

Tuesday, November 25 (Morning)

Theatre 1 – Geoscience and Exploration

Chairs: Beth Fischer and Karen Gochnauer

- 08:40 Northwest Territories Geoscience Office: A Year in Review** – Ketchum, J.
- 09:00 2014 Northwest Territories Exploration and Mining: A Year in Review** – Gochnauer*, K. and Falck, H.
- 09:20 An Overview of Nunavut Mining and Mineral Exploration Activities in 2014** – Budkewitsch, P.
- 09:40 Overview of the Second Phase of the Geological Survey of Canada's Geo-mapping for Energy and Minerals Program** – Ozyer*, C.A. and LeClair, A.D.
- 10:00 Coffee** (sponsored by Discovery Mining Services; Sub-Arctic Surveys Ltd.)
- 10:20 Neoproterozoic Volcanic Belts in the Southern Slave Craton: Regional Correlations and VMS Mineralization** – Ootes*, L., Jackson, V.A., Hamilton, M. A., Berger, A., Williams, B., and Cousens, B.
- 10:40 The Slave VMS Project: New U-Pb Ages Constraining the Temporal Evolution of Neoproterozoic Volcanic Belts and VMS Mineralization in the Slave Craton** – Hamilton*, M.A., Ootes, L., and Jackson, V.A.
- 11:00 The Geochemical Signatures and Nd-Isotopes of Archean Volcanic Units Around the Sleepy Dragon Complex, Slave Craton, Northwest Territories** – Berger**, A.J., Cousens, B., Williams, B., Ootes, L., Jackson, V., and Hamilton, M.
- 11:20 A Comparison of Wijnnedi-Snare, Courageous-Mackay, and Lac Du Rocher/Camsell Lake Volcanic Belts of the Slave Craton and Implications for VMS Exploration** – Williams**, B., Cousens, B., Berger, A., Ootes, L., Jackson, V., and Hamilton, M.
- 11:40 Coffee** (sponsored by Dyno Nobel Canada Inc.)
- 12:00 The Neoproterozoic Banded Iron Formations of the Slave Craton: Insight into a Tectonically Active Marine Environment** – Haugaard**, R., Ootes, L., Heaman, L.M., and Konhauser, K.
- 12:20 Yellowknife City Gold Project** – Setterfield*, T., Campbell, J., and Sexton, A.
- 12:40 Official Opening and Awards**
- 12:30-19:00 Trade Show** (Ed Jeske Arena – Multiplex – 41 Kam Lake Road)
- 13:00 Lunch** (sponsored by the NWT & Nunavut Chamber of Mines) – Ed Jeske Arena – Multiplex (41 Kam Lake Road)

* Denotes presenting author

** Denotes student presentation

Tuesday, November 25 (Morning)

Theatre 2 – Petroleum in Canada's North

Chairs: Kathryn Fiess and John Ritchie

- 08:40 Northwest Territories Petroleum Resources Division and 2014 Petroleum Industry Activity Overview** – Ritchie, J.
- 09:00 2014 Northwest Territories Geoscience Office (NTGO) Petroleum Group Research and Support Activities Report** – Fiess, K.M.
- 09:20 Devonian and Cretaceous Hydrocarbon Source Rocks, Central Mackenzie Valley, NWT** – Pyle*, L.J., Fiess, K.M., and Rocheleau, J.
- 09:40 Reservoir Models for Middle / Upper Devonian Shale Successions in Western Canada** – Harris, N.B.
- 10:00 Coffee** (sponsored by Discovery Mining Services; Sub-Arctic Surveys Ltd.)
- 10:20 Conventional and Unconventional Resource Assessments in Canada's North: A New Estimate of Discovered Conventional Petroleum in the Northwest Territories and NEB Methods for Assessing Unconventional Resources** – Hogue, B. and Johnson*, M.
- 10:40 Central Mackenzie Valley (CMV) Subsurface Groundwater Baseline Study** – Fiess, K.M. and Parsons*, D.F.
- 11:00 Source Rock Characterization of the Carboniferous Golata Formation and Devonian Besa River Formation Outcrops, Liard Basin, Northwest Territories** – Rocheleau*, J., Fiess, K.M., and Pyle, L.J.
- 11:20 The Future of Onshore Seismic Exploration in Canada's North** – Chatenay*, A.R. and Tigner, D. J.
- 11:40 Coffee** (sponsored by Dyno Nobel Canada Inc.)
- 12:00 Ichnological Criteria for Discerning Marine Paleo High-Latitude Settings** – Gingras, M.K.
- 12:20 A Storm-Influenced Shoreface Succession within the Cambrian Mount Clark Formation of the Mackenzie Mountains, Northwest Territories** – Herbers**, D., Bobey, B., Bilak, G, Kolensky, S, and Gingras, M.
- 12:40 Official Opening and Awards** (Theatre 1)
- 12:30-**
- 19:00 Trade Show** (Ed Jeske Arena – Multiplex – 41 Kam Lake Road)
- 13:00 Lunch** (sponsored by the NWT & Nunavut Chamber of Mines) – Ed Jeske Arena – Multiplex (41 Kam Lake Road)

Tuesday, November 25 (Morning)

Theatre 3 – Regulatory and Policy Updates

Chairs: Pamela Strand and Bernard Park

- 09:00 Devolution: Post Transfer** – Woodward*, S., Archibald*, D., Hopkins*, A., and Jenkins*, R.
- 09:40 An Update on the Northwest Territories Mineral Development Strategy** – Strand*, P. and Powell*, L.
- 10:00 Coffee** (sponsored by Discovery Mining Services; Sub-Arctic Surveys Ltd.)
- 10:20 CanNor – Resource Development and Community Economic Opportunities** – Spence, M.
- 10:40 Liabilities and Financial Assurances** – Conkin, C.
- 11:00 When Security is Not Enough: Directors and Officers Liability for Environmental Damages when Mining Projects Fail** – Donihee*, J. and Birchall*, C.
- 11:40 Coffee** (sponsored by Dyno Nobel Canada Inc.)
- 12:00 Environment Canada Pollution Prevention Regulations** – Brown, G.
- 12:20 Draft Interim Dehcho Land Use Plan** – Fleck, S.
- 12:40 Official Opening and Awards** (Theatre 1)
- 12:30-**
- 19:00 Trade Show** (Ed Jeske Arena – Multiplex – 41 Kam Lake Road)
- 13:00 Lunch** (sponsored by the NWT & Nunavut Chamber of Mines) – Ed Jeske Arena – Multiplex (41 Kam Lake Road)

Tuesday, November 25 (Afternoon)

Theatre 1 – Geoscience & Exploration

Chairs: Paul Budkewitsch and Hendrik Falck

- 14:50 Mapping Hydrothermal Footprints: Case Studies from the BIF-Hosted Meliadine Gold District, Nunavut** – Lawley*, C.J.M., Dubé, B., Mercier-Langevin, P., and Vaillancourt, D.
- 15:10 Protracted Paleoproterozoic Gold History at the Archean BIF-Hosted Meliadine Gold District, Nunavut** – Lawley*, C.J.M., Creaser, R.A., Jackson, S., Yang, Z., Davis, B., Dubé B., Mercier-Langevin, P., Pehrsson, S., and Vaillancourt, D.
- 15:30 New Ideas on the Architecture and Economic Potential of the Western Rae Craton and its Boundary Zone from the GEM-2 Chantrey-Thelon Project** – Nadeau*, L., Berman, R.G., Percival, J.A., Davis, W.J., McMartin, I., McCurdy, M., Craven, J., Sanborn-Barrie, M., Carr, S., Whalen, J., Pehrsson, S., Tschirhart, V., and Girard, A.
- 15:50 Preliminary Re-Os Age, and Platinum Group Element Systematics of the ~1.9 Ga Winnepegosis Komatiite** – Waterton*, P., Pearson, D.G., Kjarsgaard, B.A., and Parman, S.W.
- 16:10 Targeted Bedrock Mapping, and New Geochemistry and Geochronology Data for Hall Peninsula, Baffin Island, Nunavut** – Steenkamp*, H.M., Rayner, N., Bigio, A., and Beaugard, M.
- 16:30-**
- 19:00 Reception** (sponsored by First Air, The Airline of the North; Major Drilling; Nuna Group of Companies) – Ed Jeske Arena – Multiplex (41 Kam Lake Rd). Please don't drink and drive. Complimentary rides home are provided by St. Patrick's SADD.
- 19:00-**
- 22:00 NWT Night** (ticket is required) – Multiplex Gymnasium (41 Kam Lake Rd). Please don't drink and drive. Complimentary rides home are provided by St. Patrick's SADD.

Tuesday, November 25 (Afternoon)

Theatre 3 – Regulatory and Policy Updates

Chairs: Pamela Strand and Bernard Park

14:50 NWT Petroleum Resources Policy and Regulatory Priorities – McEachern, M.

15:10 Public Access to NWT Petroleum Geoscientific Information Post-Devolution – Fulford, J.

15:30 National Energy Board in the North – Dixit, B.

15:50 Devolution of Oil and Gas Resources: The Yukon Experience – Spicer, L.

16:10 The National Energy Board's Participation in FracFocus.ca – Woo, G.

16:30-

19:00 Reception (sponsored by First Air, The Airline of the North; Major Drilling; Nuna Group of Companies) – Ed Jeske Arena – Multiplex (41 Kam Lake Rd). Please don't drink and drive. Complimentary rides home are provided by St. Patrick's SADD.

19:00-

22:00 NWT Night (ticket is required) – Multiplex Gymnasium (41 Kam Lake Rd). Please don't drink and drive. Complimentary rides home are provided by St. Patrick's SADD.

Wednesday, November 26 (Morning)

Theatre 1 – Diamonds

Chairs: Barrett Elliott and Scott Cairns

- 08:40 Kennady North Property: 2014 Field Season Update** – Nelson*, L., Bezzola, M., Hrkac, C., and Vivian, G.
- 09:00 A Tunnel to the Future: The Preliminary Geology of the Kelvin Kimberlite** – Bezzola*, M., Hrkac, C., and Vivian, G.
- 09:20 Kennady North Property: 2014 Geophysical Update** – Belcourt*, G., Hrkac, C., and Vivian, G.
- 09:40 Unearthing the Secrets of the Southern Slave** – Turner, R.
- 10:00 Coffee** (sponsored by SRC – Geoanalytical Laboratories)
- 10:20 High-Spatial Resolution Hyperspectral Imagery: A New Analytical Technique for Obtaining Compositional Information from Kimberlites (Snap Lake, NT) and Kimberlite Indicator Minerals** – Tappert, M.C.
- 10:40 Olivine as a Petrogenetic and Exploration Indicator in Lac de Gras Kimberlites** – Bussweiler**, Y., Foley, S.F., Prelevic, D., Jacob, D.E., Pearson, D.G., and Stachel, T.
- 11:00 The Rise and Stall of Kimberlite Magma** – Stublely, M.P.
- 11:20 Fluid Sources of Ultra-Deep Diamonds** – Palot, M., Pearson*, D.G., Stern, R.A., Harris, J.W., and Stachel, T.
- 11:40 Coffee** (sponsored by Associated Engineering Ltd./Summit Environmental)

Theatre 1 – Geoscience & Exploration

Chairs: Barrett Elliott and Scott Cairns

- 12:00 Mantle Sources and Lithospheric Lid Thickness during Sverdrup Basin Volcanism: Preliminary Results** – Dockman**, D.M., Pearson, D.G., Sarkar, C., and Gibson, S.A.
- 12:20 Assessing the Ni-Cu-Pge Potential of the Caribou Lake Gabbro through Analysis of Silicate and Sulfide Melt Inclusions** – Neyedley**, K., Hanley, J.J., Falck, H., Bodnar, R.J., Fedele, L., Fayek, M., and Sharpe, R.
- 12:40 Litho geochemistry and Distribution of 4.0 Ga – 3.4 Ga Units within the Acasta Gneiss Complex, NWT, Canada** – Reimink**, J.R. Chacko, T., Stern, R.A., and Heaman, L.M.
- 13:00 Lunch** (sponsored by the NWT & Nunavut Chamber of Mines) – Capitol Theatre
- 13:00 NWT & Nunavut Chamber of Mines AGM** (ticket is required) – Multiplex Gymnasium (41 Kam Lake Rd)
- 14:00-**
- 19:00 Trade Show** (Ed Jeske Arena – Multiplex – 41 Kam Lake Rd)

Wednesday, November 26 (Morning)

Theatre 2 – Environmental Monitoring and Research

Chairs: Mike Palmer and Julian Kanigan

- 09:00 Mapping Human Disturbance in the Bathurst Caribou Range Using Permitting Registry Information and Remote Sensing Tools** – McPherson*, J., Laing, I., Palmer, M.J., and Clark, K.
- 09:20 A Remote Sensing Based Method for Distinguishing Impacts of Industrial Developments from that of Natural Factors on Barren Ground Caribou** – Chen, W., Adamczewski*, J.Z., Croft, B., White, L., Leblanc, S., Garner, K., Football, A., McCullum, J., and Tracz, B.
- 09:40 On the Potential of Radar Satellite Images for Application to Winter Road Management** – van der Sanden*, J.J., Drouin, H., Murnaghan, K., Short, N., and Wolfe, S.
- 10:00 Coffee** (sponsored by SRC – Geoanalytical Laboratories)
- 10:20 Integration of Remote Sensing Derived Tree Species Information into a Northwest Territories Forest Vegetation Inventory System** – van der Sluijs*, J., Hall, R.J., Peddle, D.R., and Schwarz, S.
- 10:40 Remote Sensing as a Tool to Assess and Monitor Reclaimed Areas: A Multi-Sensor, Multi-Data Approach** – Loos*, E., Martínez, M., Ersahin, K., Henley, M., and Borstad, G.
- 11:00 Kennady Lake T'e Halye (Fish-out)** – Remshardt*, W.J., Shurgot, C., Coolen, R., Clipperton, K., and Chisholm, V.
- 11:20 The Lac de Gras Permafrost Project** – Bevington**, A., Gruber, S., Subedi, R., and Riddick, J.
- 11:40 Coffee** (sponsored by Associated Engineering Ltd./Summit Environmental)
- 12:00 A Watershed-Scale Sampling Protocol for Distribution and Trend Assessments of Stream Salmonids in the Northwest Territories** – Mochnacz*, N.J., Isaak, D., Teleki, D., McPherson, M., Lewis, B., Docker, M., Reist, J.D., and Cott, P.A.
- 12:20 Seismic Monitoring in the Central Mackenzie Valley, NWT** – Cairns, S.R., Kao, H., Farahbod, A.M., and Snyder*, D.
- 12:20 Update on the Marian Watershed Community-Based Aquatic Effects Monitoring Program** – van der Wielen*, S.W., and Wheler, B.
- 13:00 Lunch** (sponsored by the NWT & Nunavut Chamber of Mines) – Capitol Theatre
- 13:00 NWT & Nunavut Chamber of Mines AGM** (ticket is required) – Multiplex Gymnasium (41 Kam Lake Rd)
- 14:00-**
- 19:00 Trade Show** (Ed Jeske Arena – Multiplex – 41 Kam Lake Rd)

Wednesday, November 26 (Morning)

Theatre 3 – Infrastructure and Innovation

Chairs: Angela Norris and Mike Byrne

- 10:00 Coffee** (sponsored by SRC – Geoanalytical Laboratories)
- 10:20 Managing Risk in the Extractives Sector** – Chubb*, D. and Wen, M.
- 10:40 2013 Geotechnical Investigation at the Long Lake Containment Facility, at Ekati Diamond Mine** – Garven, E.A., Novy, L., and Koop*, G.
- 11:00 Innovative Solutions for Operating on Ice Covers in Northern Canada** – Neth, V.W.
- 11:20 Innovative Process to Stabilize Subsurface at Giant Mine Site** – MacInnis, C.
- 11:40 Coffee** (sponsored by Associated Engineering Ltd./Summit Environmental)
- 12:00 Evaluation and Stabilization of a Slope Failure at Liard Highway No. 7, km 5.9** – Kors-Olthof*, M.I., Hoeve, T.E., and Patrick, R.A.
- 12:20 Geotechnical Assessment and Monitoring of Runway 14-32, Merlyn Carter Airport, Hay River, NT** – Schaap, T.
- 13:00 Lunch** (sponsored by the NWT & Nunavut Chamber of Mines) – Capitol Theatre
- 13:00 NWT & Nunavut Chamber of Mines AGM** (ticket is required) – Multiplex Gymnasium (41 Kam Lake Rd)
- 14:00-**
- 19:00 Trade Show** (Ed Jeske Arena – Multiplex – 41 Kam Lake Rd)

Wednesday, November 26 (Afternoon)

Theatre 1
Keynote Presentation
Open to delegates
14:00-14:50

Lithospheric Structure and Diamond Potential of Northern Canada

Dr. David B. Snyder

*Geological Survey of Canada
Ottawa, Ontario*

Abstract – After over ten years of acquiring geophysical, geochemical and geological observations, we are able to compile a fully 3-dimensional model of the subcontinental mantle lithosphere of the Slave and Rae cratons in northern Canada. This model has benefited from the wealth of samples of mantle rocks and diamonds produced by mineral exploration to date, and supports future exploration in northern Canada for diamonds, and other commodities. These cratons have undergone over a two decades of intense diamond exploration, and superior collections of mantle xenoliths, xenocrysts and derivative observations, and models now exist. The Slave craton hosts four diamond mines and its exploration-driven petrologic database is now comparable with the Kaapvaal, Zimbabwe and Siberia cratons.

The resolution of the seismic-wave velocity model was greatly improved by increased coverage of recording stations deployed by the POLARIS consortium over the past decade. This station coverage is not as uniform or dense as that of USArray in southern North America, but is sufficient to provide new insights into mantle structure within focus areas such as the Slave and Rae cratons. In addition, the POLARIS stations have been active for sufficient periods (3–8 years) to enable their recordings of earthquakes as 3-dimensional ‘cones’ that demarcate local discontinuity surfaces. The Moho is the most prominent discontinuity surface, but several intra-lithosphere surfaces are also observed. Conductivity is being modelled in 3-D on a regional scale for the first time, using newly developed algorithms for linear arrays or grids of magnetotelluric soundings acquired over the past two decades.

A number of kimberlite pipes have yielded sufficient mantle samples for which pressure-temperature determinations can be made to allow construction of vertical ‘cores’ of mantle rock types and paleotemperatures. The lithosphere-asthenosphere boundary can thus be estimated in some locations. In some pipes, diamonds, garnets and other indicator minerals provide additional geochemical information such as age, and major- and trace element systematics, with depth. These 1-D “drill hole” arrays provide critical localized calibration for the regional 3-D models. New compilations of surface geology, improved digital elevation models, and regional magnetic- and gravity-field maps all provide very detailed 2-D knowledge at the surface and near-surface with which to relate the deeper knowledge layers. This surface information can only be extrapolated to the mantle structures that are of primary interest to our project with great care, but is invaluable because of its continuous and higher spatial resolution.

Biography – Dr. David B. Snyder is a research scientist with the Geological Survey of Canada. He leads a government-industry-academia collaborative project that is mapping the mantle lithosphere of Canada for its diamond potential and was a founding member of the POLARIS (Portable Observatories for Lithospheric Analysis and Research Into Seismicity) consortium. He has served on the Earthscope USArray Advisory Committee, the Board of Directors of Lithoprobe, and as a SNORCLE transect scientist. Dr. Snyder's career includes sixteen years (1998-present) with the Geological Survey of Canada, ten years (1988-1998) with the British Institutes Reflection Profiling Syndicate (BIRPS), and five years (1979-1984) with the U. S. Geological Survey. He is based in Ottawa, and in addition to lithospheric-scale seismic studies, uses seismic methods to reveal Earth structure at basin-wide and mineral deposit scales. Dr. Snyder received B.Sc. Physics and M.Sc. Geophysics degrees from Stanford University in 1978 and a Ph.D. degree in Geological Sciences from Cornell University in 1988. He has been a member of the American Geophysical Union, Canadian Geophysical Union, Geological Society of London, and the Society of Exploration Geophysicists.

15:00-

16:30 Posters and Soapbox Talks (refreshments sponsored by GAC MAC Yellowknife 2007) – Capitol Theatre Lobby

14:00-

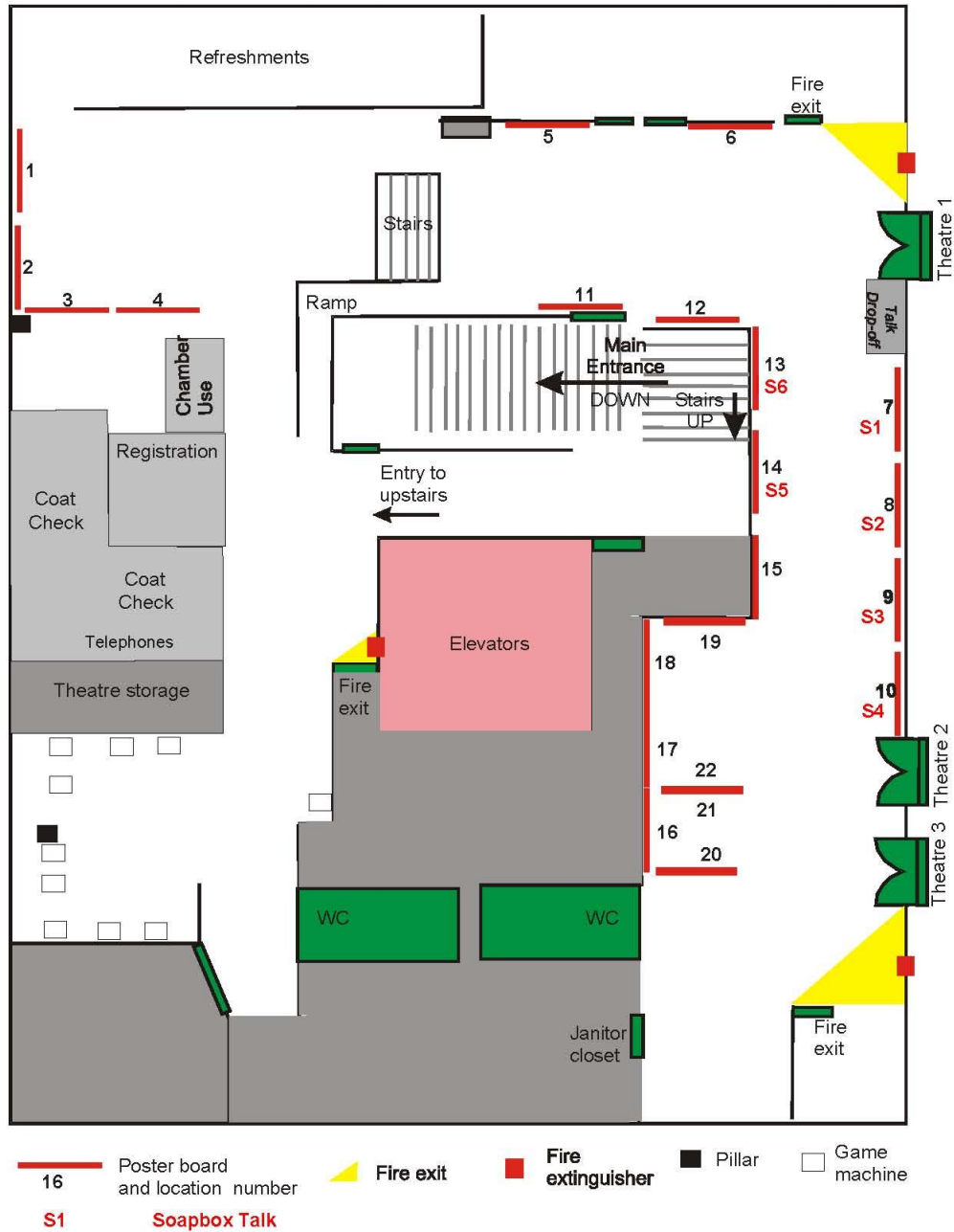
19:00 Trade Show (Ed Jeske Arena – Multiplex – 41 Kam Lake Road)

16:30-

19:00 Reception (sponsored by Associated Engineering Ltd./Summit Environmental; Diavik Diamond Mines Inc.; First Air, The Airline of the North; Foraco Canada Ltd.; Northern News Services Ltd.) – Ed Jeske Arena – Multiplex – 41 Kam Lake Road


Poster Session

Chairs: David Watson and Maurice Bowen



Poster Layout

| Poster # | First Author | Title |
|----------|------------------|---|
| 1 | Hanley, J. | Secondary Gold Precipitation Involving Immiscible Methane-Nitrogen-Rich and Aqueous Fluids, Lupin Gold Deposit, Nunavut |
| 2 | LeBlanc, H. | Polymetallic Co-Ni-As-Bi-Sb-Ag Veins in the Southern Slave Province, Northwest Territories |
| 3 | Pierce, K.L. | Delineation of Watersheds in the Mackenzie Mountains |
| 4 | Irwin, D. | The New Geological Poster of the Northwest Territories |
| 5 | Jackson, V.A. | The Slave VMS Project: An update on the bedrock mapping |
| 6 | Broscoe, D. | Quantitative Mapping of Eskers |
| 7 | Bobey, B. ** | Investigation of the Sedimentology, Ichnology, and Source Rock Potential of the Mount Cap Formation: an outcrop study, Mackenzie Plain, Northwest Territories, Canada |
| 8 | Sheen, A.I. ** | Investigating the Onset of Magmatism in the East Arm Basin, Great Slave Lake |
| 9 | Palmer, E.M. ** | Examining Degree of Pegmatite Fractionation in the Yellowknife Pegmatite Swarm Using In Situ Gamma-Ray Spectrometry |
| 10 | Janzen, M. ** | Age and Origin of Basement Inliers, East Arm Basin, N.W.T. |
| 11 | St-Onge, M.R. | Tectonic Map of Arctic Canada |
| 12 | Harrison, J.C. | New Geological Compilation Maps and Spatial Datasets for Canada's Arctic Islands |
| 13 | Haugaard, R. ** | Depositional Ages of Neoproterozoic Turbidites Across the Slave Craton |
| 14 | Davies, R. | Kimberlite Pathfinder Elements Down-Ice of Talmora |
| 15 | Normandeau, P.X. | Kimberlite Indicator Minerals and Gold Grains in Till from the Great Bear Magmatic Zone and Wopmay Metamorphic Zone, Northwest Territories, Canada |
| 16 | Shaulis, B. J. | An Update on the Detrital Zircon Record from the Paleoproterozoic East Arm Basin, Great Slave Lake, NWT |
| 17 | Cummings, D.I. | Till in Arctic Canada is Not Till |
| 18 | Cummings, D.I. | Dispersal Trains in Eskers Versus Till East of Great Slave Lake |
| 19 | Stevens, C. | Linking Science and Community for Fisheries Productivity Offsetting in the Canadian Arctic |
| 20 | Lesemann, J.E. | Remote Predictive Mapping (RPM) of Surficial Geology Using Random Forest Algorithms: An Automated Method for Rapid and Effective Mapping of Surface Materials |
| 21 | Kressall, R.D. | Fe-Ti oxides in Kimberlites: Implications for Kimberlites from the Ekati Diamond Mine, Northwest Territories |

 Poster Soapbox Talk – See Soapbox Talk Schedule

**Student Presentation

Poster Soapbox Talk Schedule

| Talk # | Poster # | Presenter | Title | Time |
|---------------|-----------------|------------------|---|--------------|
| 1 | 7 | Bobey, B. ** | Investigation of the Sedimentology, Ichnology, and Source Rock Potential of the Mount Cap Formation: an outcrop study, Mackenzie Plain, Northwest Territories, Canada | 15:05 |
| 2 | 8 | Sheen, A.I. ** | Investigating the Onset of Magmatism in the East Arm Basin, Great Slave Lake | 15:12 |
| 3 | 9 | Palmer, E.M. ** | Examining Degree of Pegmatite Fractionation in the Yellowknife Pegmatite Swarm Using in Situ Gamma-Ray Spectrometry | 15:19 |
| 4 | 10 | Janzen, M. ** | Age and Origin of Basement Inliers, East Arm Basin, N.W.T. | 15:26 |
| 5 | 14 | Davies, R. | Kimberlite Pathfinder Elements Down-Ice of Talmora | 15:33 |
| 6 | 13 | Haugaard, R. ** | Depositional Ages of Neoproterozoic Turbidites Across the Slave Craton | 15:40 |

**Student Presentation

Wednesday, November 26 (Evening)

**Charles Camsell Talk
Prince of Wales Northern Heritage Centre**

19:30

Open to the public
Sponsored by NAPEG

Canada's Geology in 3-D: Why We Need Geophysics

Dr. David B. Snyder

*Geological Survey of Canada
Ottawa, Ontario*

Abstract – New geophysics techniques, using energy from such diverse sources as earthquakes and the northern lights, can be used to “X-Ray” the earth so that we can “see” the geology deep beneath its surface. Using fast computers we can then create three dimensional (3-D) models of the earth’s interior. Understanding these 3-D geophysics models of the earth can help find new diamond deposits in the NWT.

Diamonds were originally discovered in the NWT using surface geological mapping and geochemistry but diamonds have been transported from deep within the earth to the surface. Geophysics can illuminate areas deep within the earth that have favorable conditions for preserving diamonds allowing us to predict where the next diamond-rich area may be found.

Additionally, once we collect and understand these deep geophysical images, we can assemble the information into a 3-D map and start to understand the many other mysteries of the earth, deep below our feet.

Biography – Dr. David B. Snyder is a research scientist with the Geological Survey of Canada. He leads a government-industry-academia collaborative project that is mapping the mantle lithosphere of Canada for its diamond potential and was a founding member of the POLARIS (Portable Observatories for Lithospheric Analysis and Research Into Seismicity) consortium. He has served on the Earthscope USArray Advisory Committee, the Board of Directors of Lithoprobe, and as a SNORCLE transect scientist. Dr. Snyder’s career includes sixteen years (1998-present) with the Geological Survey of Canada, ten years (1988-1998) with the British Institutes Reflection Profiling Syndicate (BIRPS), and five years (1979-1984) with the U. S. Geological Survey. He is based in Ottawa, and in addition to lithospheric-scale seismic studies, uses seismic methods to reveal Earth structure at basin-wide and mineral deposit scales. Dr. Snyder received B.Sc. Physics and M.Sc. Geophysics degrees from Stanford University in 1978 and a Ph.D. degree in Geological Sciences from Cornell University in 1988. He has been a member of the American Geophysical Union, Canadian Geophysical Union, Geological Society of London, and the Society of Exploration Geophysicists.

Thursday, November 27 (Morning)

Theatre 1 – Geoscience & Exploration

Chairs: Beth Fischer and Edith Martel

- 08:40 Research Progress on Interpreting Heavy Mineral Concentrates and Silt Chemistry from Stream Sediments from the Mackenzie Mountains, NWT** – Falck*, H., Day, S., and Pierce, K.L.
- 09:00 Sources and Metallogenic Significance of Early to Mid-Cretaceous Magmatism Across the Selwyn Basin: Insight into the Age and Composition of Cordilleran Basement** – Rasmussen, K. L.
- 09:20 A Structural Model for Howard's Pass Pb-Zn District: Let's Start from Scratch** – Martel, E.
- 09:40 Preliminary Analysis of the Distribution, Mineralogy, and Petrogenesis of Gold Mineralization in the Cantung W-skarn Deposit, Northwest Territories** – Palmer**, E.M., Lentz, D.R., Mcfarlane, C.R.M., and Falck, H.
- 10:00 Coffee** (sponsored by Dominion Diamond Ekati Corporation)
- 10:00-**
- 15:00 Trade Show** (Ed Jeske Arena – Multiplex – 41 Kam Lake Rd)
- 10:20 Cumulate Pl-Hbl-OI-Opx-Chr-Po Intrusions in the Wopmay Orogen Backarc, NWT: Late Orogenic Melting of Subduction Modified Lithospheric Mantle** – Ootes*, L., Sandeman, H., Cousens, B., Pearson, G., and Jackson, V.A.
- 10:40 IOCG Style Alteration and Mineralization in a Proterozoic Caldera, Camsell River, NWT** – Bowdidge*, C., Walker, E. C., and Dunford, A.
- 11:00 Apatite as an Indicator Mineral to IOCG Deposits in the Great Bear Magmatic Zone, Northwest Territories, Canada** – Normandeau*, P.X., Corriveau, L., Paquette, J., and McMartin, I.
- 11:20 Reconnaissance Mapping and Thematic Studies of Northern Brock Inlier** – Rainbird*, R.H., Ielpi, I., Turner, E.C., and Jackson, V.
- 11:40 Coffee** (sponsored by the NWT & Nunavut Chamber of Mines)
- 12:00 Nunavut Carving Stone Deposit Evaluation Program: Defining the Supply Side for the Community Commodity of Arctic Canada** – Beauregard, M.
- 12:20 Provenance of Paleoproterozoic Fluvial Successions: Gamma-ray Spectrometry and Paleodrainage of the 1.9-1.6 Ga Elu Basin, Nunavut, Canada** – Ielpi*, A. and Rainbird, R. H.
- 12:40 Hope Bay Gold Project – Nunavut, Exploration and Project Update** – King, D. M.

13:00 Students awards (sponsored by NAPEG) – Theatre 1

13:00 Lunch (sponsored by First Air, The Airline of the North) – Ed Jeske Arena – Multiplex
(41 Kam Lake Road)

14:00 Business Card Draws, and Passport to Diamond Draw – Ed Jeske Arena – Multiplex
(41 Kam Lake Rd)

Thursday, November 27 (Morning)

Theatre 2 – Environmental Monitoring and Research

Chairs: Mike Palmer and Kirsty Ketchum

- 08:40 The Concentration of Arsenic in Lake Waters of the Yellowknife Area** – Palmer*, M.J., Galloway, J., Jamieson, H.E., and Kokelj, S.V.
- 09:00 Mineralogical Speciation of Arsenic in Lake Sediments and Soils in the Yellowknife Area** – Jamieson*, H.E., Bromstad, M., Nash, T.J., Howell, D., Walker, S.R., Andrade, C.F., Wrye, L.A., Fawcett, S.E., Galloway, J., and Palmer, M.J.
- 09:20 Characterization of Arsenic Species in Lake Sediments Surrounding Giant Mine, NWT** – Van Den Berghe**, M., Jamieson, H.E., and Palmer, M.J.
- 09:40 Arcellaceans (testate lobose amoebae) as Indicators of Arsenic Contamination and Geochemical Baseline in the Baker Creek Watershed Region, Northwest Territories, Canada** – Patterson*, R.T., Nasser, N., Galloway, J.M., Palmer, M., Roe, H.M., Macumber, A., and Falck, H.
- 10:00 Coffee** (sponsored by Dominion Diamond Ekati Corporation)
- 10:00-**
- 15:00 Trade Show** (Ed Jeske Arena – Multiplex – 41 Kam Lake Rd)
- 10:20 Arsenic Geochemistry in the Subaqueous Tailings at Terra Mine, NWT** – Bubar**, A., and Jamieson, H.E.
- 10:40 Geochemical Characterization of Oxide Mineralization at the Prairie Creek Deposit, NWT** – Stavinga, D., Jamieson*, H.E., Paradis, S., and Falck, H.
- 11:40 Coffee** (sponsored by the NWT & Nunavut Chamber of Mines)
- 13:00 Students awards** (sponsored by NAPEG) – Theatre 1
- 13:00 Lunch** (sponsored by First Air, The Airline of the North) – (Ed Jeske Arena – Multiplex – 41 Kam Lake Road)
- 14:00 Business Card Draws, and Passport to Diamond Draw** – Ed Jeske Arena – Multiplex (41 Kam Lake Rd)

Thursday, November 27 (Morning)

Theatre 3 – Infrastructure and Innovation
Chairs: Angela Norris and Elizabeth Kingston

- 09:00 Corridors for Energy and Communications in Nunavut, Northwest Territories and Yukon**
– Lafferty, R.
- 09:20 Delivering Community Benefits from Mineral Development** – van Aanhout, M.
- 09:40 State of Northern Knowledge in Canada: Research Gaps, Gains and Opportunities Respecting Northern Resource Development** – Miller, D.
- 10:00 Coffee** (sponsored by Dominion Diamond Ekati Corporation)
- 10:00-**
- 15:00 Trade Show** (Ed Jeske Arena – Multiplex – 41 Kam Lake Rd)
- 10:20 DEMCo – The Experience of an Aboriginal Owned Mine Exploration Development Company** – Beaulieu, D.
- 10:40 Implications of Recent Aboriginal Rights Court Decision on Resource Development** – Chamberlain, A.
- 11:00 Airlander aircraft – An Innovative New Aerial Platform for Geoscience Surveying** – Barton, A.
- 11:40 Coffee** (sponsored by the NWT & Nunavut Chamber of Mines)
- 13:00 Students awards** (sponsored by NAPEG) – Theatre 1
- 13:00 Lunch** (sponsored by First Air, The Airline of the North) – (Ed Jeske Arena – Multiplex – 41 Kam Lake Road)
- 14:00 Business Card Draws, and Passport to Diamond Draw** – Ed Jeske Arena – Multiplex (41 Kam Lake Rd)