# Crustal Fluids, Friction and Faults: What can we learn from injection-induced earthquakes?

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2019-20 CSEG Distinguished Lecturer
Tour blog: cdl2019.blogspot.com

## Abstract

Induced earthquakes - seismic events that are triggered by human activities - have been linked to various anthropogenic processes including deep underground mining, impoundment of a large surface water reservoir behind a dam, and subsurface injection or withdrawal of fluids. Several energy technologies, such as shale-gas development and enhanced geothermal systems, rely on subsurface fluid-injection processes that mimic certain naturally occurring phenomena. The deployment of these energy technologies has led to felt seismicity in some areas where certain necessary conditions are met, notably the presence of a pre-existing fault network and a hydraulic pathway connecting it to the injection source. Passive-seismic monitoring is a rapidly developing geophysical technique used to characterize fracture growth, fluid diffusion and fault activation across a range of temporal and spatial scales. Recent investigations of induced seismicity are yielding surprising new insights about fluid transport, ground motion, and the frictional behaviour of faults. Examination of induced events could therefore aid in understanding natural earthquakes in intraplate regions and, more generally, fluid-driven processes in the Earth's crust.

## Biography

**Professor David Eaton** holds the NSERC/Chevron Industrial Research Chair in Microseismic System Dynamics, in the Department of Geoscience at the University of Calgary. Together with graduate students and postdoctoral fellows, his work focuses on advancement of research, education and technological innovations in passive seismic monitoring and deep lithospheric structure of continents. He received a BSc from Queens and MSc and PhD from the University of Calgary. His postdoctoral research experience included work at Arco's Research and Technical Services (Plano, Texas) and the Geological Survey of Canada (Ottawa). In 2007, he rejoined the University of Calgary as Head of the Department of Geoscience, after an 11-year academic career at the University of Western Ontario.

# Schedule

*Note: schedule is tentative and subject to change.*

| Date | Time | Location |
|---|---|---|
| Sept. 12, 2019 | 3:30pm | U of Calgary |
| Oct. 7, 2019 | 1:00pm | Memorial University |
| Oct. 9, 2019 | 11:00am | GSC-Atlantic |
| Oct. 9, 2019 | 5:30pm | Dalhousie University |
| Oct. 10, 2019 | 12:00pm | University of New Brunswick |
| Oct. 11, 2019 | 12:30pm | Acadia University |
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| Jan. 9, 2020 | 10:00am - 11:00am | NRCan |
| Jan. 9, 2020 | 11:30am - 12:30pm | Ottawa-Carleton |
| Jan. 10, 2020 | 11:00am - noon | McGill-UQAM |
| Jan. 13, 2020 | 10:30am - 11:30am | Queens |
| Jan. 14, 2020 | 4:30pm - 6:00pm | Toronto |
| Jan. 16, 2020 | 2:00pm - 3:00pm | Waterloo |
| Jan. 17, 2020 | 2:30pm - 3:30pm | Western |
| | | |
| Feb. 5, 2020 | TBD | Manitoba |
| Feb. 6, 2020 | 3:00pm - 4:00pm | Alberta |
| Feb. 7, 2020 | 3:30pm - 4:30pm | Saskatchewan |
| Feb. 13, 2020 | TBD | Mount Royal University |
| Mar. 5, 2020 | 4:00pm - 5:00pm | UBC |
| Mar. 10, 2020 | 3:00pm - 4:00pm | UVic/PGC |