

**JOHN W. MOLSON**  
**Ph.D., P.Eng. (Ontario), ing. (Québec)**

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Université Laval, Department of Geology and Geological Engineering  
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**Languages:** Bilingual English/French (Attestation: OQLF); conversational German.

**Citizenship:** Canadian

**Research Interests:**

Development and application of computer simulation models for interpreting physical and reactive transport processes in groundwater, surface water and earth science systems. Expertise in modelling multi-phase flow, NAPL dissolution, biodegradation and transport of organic contaminants, thermal transport, fractured systems, geochemical systems, acid mine drainage and 3D capture zones for water supply and groundwater protection.

**Academic Records and Awards:**

Ph.D. (2000), Earth Sciences, (Hydrogeology), University of Waterloo

M.Sc. (1988), Earth Sciences, (Hydrogeology), University of Waterloo

Hon. B.Sc. (1985), (Geotech. Engineering), University of Waterloo

**Professional Experience & Appointments:**

June 2017 – present: Professeur titulaire, Université Laval, Dept. of Geology & Geological Engineering, and Canada Research Chair in Quantitative Hydrogeology of Fractured Porous Media (2008-13 and 2013-18).

April 2002 – present: Adjunct Professor, Dept. of Earth & Environ. Sciences, University of Waterloo

June 2013 – May 2017: Associate Prof., Université Laval, Dept. of Geology & Geological Engineering

February 2015 – 2018: Habilitation (Adjunct), Dept. of Environmental Sciences, UQAM

Sept. 2002 – Aug. 2008: Res. Assoc.: Civil, Geol. & Mining Engineering, Polytechnique Montreal

**Recent National & International Invitations:**

- Invited speaker: RENEW Conference, Queen's Univ. Kingston, ON Canada, Nov 2-3. 2017.
- Invited participant: Tight Rock Roundtable, Calgary & Banff, AL, Nov 24-25, 2016.
- Invited participant: Permafrost & Hydrogeology Workshop, Yellowknife, NWT, Nov. 2016.
- Invited speaker: Dept. of Earth Sciences, University La Sapienza, Rome, Italy, April 2015.
- Invited speaker: Energy Geoscience and Geo-Engineering Collaborative Open Innovation Network (EG-COIN), Atelier sur la Géoscience et la Géo-Ingénierie des Gaz de Schiste (Québec), Feb. 2015.
- Invited scientist and speaker: Eötvös Loránd Univ., Dept. of Physical & Applied Geology, Budapest, Hungary, Nov. 2014 & May 2015.
- Invited speaker: InterFrost Workshop, Freeze-thaw modeling, U. Paris VI, Nov.&April 2014-15.
- Invited scientist and 3x Guest Speaker: Eawag Aquatic Research Institute, Dübendorf (Zurich), Switzerland, June 2010, and Sept. 2014-June 2015 (sabbatical year).
- Invited speaker and invited scientist: Czech Technical University, Prague, and Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU), Erlangen, Germany, Nov. 2014

**Current Graduate student supervision: (1) Supervisor, (2) Co-supervisor, (3) Committee/Jury/Thesis Examiner/Pre-doc jury, (4) Work Term Supervisor, (5) MSc. Thesis project (Essai) supervisor**

(1) U. Arai, U. Laval	MSc. candidate, Modelling isotope fractionation, HC biodegradation
(1) M. Khadhraoui, U. Laval	PhD. candidate, Modelling permafrost & sediment transport
(1) M. Cochand, U. Laval	PhD. candidate, Geochemical tracers in permafrost environments
(3) V. Boico, U. Laval	PhD. candidate, Nitrate transport modeling, tile drain fields, Denmark
(2) N. Jaziri, INRS	MSc. candidate, Modélisation de chaleur : systèmes géothermiques
(1) S. Dagenais, U. Laval	MSc. candidate, Modélisation numérique : Buttes de pergélisol
(2) J. Fortin, U. Laval	MSc. candidate, Modélisation : Tassement des buttes de pergélisol
(3) N. Benoit, GSC & E. Polytech.	PhD. candidate, Conceptual model uncertainty
(2) M. Parhizkar, U. Laval	PhD. candidate, 3D thermal hydrogeological model, Umiujaq, Quebec
(2) H.E. Ben Ali, UQAT	PhD. candidate, Mine tailings behaviour in cold climates
(2) M-A. El-Kilani, UQAT	MSc. candidate, Passive bioreactors in cold climates
(3) V. Bouzaglou, INRS	PhD. candidate, Modélisation de la contamination, filtres de Kalman
(2) T. Havril, Eötvös Loránd U.	PhD. candidate, Hydrothermal karst modelling, Budapest, Hungary
(2) A. Gras, U. Laval	PhD. candidate, CO2 sequestration in mine wastes : Royal Nickel
(2) M. Laurencelle, INRS-ETE	PhD. candidate, Paleoclimate flow modelling: Montérégie Est
(1) D. Janos, U. Laval	MSc. 2017, Regional aquifer modelling : Chaudière-Appalaches
(2) A. Sterckx, U. Laval	PhD. 2017, Paleohydrogeology modelling: Baltic Basin, Estonia
(5) P. Rousseville	MSc. 2017, Modélisation multi-phase de stockage du CO2
(5) T. Badou, U. Laval	MSc. 2017, Capture zone modelling
(3) P. Ladevèze, INRS	PhD. 2017, Fracturation en Montérégie Est
(2) M.S. Ghias, U. Laval	PhD. 2017, Permafrost & flow modelling, Iqaluit, Nunavut

**Affiliations/Community Service/Outreach:**

Affiliations & Committees:

- Member: Centre d'Études Nordiques (CEN), CentrEau, et Centre E4M (Université Laval).
- Member: Organizing committee, (Technical Program), GAC-MAC/IAH-CNC 2019, Quebec City.
- Member: Comité pour l'Évaluation Environnementale Stratégique (ÉES) sur le gaz de schiste, 2011-2014
- Member: Council of Canadian Academies (CCA) Expert Panel on *Harnessing Science and Technology to Understand the Environmental Impacts of Shale Gas Extraction, 2012-2014.*
- Expert panel member: Quebec BAPE Commission on Shale Gas, Saint-Hyacinthe QC, October 2010.
- Member: American Geophysical Union, International Assoc. of Hydrogeologists (IAH/CNC), Prof. Engineers Ontario, l'Ordre des ingénieurs du Québec, Réseau Québécois sur les eaux souterraines (RQES)

Recent Editorships & Peer Review:

- Associate Editor, *Grundwasser*, (Springer), 2010-2017.
- Associate Editor, *Canadian Geotechnical Journal*, (NRC Research Press), 2012-2017.
- Outstanding Reviewer Award: 2014; *Advances in Water Resources*
- Peer review for over 20 leading scientific journals including : *Water Resour. Res.*, *J. of Contam. Hydrol.*, *J. of Hydrology*, *Ground Water*, *Hydrogeo. Journal*, *Water Research*, *Environ. Sci. & Tech.*, *Grundwasser*

Conference Chairs (last 5 years):

- Scientific Rev. Committee & Session co-Chair, IAH-CNC Regional GW Flow Symp., Calgary, June 2017.
- Session co-Chair: 43<sup>rd</sup> IAH Congress, Session 8.06: *Regional Hydrogeology*, Montpellier, Fr., Sept. 2016.
- Session co-Chair: *International Conf. on Groundwater Vulnerability*, Ustroń, Poland, May 25-29, 2015.
- Session co-Chair: *Joint Assembly AGU-GAC-MAC-CGU Spring Meeting*, Session H22B: *Deep Geological*

*Resource Exploitation and Protection of Shallow Groundwater Resources*, Montréal, May 3-7, 2015.

- Session co-organizer and co-Chair: *Hydrogeologic issues facing the mining and gas exploitation industries*, GeoMontréal 2013: 11<sup>th</sup> joint CGS-IAH/CNC Conference, Montreal, QC, 30 Sept.-2 Oct. 2013.
- Session co-Chair: Early Career Hydrogeologists' Session: Topic 2: Recharge and discharge processes and parameters & Topic 7: Significance of flow system approach, IAH International Symposium on Hierarchical Flow Systems in Karst Regions, Budapest, Hungary, 2-7 September, 2013.

**Peer-Reviewed Journal Publications:** (student/post-doc co-authors underlined) (last 5 years; 84 total)

1. Havril, T., Tóth, A., **Molson, J.W.**, Galsa A., Mádl-Szőnyi, J., Impacts of predicted climate change on groundwater flow systems: Can wetlands disappear due to recharge reduction?, Accepted Sept 11, 2017: *Journal of Hydrology*, Special Issue: Climate Change & Recharge, <https://doi.org/10.1016/j.jhydrol.2017.09.020>, 2017.
2. Montcoudiol, N., **J. Molson** & J.-M. Lemieux, Numerical modelling in support of a conceptual model for groundwater flow and geochemical evolution in the southern Outaouais Region, Quebec, Canada, *Canadian Water Resources Journal*, Special Issue : Quebec PACES Projects, <http://www.tandfonline.com/doi/full/10.1080/07011784.2017.1323560>, 2017.
3. Beaudoin, G., Nowamooz, A., Assima, G.P., Lechat, K., Gras, A., Entezari, A., Kandji, E.H.B., Awoh, A-S., Horswill, M., Turcotte, S., Larachi, F., Dupuis, C., **Molson, J.**, Lemieux, J-M., Maldague, X., Plante, B., Bussière, B., Constantin, M., Duchesne J., Therrien, R. Fortier, R., Passive mineral carbonation of Mg-rich mine wastes by atmospheric CO<sub>2</sub>, *Energia Procedia*, 114, p.6083-6086, <http://dx.doi.org/10.1016/j.egypro.2017.03.1745>, 2017.
4. Gras, A., G. Beaudoin, **J. Molson**, B. Plante, B. Bussière, J.M. Lemieux, P.P. Dupont, Isotopic evidence of passive mineral carbonation in mine wastes from the Dumont Nickel Project (Abitibi, Quebec), *International Journal of Greenhouse Gas Control*, (60) 10–23, <http://dx.doi.org/10.1016/j.ijggc.2017.03.002>, May 2017.
5. Pabst, T., Aubertin, M., Bussière, B., and **Molson, J.**, Experimental and numerical evaluation of single-layer covers placed on acid-generating tailings, *Journal of Geotechnical and Geological Engineering*, <https://doi.org/10.1007/s10706-017-0185-0>, February 2017.
6. Pabst, T., **Molson, J.**, Aubertin, M., and Bussière, B., Reactive transport modelling of the hydro-geochemical behaviour of partially oxidized acid-generating mine tailings with a monolayer cover, *Applied Geochemistry*, 78, 219-233, <http://dx.doi.org/10.1016/j.apgeochem.2017.01.003>, 2017.
7. Chow, R., E.O. Frind, M.E. Frind, J.P. Jones, M.R. Sousa, D.L. Rudolph, **J.W. Molson**, W. Nowak, Delineating baseflow contribution areas for streams – A model and methods comparison. *Journal of Contaminant Hydrology*, vol.195; p11-22, <http://dx.doi.org/10.1016/j.jconhyd.2016.11.001>, 2016.
8. Shojae-Ghias, M., Therrien, R., **Molson J.**, & Lemieux, J-M., Controls on permafrost thaw in a coupled groundwater flow and heat transport system: Iqaluit Airport, Nunavut, Canada, *Hydrogeology Journal*, <http://dx.doi.org/10.1007/s10040-016-1515-7>, 2016.
9. Havril, T., **Molson, J.**, Mádl-Szőnyi, J., Evolution of fluid flow and heat distribution over geological time scales at the margin of unconfined and confined carbonate sequences - A numerical investigation based on the Buda Thermal Karst analogue, *Journal of Marine and Petroleum Geology*, Special issue: *Basin Hydrodynamics & Resources*, <http://dx.doi.org/10.1016/j.marpetgeo.2016.10.001>, 2016.
10. Raynauld, M., Peel, M., Lefebvre, R., **Molson, J.**, Crow, H., Ahad, J., Ouellet, M., and Aquilina, L., Understanding shallow and deep flow for assessing the risk of hydrocarbon development to groundwater quality, *Journal of Marine and Petroleum Geology*, Special issue: “*Basin Hydrodynamics & Resources*”, <http://dx.doi.org/10.1016/j.marpetgeo.2016.09.026>, 2016.

11. Roy, N., **Molson, J.**, Lemieux, J.-M., van Stempvoort, D., and Nowamooz, A., Three-dimensional numerical simulations of methane gas migration from decommissioned hydrocarbon production wells into shallow aquifers, *Water Resources Research*, <http://dx.doi.org/10.1002/2016WR018686>, 2016. (Paper chosen as a *Research Highlight* in EOS: “What happens to methane that leaks from abandoned wells ?” Stanley, S., <http://dx.doi.org/10.1029/2016EO057195>; EOS 97, Aug 2016).
12. Lemieux J.-M., Fortier, R., Talbot-Poulin, M.-C., **Molson, J.**, Therrien, R., Ouellet, M., Banville, D., Cochand, M., Murray, R., Groundwater occurrence in cold environments: Examples from Nunavik, Canada. *Hydrogeology Journal*, <http://dx.doi.org/10.1007/s10040-016-1411-1>, 2016.
13. Lechat, K., Lemieux, J.-M., **Molson, J.**, Beaudoin, G., Hébert, R., Field evidence of CO<sub>2</sub> sequestration by mineral carbonation in ultramafic milling wastes, Thetford Mines, Canada, *International Journal of Greenhouse Gas Control*, 47, 110-121, <http://dx.doi.org/10.1016/j.ijggc.2016.01.036>, 2016.
14. Rühaak, W., Anbergen, H., Grenier, C., McKenzie, J., Kurylyk, B.L., **Molson, J.**, Roux, N., Sass, I., Benchmarking Numerical Freeze/Thaw Models, European Geosciences Union General Assembly 2015, EGU, Division Energy, Resources & Environment, ERE, *Energy Procedia*, 76, 301-310, <http://dx.doi.org/10.1016/j.egypro.2015.07.866>, 2015.
15. Viswanathan, V.C., **Molson, J.**, Schirmer, M., Does river restoration affect diurnal and seasonal changes to surface water quality? A study along the Thur River, Switzerland, *Science of the Total Environment*, DOI: <http://dx.doi.org/10.1016/j.scitotenv.2015.05.121>, 2015.
16. Nowamooz, A., J.-M. Lemieux, **J. Molson**, and R. Therrien, Numerical investigation of methane and formation fluid leakage along the casing of a decommissioned shale-gas well, *Water Resources Research*, <http://dx.doi.org/10.1002/2014WR016146>, 2015.
17. Montcoudiol, N., **J. Molson** & J.-M. Lemieux, Cloutier, V., A conceptual model for groundwater flow and geochemical evolution in the southern Outaouais Region, Québec, Canada. *Applied Geochemistry* 58, p62-77, <http://dx.doi.org/10.1016/j.apgeochem.2015.03.007>, 2015.
18. Tremblay, Y., Lemieux, J.-M., Fortier, R., **Molson, J.**, Therrien, R., Therrien, P., Comeau, G., Talbot Poulin, M.-C., Semi-automated filtering of data outliers to improve spatial analysis of piezometric data, *Hydrogeology Journal*, <http://dx.doi.org/10.1007/s10040-015-1257-y>, 2015.
19. Lemieux, J.M., Hassaoui, J., **Molson, J.W.**, Therrien, R., Therrien, P., Chouteau, M., Ouellet, M., Simulating the impact of climate change on the groundwater resources of the Magdalen Islands, Québec, Canada, *J. Hydrol.: Regional Studies*, v3 p.400-423, doi:10.1016/j.ejrh.2015.02.011, 2015.
20. Montcoudiol, N., **J. Molson** & J.-M. Lemieux, Groundwater geochemistry of the Outaouais Region Québec, Canada: A regional scale study. *Hydro J.*, <http://dx.doi.org/10.1007/s10040-014-1190-5>, 2014.
21. Neuweiler, F., **Molson, J.**, Fortin-Morin, F., Larmagnat, S., Sponge spicules, silicification and sequence stratigraphy, *J. of Sedimentary Research*, DOI: <http://dx.doi.org/10.2110/jsr.2014.86>, 2014.
22. Frind, E.O., **Molson, J.W.**, Sousa, M.R., and Martin, P.J., Insights from four decades of model development on the Waterloo Moraine: A review, *Canadian Water Resources J.* (Special Issue: The Waterloo Moraine, E. Frind, Ed.), 149-166, <http://dx.doi.org/10.1080/07011784.2014.914799>, 2014.
23. Benoit, N., Nastev, M., Blanchette, D., and **Molson, J.**, Hydrogeology and hydrogeochemistry of the Chaudière River Watershed aquifers, Québec, Canada, *Canadian Water Resources J.*, 39(1), 32-48, <http://dx.doi.org/10.1080/07011784.2014.881589>, 2014.
24. Assima, G.P., Larachi, F., **Molson, J.**, Beaudoin, G., New tools for the stimulation of dissolution and carbonation of ultramafic mining residues, *Canadian Journal of Chemical Engineering* (Special Issue, J.B. Joshi, Ed.), Vol. 92, Issue 12, p 2029–2038, <http://dx.doi.org/10.1002/cjce.22066>, Dec. 2014.
25. Assima, G.P., Larachi, F., **Molson, J.**, Beaudoin, G., Comparative study of five Québec ultramafic mining residues for direct ambient carbon dioxide mineral sequestration, *Chemical Engineering Journal*,

- 245, 56–64, <http://dx.doi.org/10.1016/j.cej.2014.02.010>, 2014.
26. Assima, G.P., Larachi, F., **Molson, J.**, Beaudoin, G., Impact of temperature and oxygen availability on the dynamics of ambient CO<sub>2</sub> mineral sequestration by nickel mining residues, *Chemical Engineering Journal*, 240, 394–403, <http://dx.doi.org/10.1016/j.cej.2013.12.010>, 2014.
  27. Assima, G.P., Larachi, F., **Molson, J.**, Beaudoin, G., Emulation of ambient carbon dioxide diffusion and carbonation within nickel mine residues: *Minerals Engineering*, <http://dx.doi.org/10.1016/j.mineng.2013.09.002>, 2014.
  28. Pabst, T., Aubertin, M., Bussière, B., and **Molson, J.**, Column tests to characterize the hydrogeochemical response of pre-oxidized acid-generating tailings with a monolayer cover. *Water Air Soil Pollution*, 225:1841, <http://dx.doi.org/10.1007/s11270-013-1841-5>, 2014.
  29. Bussière, B., Demers, I., Dawood, I., Plante, B., Aubertin, M., Peregoedova, A., Pepin, G., Lessard, G., Intissar, R., Benzaazoua, M., **Molson, J.W.**, Chouteau, M., Zagury, G.J., Monzon, M., Laflamme, D., Comportement géochimique et hydrogéologique des stériles de la Mine Lac Tio, *Déchets - Sciences et Techniques*, 18(64): 15-23, 2013.
  30. Assima, G.P., Larachi, F., **Molson, J.**, Beaudoin, G., Accurate and direct quantification of native brucite in serpentine ores - New methodology and implications for CO<sub>2</sub> sequestration by mining residues, *Thermochimica Acta*, 566, 281–291, <http://dx.doi.org/10.1016/j.tca.2013.06.006>, 2013.
  31. Demers, I., **Molson, J.W.**, Bussière, B., Laflamme, D., Numerical modeling of contaminated neutral drainage from a waste rock field test cell, *Applied Geochemistry*, <http://dx.doi.org/10.1016/j.apgeochem.2013.02.025>, 2013.
  32. Pehme, P., Parker, B.L., Cherry, J.A., **Molson, J.W.** and J.P. Greenhouse, Enhanced detection of hydraulically active fractures by temperature profiling in lined heated bedrock boreholes, *J. of Hydrology*, 484, 1–15, <http://dx.doi.org/10.1016/j.jhydrol.2012.12.048>, 2013.
  33. Assima, G.P., Larachi, F., Beaudoin, G., **Molson, J.**, Dynamics of carbon dioxide uptake in chrysotile mining residues - Effect of mineralogy and liquid saturation, *Int. J. Greenhouse Gas Control*, <http://dx.doi.org/10.1016/j.ijggc.2012.10.001>, 2013.

#### Conference Proceedings, Bulletins, Abstract Presentations and Posters: Last 2 years (243 total)

1. Parhizkar, M., Therrien, R., **Molson, J.**, Lemieux J-M., Fortier, R., Talbot-Poulin, M-C., Therrien, P., Ouellet, M., An integrated surface-subsurface flow model of the thermo-hydrological behavior and effect of climate change in a cold-region watershed in northern Quebec, Canada, *GeoOttawa 2017*, 12th Joint CGS/IAH-CNC Groundwater Conference, Ottawa, Canada, Oct. 1-4, 2017.
2. Dagenais, S., **J. Molson**, J-M. Lemieux, R. Fortier, and R. Therrien, Coupled cryo-hydrogeological modelling of permafrost degradation at Umiujaq, Quebec, Canada, Abstract & oral presentation: *GeoOttawa 2017*, 12th Joint CGS/IAH-CNC Groundwater Conference, Ottawa, Canada, Oct. 1-4, 2017.
3. Fortier, R., Banville, D.R., Lemieux, J-M. **Molson, J.**, Therrien, R., and Ouellet, M., Development of a 3D cryohydrogeological model of a small watershed in a degrading permafrost environment in northern Quebec, *GeoOttawa 2017*, 12th Joint CGS/IAH-CNC Groundwater Conf., Ottawa, Canada, Oct.1-4, 2017.
4. Havril, T., Tóth, A., Mádl-Szőnyi, J., **Molson, J.W.**, Effects of hydrological extremes and climate change on surface water – groundwater interaction : Example of the Tihany Peninsula, Hungary, 44th IAH International Congress, Dubrovnik, Croatia, 25-29 Sept., 2017.
5. Laurencelle, M., Lefebvre, R., **Molson, J.**, Parent, M., Paleo-hydrogeological evolution of a fractured-rock aquifer following the Champlain Sea Transgression in the St. Lawrence Valley (Canada), Poster: IAH Calgary Symposium 2017, Regional groundwater flow systems, 26-28 June, Calgary, AL, 2017.

6. Janos, D., **Molson, J.**, Lefebvre, R., Benoit, N., Numerical simulations of regional groundwater flow and residence time distributions in the Chaudière-Appalaches region, Québec, Abstract & oral presentation: IAH Symp. 2017, Regional groundwater flow systems, 26-28 June, Calgary, AL, 2017.
7. Therrien, R., J-M. Lemieux, R. Fortier, **J. Molson**, Ressources en eau souterraine au Nunavik, Présentation orale : 85<sup>e</sup> ACFAS 2017, Session 624 Inst. Nord. QC, McGill U., Montréal, 8 mai 2017.
8. Cochand, M., **Molson, J.**, Barth, J.A.C., van Geldern, R., Lemieux, J.-M., Fortier, R. & Therrien, R., Hydrogeochemical characterisation of groundwater in a small watershed in a discontinuous permafrost zone, In: *European Geophysical Union mtg. 2017: Session CR4.2 Quantification of permafrost and hydrogeological interactions in a changing climate*, EGU2017-4474, Vienna, Austria, 23-28 April 2017.
9. Horswill, M., Dupuis, J.C., Nowamooz, A., Beaudoin, G., Lemieux, J.-M., Fortier, R., **Molson, J.**, and Constantin, M., Petrophysical signature of carbonates generated from the carbonation of magnesium-rich mining waste at Thetford Mines, Québec, Canada, *SAGEEP 2017*, Denver USA, March 19-23, 2017.
10. Parhizkar, M., Therrien, R., **Molson, J.**, Lemieux J-M., Fortier, R., Talbot-Poulin, M-C., Therrien, P., Ouellet, M., Application of a 3D model to assess the thermo-hydrological effects of climate warming in a discontinuous permafrost zone, Umiujaq, northern Quebec, Canada, Abstract 131977 & poster, *AGU Fall Meeting*, San Francisco, US, Dec. 2016.
11. Fortier, R., Lemieux J-M., **Molson, J.**, Therrien, R., Ouellet, M., Geophysical investigation and monitoring of thermo-hydraulic conditions of a closed talik and icing of the Kuuguluk River at Salluit, northern Quebec, Canada, *AGU Fall Meeting*, San Francisco, US, Dec. 2016.
12. Beaudoin, G., Assima, G.P., Lechat, K., Gras, A., Nowamooz, A., Entezari, A., Horswill, M., Turcotte, S., Larachi, F., Dupuis, C., **Molson, J.**, Lemieux, J-M., Maldague, X., Plante, B., Bussière, B., Constantin, M., Duchesne J., Therrien, R. Fortier, R., Passive mineral carbonation of Mg-rich mine wastes by atmospheric CO<sub>2</sub>, Abstract & oral presentation: *Greenhouse Gas Control Technologies (GHGT-13)*, Lausanne, Switzerland, 14-18 November 2016.
13. **Molson, J.**, J.M. Lemieux, R. Fortier, R. Therrien, M. Ouellet, J.A.C. Barth, R. van Geldern, M. Cochand, S. Dagenais, J. Fortin, M. Parhizkar, Hydrogeological characterisation of a degrading permafrost environment: A catchment-scale study in Umiujaq, Québec, Canada, *Yellowknife Geoscience Forum - Permafrost & Hydrogeology Interactions*, Nov. 15-17, 2016.
14. Pabst, T., Aubertin, M., Bussière, B., and **Molson, J.**, On the optimum use of waste rock in cover systems for the reclamation of acid-generating tailings sites, In Proceedings: *Geo Vancouver 2016 - 69th CGS Conference*, Vancouver BC, Canada, Oct. 2-5, 2016.
15. Janos, D., **Molson, J.**, & Lefebvre, R., Regional flow and groundwater residence time simulations in Chaudière-Appalaches, Québec, Canada: Implications for interpreting regional geochemistry, In Proceedings: *43<sup>rd</sup> IAH Congress*, Montpellier, France, 25-29 Sept. 2016.
16. Havril, T., **Molson, J.**, Mádl-Szőnyi, J., Evolution of regional groundwater flow and heat distribution over geological time scale at the margin of unconfined and confined carbonate sequences, In Proceedings (abstract and e-poster): *43<sup>rd</sup> IAH Congress*, Montpellier, France, 25-29 Sept. 2016.
17. Laurencelle, M., Lefebvre, R., **Molson, J.**, Parent, M., Modeling of the palaeo-hydrogeological evolution of a fractured-rock aquifer following the Champlain Sea Transgression in the St. Lawrence Valley (Quebec), In Proceedings: *43<sup>rd</sup> IAH Congress*, Montpellier, France, 25-29 Sept. 2016.
18. Nowamooz, A., Therrien, R., **Molson, J.**, Raymond, J., Malo, M., Commeau, F-A., and Bedard, K., Numerical investigation of enhanced geothermal system performance in a sedimentary basin, In Proceedings (e-poster): *43<sup>rd</sup> IAH Congress*, Montpellier, France, 25-29 Sept. 2016.
19. Havril, T., **Molson, J.**, Mádl-Szőnyi, J., Numerical simulation of fluid flow and heat transport evolution over geological time scales for the Buda Thermal Karst, Hungary, Abstract & oral presentation, *Eurokarst 2016*, Neuchâtel, Switzerland, 5-7 Sept. 2016.

20. Cochand, M., **Molson, J.**, Barth, J.A.C., van Geldern, R., Lemieux, J.-M., Fortier, R. & Therrien, R., Groundwater dynamics and transport processes in a discontinuous permafrost environment, *2016 Goldschmidt Conference*, 26 June – 1 July 2016, Yokohama, Japan.
21. Grenier, C., Roux, N., Anbergen, H., Bense, V., Coon, E., Collier, N., Costard, F., Ferry, M., Frampton, A., Frederick, J., Holmen, J., Jost, A., Kokh, S., Kurylyk, B., McKenzie, J., **Molson, J.**, Orgogozo, L., Rivière, A., Rühaak, W., Scheidegger, J., Selroos, J.-O., Therrien, R., Vidstrand, P., Voss, C., The InterFrost benchmark of thermo-hydraulic codes for cold regions hydrology – First inter-comparison phase results, Abstract in: *ICOP2016 for topic 18: Permafrost Hydrology & 19: Groundwater systems under a changing permafrost, XI Internat. Conf. on Permafrost, Potsdam, Germany, 20-24 June 2016.*
22. Cochand, M., **Molson, J.**, Lemieux, J.-M., Barth, J.A.C., van Geldern, R., Fortier, R. & Therrien, R., Assessing groundwater dynamics in a discontinuous permafrost environment using hydrogeochemical tracers, In: *ICOP2016: XI Internat. Conf. on Permafrost, Potsdam, Germany, 20-24 June 2016.*
23. Horswill, M., Dupuis, J.C., Nowamooz, A., Lemieux, J.-M., Fortier, R., **Molson, J.**, Beaudoin, G. and Constantin, M., Petrophysical signature of carbonates generated from the carbonation of magnesium-rich mining waste at Thetford Mines, QC., *CGU, Annual Mtg, Fredericton NB, May 29- June 2, 2016.*
24. Nowamooz, A., Dupuis, J.C., Lemieux, J.-M., Fortier, R., Beaudoin, G., **Molson, J.**, and Constantin, M., Long-term monitoring of CO2 sequestration in magnesium-rich mining waste at Thetford Mines, QC, *Canadian Geophysical Union, Annual Meeting, Fredericton NB, May 29- June 2, 2016.*
25. Nowamooz, A., **Molson, J.**, Therrien, R., Raymond, J., Malo, M., Commeau, F.-A., and Bedard, K., Numerical investigation of the geothermal potential of the St. Lawrence Lowlands basin, Quebec, Canada, In Proceedings : 43<sup>rd</sup> IAH-CNC Conference, Montreal, Canada, May 24-27, 2016.
26. Havril, T., Mádl-Szőnyi, J., **Molson, J.**, Regional fluid flow and heat distribution over geological time scales at the margin of unconfined and confined carbonate sequences, Abstract & Oral presentation EGU2016-8929: Session HS8.2.9 Groundwater vulnerability and circulation, *European Geosciences Union - General Assembly 2016*, Vienna, Austria, 17-22 April 2016.
27. Cochand, M., **Molson, J.**, Lemieux, J.-M., Barth, J.A.C., van Geldern, R., Fortier, R. & Therrien, R., Évaluation de la dynamique des eaux souterraines à l'aide de traceurs hydrogéochimiques dans un environnement pergélisolé en voie de dégradation au Québec nordique, Abstract & Oral Presentation : 2016 Annual Colloquium: Centre d'Etudes Nordiques, U. Laval, Trois Rivières, QC, 11 Feb. 2016.

#### Copyrighted Numerical Simulation Models & Manuals:

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1. **Molson, J.W.**, E.O. Frind, *HEATFLOW-SMOKER USER GUIDE*, Density-dependent flow and advective-dispersive transport of mass, thermal energy or residence time in 3D fractured porous media, Version 5.0, Université Laval & University of Waterloo, 2017.
2. **Molson, J.W.**, *BIONAPL/3D User Guide*, A 3D coupled flow and multi-component NAPL dissolution and reactive transport model, Université Laval & University of Waterloo, 2017.
3. **Molson, J.W.** and E.O. Frind, *FLONET/TR2 User Guide*, A Two-Dimensional Simulator for Groundwater Flownets, Contaminant Transport and Residence Time, Version 5, Université Laval & University of Waterloo, 57 pp, 2017.
4. **Molson, J.W.**, E.O. Frind, *SALTFLOW*, A 3D groundwater flow and density-dependent mass transport model, version 3.0, Université Laval & University of Waterloo, 2017.
5. **Molson, J.W.**, Beckers, J., Frind, E.O. and Martin, P.J., *WATFLOW/3D v4.0*, A 3D Groundwater Flow Model, Department of Earth Sciences, University of Waterloo, 2002.