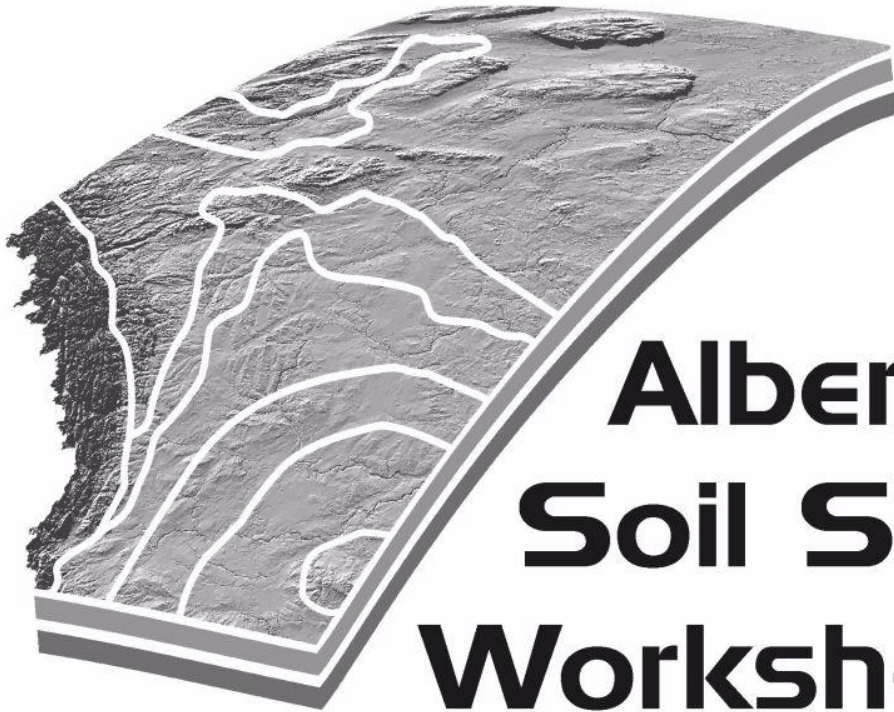


Program for the 54<sup>th</sup> Annual



# Alberta Soil Science Workshop

Workshop Theme:  
**What is Soil Health? Concepts to  
Applications**

February 15 to 17, 2017

**Coast Hotel & Conference Centre**  
Lethbridge, Alberta

[www.soilsworkshop.ab.ca](http://www.soilsworkshop.ab.ca)

## **About the Alberta Soil Science Workshop**

The Alberta Soil Science Workshop is held to facilitate regional interaction among professionals in soil science. Typically 100 to 150 participants gather for a 1½ to 2 day program that comprises 40 to 60 oral and poster presentations. These include: keynote papers focussed on the workshop theme, technical papers within five distinct fields, and volunteer papers. Currently the five technical groups are: Land Use and Rangelands, Soil Fertility, Technology and Soil Science, Land Reclamation, and Forest, Riparian and Wetland Soils.

Workshop participants are professionals from private industry (e.g. consultants in agronomy, pedology, reclamation, remediation, and environmental services; chemists from commercial analytical laboratories), government (federal, provincial, municipal) and academia (universities and colleges). The Workshop is graduate student-friendly, providing an excellent opportunity to enhance presentation skills in a supportive setting (travel bursaries are available for out-of-town students; awards are provided for the best student presentations).

<b>Past Chair</b>	Amanda Schoonmaker Northern Alberta Institute of Technology, Peace River AB
<b>Chair</b>	Preston Sorenson Maapera Analytics, Edmonton AB
<b>Treasurer</b>	Derek MacKenzie Department of Renewable Resources, University of Alberta, Edmonton AB
<b>Sponsorship</b>	Dani Degenhardt InnoTech Alberta, Edmonton AB
<b>Secretary</b>	Janna Casson Alberta Agriculture and Forestry, Lethbridge AB
<b>Event Coordinator</b>	Ben Thomas Agriculture and Agri-Food Canada, Lethbridge AB
<b>Web Administrator</b>	Andrew Underwood InnoTech Alberta, Edmonton AB

### **Technical Session Chairs**

<b>Soil Fertility</b>	Len Kryzanowski Alberta Agriculture and Forestry, Edmonton AB
<b>Land Use and Rangelands</b>	Karen Raven and Janna Casson Alberta Agriculture and Forestry, Edmonton AB
<b>Land Reclamation</b>	Deo A. Heeraman Amec Foster Wheeler, Calgary AB
<b>Forest, Riparian and Wetland Soils</b>	Bin Xu Northern Alberta Institute of Technology, Peace River AB
<b>Technology and Soil Science</b>	Preston Sorenson Maapera Analytics, Edmonton AB
<b>Volunteer Session</b>	Konstantin Dlusskiy Paragon Soil and Environmental Consulting

## Sponsors

We would like to thank the following sponsors for helping make the 2017 Alberta Soil Science Workshop possible.



# Program - 2017 Alberta Soil Science Workshop

## Wednesday, February 15, 2017

**2:30 – 5:00 PM** Pre-workshop on Updated Alberta Soil Viewer (Foothills Room)

## Thursday, February 16, 2017

**7:00 AM – 5:30 PM** Registration (Grand Ballroom)

**7:00 – 8:00 AM** Breakfast (Grand Ballroom)

**8:00 – 12:00 PM** Plenary Session (Grand Ballroom)

**10:00 – 10:25 AM** Coffee and Refreshments (Grand Ballroom)

**12:00 – 1:00 PM** Lunch (Grand Ballroom)

**1:00 – 3:15 PM** Land Use and Rangelands (Foothills Room)  
Soil Fertility (Grand Ballroom)

**3:15 – 3:30 PM** Coffee and Refreshments (Grand Ballroom)

**3:30 – 4:35 PM** Land Use and Rangelands (Foothills Room)  
Volunteer Technical Session (Grand Ballroom)

**4:35 – 6:00 PM** Poster Session (Grand Ballroom)

**4:30 – 9:00 PM** Cash Bar (Grand Ballroom)

**6:00 – 10:00 PM** Banquet and Entertainment (Grand Ballroom)

## Friday, February 17, 2017

**7:00 – 8:00 AM** Breakfast (Grand Ballroom)

**8:00 – 9:25 AM** Land Reclamation Technical Session (Grand Ballroom)  
Technology and Soil Science (Foothills Room)

**9:25 – 9:45 AM** Coffee and Refreshments (Grand Ballroom)

**9:45 – 11:45 AM** Soil Fertility Technical Session (Grand Ballroom)  
Forested, Wetland and Riparian Soils Technical Session (Foothills Room)

**11:45 – 1:00 PM** Lunch and ASSW Business Meeting (Grand Ballroom)

**Detailed Program**  
**Thursday, February 16, 2017**  
**Plenary Session – Grand Ballroom**

- 8:00 am** *Breakfast – Grand Ballroom*
- 8:15 – 8:30** **Welcome and Introduction**  
**Chair: Preston Sorenson**  
Maapera Analytics, Edmonton AB
- 8:30 – 9:15** **Defining and Exploring Soil Health**  
**Dr. Henry Janzen**  
Agriculture and Agri-Food Canada, Lethbridge, AB
- 9:15 – 10:00** **What Farmers Should Know about Soil Health!!**  
**Dr. Yamily Zavala**  
Soil Health and Crop Management Specialist  
Chinook Applied Research Association (CARA), Oyen, AB
- 10:00 – 10:25** *Coffee and Refreshments – Grand Ballroom*
- 10:25 – 11:10** **Long term perspectives on soil disturbance and reclamation in British Columbia’s forests**  
**Dr. Chuck Bulmer**  
British Columbia Ministry of Forests, Lands and Natural Resource Operations, Vernon, BC
- 11:10 – 11:55** **Soil quality changes over 12 years of conservation vs. conventional management on irrigated rotations in southern Alberta**  
**Dr. Francis Larney**  
Agriculture and Agri-Food Canada, Lethbridge, AB
- 12:00 – 1:00** *Lunch – Grand Ballroom*

## Thursday, February 16, 2017 – Afternoon Concurrent Technical Sessions

PM	<b>Soil Fertility</b> Grand Ballroom	<b>Land Use and Rangelands</b> Foothills Room
1:00 – 1:05	<b>Chair: Len Kryzanowski</b> Alberta Agriculture and Forestry	<b>Chair: Karen Raven and Janna Casson</b> Alberta Agriculture and Forestry
1:05 – 1:25	Impact of long-term (24 years) land management on soil health parameters and 2016 wheat yield  <b>Eric Bremer, Doon Pauly, Allan Middleton, Ross McKenzie, Ben Ellert, Henry Janzen</b>	The potential for ecosystem service programs and markets in the livestock sector  <b>Marian Weber</b>
1:25 – 1:45	Crops, residual nutrients and soil responses to six annual repetitions of test based fertilizer rates and seeding systems  <b>Kabal S. Gill</b>	Management of tax recovery lands in the M.D. of Taber  <b>Brian Peers</b>
1:45 – 2:05	Root growth and soil properties responses to six annually repeated fertilizer applications and seeding systems  <b>Kabal S. Gill</b>	Potential addition or modification of soil-related indicators for use in range health assessments  <b>Ron McNeil</b>
2:05 – 2:35	Fall rye reduced residual soil nitrate and dryland spring wheat grain yield  <b>Ben W. Thomas, Francis J. Larney, Xiyang Hao, Martin H. Chantigny, Claudia Goyer</b>	A horizon depth varies between Idaho and wheatgrass dominant plant communities on clayey range sites in the Milk River Upland  <b>Tanner Broadbent, Ed Karpuk, Craig DeMaere, Oriano Castelli</b>
2:35 – 2:55	Impact of eNtrench™ and N-Serve™ nitrogen stabilizers on N supply in western Canada.  <b>Rory Degenhardt, Laura Smith, Len Juras, Andrew MacRae</b>	Trends for conservation cropping system adoption in Alberta's Brown and Dark Brown Soil Zones  <b>Rob Dunn, Janna Casson, Wally Sawchuk, Deb Werk</b>
2:55 – 3:15	Influence of the long-term fertilizer treatments on dynamics of dissolved organic carbon and methane emissions during rice growth  <b>Harmanjit S. Dhadli, Babu S. Brar, Thomas A. Black, Rachhpal Jassal</b>	Grassland species respond differently to altered precipitation amount and pattern  <b>Bin Zhang, Xiyang Hao, Mengli Zhao, Qingmin Pan</b>
3:15 – 3:30	<b>Coffee break Grand Ballroom</b>	

	<b>Volunteer</b> Grand Room	<b>Land Use and Rangelands</b> Foothills Room
3:30 – 3:35	<b>Chair: Konstantin Dlusskiy</b> Paragon Soil and Environmental Consulting	<b>Chair: Karen Raven</b> Alberta Agriculture and Forestry
3:35 – 3:55	Influence of long-term application of feedlot manure amendments on soil water repellency of a clay loam soil  <b>Jim Miller, Bruce Beasley, Craig Drury, Paul Hazendonk</b>	Modeling dynamic water demand of rainfed and irrigated barley production in Alberta: implication for regional water and food security  <b>M. Badrul Masud, Greg Goss, Monireh Faramarzi</b>
3:55 – 4:15	Bulk optical characterization of dissolved organic matter from wheat-based croplands in Montana, USA  <b>Carlos M. Romero, Richard E. Engel, Roseann Wallander, Juliana D'Andrilli, Chengci Chen</b>	Insect activity reduces CO <sub>2</sub> and N <sub>2</sub> O emissions from dung pats  <b>Xiying Hao, Ben W. Thomas, Jessica Stoeckli, Kevin Floate</b>
4:15 – 4:35	Accuracy of soil mapping at SIL4  <b>Konstantin Dlusskiy, Scott Boorman, Steve Murchison</b>	
4:35 – 6:00	<b><i>Poster Session – Grand Ballroom (cash bar after 4:30 pm)</i></b>	



**Thursday, February 16 – Afternoon  
Poster Session 4:35 – 6:00 PM  
Grand Ballroom**

1	Soil organic carbon 23 years after cultivating Northern Great Plains grasslands <b>Haibo An, Ben W. Thomas, Ryan Beck, Kui Liu, Jessica Stoeckli, Walter D. Willms, Xiying Hao</b>
2	Monitoring and enhancing forest floor reclamation with the forest floor recovery index <b>Darrell Hoffman, Cindy Shaw, Stephen Kull, Mihai Voicu, Catherine McNalty</b>
3	Fate of organic nitrogen in an alkaline, saline coal gasification ash environment <b>Ikenna Mbakwe, Pieter de Jager, John Annandale</b>
4	Evaluation of soils on mineral surface leases certified to forested land reclamation standards <b>Mark Dewey, Trevor Floreani, Jasmeen Kaur, Amanda Schoonmaker</b>
5	Growing season N <sub>2</sub> O emissions from a Gray Luvisol as a function of long-term N balance <b>Miles Dyck, Mekonnen Giweta, Sukdhev S. Malhi, Dick Puurveen</b>
6	Economics of beneficial management practice (BMP) adoption by southern Alberta cow-calf producers <b>Stephen N. Bruce, Scott Jeffrey, Peter Boxall, Marian Weber</b>
7	Beef production and soil ecosystem services in Canada's prairie provinces <b>Sarah Pogue, Roland Kroebel, Tim McAllister, Carrie Selin, Marian Weber, Jim Byrne, Danielle Maia de Souza</b>
8	Nitrapyrin reduced nitrous oxide emissions from beef cattle urine patches on a semiarid tame pasture <b>Ben W. Thomas, Xinlei Gao, Jessica Stoeckli, Ryan Beck, Kui Liu, Karen M. Koenig, Brian Beres, Xiying Hao</b>
9	Soil organic carbon storage in agroforestry systems: from surface organic to deeper mineral layers <b>Sang-Sun Lim, Mark Baah-Acheamfour, Cameron N. Carlyle, Edward W. Bork, Muhammad A. Arshad, Scott X. Chang, Jin-Hyeob Kwak, Woo-Jung Choi, Farrah Fatemi, Samiran Banerjee</b>
10	Predicting water-related risks and opportunities for Alberta's beef industry <b>M Badrul Masud, Greg Goss, Monireh Famarzi, Dan Farr, Majid Irvani, Wiktor Adamowicz, Scott Jeffrey, Tim McAllister, Marcos Cordeiro, Getahun Legesse</b>
11	Willingness-to-pay for ecosystem services from adopting agricultural beneficial management practices in beef production <b>Zhaochao (Liam) Lin, Peter Boxall, Marian Weber</b>

12	The legacy effect of manure application on active soil carbon <b>Kui Liu, Ben W. Thomas, Jessica Stoeckli, Xiying Hao</b>
13	What is soil health and how can we assess it in agricultural soils? <b>Jeff Battigelli, Miles Dyck, Len Kryzanowski, Lori Phillips, Laura Van Eerd, Linda Hall</b>
14	Developing a place-based tool for evaluating the water quantity and quality effects of livestock BMPs <b>Wanhong Yang, Yongbo Liu, Shawn Shao, John Lindsay</b>
15	Spatial variability of loss of peat/duff layer following wildfire at Slave Lake and Fort McMurray using a data fusion approach <b>Laura Chasmer, Ravinder Virk, Joshua Montgomery, Chris Hopkinson, Richard Petrone</b>
16	Controls on methane flux from a constructed fen in the Athabasca Oil Sands Region, Alberta <b>Kimberley Murray, Natasha Barlow, Maria Stack</b>
17	Soil carbon dynamics in long-term temperate agroecosystems: Rotation and nutrient addition effects <b>Jichen Li, Guillermo Hernandez Ramirez, Mina Kiani, Sylvie Quideau, Elwin Smith, Henry Janzen, Francis Larney, Dick Puurveen</b>

## Friday, February 17, 2017 – Morning Concurrent Technical Sessions

AM	<b>Land Reclamation</b> Grand Ballroom	<b>Technology and Soil Science</b> Foothills Room
8:00 - 8:05	<b>Chair: Deo A. Heeraman</b> Amec Foster-Wheeler	<b>Chair: Preston Sorenson</b> Maapera Analytics
8:05 - 8:25	Regeneration dynamics of seedling origin aspen: Managing for resiliency in forest restoration  <b>Carolyn King and Simon Landhäuser</b>	Anaerobic digestion of <i>Dalea purpurea</i> and <i>Pascopyrum smithii</i> : Effect of anaerobic digestate recirculation  <b>Valentine Nkongndem Nkemka, Don Thompson, Xiying Hao</b>
8:25 - 8:45	Oribatid mites as a tool to assess soil recovery after surface mining in Alberta  <b>Brittany N. McAdams, Sylvie A. Quideau</b>	Spatial modeling methods and the heterogeneity of soil properties within a controlled traffic environment  <b>Kris Guenette and Guillermo Hernandez-Ramirez</b>
8:45 - 9:05	Dissipation of antimicrobials and resistance genes in compost originating from cattle manure after direct oral administration or post-excretion fortification of antimicrobials  <b>Shanwei Xu, Rahat Zaheer, Francis J. Larney, Tim A. McAllister</b>	Invasive mussels, irrigation, potash, and soil: The Alberta connection  <b>Barry Olson, Andrea Kalischuk, Brad Calder, Ki Au, Lloyd Healy, Ivan Friesen</b>

AM	<b>Land Reclamation Grand Ballroom</b>	<b>Technology and Soil Science Foothills Room</b>
9:05 - 9:25		Monitoring organic carbon, total nitrogen and pH for field reclaimed soils using reflectance spectroscopy  <b>Preston Sorenson, Christina Small, Michelle Tappert, Sylvie Quideau, Bonnie Drozdowski, Andrew Underwood, Arnold Janz</b>
9:25 - 9:40	<b><i>Break - Grand Ballroom</i></b>	
AM	<b>Soil Fertility Technical Session - Grand Ballroom</b>	<b>Forested, Wetland and Riparian Soils Technical Session - Foothills Room</b>
9:40-9:45	<b>Chair: Len Kryzanowski</b> Alberta Agriculture and Forestry,	<b>Chair: Bin Xu</b> Northern Alberta Institute of Technology
9:45 - 10:05	A soil-based approach to variable rate fertilizer management zone delineation  <b>Doon Pauly, Ross McKenzie, Eric Bremer</b>	Soil respiration along a Boreal hillslope  <b>Paul D. Sewell, Sylvie Quideau, Miles Dyck</b>
10:05 - 10:25	Economic analysis of crop fertigation  <b>Daniel Donkersgoed, Doon Pauly, Allan Middleton, Elwin Smith, Danny LeRoy</b>	Dissolved organic carbon production affected by warming and water table lowering in a boreal forested bog: A climate impact perspective  <b>Tariq Munir, Bin Xu, Khadka B, Maria Stack</b>

10:25 - 10:45	<p>Fertigation effects in wheat and canola crops in Alberta: Nitrous oxide (N<sub>2</sub>O) emissions, soil nitrogen dynamics, and grain productivity</p> <p><b>Leanne Chai, Guillermo Hernandez Ramirez, Miles Dyck, Doon Pauly, Len Kryzanowski, Allan Middleton, Leigh-Anne Powers, Germar Lohstraeter, Deb Werk</b></p>	<p>A remote sensing-based vegetation structural and terrain classification for Boreal Plains Wetlands in Alberta</p> <p><b>Laura Chasmer, Chris Hopkinson, Joshua Montgomery, Richard Petrone</b></p>
10:45 - 11:05	<p>Ammonia loss and fertilizer <sup>15</sup>N recovery of late-fall, winter, and spring broadcast urea to no-till winter wheat</p> <p><b>Richard E. Engel, Carlos M. Romero, Clain Jones, Roseann Wallander</b></p>	<p>Prairie Pothole Region, temporal wetland classification at Shepard Slough Alberta, Canada</p> <p><b>Joshua Montgomery, Chris Hopkinson, Brian Brisco</b></p>
11:05 - 11:25	<p>Assessing agronomic nitrogen management to mitigate environmental and economic losses in Alberta</p> <p><b>Symon Mezbahuddin, David Spiess, David Hildebrand, Len Kryzanowski, Daniel Itenfis, Geoff Montgomery, Robert Grant, Fatima Shire, Rigas Karamanos</b></p>	<p>Monitoring water-level changes and wetland shrubification using a hydrological/LiDAR data fusion approach</p> <p><b>Laura Chasmer, Chris Hopkinson, Kevn Devito, Kelly Hokanson, Richard Petrone, Carl Mendoza</b></p>
11:25 - 11:45	<p>Nitrogen credits after soybean and dry bean in southern Alberta</p> <p><b>Tram Thai, Frank Larney, James Thomas, Manjula Bandara, Doon Pauly</b></p>	