

Colleen M. Iversen · Curriculum Vitae

Oak Ridge National Laboratory · Climate Change Science Institute · Environmental Sciences Division ·
Oak Ridge · TN · 37831 · Phone: (865) 241-3961 · iversencm@ornl.gov · <http://www.ornl.gov/~ciz>

Research interests

I am an ecosystem ecologist who uses a variety of field and laboratory techniques to understand and predict how ecosystems are shaped by climatic change. Specifically, I work at the root-soil interface to investigate how atmospheric and climatic change alters belowground carbon and nutrient cycling.

Education

- 2003 – 2008** **Ph.D., University of Tennessee, Knoxville**
Ecology and Evolutionary Biology
Co-advisors: Richard J. Norby and Aimée T. Classen
Dissertation: Forest responses to rising atmospheric CO₂: Causes and consequences of increased fine-root production in a CO₂-enriched sweetgum plantation
- 2001 – 2004** **M.S., University of Notre Dame**
Biological Sciences
Advisor: Scott D. Bridgham
Thesis: Scaling community nitrogen use- and uptake efficiencies in response to increased nutrient availability in peatlands
- 1997 – 2001** **B.S. (*cum laude*), Hope College**
Biological and Environmental Sciences

Appointments

- 2012 – Present** **Staff Scientist**
Climate Change Science Institute and
Environmental Sciences Division
Oak Ridge National Laboratory
- 2010 – 2012** **Associate Staff Scientist**
Environmental Sciences Division
Oak Ridge National Laboratory
- 2008 – 2010** **Post-doctoral research associate**
Environmental Sciences Division
Oak Ridge National Laboratory
- 2007 – 2008** **Marvin L. Wesely Graduate Research Environmental Fellow**
Global Change Education Program
Department of Energy

Publications

2015

Iversen CM, Sloan VL, Sullivan PF, Euskirchen ES, McGuire AD, Norby RJ, Walker AP, Warren JM, Wullschleger SD. 2015. The unseen iceberg: Plant roots in arctic tundra (Tansley Review). *New Phytologist* 205: 34-58.

Warren, JM, Hanson PJ, Iversen CM, Kumar J, Walker AP, Wullschleger SD. 2015. Root structural and functional dynamics in terrestrial biosphere models – Evaluation and recommendations (Tansley Review). *New Phytologist* 205: 59-78.

2014

De Kauwe MG, Medlyn BE, Zaehle S, Walker AP, Dietze MC, Wang Y-P, Luo Y, Jain AK, El-Masri B, Hickler T, Wårlind D, Weng E, Parton WJ, Thornton PE, Wang S, Prentice IC, Asao S, Smith B, McCarthy HR, Iversen CM, Hanson PJ, Warren JM, Oren R, Norby RJ. 2014. Where does the carbon go? A model-data intercomparison of vegetation carbon allocation and turnover processes at two temperate forest free-air CO₂ enrichment sites. *New Phytologist* 203: 883-899.

Iversen CM. 2014. Using root form to improve our understanding of root function. *New Phytologist* 203: 707-709.

Iversen CM, Norby RJ. 2014. Terrestrial plant productivity and carbon allocation in a changing climate. In Freedman B, ed. Handbook of Global Environmental Pollution: Global Environmental Change, New York, NY: Springer, pp. 297-316.

Tfaily MM, Cooper WT, Kostka J, Chanton PR, Schadt CW, Hanson PJ, Iversen CM, Chanton JP. 2014. Organic matter transformation in the peat column at Marcell Experimental Forest: Humification and vertical stratification. *Journal of Geophysical Research: Biogeosciences* 119: 661-675.

Walker AP, Hanson PJ, De Kauwe MG, Medlyn BE, Zaehle S, Asao S, Dietze M, Hickler T, Huntingford C, Iversen CM, Jain A, Lomas M, Luo YQ, McCarthy H, Parton WJ, Prentice IC, Thornton PE, Wang SS, Wang YP, Warlind D, Weng ES, Warren, JM, Woodward FI, Oren R, Norby RJ. Comprehensive ecosystem model-data synthesis using multiple data sets at two temperate forest free-air CO₂ enrichment experiments: Model performance at ambient CO₂ concentration. *Journal of Geophysical Research-Biogeosciences* 119: 937-964.

Wullschleger SD, Epstein HE, Box EO, Euskirchen ES, Goswami S, Iversen CM, Kattge J, Norby RJ, van Bodegom PM, Xu X. 2014. Plant functional types in Earth System Models: Past experiences and future directions for application of dynamic vegetation models in high-latitude ecosystems. *Annals of Botany* 114: 1-16.

Zaehle S, Medlyn BE, De Kauwe NG, Walker AP, Dietze MC, Hickler T, Luo Y, Wang Y-P, El-Masri B, Thornton P, Jain A, Wang S, Warlind D, Weng E, Parton W, Iversen CM, Gallet-Budynek A, McCarthy H, Finzi A, Hanson PJ, Prentice IC, Oren R, Norby RJ. 2014. Evaluation of 11 terrestrial carbon–nitrogen cycle models against observations from two temperate Free-Air CO₂ Enrichment studies. *New Phytologist* 202: 803–822.

2013

Lynch DJ, Matamala R, Iversen CM, Norby RJ, Gonzalez-Meler MA. 2013. Stored carbon partly fuels fine-root respiration but is not used for production of new fine roots. *New Phytologist* 199: 420-430.

2012

Iversen CM, Keller JK, Garten CT, Norby RJ. 2012. Soil carbon and nitrogen cycling and storage throughout the soil profile in a sweetgum plantation after 11 years of CO₂-enrichment. **Global Change Biology** 18: 1684-1697. (Faculty of 1000 article recommendation, <http://f1000.com/714597877>).

Iversen CM, Murphy MT, Allen MF, Childs J, Eissenstat DM, Lilleskov EA, Sarjala TM, Sloan VL, Sullivan PF. 2012. Advancing the use of minirhizotrons in wetlands. **Plant and Soil** 352: 23-39.

Warren JM, Iversen CM, Garten CT, Norby RJ, Childs J, Brice DJ, Evans RM, Gu L, Thornton PE, Weston DJ. 2012. Timing and magnitude of carbon partitioning through a young loblolly pine (*Pinus taeda* L.) stand using ¹³C labeling and shade treatments. **Tree Physiology** 32: 799-813.

McMurtrie RE, Iversen CM, Dewar RC, Medlyn BE, Näsholm T, Pepper DA, Norby RJ. 2012. Plant root distributions and nitrogen uptake predicted by a hypothesis of optimal root foraging. **Ecology and Evolution** 2: 1235-1250.

2011

Garten CT, Iversen CM, Norby RJ. 2011. Litterfall ¹⁵N abundance indicates declining soil nitrogen availability in a free air CO₂-enrichment experiment. **Ecology** 92: 133-139.

Iversen CM, Hooker TD, Classen AT, Norby RJ. 2011. Net mineralization of N at deeper soil depths as a potential mechanism for sustained forest production under elevated [CO₂]. **Global Change Biology** 17: 1130-1139.

2010

Iversen CM. 2010. Digging deeper: Fine root responses to rising atmospheric CO₂ concentration in forested ecosystems. **New Phytologist** 186: 346-357.

Iversen CM, Bridgham SD, Kellogg LE. 2010. Scaling plant nitrogen-use and uptake efficiencies in response to nutrient addition in peatlands. **Ecology** 91: 693-707.

Iversen CM, O'Brien SL. 2010. Organized Oral Session 3. Missing links in the root-soil organic matter continuum. **Bulletin of the Ecological Society of America** 91: 54-64.

Norby RJ, Warren JM, Iversen CM, Medlyn BE, McMurtrie RE. 2010. CO₂ enhancement of forest productivity constrained by limited nitrogen availability. **Proceedings of the National Academy of Sciences, USA** 107: 19368-19373.

2009

Franklin O, McMurtrie RE, Iversen CM, Crous KY, Finzi A, Tissue DT, Ellsworth DS, Oren R, Norby RJ. 2009. Forest fine-root production and nitrogen use under elevated CO₂: contrasting responses in evergreen and deciduous trees explained by a common principle. **Global Change Biology** 15: 132-144.

O'Brien SL, Iversen CM. 2009. Missing links in the root-soil organic matter continuum. **New Phytologist** 184: 513-516.

2008

Iversen CM, Ledford J, Norby RJ. 2008. CO₂ enrichment increases carbon and nitrogen input from fine roots in a deciduous forest. *New Phytologist*. 179: 837-847.

Iversen CM, Norby RJ. 2008. Nitrogen limitation in a sweetgum plantation: Implications for carbon allocation and storage. *Canadian Journal of Forest Research* 38: 1021-1032.

2005 – 2007

Finzi AC, Norby RJ, Calfapietra C, Gallet-Budynek A, Gielen B, Holmes WE, Hoosbeek MR, Iversen CM, Jackson RB, Kubiske MB, Ledford J, Liberloo M, Oren R, Polle A, Pritchard S, Zak DR, Schlesinger WH, Ceulemans R. 2007. Increases in nitrogen uptake rather than nitrogen-use efficiency support higher rates of temperate forest productivity under elevated CO₂. *Proceedings of the National Academy of Sciences, USA* 104: 14014-14019.

Keller JK, Bauers AK, Bridgham SD, Kellogg LE, Iversen CM. 2006. Nutrient control of microbial carbon cycling along an ombrotrophic-minerotrophic peatland gradient. *Journal of Geophysical Research* 111: G03006.

Keller JK, Bridgham SD, Chapin CT, Iversen CM. 2005. Limited effects of six years of fertilization on carbon mineralization dynamics in a Minnesota fen. *Soil Biology and Biochemistry* 37: 1197-1204.

Norby RJ, Iversen CM. 2006. Nitrogen uptake, distribution, turnover, and efficiency of use in a CO₂-enriched sweetgum forest. *Ecology* 87: 5-14.

External funding

Current

- 2013 – Measuring and modeling fine roots to improve predictive understanding of climate change feedbacks; **US Department of Energy**; PI.
- 2011 – Next-Generation Ecosystem Experiments (NGEE) – Arctic (<http://ngee-arctic.ornl.gov/>); **US Department of Energy**; Co-I.
- 2010 – Spruce and Peatland Responses Under Climatic and Environmental Change (SPRUCE) (<http://mnspruce.ornl.gov/>); **US Department of Energy**; Co-I.

Previous

- 2010 – 2013 Partitioning in Trees and Soils (PiTS): Field research facilities for testing and improving dynamic carbon partitioning representations in global models; **US Department of Energy**; Co-PI.
- 2007 – 2009 Doctoral Dissertation Improvement Grant. Will CO₂ mediated increases in fine-root litter progressively decrease forest N availability by increasing N immobilization in soil organic matter? **National Science Foundation**.
- 2005 – 2008 Graduate Research Environmental Fellowship. Global Change Education Program, **US Department of Energy**.

Honors and awards

- 2012 Stanley I. Auerbach Early-Career Award for Excellence in Environmental Sciences. Environmental Sciences Division, Oak Ridge National Laboratory.
- 2010 Finalist in *New Phytologist* Tansley Medal competition for mini-review: Iversen CM (2010), *New Phytologist* 186: 346-357. Highlighted in Woodward & Hetherington 'The *New Phytologist* Tansley medal', *New Phytologist* 186: 263-264.
- 2009 Distinguished Achievement Award for Post-Graduate Research. Environmental Sciences Division, Oak Ridge National Laboratory.

Professional activities

Editorial Advisory Board, *New Phytologist* (2014 –)

Co-organizer: 'A path forward for improved representation of fine roots in large-scale models: Linking models, data, and experiments'. Organized Oral Session at the annual Ecological Society of America meeting, August, 2014, in Sacramento, CA, USA (<http://eco.confex.com/eco/2014/webprogram/Session9688.html>).

Organizer: 'Roots in Models' workshop held at Oak Ridge National Laboratory, TN, USA in June, 2014, and funded by the Department of Energy, Office of Science (http://web.ornl.gov/~ciz/Roots_in_Models.html).

Organizing committee: 'Scaling Root Processes: Global Impacts' workshop held in Washington, DC, USA, in March, 2012, and funded by the Department of Energy, Office of Science (<http://www.bio.anl.gov/ScalingRootProcesses-GlobalImpactsWorkshop>).

Organizer: 'Advancing minirhizotron use to examine ephemeral root dynamics in peatland and high carbon ecosystems'. Small workshop hosted at Oak Ridge National Laboratory in October, 2010, and funded by the Department of Energy, Office of Science and New Phytologist Trust.

Co-organizer: 'Missing links in the root-soil organic matter continuum'. Organized Oral Session at the annual Ecological Society of America meeting, August, 2009 in Albuquerque, NM, USA.

Ad-hoc reviewer for: *Acta Oecologica*; *Agriculture, Ecosystems & Environment*; *Biogeosciences*; *Biology and Fertility of Soils*; *Biological Invasions*; *Canadian Journal of Forest Research*; *Ecology*; *Ecology Letters*; *Ecosphere*; *Global Biogeochemical Cycles*; *Global Change Biology*; *Journal of Ecology*; *Journal of Geophysical Research – Biogeosciences*; *Nature*; *New Phytologist*; *Oecologia*; *Plant Physiology*; *Plant and Soil*; *Soil Biology and Biochemistry*; *Soil Science Society of America Journal*; *Tree Physiology*; National Science Foundation; National Institute for Climate Change Research; Department of Energy, Office of Science.

Society memberships: American Geophysical Union, Ecological Society of America, Soil Ecology Society.

Press and public outreach

'What problem are you working on?'

21 November 2013

Oak Ridge National Laboratory

<https://www.youtube.com/watch?v=8yu1qrXdsh0>

'Deep, dank and mysterious'

21 September 2013

New Scientist Magazine

'Study gets to the roots of enhanced CO₂ experiment'

7 March 2012

Nature News Blog

<http://blogs.nature.com/news/2012/03/study-gets-to-the-roots-of-enhanced-co2-experiment.html>

'Method of studying roots, rarely used in wetlands, improves ecosystem research'

13 October 2011

ScienceDaily

<http://www.sciencedaily.com/releases/2011/10/111013121705.htm>

'ORNL interns taking advantage of chance of a lifetime'

26 July 2011

WBIR, Channel 10

<http://www.wbir.com/news/local/story.aspx?storyid=177585>

'What is a typical day for an ecosystem ecologist?'

15 September 2010

Oak Ridge National Laboratory

<https://www.youtube.com/watch?v=ViWum2HpALs>

'ORNL Free-Air CO₂ Enrichment Experiment'

22 February 2008

WUOT (Local NPR station, Morning Edition)

<http://web.ornl.gov/~ciz/ME%2002.22.08%20ORNL%20FACE%20Site%20ck.mp3>

Selected presentations (Past 3 years)

2014

Iversen CM. 2014. A path forward to improve the representation of fine roots in terrestrial biosphere models. *Invited talk*. Ecological Society of America annual meeting, Sacramento, CA, USA.

Iversen CM. 2014. Digging deeper: Improving our understanding of ecosystem responses to climate change through measurements and modeling of belowground processes. *Keynote address*. 'Belowground processes and the RhizoNet integrated network of belowground measurements' workshop at the Chinese Academy of Sciences Institute of Geographic Sciences and Natural Resources Research in Beijing, China.

2013

Iversen CM, Childs J, Norby RJ. 2013. ORNL FACE improved our understanding and modeling of root-soil interactions. American Geophysical Union, organized session 'Ecosystem Responses to Increasing Atmospheric CO₂: Moving Forward from First Generation Free Air CO₂ Experiments' at fall meeting, San Francisco, CA, USA. *Poster presentation*.

Iversen CM. 2013. Digging deeper: Improving our understanding of ecosystem responses to climate change through measurements and modeling of belowground processes. *Invited talk.* Virginia Tech, Blacksburg, VA, USA.

Iversen CM. 2013. Quantifying and categorizing the unseen: The representation of root traits in PFTs. *Organized Oral Session: Plant Functional Types in DVM for Arctic Ecosystems: Past Experiences, Future Directions.* Ecological Society of America annual meeting, Minneapolis, MN, USA.

Iversen CM, Childs J, Norby RJ, Kolka, RK, Ontl TA. 2013. Advancing the use of minirhizotrons in wetlands. *Invited talk.* Environmental Sensing Technology workshop associated with the Center for Embedded Network Sensors at the University of California, Riverside, CA, USA.

2012

Iversen CM. 2012. Digging deeper: Improving our understanding of ecosystem responses to atmospheric and climatic change through measurements and modeling of belowground processes. *Invited talk.* Biogeochemistry and Environmental Science and Sustainability Fall 2012 Seminar Series, Cornell University, Ithaca, NY, USA.

Iversen CM, Norby RJ. 2012. Digging deeper: Rooting distributions in forested CO₂-enrichment experiments. *Invited talk.* Scaling Root Processes: Global Impacts workshop, Washington, D.C., USA.

Iversen CM, Jastrow JD, and Norby RJ. 2009. Carbon and nitrogen inputs from decomposing roots into different soil organic matter fractions. *Organized oral session.* Ecological Society of America annual meeting, Albuquerque, NM, USA.

Iversen CM. 2009. The causes and consequences of increased fine-root production in a CO₂-enriched sweetgum plantation. *Invited talk.* Department of Biological Sciences Seminar, University of Illinois at Chicago, Chicago, IL, USA.