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RESEARCH SCIENTIST II

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I. PROFESSIONAL PREPARATION

A. Education

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

B. Appointments

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| 2022-Present | Research Scientist II , Woodwell Climate Research Center, Falmouth, MA |
| 2020-2022 | Research Soil Scientist , USDA-Agricultural Research Service, Davis, CA |
| 2018-2020 | Principal Faculty Specialist , Soil Microbiology & Molecular Biogeochemistry |
| 2015-2017 | Postdoctoral Researcher , Soil Microbiology, Pacific Northwest National Laboratory, WA |
| 2012-2015 | Postdoctoral Researcher , Microbial Ecology & Physiology, Oak Ridge National Laboratory, TN |
| 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, India |

II. ACADEMIC PRIZES AND HONORS

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| 2023 | Recipient of Christiana Figueres Prize at Applied Microbiology International 2023 . The prize is awarded to a scientist who uses microbiology to help further our understanding of climate change or directly in solutions thereof. |
| 2023 | Travel Award to attend Agricultural Microbiomes Thinkathon: A community-based Interactive Workshop organized by the American Phytopathological Society (August) |
| 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 |

III. PUBLICATIONS (Mentee authorships are marked by ***)

In Review **RoyChowdhury, T.**, Rubin, R., ***Jacques, M., Mullen, A., Martin, A., Carroll, M., Oldfield, E., Sanderman, J. Cover crops and full-profile soil carbon stocks: Observations from commercial trials. *Environmental Research Letters*.

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*.

2025 ***Hamovit, N., RoyChowdhury, T., Akob, D.M., Zhang, X., McCarty, G., Yarwood, S.A. Comparative assessment of a restored and natural wetland using ¹³C-DNA SIP reveals a higher potential for methane production in the restored wetland. *Applied Environmental Microbiology*.

2024 Oldfield, E.E., Lavalley, J.M., and others. Greenhouse gas mitigation on croplands: clarifying the debate on knowns, unknowns and risks to move forward with effective management interventions. *Carbon Management*, 15(1), 2365896.

Li, Y., Xue, Y., **RoyChowdhury, T.**, Graham, D.E., Tringe, S.G., Jansson, J.K., Tas, N. Genomic insights into redox-driven microbial processes for carbon decomposition in thawing arctic soils and permafrost. *mSphere*, e00259-24.

2022 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. Standardized multi-omics of Earth's microbiomes reveals microbial and metabolite diversity. *Nature Microbiology*, 7, 2128-2150.

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*, 10 (8), 1653

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., Maezato, 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., Wulfschleger, 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., Wulfschlegel, 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 facilitate 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., Wulfschlegel, 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. *Journal of Microbiological Methods* 88(22): 285–291. doi: 10.1016/j.mimet.2011.12.008.

A. Book Chapter

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

B. 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., Wulfschleger, 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**

C. 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.

IV. EDUCATIONAL AND OUTREACH ACTIVITIES

Spring 2018, 2019	Presenter	USA Science and Engineering Festival, Washington, D.C.
Spring 2017	Facilitator	Graduate Networking Session for Interns at the Pacific Northwest National Laboratory
Summer 2017	Mentor	Minority Serving Institutions Partnership Program at Pacific Northwest National Laboratory
Summer & Winter 2017	Presenter	After-school STEM Workshop in Soil Science, Sagebrush Elementary School, Richland, WA
Summer 2014	Mentor	Science Undergraduate Laboratory Internship program at Oak Ridge National Laboratory
Fall 2014	Facilitator	Led TN-SCORE workshop for STEM undergraduates
Spring 2013	Facilitator	"Science Saturdays" organized by Oak Ridge National Laboratory in association with Oak Ridge and Associated Universities