# Verity G. Salmon, PhD

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## EDUCATION

2011- 2016 PhD in Botany. Biology Department, University of Florida, College of Liberal Arts and Sciences
2005-2009 Bachelor of Arts in Biology (magna cum laude). Boston University, College of Arts and Sciences

## RELEVANT SCIENTIFIC EXPERIENCE

### Summer 2016- present • Postdoctoral researcher, Oak Ridge National Lab (ORNL, Oak Ridge, TN)

Postdoctoral scientist on Department of Energy's Next Generation Ecosystem Experiment- Arctic project supervised by Dr. Colleen Iversen. This ongoing research focuses on belowground plant traits, symbiotic nitrogen fixation by alder shrubs, and the temperature sensitivity of plant uptake of nitrogen. I am responsible for proposing novel arctic research, developing protocols, coordinating and executing field campaigns, managing sample processing in the laboratory, statistical analysis of data, and writing scientific publications. This project's overarching goal is to integrate belowground plant dynamics into models and improve the representation of arctic ecosystems in earth system models. My position therefore also involves collaboration with the Energy Exascale Earth System Model (E3SM) team at ORNL.

### Fall 2011- Summer 2016 • Doctoral research, University of Florida (Gainesville, FL)

Doctoral Research supervised by Dr. Edward Schuur. This research was based around on a manipulative field experiment in interior Alaska. During growing seasons, I managed scientific observations of the warming experiment and conducted self-directed research to quantify the impact of permafrost thaw on nitrogen cycling in plants and soils. I secured partial funding through self-initiated partnership with an education and outreach center at Denali National Park. Graduate assistant responsibilities at the University of Florida included teaching undergraduate Plant Ecology and Introductory Biology lab courses.

### Fall 2009- Fall 2011 • Research Assistant, Marine Biological Laboratory (Woods Hole, MA)

Technician for Dr. Gaius Shaver at Ecosystems Center. In this position I was based at Toolik Lake LTER site in the summer months and carried out data collection and logistics coordination for a variety of researchers funded through the National Science Foundation. Research focused on the effects of nitrogen and phosphorus fertilization on tundra ecosystems. Winter months were spent processing soil and leaf samples, data quality control and archival as well as performing data analysis with an interdisciplinary team of scientists.

### Fall 2008- Fall 2009 • Undergraduate Thesis for Distinction, Boston University (Boston, MA)

Conducted research under the supervision of Dr. Adrien Finzi on the impact tannins from Eastern Hemlock (*Tsuga canadensis*) have on nitrogen cycling within temperate forest soils.

## RESEARCH TOOLS

Use of stable isotopes (tracers & natural abundance) for mechanistic understanding of the nitrogen cycle
Implementation and interpretation of manipulative field experiments
Knowledgeable user of R programming language (automated data processing, graphing, and statistics)
Leading remote Alaskan field campaigns while maintaining the safety and well being of all team members
Experience with manipulating large, multiyear datasets for analysis and publication
Production, documentation, and archival of data for public access
Interdisciplinary research with scientists from academia, national laboratories, and national park system

## SCIENCE COORDINATION & COMMUNICATION

Annual participation in scientific meetings as attendee, presenter, and speaker (American Geophysical Union annual meeting, Ecological Society of America, Permafrost Carbon Network, Department of Energy Earth System Sciences Principle Investigator Meeting)

Reviewer for *Ecology, Global Change Biology, Functional Ecology, Journal of Geophysical Research: Biogeosciences*, *New Phytologist*, *PLOS One*, and *Biogeochemistry.*

AGU Research Spotlight by A. Sidder. "How Nitrogen contributes to permafrost carbon dynamics."

Participant in 2018 Alan Alda Flame Challenge: What is Climate? ORNL video submission

Reviewer for DOE Environmental System Science Funding Opportunity (DE-FOA-0001855, May 2018)

Public seminar entitled "Beneath our Feet: Plants & Soils on the Seward Peninsula." Strait Science Series at University of Alaska Northwest Campus, Nome, AK (July 2018)

Author of public report for Mary's Igloo Native Corporation summarizing research on native land (Feb 2018)

Guest lecturer for Montclair State University, graduate level course (March 2017, April 2018)

Author of report materials for DOE Quarterly and Annual project updates (Dec 2016- present)

Breakout session coordinator at DOE NGEE Arctic all hands meeting (Dec 2017)

Breakout session coordinator at DOE Environmental System Science meeting (April 2017)

Author of Denali National Park Factsheet on carbon in permafrost (March 2016)

## FELLOWSHIPS AND AWARDS

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|---|---|
| 2016 | Department of Energy Science Student Travel Fellowship ($500) |
| 2015 | University of Florida, Graduate Student Council Travel Grant ($350) |
| 2015 | University of Florida, College of Liberal Arts and Sciences Travel Grant ($300) |
| 2015 | Department of Energy Science Student Travel Fellowship ($500) |
| 2014 | University of Florida, College of Liberal Arts and Sciences Travel Grant ($300) |
| 2014 | Permafrost Young Researchers Network Travel Grant ($500) |
| 2013 | Discover Denali Research Fellowship through Denali National Park ($6,000) |
| 2011 | Graduate Student Fellowship, University of Florida (tuition and stipend) |
| 2009 | Biology Department Honors Thesis Work for Distinction, Boston University |
| 2008-2009 | Funded Research Opportunity Grants, UROP, Boston University ($1,000) |

## MANUSCRIPTS IN PROGRESS

**Salmon VG**, et al. *Manuscript submission anticipated February 2019.* Impact of alder on nitrogen cycling across a tundra shrub landscape.

**Salmon VG**, et al. *Manuscript submission anticipated May 2019.* Beneath our feet: belowground plant traits within tundra plant communities.

## PUBLICATIONS (google scholar, orcid.org/0000-0002-2188-551X)

van Gestel NC, Natali SM, Andriuzzi WS, Chapin FS, Ludwig S, Moore JC, Pressler Y, **Salmon VG**, Schuur EAG, Simpson R, Wall DH. (Book publication May 2019). Long-term warming research in high-latitude ecosystems: Responses from polar ecosystems and implications for future climate. In J. E. Mohan (Ed.), Ecosystem Consequences of Soil Warming: Microbes, Vegetation, Fauna and Soil Biogeochemistry. Elsevier Science Ltd.

Mauritz M, Celis G, Ebert C, Hutchings J, Ledman J, Natali SM, Pegoraro E, **Salmon VG**, Schädel C , Taylor M, Schuur EAG. (2018). Using Stable Carbon Isotopes of Seasonal Ecosystem Respiration to Determine Permafrost Carbon Loss. Journal of Geophysical Research: Biogeosciences. https://doi.org/10.1029/2018JG004619

Schädel C, Koven C, Lawrence DM, Celis G, Garnello AJ, Hutchings J, Mauritz M, Natali SM, Pegoraro E, Rodenhizer H, **Salmon VG**, Taylor M, Webb EE, Wieder WR, Schuur EAG (2018). Divergent patterns of experimental and model-derived permafrost ecosystem carbon dynamics in response to Arctic warming. Environmental Research Letters. https://doi.org/10.1088/1748-9326/aae0ff

**Salmon VG**, Schädel C, Bracho R, Pegoraro E, Celis G, Mauritz M, Mack MC, Schuur EAG (2018). Adding depth to our understanding of nitrogen dynamics in permafrost soils. Journal of Geophysical Research: Biogeosciences. https://doi.org/10.1029/2018JG004518

Liang J, Xia J, Shi Z, Jiang L, Ma S, Lu X, Mauritz M, Natali SM, Pegoraro E, Penton CR, Plaza C, **Salmon VG**, Celis G, Cole JR, Konstantinidis KT, Tiedje JM, Zhou J, Schuur EAG, and Luo Y (2018). Biotic responses buffer warming-induced soil organic carbon loss in Arctic tundra. Global Change Biology:0–3. https://doi.org/10.1111/gcb.14325

Celis G, Mauritz M, Bracho R, **Salmon VG**, Webb EE, Hutchings JA, Natali SM, Schädel C, Crummer KG, Schuur EAG (2017) .Tundra is a consistent source of $CO_2$ at a site with progressive permafrost thaw during 6 years of chamber and eddy covariance measurements. Journal of Geophysical Research: Biogeosciences, 122, 1471–1485. http://dx.doi.org/10.1002/2016JG003671

Mauritz M, Bracho R, Celis G, Hutchings JA, Natali SM, Pegoraro E, **Salmon VG**, Schädel C, Webb EE, Schuur EAG (2017). Non-linear $CO_2$ flux response to seven years of experimentally induced permafrost thaw. Global Change Biology. https://dx.doi.org/10.1111/gcb.13661

**Salmon VG**, Soucy P, Mauritz M, Celis G, Natali SM, Mack MC, Schuur EAG (2016). Nitrogen availability increases in a tundra ecosystem during five years of experimental permafrost thaw. Global Change Biology, 22, 1927–1941. https://dx.doi.org/10.1111/gcb.13204

Deane-Coe KK, Mauritz M, Celis G, **Salmon VG**, Crummer KG, Natali SM, Schuur EAG (2015). Experimental Warming Alters Productivity and Isotopic Signatures of Tundra Mosses. Ecosystems, 18, 1070–1082. https://doi.org/10.1007/s10021-015-9884-7

Natali SM, Schuur EAG, Mauritz M, Schade JD, Celis G, Crummer KG, Johnston C, Krapek J, Pegoraro E, **Salmon VG**, Webb EE (2015). Permafrost thaw and soil moisture driving $CO_2$ and $CH_4$ release from upland tundra. Journal of Geophysical Research: Biogeosciences, 120, 525–537. https://doi.org/10.1002/2014JG002872

Shaver GR, Rastetter EB, **Salmon VG**, Street LE, van de Weg MJ, Rocha A, van Wijk MT, Williams M (2013). Pan-Arctic modelling of net ecosystem exchange of $CO_2$. Philosophical Transactions of the Royal Society B: Biological Sciences, 368, 20120485–20120485. https://doi.org/10.1098/rstb.2012.0485

van de Weg MJ, Shaver GR, **Salmon VG** (2013). Contrasting effects of long term versus short-term nitrogen addition on photosynthesis and respiration in the Arctic. Plant Ecology, 214–1286. https://doi.org/10.1007/s11258-013-0250-6

## SHARED DATA PRODUCTS

**Salmon VG**, Iversen CM, 2019. NGEE Arctic Plant Traits: Nodule Biomass, Kougarok Road Mile Marker 64, Seward Peninsula, Alaska, 2017. Next Generation Ecosystem Experiments Arctic Data Collection, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA. Dataset access at [*DOI pending*].

**Salmon VG**, Iversen CM, 2019. NGEE Arctic Plant Traits: Nitrogen fixation, Kougarok Road Mile Marker 64, Seward Peninsula, Alaska, 2017-2018. Next Generation Ecosystem Experiments Arctic Data Collection, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA. Dataset access at [*DOI pending*].

**Salmon VG,** Iversen CM, Breen A, Childs JC, Vander Stel H, Wullschleger S, 2019. NGEE Arctic Plant Traits: Soil Nutrient Availability, Seward Peninsula, Alaska, beginning 2016. Next Generation Ecosystem Experiments Arctic Data Collection, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA. Dataset access at http://dx.doi.org/10.5440/1346201

**Salmon VG**, Schuur EAG. 2018. Eight Mile Lake Research Watershed, Carbon in Permafrost Experimental Heating Research (CiPEHR): Off Plot Soil Incubation by Depth I - Soil Properties and Final Microbial Biomass 2013-2014. http://dx.doi.org/10.6073/pasta/8c8a28a8d8ed4f443cb75ed00aabd647

**Salmon VG**, Schuur EAG. 2018. Eight Mile Lake Research Watershed, Carbon in Permafrost Experimental Heating Research (CiPEHR): Off Plot Soil Incubation by Depth II - Soil $CO_2$ Fluxes 2013-2014. http://dx.doi.org/10.6073/pasta/42154f55124b9774632094ff6242f7d3

Salmon VG, Schuur EAG. 2018. Eight Mile Lake Research Watershed, Carbon in Permafrost Experimental Heating Research (CiPEHR): Off Plot Soil Incubation by Depth III - Soil Extracts 2013-2014. Bonanza Creek LTER data archives. http://dx.doi.org/10.6073/pasta/eef7cf20be08bfc20f1ea0540e2a1431

Salmon VG, Iversen CM, Childs JC, Vander Stel H, 2017. NGEE Arctic Plant Traits: Soil Cores, Kougarok Road Mile Marker 64, Seward Peninsula, Alaska, 2016. Next Generation Ecosystem Experiments Arctic Data Collection, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA. Dataset access at http://dx.doi.org/10.5440/1346200

Salmon VG, Iversen CM, Breen A, Vander Stel H, Childs J. 2017. NGEE Arctic Plant Traits: Plant Biomass and Traits, Kougarok Road Mile Marker 64, Seward Peninsula, Alaska, beginning 2016. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset access at http://dx.doi.org/10.5440/1346199

Salmon VG, Iversen CM, Vander Stel H, Breen A, Wullschleger S. 2017. NGEE Arctic Plant Traits: Vegetation Plot Locations, Ecotypes, and Photos, Kougarok Road Mile Marker 64, Seward Peninsula, Alaska, 2016. Next Generation Ecosystem Experiments Arctic Data Collection, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA. Data access at http://dx.doi.org/10.5440/1346196

Salmon VG, Iversen CM, Vander Stel H, Breen A, Wullschleger S. 2017. NGEE Arctic Plant Traits: Soil Temperature and Moisture, Kougarok Road Mile Marker 64, Seward Peninsula, Alaska, beginning 2016. Next Generation Ecosystem Experiments Arctic Data Collection, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA. Data access at http://dx.doi.org/10.5440/1346195

Salmon VG, Iversen CM, Breen A, Vander Stel H, Wullschleger S. 2017. NGEE Arctic Plant Traits: Soil Depth, Kougarok Road Mile Marker 64, Seward Peninsula, Alaska, beginning 2016. Next Generation Ecosystem Experiments Arctic Data Collection, Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, Oak Ridge, Tennessee, USA. Data access at http://dx.doi.org/10.5440/1346198

Breen A, Iversen CM, Salmon VG, Vander Stel H, Wullschleger S. 2016. NGEE Arctic Plant Traits: Plant Community Composition, Kougarok Road Mile Marker 64, Seward Peninsula, Alaska, 2016. Next Generation Ecosystem Experiments Arctic Data Collection, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tennessee, USA. Dataset access at https://doi.org/10.5440/1465967

Salmon VG, Natali S, Schuur EAG. Six years of plot level NDVI from EML Site in Healy, AK. 2015. Bonanza Creek LTER data archives. http://dx.doi.org/10.6073/pasta/3ff42c06e62ce1bad1df8c2745429fd8

Salmon VG, Natali S, Schuur EAG. Five years of aboveground biomass from the CiPEHR project. 2014. Bonanza Creek LTER data archives. http://dx.doi.org/10.6073/pasta/4446e37f339ffdac6912030d83e2f61f

## REFERENCES

*Available upon request*