing facilitates assembly and resolves functionally active genomic bins from complex soil metagenomes. *mSystems*. **doi:** 10.1128/mSystems.00045-16

2015 **RoyChowdhury, T.**, Herndon, E., Elias, D.A., Phelps, T.J., Gu, B., Liang, L., Wulschleger, S.D., Graham, D.E. Stoichiometry and temperature sensitivity of methanogenesis and CO₂ production from saturated Polygonal Tundra in Barrow, Alaska. *Global Change Biology* 21: 722-737. **doi:** 10.1111/gcb.12762

Treat, C., Natali, S., Ernakovich, J., Iversen, C., Lupascu, M., McGuire, D., Norby, R., **RoyChowdhury, T.**, Richter A., Šantrůčková, H., Schädel, C., Schuur, E.A., Sloan, V.L., Turetsky, M.R. A pan-Arctic synthesis of CH₄ and CO₂ production from anoxic soil incubations. *Global Change Biology*. 21(7): 2787-2803.
<https://doi.org/10.1111/gcb.12875>

Herndon, E.M., Mann, B.F., **RoyChowdhury, T.**, Wulschleger, S.D., Graham, D.E., Liang, L., Gu, B. Pathways of anaerobic organic matter decomposition in tundra soils from Barrow, Alaska. *JGR Biogeosciences* 120(11): 2345-2359.
<https://doi.org/10.1002/2015JG003147>

Mann, B.F., Hongmei, C., Herndon, E.M., Chu, R.K., Tolic, N., Portier, E.F., **RoyChowdhury, T.**, Callister, S.J., Robinson, E.W., Wulschleger, S.D., Graham, D.E., Liang, L., Gu, B. Indexing soil organic matter degradation using high-resolution mass spectrometry. *PlosOne* 10: e0130557.
<https://doi.org/10.1371/journal.pone.0130557>

2014 Heikoop, J.M., Throckmorton, H.M., Newman, B.D., Perkins, G.B., Iversen, C.M., **RoyChowdhury, T.**, Romanovsky, V., Norby, R.J., Graham, D.E., Wilson, C.J., Wulschleger, S.D. Isotopic identification of soil and permafrost nitrate sources in an Arctic tundra ecosystem. *JGR Biogeosciences* 120(6): 1000-1017. <https://doi.org/10.1002/2014JG002883>

2013 **RoyChowdhury, T.**, W.J. Mitsch and Dick, R.P. Seasonal methanotrophy across a hydrological gradient in a freshwater wetland. *Ecological Engineering* 72: 116-124.
<https://doi.org/10.1016/j.ecoleng.2014.08.015>

2012 **RoyChowdhury, T.** and R.P. Dick. Ecology of aerobic methanotrophs in controlling methane fluxes from wetlands. *Applied Soil Ecology* 65: 8-22.
<https://doi.org/10.1016/j.apsoil.2012.12.014>

RoyChowdhury, T. and R.P. Dick. Standardizing methylation method during phospholipid fatty acid analysis to profile soil microbial communities.

F. Book Chapter

- 2018 Yarwood, S., Bach, E., Busse, M., Callaham, M.A., Smith, J.E., Warren, S., Chang, C.-H., **RoyChowdhury, T.** 2018. Forest and Range Soil Biodiversity. *INVITED*

G. Datasets

- 2021 Patel, K.F., Fansler, S., Campbell, T., Bond-Lamberty, B., Smith, P.A., **RoyChowdhury, T.**, McCue, L.A., Bailey, V.L. Soil texture and environmental conditions influence the biogeochemical responses of soils to drought and flooding. Environmental System Science Data Infrastructure for a Virtual Ecosystem (ESS-DIVE)
- 2018 Zheng, J, **RoyChowdhury, T.**, Herndon, E., Yang, Z., Gu, B., Wullschleger, S., Graham, D.E. Synthesis of soil geochemical characteristics and organic carbon degradation in Arctic polygon tundra Barrow, Alaska. Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA. Data set accessed at doi:10.5440/1440029.
- 2016 **RoyChowdhury, T.** and Graham, D.E. CO₂ and CH₄ production in low-temperature soil incubations from Low and High Centered Polygons, Barrow, Alaska, 2012-2013. Next Generation Ecosystem Experiments Arctic Data Collection, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA. Data set accessed at <http://dx.doi.org/10.5440/1237703>.
- 2016 Zheng, J., **RoyChowdhury, T.** and Graham, D.E. CO₂ and CH₄ production and CH₄ oxidation in low temperature soil incubations from Flat- and High-Centered Polygons, Barrow, Alaska, 2012. <http://dx.doi.org/10.5440/1288688>.
- 2013 **RoyChowdhury, T.**, Herndon, E., Phelps, T.J., Gu, B., Elias, D.A., Liang, L., Graham, D.E. Soil physicochemical characteristics from Low-Centered Polygon in Barrow, Alaska. Next Generation Ecosystems Experiment-Arctic, Oak Ridge National Laboratory (ORNL), Oak Ridge, TN, USA. doi: 10.5440/1109232

H. Invention Disclosure

- 2016 **RoyChowdhury, T.** and Weitz, K.K. (2016) Engineered improvements to Agilent's commercially available G2747A methanizer kit for Agilent 5890/6890/7890 Gas Chromatographs". Office of Technology Deployment and Outreach, Pacific Northwest National Laboratory. Richland, WA.

I. Invited Talks (last 5-years)

- 2021 **RoyChowdhury, T.,** Hoyt, D., ***White, K, Hamovit, N., Akob, D., Yarwood, S.A. Conference Symposium Title: “Coastal Wetland Science in a Changing World: Driving Innovation in Coastal Research”. Society of Wetland Scientists Annual Meeting.
- 2019 **RoyChowdhury, T.,** Bramer, L.M., McCue, L.A., Elder, E.K., Hoyt, D.A., Bailey, V.L. Wetland metatranscriptomes provide insights into key redox biogeochemistry. September, Johns Hopkins University Dept. of Environmental Health and Engineering.
- RoyChowdhury, T.,** Bramer, L.M., McCue, L.A., Elder, E.K., Hoyt, D.A., Bailey, V.L. Wetland metatranscriptomes provide insights into key redox biogeochemistry. September, United States Geological Survey, Reston, VA.
- 2018 **RoyChowdhury, T.,** Bramer, L.M., Brown, J., Elder, E.K., Hoyt, D.A., Bailey, V.L. October. Microbial insights into freshwater tidal wetland redox biogeochemistry. Distinguished Scholar Seminar Series at the Chesapeake Biological Laboratory. University of Maryland Center for Environmental Sciences.
- 2018 **RoyChowdhury, T.,** Bailey, V.L. March. Decoupling redox from moisture as controlling factors of wetland biogeochemistry. School of Environment and Natural Resources. The Ohio State University, Columbus, OH.
- 2017 **RoyChowdhury, T.,** Bailey, V.L., Jansson, J.K. July. Functional response of the soil microbiome to nutrient and moisture perturbations. Gordon Research Seminar on Applied & Environmental Microbiology. MA.
- RoyChowdhury, T.,** Bailey, V.L., Jansson, J.K. Microbial drivers of carbon biogeochemistry in freshwater coastal wetlands. May. Smithsonian Environmental Research Center, MD.
- RoyChowdhury, T.,** Bailey, V.L., Jansson, J.K. Microbial drivers of carbon biogeochemistry in freshwater coastal wetlands. May. The George Washington University, Washington D.C.
- 2016 **RoyChowdhury, T.,** Kim, Y.-M., Nicora, C., Diefenderfer, H., Cliff, J., Metz, T., McCue, L.A., Stegen, J., Jansson, J., Bailey, V.L. Role of the soil microbiome in wetland coupled carbon biogeochemistry: A multi-omics approach. EcoSummit 2016, Montpellier, France.
- 2015 **RoyChowdhury, T.,** Dick, R.P., Graham, D.E., Wullschleger, S.D. A cross-scale understanding of methane biogeochemistry and methanotrophy. October 2015. Washington State University, WA.
- RoyChowdhury, T.,** Dick, R.P., Graham, D.E., Wullschleger, S.D. A cross-scale understanding of methane biogeochemistry and methanotrophy. November 2015. Biogeochemistry and Environmental Sciences and Sustainability (BESS) program. Cornell University, NY.
- RoyChowdhury, T.,** Dick, R.P., Graham, D.E., Wullschleger, S.D., Jansson, J.K. Methane

biogeochemistry at the aquatic-terrestrial interface. December 2015.
Bidhan Chandra Krishi VishwaVidyalaya, Mohanpur, INDIA.

Dick, R.P. and **RoyChowdhury, T.** Optimizing oxidation by methanotrophs to mitigate methane emissions from constructed wetlands and rice paddy soils. 2015.
20th World Congress of Soil Science. Jeju, Korea.

Wullschleger, S.D., **RoyChowdhury, T.**, Curtis, J.B., Graham, D.E., Iversen, C.M., Lewin, K.F., Rogers, A., Sloan, V.L., Smith, L.J., Torn, M.S. 2015. Climate Forcing in the Arctic: Carbon Cycle and Energy Balance Measurements for Improved Process Understanding in High-Latitude Ecosystems. 5th NACP & AmeriFlux Principal Investigators Joint Meeting.

*Contributed conference presentations (Mentee/student authorships are marked by ***)*

2021 Haghnegahdar, M., Hamovit, N.,H., **RoyChowdhury, T.**, Yarwood, S.A., Farquhar, J. A better understanding of atmospheric methane sources and sinks using ¹³CH₃D and ¹²CH₂D₂ clumped isotopes

2020 Diefenderfer, H., Gunn, C., V. Cullinan, Weisenhorn, P., **RoyChowdhury, T.**, Borde, A. Microbially mediated nitrous oxide emissions in tidal freshwater forested wetlands under laboratory-simulated sea level rise conditions. Conference Symposium Title: “Coastal Wetland Science in a Changing World: Driving Innovation in Coastal Research”. Society of Wetland Scientists Annual Meeting, 2021

***Hamovit, N., **RoyChowdhury, T.**, Yarwood, S.A. Assessing the impact of site legacy on methanogen community composition and activity in the soil of a restored freshwater mineral wetland through use of ¹³C-DNA stable isotope probing. American Geophysical Union Fall Meeting, 2020.

2019 Smith, P.A., Patel, K.F., Fansler, S., Campbell, T., Bond-Lamberty, B., **RoyChowdhury, T.**, McCue, L.A., Varga, T., Bailey, V.L. Microbial and molecular insights into how shifts in hydrologic pore connectivity from drought or floods shape soil greenhouse production. Geological Society of America Fall Meeting, 2020

RoyChowdhury, T., Bramer, L.M., Brown, J., ***Elder, E.K., Hoyt, D.A., Bailey, V.L. Microbial insights into freshwater tidal wetlands redox biogeochemistry. Mid-Atlantic Ecological Society of America Spring Meeting, April, 2019 [Oral]

RoyChowdhury, T., Lee, J.-Y., Bottos, E.M., White III, R.A., Bramer, L., Brown, J., Zucker, J., Kim, Young-Mo, Brislawn, C.J., Fansler, S.J., Metz, T.O., McCue, L.A., Callister, S.J., Song, H.-S., Jansson, J.K. A multi-omic approach to decipher soil microbiome response to perturbation. ASM DC Branch Meeting. March, 2019 [Poster]

Bailey, V.L., Smith, A.P., **RoyChowdhury, T.**, Fansler, S.J., Yan, Z., Liu, C., Tfaily, M.,

Bond-Lamberty, B. The Nexus of Water, Physical Structure, and Microbial Communities in Soil: Unpredictable Soil Biogeochemistry in a Changing Earth System. Soil Science Society of America Meeting, 2019. [Oral]

2018 **RoyChowdhury, T.**, Lee, J.-Y., Bottos, E.M., White III, R.A., Bramer, L., Brown, J., Zucker, J., Kim, Young-Mo, Brislawn, C.J., Fansler, S.J., Metz, T.O., McCue, L.A., Callister, S.J., Song, H.-S., Jansson, J.K. A multi-omic approach to decipher soil microbiome response to perturbation. ASM Conference on Rapid Applied Microbial Next-Generation Sequencing and Bioinformatic Pipelines. September, 2018. [Poster]

RoyChowdhury, T., Bramer, L.M., Brown, J., Elder, E.K., Hoyt, D.A., Bailey, V.L. Microbial insights into freshwater tidal wetlands redox biogeochemistry. AGU Fall Meeting, December, 2018. [Oral]

Smith, A.P., **RoyChowdhury, T.**, Fansler, S., Bond-Lamberty, B., Tfaily, M., Bramer, L., McCue, L.A., Bailey, V.L. Metabolomic and metagenomics insights into drought- and flood-induced greenhouse gas emissions in soils. AGU Fall Meeting, 2018. [Oral]

2017 **RoyChowdhury, T.**, Bramer, L., Hoyt, D., Kim, Y.-M., Metz, T. O., McCue, L.A., Diefenderfer, H.L., Jansson, J.K., Bailey, V.L. Microbial processes driving anaerobic carbon transformations in response to hydrological shifts in tidal wetland soils. Multi-omics for microbiomes Conference, September 2017. [Poster]

RoyChowdhury, T., Bottos, E.M., White III, R.A., Bramer, L., Zucker, J., Kim, Young-Mo, Brislawn, C.M., Fansler, S.J., Metz, T.O., Jansson, J.K. Functional response of the soil microbiome to perturbations. Gordon Research Conference – Applied Environmental Microbiology. July 2017. [Poster]

RoyChowdhury, T., McCue, L.A., Fansler, S.J., Bailey, V.L. August 2016. Still counting the uncountable: effect of soil volume size on bacterial diversity estimates. International Society of Microbial Ecology 16, Montreal, Canada. [Oral]

2016 **RoyChowdhury, T.**, Bottos, E., White III, R.A., Brislawn, C., M., Zucker, J.D., Fansler, S.J., Nicora, C.D., Kim, Y.M., Metz, T., McCue, L.A., Jansson, J. August 2016. Exploiting multi-omics to decipher soil microbiome responses to perturbations. International Society of Microbial Ecology 16, Montreal, Canada. [Poster]