



ReDeveLoP Challenge brings people together to discuss the future of Canada's energy.

The results of innovative approaches to professional training through The ReDeveLoP Challenge were presented during the 2nd Annual Conference, in *Dragon's Den* format, held May 26 – 31, 2019, at the Hilton Garden Inn, in Downtown Calgary. This year's *Challenge* brought together more than 70 participants from academia, industry, government and Indigenous communities to discuss the future of Canada's energy. There were presentations highlighting the intersection of science and policy, subject matter expert panels (SME), a poster session and, in *Super Bowl* fashion, 90-second videos targeting public perception and outreach. Invited speakers covered topics from advocacy, law and policy to the technical aspects of hydraulic fracturing.



Hydraulic Fracturing: Freshwater Team (Rasoul Sheikmal, Mirella Chiappe, Paulina Wozniakowska and Jorge Nustes-Andrade) defends its position in the *Dragon's Den* based on scientific evidence.

Why It Matters. ReDeveLoP is a training program in the *Responsible Development of Low-Permeability Hydrocarbon Resources*. It exists because professional training in communication, conflict resolution, project management, and Indigenous engagement at the intersection of science and socio-economic policy is absent from most academic degree programs. Graduate students examine traditional and social media platforms that impact public perception of the energy sector, sorting fact from fiction.



Dan Soeder demonstrates how social media can merge fact and fiction, turning an isolated incident like tap water on fire in the US into the face of the (hydraulic fracturing) industry.



Dragons, John Nieto, Deanna Burgart and Jamie Wills, surrounded by the 2019 Challengers and the conference planning committee. Back row: Ryan Green, Mitchell Boyne, Neil Fleming, Jorge Nustes-Andrade, Zahra Esmailzadeh, Paulina Wozniakowska, Jordan Phillips, Aly Abdelaziz, Mauricio Reyes-Canales, Rabia Ladha, Earl Magsipoc, and Jieyu Zhang. Front row: Sarah Saad, Wayne Park, Rasoul Sheikmal, Yiru Zhou, Mei Li, Hamzeh Ali Mohammadi, and Edouard Kravchinsky.

Training is a journey travelled by students in the disciplines of geoscience, engineering and public policy, learning how to collaborate within a team and how to compete in an arena of other inter-disciplinary teams. Dr. David Eaton of the University of Calgary has partnered with 10 researchers from the universities of Alberta, Toronto, Waterloo and Western Ontario to deliver this much-needed approach to preparing university graduates for the workforce. This *Collaborative Research and Training Experience* (CREATE) is a 6-year pilot program funded by NSERC, and its sustainability relies on industry support by the year 2022.

Challenge Week represents the summit of the program, when students from across Canada gather in Calgary for the first time, following completion of a 6-month project. In reality, the whole thing kicked off with a 4-day workshop of Indigenous Relations Training (IRT), May 21 – 24, hosted by the UoC Writing Symbols Lodge (formerly known as the Native Centre). IRT introduces students to Indigenous ways of knowing, of doing, and of connecting that they can build on throughout their lives and careers in the energy sector. On May 26, they completed Individual & Team Performance (ITP) Metrics Workshops, hosted by Dr. Tom O'Neill's Industrial-Organizational Psychology Team at the UoC. ITP introduces students to the science of communication, conflict resolution and self- and peer-evaluation through measurement of team functionality metrics. In short, ITP empowers students with the fundamentals of effective people management strategies for leadership roles in the workforce.

"Coming together is a beginning, staying together is progress, and working together is success." – Henry Ford



Monday, May 27. The Welcome Breakfast opened with an update from Dr. Eaton that program goals by year have been met or exceeded, training 44 graduate students in 2018 and 2019 (28 masters, 16 doctoral) and 2 undergraduate summer interns, with 35% of the graduates from year 1 returning to attend exchanges, internships and/or serve on the conference planning committee. Areas to improve on include the 60:40 male-to-female ratio and the 4% Indigenous student enrolment. Monday (and Tuesday) morning featured a line-up of engaging speakers from across North America as a warm-up to the main event. The appetizer buffet and cash bar opened at midday, as this year's Dragons, John Nieto (Canbriam Energy), Jamie Wills (Waterline Resources) and Deanna Burgart (Indigenous Engineering Inclusion), were introduced. Energy filled the room during the scientific poster Q&A and a plenary networking session in *Speed-Dating* format. All teams will be presenting their posters at the CSUR Technical Lunch in Calgary on **Thursday, June 20** (mark your calendar) and at the IUGG Conference in Montreal in July.



Induced Seismicity: Prediction/Mitigation Team, Mitchell Boyne, Hamzeh Ali Mohammadi (shown above), Edouard Kravchinsky and Zahra Esmaeilzadeh explain ground shaking probabilities to the Dragons and David Eaton during the poster session component.

Tuesday, May 28. In a unique demonstration of science meets policy, teams communicated concepts to their audience through verbal, written, pictorial and animated means of information transfer with a 15-min presentation and a 90-s video, followed by a 30-min Q&A from the Dragons and the audience. The 2019 themes included hydraulic fracturing and induced seismicity, with specific focus on topics of wastewater disposal, alternate fracking fluids, induced seismicity and modification of the current AER Traffic Light System during drilling and hydraulic fracturing activities.



Hydraulic Fracturing: Disposal Team (Wayne Park, Melissa MacDonald, Mauricio Reyes Canales and Rabia Ladha) presents its findings to the Dragons on the reuse and disposal of wastewater.

The ability to deliver information to an audience with concise, effective diction and visual representation is a skillset that does not come easily to most, yet it is often the deal-breaker in swaying public perception and will likely impact the future of these young professionals. Being able to engage with industry and Indigenous communities in both written and oral formats is a valued skillset for effective communication, understanding and decision-making for the future.



Induced Seismicity: Traffic Team and Challenge Winners, Neil Fleming (U.Calgary), Mei Li (U.Toronto), Yiru Zhong (U.Alberta) and Ryan Green (U.Calgary), each took home bragging rights and a \$1000 scholarship for their idea to revise the Traffic Light System used during hydraulic fracturing.

What wasn't mentioned during the competition is that each team also wrote a policy paper, suitable for publication in an academic journal. They elected a project manager, who scheduled weekly online meetings, prepared agendas and recorded minutes, which were submitted in journal report format upon entering the competition. These written submissions were used to evaluate team cohesiveness and deeper understanding of their chosen topics.

While the Dragons were deliberating, the Energy Champ Panels took the floor, with each SME delivering a 5-min thought-provoking position on either: (1) Public Perception and the Future Sustainability of the Oil/Gas Industry, or (2) Orphan Wells, Legacy Pipelines, Climate Change and the Carbon Tax. Enthusiastic discussions continued into the networking session that followed. By popular demand, we will narrow the focus of each topic (3 bullets) and expand not only the Q&A timeslot for each panel, but also the number of panels next year.



Public Perception and the Future Sustainability of the Oil/Gas Industry Energy Champ Panelists (from left to right): Ramez Hanna Alla (Chevron), Donna Phillips (Canbriam Energy), Dave Browne (Trican Wells Services), Bill Whitelaw (JWN Energy) and Brad Hayes (CSUR & Petrel-Robertson Consulting).



Orphan Wells, Legacy Pipelines, Climate Change and the Carbon Tax Energy Champ Panelists (from left to right): Brian Schulte (Shiefer Reservoir Consulting), Jim Reimer (Retired, Painted Pony Energy), Heather Lemon (AER), Lars DePauw (Orphan Well Assoc), and Mike Johnson (NEB).

Wednesday, May 29: Geology Field Tour of the Kananaskis area, hosted by the UoC's Dr. Per Pedersen and Dr. Paul McKay, was for many students, their first look at the Montney, the Cardium and the Banff Formations, not to mention the mountain sheep.



Geology Field Experience, where students from across Canada got a first-hand look at the Montney Formation and the less than horizontal bedding planes of the west.

Thursday, May 30 Workshops: Induced Seismicity in Western Canada and Beyond by Dr. David Eaton, a Case Study from the Northwest Territories by Deborah Archibald (UoC), Machine Learning by Dr. Nancy Chen (UoC), and a combined Isotope Geochemistry talk by Dr. Karlis Muehlenbachs (UoA) and lab tour by Dr. Bernhard Mayer (UoC).

Many thanks to our workshop hosts and invited speakers: Dan Allan (CSUR), Dr. Jérôme Marty (CCA), Martin Olszynski (UoC), Arthur Cunningham (Round Table Consulting), Dr. Kristen van de Biezenbos (UoC), Tom Murphy (Penn State MCOR), Dr. Brad Hayes (Petrel Robertson Consulting), Hamreet Sekhon (UoC), Dan Soeder (South Dakota School of Mines & Technology), Dr. Paul McKay (Shale Petroleum), Oba Harding (Mitacs), and Leah Pezer (UoC).

Friday, May 31: Hydraulic Fracturing Field Tour, hosted by John Evans (Chevron), was an eye opener to the magnitude of a field operation, as well as the environmental considerations and the safety precautions applied onsite. The remainder of the tour to visit the Sucker Creek First Nation community had to be deferred due to the evacuation alert issued in connection with the wild fire in High Level.



Unconventional Resource Extraction Field Experience, where students observed a hydraulic fracturing operation in Alberta to link theory to practical application.

Internships. Many thanks to Oba Harding at Mitacs for assistance in completing our first theme-based proposal so that industry collaborators can now employ student interns through ReDeveLoP with **\$7,500 financial assistance** and minimal processing time. This summer, CSUR hired two of our graduates, Jieyu Zhang and Paulina Wozniakowska, under this new blanket proposal. For further information, please contact the ReDeveLoP Program Manager, Dr. Celia Kennedy.

Upcoming Exchanges & Workshops for Students & Industry Champions

Monday, August 26-30: Introduction to Passive Seismic Methods, hosted by Dr. David Eaton, University of Calgary. Academic credit course code GOPH667. Industry professionals receive Certificate of Completion. There will be an afternoon field trip to Trican Well Services for a tour of their R&D Lab.

Monday, October 7: Rock Mechanics Lab Tour, hosted by Dr. Giovanni Grasselli, University of Toronto.

Wednesday, October 9-11: Immersive Shale Field Tour, hosted by Tom Murphy, Director of Penn State Marcellus Centre for Outreach and Research (MCOR). Industry champions are welcome for a fee. ReDeveLoP students will receive travel scholarships. For more information contact the ReDeveLoP Program Manager.

Applications for 2019-20. Student Applications are available on the website for students interested in applying to the CREATE ReDeveLoP Program for the Fall 2019. Successful applicants are eligible for up to 2 years' scholarship funding.



Dragons, Deanna Burgart, John Nieto and Jamie Wills, challenged the teams to think fast on their feet during the Q&A.



Engaged in the moment, audiences of industry, government and student participants were anything but bored during The ReDeveLoP Challenge and Energy Champ Panel discussions.



Students get up close and personal with the Montney Formation at a roadside stop.



Geochemist, Mike Nightingale, guides students through a tour of the U.Calgary Isotope Labs.

Sincere thanks to our collaborators

