

CANN₂ONET

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THE N FACTOR

FEBRUARY 2025

Project Updates

- CanN₂ONet has established an ongoing communications schedule for all components (Benchmark, Metrics, Roadmap, and Communications) and plans for our next all-hands are underway for late May or early June (virtual).
- CanN₂ONet is gearing up for our first official growing season!
- Baseline sampling is complete at all benchmark sites across Canada and soil analyses are underway.
- Agreements have been finalized with the CBC to establish the regional “tall tower” in Yorkton, SK.
- Spring plans are underway to install the new benchmark sites at Olds, AB, and Lethbridge, AB, and to move the current site as Saskatoon to Aberdeen, SK.
- Standard operating procedures for field season measurements at the field tower sites are in development.
- Work to calibrate and validate the DNDC Canada model is ongoing.
- CanN₂ONet has advanced the database component by joining the Soil Carbon Solutions Centre Ecosystem Modelling and Data Consortium (www.soilcarbonsolutionscenter.com).
- CanN₂ONet will be hosting a session at the Canadian Society of Soil Science Annual Meeting in Winnipeg, MB in July 2025.



CanN₂ONet collaborators Olivia Otchere, research assistant, University of Saskatchewan (top), and Maurizio Comandone, PhD student, University of Guelph (bottom), sample soils at our benchmark sites in Aberdeen, SK and Elora, ON.



CanN₂O Net at Soils For Our Future 2025

Join CanN ONet in Winnipeg this July! Consider submitting an abstract for our session, “Towards N₂O Emission Reduction Goals through Enhanced Communication, Data Sharing, and Spatial Integration of Research Across Canada” at the Canadian Society of Soil Science Annual Conference July 22-25 in Winnipeg, MB.

The SOILS FOR OUR FUTURE 2025 Conference brings together three conference events: The Canadian Society of Soil Science Annual Meeting, The 5th Global Soil Security Conference, and The International Union of Soil Sciences Division 1 - Soils In Space and Time Meeting.

Hosted by the Soil Conservation Council of Canada and the Manitoba Soil Science Society, with over 700 researchers, industry members, leaders of farmer organizations, graduate students and other attendees, the SOILS FOR OUR FUTURE 2025 Conference provides global perspective to today’s research to sustain our future.



Hosted by



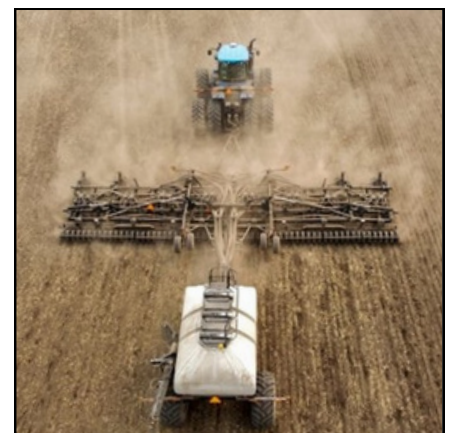
CanN₂O Net in the News

THE WESTERN PRODUCER

Check out this [article](#) in The Western Producer to learn from Dr. Henrique Carvalho, who explains the regional “tall” tower in Yorkton, Saskatchewan.

Or head over to this [article](#) to hear project manager Erin Daly chat with CBC Saskatoon about the rationale behind CanN ONet and expand upon the regional “tall” tower.

Images: A farmer is pictured driving a seeding rig as he plants a canola crop on the family's farm near Cremona, Alta., on Tuesday, May 16, 2023. (Right; Source: Jeff McIntosh/The Canadian Press). Henrique Carvalho of the University of Manitoba heads up the Regional (Tall) Tower project in Saskatchewan (Left; Source: Don Norman photo).



GET TO KNOW CAN_NONET

In each newsletter, we'll spotlight some CanN ONet members, giving you an inside look at the people who are driving the project forward!

Andy Black Professor

University of British Columbia

Andy grew up on a dairy farm in BC's Lower Fraser Valley (LFV). He received his BSc in Agricultural Sciences at UBC majoring in Soil Science, then obtained his MSc and PhD degrees from the University of Wisconsin where he was a grad student in Champ Tanner's agrometeorology/soil physics group. Andy also worked with soil physicist, Wilford Gardner, on drainage and evaporation in bare soils.



In 1969, he joined the UBC Department of Soil Science as a biometeorologist. Shortly afterward, he designed a psychrometric apparatus for measuring the Bowen ratio above forest stands in order to determine evapotranspiration rates and to study the controls on canopy conductance. With Andy in the lead, his research group participated in the Boreal Ecosystem-Atmosphere Study (BOREAS) (1993-1996) using eddy covariance to measure CO₂ and water vapour exchange at the Old Aspen site in Prince Albert National Park. Andy was also a member of Fluxnet Canada and the Canadian Carbon Program (2002-2010) and established long-term flux towers on a Douglas-fir chronosequence of three sites on Vancouver Island and three lodgepole pine sites in Northern BC studying the impact of wide-spread mountain pine beetle attack on their water and C balances.

Recently, as part of the Agricultural Greenhouse Gases Program, his group measured components of the C and greenhouse gas balances of high value crops in the LFV, with the goals of determining the effects of climate variability and assessing how changes in management can increase C sequestration and decrease N₂O emissions. As the field tower component co-lead of CanN ONet, he is excited to see the effectiveness of variable rate fertilization and nitrification inhibitors in reducing N₂O emissions from crops at the AB1 site in Olds, Alberta.

His favorite paper is "Webb et al. 1980, Correction of flux measurements for density effects due to heat and water vapor transfer. Q. J. R. Meteorol. Soc. 196, 85-100". This foundational paper elegantly derives the basic equations used in calculating trace gas fluxes using eddy covariance and flux-gradient approaches, and the theory has stood the test of time. One of the funniest things he has seen in the field was (during BOREAS) a black bear determined to climb the scaffold flux tower at the Old Aspen site completely ignoring the posted "KEEP OUT" sign! When not hard at work, catch Andy hiking with his wife, riding his bike, and reading books about science, history, adventure, and mountain climbing (an activity Andy himself has experience in!).

Daphnee Ferland PhD Student

University of Saskatchewan

Daphnée is from all over Canada: originally from Québec, spent her childhood in Maryfield, SK, and now resides in Hudson Bay, SK. She grew up on a family grain farm in Saskatchewan, surrounded by canola and wheat fields. She earned her Bachelor of Science in Agriculture with a Crop Science major at the University of Saskatchewan.

Daphnée decided to broaden her horizons and has taken courses in all aspects of agriculture (animals, field crops, apiculture, soils and horticulture). After the completion of her undergraduate degree, Daphnée worked a summer as an intern agronomist for an independent agricultural retail to gain further agronomy experience. She returned to the University of Saskatchewan to pursue an MSc in Plant Sciences. In her master's research, she assessed the impact of nitrogen fertilizer management on the greenhouse gas emissions of a canola-wheat cropping system in Saskatchewan, by means of a flux-gradient micrometeorology system. Shortly after, Daphnée transferred to a PhD program, where she will model additional nitrogen fertilizer management practices that further reduce the greenhouse gas emissions from Saskatchewan cropping systems.

By using a combined micrometeorological and modelling approach, her research can contribute to the development of climate-smart policies and practices that benefit farmers. Furthermore, her background as a farmer's daughter has sparked an interest in farming, and she has undertaken her own farming operation with the help of her father. When not contributing to research or farming, Daphnée loves horseback riding, hiking, and playing with her dogs. Daphnée will play an integral role in the Metrics team of CanN ONet as a member of



of the modelling component, primarily working with the process-based model DNDC.

CanN₂O Net Opportunities

Post-Doctoral Fellowship in Atmospheric Sciences

University of Manitoba

Position Description: The Post-Doctoral Fellow (PDF) will participate in an exciting multidisciplinary research project supported by NSERC/SSHRC that aims to quantify N₂O emissions from key agricultural regions in Canada and determine metrics that can aid growers in achieving emission reduction targets. Specifically, the PDF will participate in the establishment of the first regional “tall tower” observatory in Yorkton, Saskatchewan, where mixing ratio measurements of N₂O, CO, and CO₂ will be conducted. The PDF will use mixing ratio data from the tall tower and apply state-of-the-art atmospheric inverse modeling to determine regional budgets of N₂O and CO₂ and evaluate sink/source attribution. The PDF will be supervised by and work in close collaboration with Drs. Claudia Wagner-Riddle (University of Guelph), Tim Griffis (University of Minnesota), and Henrique Carvalho (University of Manitoba). The PDF will have the opportunity to mentor graduate and undergraduate students. Professional development activities including participation in conferences and publication of research results will be supported. Anticipated start is in the Fall of 2024.



UNIVERSITY OF MINNESOTA

UNIVERSITY
of GUELPH



University
of Manitoba

PhD Position in Agricultural Micrometeorology

Lethbridge Polytechnic

Position Description: A fully funded 4-year graduate student position (PhD level) is available in a collaborative project between the Mueller Irrigation Research Group at Lethbridge Polytechnic (Lethbridge, AB) and the Department of Civil, Geological, and Environmental Engineering at the University of Saskatchewan (Saskatoon, SK).

The PhD student will be involved in a field experiment at the Lethbridge Polytechnic Research Farm, in which N₂O emissions are measured year-round over four large plots with the flux-gradient approach. The management treatments include irrigation and fertilizer types over a four-year rotation of cereals, canola, and pulses. The PhD project will focus on process-level understanding of N₂O emission pathways in irrigated systems before, during, and after the growing season and contextualizing this understanding in the environmental and climatic conditions of southern Alberta.



LETHBRIDGE
POLYTECHNIC



UNIVERSITY OF
SASKATCHEWAN

Post Doctoral Fellowship in Modelling Agricultural Management Practices Across Canada

McGill University

Position Description: The postdoctoral researcher will contribute to the development of a ‘roadmap’ for emission reduction based on regional scaling-up of beneficial management practices across the major grain and oilseed growing areas in Canada. Specifically, the postdoctoral researcher will participate in the collaborative development of: (1) spatially explicit baseline data of cropping practices, including identification of representative crop rotations, and (2) spatially explicit baseline datasets of fertilizer use across major growing regions, drawing from existing surveys of fertilizer management practices and ‘4R’ nutrient stewardship. These objectives will help to expand on existing efforts to model N₂O emissions reduction. The initial appointment will be for one year, with an extension for a second year based on performance. Depending on project needs, the position could potentially be extended further (up to four years).



McGill
UNIVERSITY

For more information, go to our website at www.cann2onet.org.

Do you have an opportunity you'd like to share? Send the position details, requirements, location, and hiring information to edaly02@uoguelph.ca