

Oleksandra (Sasha) Hararuk

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EDUCATION

Ph.D., Botany, University of Oklahoma, Norman, OK 2014
Dissertation: *Improving global carbon cycle models with observations*
Advisor: Yiqi Luo, Ph.D.

M.S., Botany, University of Oklahoma, Norman, OK 2012
Thesis: *Changes in soil mercury pools in response to climate change in conterminous USA*
Advisors: Yiqi Luo, Ph.D., Daniel Obrist, Ph.D.

B.S., Ecology, National University “Kyiv Mohyla Academy”, Kyiv, Ukraine 2008
Thesis: *Energy storage in coniferous and deciduous forests in Kyiv region*
Advisor: Yakiv Didukh, Sc.D.

EMPLOYMENT HISTORY

Assistant Professor 2018-
University of Central Florida, Orlando, FL

Assistant Specialist 2017-2018
University of California Irvine, Irvine, CA
Advisor: Steven Allison, Ph.D.

Research Associate 2017
McGill University, Montreal, QC

Postdoctoral Research Fellow 2016- 2017
McGill University, Montreal, QC
Advisor: Dr. Christopher T. Solomon

NSERC Visiting Research Fellow 2014-2016
NRCan, Pacific Forestry Centre, Victoria, BC
Advisor: Dr. Werner A. Kurz

Graduate Research and Teaching Assistant 2008- 2014
University of Oklahoma, Norman, OK
Advisor: Dr. Yiqi Luo

PUBLICATIONS

Google scholar: <https://scholar.google.ca/citations?user=3OJtdgIAAAAJ&hl=en>

Peer-reviewed journals

Published

23. Bona, K.A., Shaw, C., Thompson D.K., **Hararuk, O.**, Webster, K., Zhang, G., Voicu, M., Kurz, W.A. (2020) The Canadian Model for Peatlands (CaMP): A peatland carbon model for national greenhouse gas reporting. *Ecological Modelling* 2020, **431**: 109164. <https://doi.org/10.1016/j.ecolmodel.2020.109164>
22. **Hararuk O.**, Kurz, W.A., Didion, M. (2020) Dynamics of dead wood decay in Swiss forests. *Forest Ecosystems* 7, 36 (2020). <https://doi.org/10.1186/s40663-020-00248-x>
21. **Hararuk O.**, Campbell, E.M., Antos, J.A. (2019) Tree rings provide no evidence of a CO₂ fertilization effect in old-growth subalpine forests of western Canada. *Glob Change Biol.* 25: 1222– 1234. doi:10.1111/gcb.14561
20. Zwart, J.A., **Hararuk O.**, Prairie, Y., Jones, S.E., Solomon, C.T. (2019) Improving estimates and forecasts of lake carbon dynamics using data assimilation. *Limnol Oceanogr Methods*. doi:10.1002/lom3.10302
19. **Hararuk O.**, Zwart, J.A., Jones, S.E., Prairie, Y., Solomon, C.T. (2018) Model-data fusion to test hypothesized drivers of lake carbon cycling reveals importance of physical controls, *JGR-Biogeosciences*, 123(3), 1130-1142, <https://doi.org/10.1002/2017JG004084>
18. **Hararuk O.**, Shaw C., Kurz W. (2017) Constraining the organic matter decay parameters in the CBM-CFS3 using Canadian National Forest Inventory data and a Bayesian inversion technique, *Ecological Modelling*, 364, 1-12, <https://doi.org/10.1016/j.ecolmodel.2017.09.008>
17. Fu, Z., Li, D., **Hararuk, O.**, Schwalm, C., Luo, Y., Yan, L., Niu, S. (2017) Recovery time and state change of terrestrial carbon cycle after disturbance, *Environmental Research Letters*, doi:<https://doi.org/10.1088/1748-9326/aa8a5c>
16. Luo, Y., Shi, Z., Lu, X., Xia, J., Liang, J., Wang, Y., Smith, M. J., Jiang, L., Ahlström, A., Chen, B., **Hararuk, O.**, Hastings, A., Hoffman, F., Medlyn, B., Niu, S., Rasmussen, M., Todd-Brown, K., and Wang, Y.-P. (2017) Transient Dynamics of Terrestrial Carbon Storage: Mathematical foundation and Its applications, *Biogeosciences*, doi: 10.5194/bg-14-145-2017
15. Rafique, R., Xia, J., **Hararuk, O.**, Leng, G., Asrar, G., and Luo, Y. (2016) Comparing the Performance of Three Land Models in Global C Cycle Simulations: A Detailed Structural Analysis. *Land Degradation & Development*, *Land Degradation and Development*, doi: 10.1002/ldr.2506
14. Rafique, R., Xia, J., **Hararuk, O.**, Asrar, G., Wang, Y., and Luo, Y. (2016) Divergent predictions of carbon storage between two global land models: attribution of the causes through traceability analysis, *Earth Syst. Dynam.*, 7, 649-658, <https://doi.org/10.5194/esd-7-649-2016>
13. Luo, Y., Ahlström, A., Allison, S., Batjes, N., Brovkin, V., Carvalhais, N., Chappell, A., Ciais, P., Davidson, E., Finzi, A., Georgiou, K., Guenet, B., **Hararuk, O.**, Harden, J., He, Y., Hopkins, F., Jiang,

- L., Koven, C., Jackson, R., Jones, C., Lara, M., Liang, J., McGuire, D., Parton, W., Peng, C., Randerson, J., Salazar, A., Sierra, C., Smith, M., Tian, H., Todd-Brown, K., Torn, M., van Groenigen, K., Wang, Y.-P., West, W., Wei, Y., Wieder, W., Xia, J., Xu, X., Xu, X., Zhou, T. (2015) Towards More Realistic Projections of Soil Carbon Dynamics by Earth System Models. *Global Biogeochemical Cycles*, 30, 40– 56. <http://dx.doi.org/10.1002/2015GB005239>
12. Wieder, W., Allison S., Davidson, E., Georgiou, K., **Hararuk, O.**, He, Y., Hopkins, F., Luo, Y., Smith, M., Sulman, B., Todd-Brown, K., Wang, Y.-P., Xia, J., Xu, X. (2015) Explicitly representing soil microbial processes in Earth system models. *Global Biogeochemical Cycles* 29, 1782-1800. <http://dx.doi.org/10.1002/2015GB005188>
11. Shi, Z., Sherry, R., Xu, X., **Hararuk, O.**, Souza, L., Jiang, L., Xia, J., Liang, J., Luo, Y. (2015) Evidence for long-term shift in plant community composition under decadal experimental warming. *Journal of Ecology*, 5, 1131-1140 <http://dx.doi.org/10.1111/1365-2745.12449>
10. Jiang, L., Yan, Y., **Hararuk, O.**, Mickle, N., Xia, J., Shi, Z., Tjiputra, J., Wu, T., and Luo, Y. (2015) Scale-dependent performance of CMIP5 Earth system models in simulating terrestrial vegetation carbon. *Journal of Climate*, 28, 5217–523. <http://dx.doi.org/10.1175/JCLI-D-14-00270.1>
9. Shi, Z., Xu, X., **Hararuk, O.**, Jiang, L., Xia, J., Liang, J., Li, D., Luo, Y. (2015) Experimental warming altered rates of carbon processes, allocation, and carbon storage in a tallgrass prairie, *Ecosphere*, 6 (11), art210. <http://dx.doi.org/10.1890/ES14-00335.1>
8. **Hararuk, O.**, Smith, M., Luo, Y. (2015) Microbial models with data-driven parameters predict stronger soil carbon responses to climate change, *Global Change Biology*, 21, 2439-2453. <http://dx.doi.org/10.1111/gcb.12827>
7. **Hararuk, O.**, Luo, Y. (2014) Improvement of global litter turnover rate predictions using a Bayesian MCMC approach, *Ecosphere*, 5, art163. <http://dx.doi.org/10.1890/ES14-00092.1>
6. Rafique, R., Xia, J., **Hararuk, O.**, and Luo, Y. (2014) Structural analysis of three global land models on carbon cycle simulations using a traceability framework, *Biogeosciences Discuss.*, 11, 9979-10014, <http://www.biogeosciences-discuss.net/11/9979/2014/>
5. **Hararuk O.**, Xia, J., Luo, Y. (2014) Evaluation and Improvement of a Global Land Model against Soil Carbon Data Using a Bayesian MCMC method *JGR-Biogeosciences*, 119(3), 403-417. <http://dx.doi.org/10.1002/2013JG002535>
4. Xia, J., Luo, Y., Wang, Y.-P., **Hararuk O.** (2013) Traceable components of terrestrial carbon storage capacity in biogeochemical models, *Global Change Biology*, 19(7), 2104-2116. <http://dx.doi.org/10.1111/gcb.12172>
3. **Hararuk, O.**, Obrist, D., and Luo, Y. (2013) Modelling the sensitivity of soil mercury storage to climate-induced changes in soil carbon pools, *Biogeosciences*, 10, 2393-2407. <http://www.biogeosciences.net/10/2393/2013/>
2. Xia, J. Y., Luo, Y. Q., Wang, Y.-P., Weng, E. S., and **Hararuk, O.** (2012) A semi-analytical solution to accelerate spin-up of a coupled carbon and nitrogen land model to steady state, *Geosci. Model Dev.*, 5, 1259-1271. <http://www.geosci-model-dev.net/5/1259/2012/>

1. Obrist, D., Johnson, D. W., Lindberg, S. E., Luo, Y., **Hararuk, O.**, Bracho, R., Battles, J. J., Dail, D. B., Edmonds, R. L., Monson, R. K., Ollinger, S. V., Pallardy, S. G., Pregitzer, K. S., Todd, D. E. (2011) Mercury Distribution Across 14 U.S. Forests. Part I: Spatial Patterns of Concentrations in Biomass, Litter, and Soils, *Environ. Sci. Technol.*, 45, 3974–3981. <http://dx.doi.org/10.1021/es104384m>

In revision

Jung, C.G., Du, Z., **Hararuk, O.**, Xu, X., Liang, J., Zhou, X., Li, D., Jiang, L., Luo, Y. (in review) Long-term soil respiration measurements in a mixed grass prairie reveal a change in soil organic carbon recalcitrance and its environmental sensitivity under warming, *Oecologia*

Koval, A., Beasley, W.H., **Hararuk, O.**, Rodgers, J.L. (in review) Social Contagion and General Diffusion Models of Late Adolescent Religious Transitions: New EMOSA Applications

Hararuk, O., Jones, S.E., Solomon C.T. Effect of Hydrologic Export on Soil Carbon Turnover Rates in *Nature Communications*

Hararuk, O., Shi, Z. What do observational data products tell us about soil carbon dynamics in the near future? *In Nature Geoscience*

Book chapters

1. Cole, J.J., **Hararuk, O.**, Solomon, C.T. (2019) Chapter 6. The Carbon Cycle With a Brief Introduction to Global Biogeochemistry. In K. Weathers, D. Strayer, G. Likens (Ed.) “*Fundamentals of Ecosystem Science, 2nd Edition*”. ISBN: 978-0128127629

TEACHING

PCB6466 Methods in Experimental Ecology 1	2020-
PCB6046 Advanced Ecology: Ecological Modelling, UCF	2020-
BSC1005 Biological Principles, UCF	2019-
PBIO2404: Ecology and Environmental Quality, Instructor, U. of Oklahoma	2010
PBIO3452: Methods in Plant Ecology, Instructor, U. of Oklahoma	2009
PBIO2404: Ecology and Environmental Quality, Lab instructor, U. of Oklahoma	2009-2012

UNDERGRADUATE TRAINEES

Maria Urrea (undergraduate researcher, 2019), Ansley Blitch (EXCEL program, 2020-); Alyssa Uebele (T-LEARN program, 2020-)

GRADUATE TRAINEES

Alicia Formanack (M.S. 2019-), Aneesh Chandel (PhD 2020-)

POSTDOCTORAL TRAINEES

Chang Gyo Jung (2019-)

PROFESSIONAL SERVICE

Buell/Braun judge (ESA student award)	2020
Proposal review panelist for Department of Energy TES Program	2019
Proposal review panelist for National Science Foundation GRFP Program	2018
Judge for the Showcase of Undergraduate Research Excellence at UCF	2019-
Member of UCF Biology Departmental Safety Committee	2019-
Co-editor of a special issue “Emerging multiple-scale modeling for ecosystem services in a changing world” in <i>Ecosystem Health and Sustainability</i> journal	2017
Reviewer for 3-6 manuscripts per year from scientific journals	2012-
Member of European Geosciences Union	2018-
Member of Association for Sciences of Limnology and Oceanography	2017-
Member of American Geophysical Union	2012-
Member of Ecological Society of America	2010-

PRESENTATIONS

* denotes graduate mentee; ** denotes undergraduate mentee

33. *Formanack, A., **Hararuk, O.** Evaluating carbon uptake and storage potential across tree species and environmental gradients in Florida: An individual-based model approach. Ecological Society of America Annual Meeting, Virtual, August 3-6, 2020

32. **Hararuk, O.**, Stuart, S.E., Solomon, C.T. Effect of Hydrologic Export on Soil Carbon Turnover Rates. Ecological Society of America Annual Meeting, Virtual, August 3-6, 2020

31. **Hararuk, O.** Data-Model Fusion as a Tool for Improving Models and Addressing Research Questions (*invited*). New Advances in Land Carbon Cycle Modelling Training Course, Flagstaff, USA, July 28th, 2020 (*presented online due to COVID-19 pandemic*)

30. **Hararuk, O.**, Stuart, S.E., Solomon, C.T. Effect of Hydrologic Export on Soil Carbon Turnover Rates. EGU General Assembly, Vienna, Austria, May 4-8, 2020 (*presented online due to COVID-19 pandemic*)

29. **Uebele, A. Relationship Between Rising Atmospheric CO₂ Levels, Environmental Conditions, and Tree Productivity. Showcase of Undergraduate Research Excellence, UCF, Orlando, April 2, 2020 (*cancelled due to COVID-19 pandemic*)

28. *Formanack, A. Modelling Tree Growth Rates of Florida Forests to Determine Carbon Capture and Residence Time. Graduate Research Forum, UCF, Orlando, FL April 1, 2020 (*cancelled due to COVID-19 pandemic*)

27. **Hararuk, O.** Data-Model Fusion as a Tool for Addressing Research Questions and Setting Management Goals. Indian River Lagoon Symposium, FAU Harbor Branch, USA, February 13-14, 2020

26. Bona, K.A., **Hararuk, O.**, Thompson, D.K., Shaw, C., Zhang, G., Webster, K.L., Kurz, W.A. The Canadian Model for Peatlands (CaMP): a Model for Greenhouse Gas Emission, Removal Estimation and Reporting. AGU Fall Meeting, San Francisco, USA, December 9-39, 2019

25. **Hararuk, O.**, Sayer, E., Allison, S. Identifying mechanisms of soil carbon dynamics at a tropical site: a data-model fusion approach. AGU Fall Meeting, San Francisco, USA, December 9-39, 2019

24. **Hararuk, O.** Evaluating future changes in soil carbon stocks using data-model integration. EGU General Assembly, Vienna, Austria, April 7-12, 2019

23. **Hararuk, O.**, del Giorgio, P., Prairie, Y., Casas-Ruiz, J., Jones, S., Solomon, C. Tracing dissolved organic carbon from soils to oceans. ASLO Summer Meeting, Victoria, Canada, June 10-15, 2018

22. **Hararuk, O.**, Zwart, J., Jones, S., del Giorgio, P., Prairie, Y., Solomon, C. Estimating carbon stocks and fluxes using novel data assimilation techniques. 70th Annual Joint Meeting of the Canadian Conference for Fisheries Research and Society of Canadian Limnologists, Montreal, Canada, January 5-8, 2017

21. **Hararuk, O.**, Smith, M. J., Luo, Y. Effect of explicit microbial dynamics on the performance of soil carbon cycle models. 100th Ecological Society of America Annual Meeting, Baltimore, USA, August 9-14, 2015 (*presented by Y. Luo*)

20. Luo, Y., Xia, J., Liang, J., Jiang, L., Shi, Z., Manoj, K., **Hararuk, O.**, Rafique, R., Wang, Y. A traceability framework for diagnostics of global land models. EGU General Assembly, Vienna, Austria, April 12-17, 2015
19. **Hararuk, O.**, Luo, Y. Evaluation and Improvement of Global Carbon Cycle Models against Soil Carbon and Microbial Data Sets Using a Bayesian MCMC method. EGU General Assembly, Vienna, Austria, April 12-17, 2015 (*poster, presented by Y. Luo*)
18. **Hararuk, O.**, Smith, M. J. Importance of modelling microbial dynamics in soil: evaluation of conventional and microbial soil models informed by observations across various plant functional types. AGU fall meeting, San Francisco, USA, December 15-19, 2014 (*poster*)
17. **Hararuk, O.**, Xia, J., Luo, Y. Data assimilation to improve parameterization of carbon models, Representing Soil Carbon Dynamics in Global Land Models to Improve Future IPCC Assessments, Breckenridge, CO, USA. June 11th – June 14th 2014
16. **Hararuk, O.**, Smith, M. J., Luo, Y. Improving global soil carbon predictions with data-constrained microbial based models. AGU fall meeting, San Francisco, USA, December 9-13, 2013 (*poster*)
15. Jiang, L., Luo, Y., Yan, Y., **Hararuk, O.** Scale-dependent performances of CMIP5 earth system models in simulating terrestrial vegetation carbon. AGU fall meeting, San Francisco, USA, December 9-13, 2013 (*poster*)
14. Rafique, R., Xia, J., **Hararuk, O.**, Luo, Y., Dai, Y.J., Macaulay, C. Carbon-Structural Analysis of Global Land Models (C-SALM). AGU fall meeting, San Francisco, USA, December 9-13, 2013 (*poster*)
13. Luo, Y., Xia, J., **Hararuk, S.**, Wang, Y-P. A Traceability Framework to facilitate model evaluation. EGU General Assembly, Vienna, Austria, April 7-12, 2013
12. **Hararuk, O.**, Xia, J., Luo, Y. Evaluation and improvement of two global land models against soil carbon data using a data assimilation approach. 4th NACP All-Investigators Meeting, Albuquerque, NM, USA, February 4-7, 2013 (*poster*)
11. **Hararuk, O.**, Xia, J., Luo, Y. Evaluation and improvement of two global land models against soil carbon data using a data assimilation approach. American Geophysical Union (AGU) fall meeting, San Francisco, USA, December 3-7, 2012
10. **Hararuk, O.**, Xia, J., Luo, Y. Evaluation and Improvement of Two Global Land Models against Soil Carbon Data Using a Data Assimilation Approach. RCN FORECAST New Investigators Conference, MBL,, Woods Hole, MA, USA, October 9-11, 2012
9. **Hararuk, O.**, Xia, J., Luo, Y. Evaluation and Improvement of Two Global Land Models against Soil Carbon Data Using a Data Assimilation Approach. 3rd RCN-Forecast conference, Woods Hole, MA, USA, October 9-11, 2012
8. Creameans, B., **Hararuk, O.** Cyber-enabled forecasting system for terrestrial C cycle. 3rd Annual cyberCommons Symposium, Manhattan, KS, USA, September 7th 2012
7. **Hararuk, O.**, Obrist, D., Luo, Y. Modeling the sensitivity of soil mercury storage to climate-induced changes in soil carbon pools. 97th Ecological Society of America Annual Meeting. Portland, Oregon, USA, August 5 - 10, 2012

6. **Hararuk, O.**, Xia, J., Luo, Y. Performance of CLM-CASA and CABLE Models in Predicting Soil Carbon: The Need for Data Assimilation. 17th Annual CESM Workshop, The Village, Breckenridge, Colorado, June 18-21, 2012. (*poster*)
5. Xia, J., Luo, Y., **Hararuk, O.**, Wang, Y. Traceable components of modeled global carbon cycle. U.S. Department of Energy Experiment-Model Workshop, Bethesda, Maryland. USA. Mar. 19-21, 2012.
4. Niu, S., Li, D., **Hararuk, O.**, Yan, L., Chen, X., Ali, E., Luo, Y. Disturbance and Recovery in Terrestrial Ecosystem Carbon Cycling-a Global Synthesis. EGU General Assembly 2012, held 22-27 April, 2012 in Vienna, Austria., p.7498
3. **Hararuk, O.** and Xia, J. Applying a semi-analytical solution to accelerate carbon model spin-up to steady state. 2nd Annual cyberCommons Symposium, Norman, Oklahoma, USA. September 30, 2011. (*poster*)
2. Xia, J., Luo, Y., Wang, Y., Weng, E., **Hararuk, O.** A semi-analytical solution to accelerate spin-up for carbon and nitrogen coupled ecosystem models. Breckenridge, Colorado, USA. June 22, 2011.
1. **Hararuk, O.**, Obrist, D., Luo, Y. Modeling mercury dynamics in terrestrial ecosystems in response to climate change. 95th Ecological Society of America Annual Meeting. Pittsburgh, Pennsylvania, USA, August 1 - 6, 2010 (*poster*)