

ALEXANDRA KUSHNIR**Date of birth: 10/11/1985****Nationality: Canadian**

CURRENT ADDRESS & CONTACT INFORMATION

Équipe de Géophysique Expérimentale
 Institut de Physique de Globe de Strasbourg
 UMR 7516 CNRS, Université de Strasbourg/EOST
 5 rue René Descartes
 67084 Strasbourg
 France

Phone: +33 (0)6 95 43 57 11
 Email: akushnir@unistra.fr

EDUCATION

Université d'Orléans (PhD, Geology, 2016)

Permeability development and evolution in volcanic systems: Insights from nature and laboratory experiments
 (Dr. C. Martel, thesis advisor)

University of British Columbia (M.Sc., Geological Sciences, 2012)

An experimental investigation of the mechanical behaviour of synthetic calcite-dolomite composites
 (Dr. L.A. Kennedy and Prof. J.K. Russell, thesis advisors)

University of British Columbia (B.Sc., Geophysics, Honours, 2008)

Understanding Multi-Peak Anomalies for Unexploded Ordinance Discrimination
 (Prof. D. Oldenburg, thesis advisor)

EMPLOYMENT

- Ongoing - 2016** **Postdoctoral researcher**, Institut de Physique de Globe de Strasbourg, Université de Strasbourg
 Petrophysical mapping of the sedimentary cover-basement transition zone in the Rhine Graben under *in situ* conditions; Study of the impact of microcracking on the rheology and fluid flow through the transition zone between the sedimentary cover and the basement in the Rhine Graben, with application of geothermal energy extraction.
- 2016 - 2013** **PhD Candidate**, Institut des Sciences de la Terre d'Orléans, Université d'Orléans
 Experimental investigations into the transition between explosive and effusive volcanic eruptions.
- 2012** **Researcher**, Laboratoire de Déformation des Roches, Institut de physique du globe de Strasbourg, Université de Strasbourg.
 Physical property determination and rock deformation investigations.
- 2012 - 2010** **Research Assistant**, Centre for Experimental Study of the Lithosphere, University of British Columbia.
 Establishing and maintaining bench-top ultrasonic velocity and acoustic-emissions equipment. Training and assisting lab members and undergraduate students with lab-related equipment use and data analysis.
- 2012 - 2010** **Teaching assistant**, Dept. of Earth and Ocean Sciences, University of British Columbia.
 Introducing new concepts and instructing weekly lab sessions (2-3 hours per session), including 20-40 minute lectures at the beginning of each lab session, related course grading, leading related online tutorials. 4.5-12 hours per week.
 EOSC 422 Structural Geology II

EOSC 323 Structural Geology I
 EOSC 110 The Solid Earth: A Dynamic Planet
 EOSC 118 Earth's Treasures: Gold and Gems
 EOSC 310 The Earth and the Solar System

- 2009- 2008** **Consulting Geophysicist**, Golder Associates Ltd., Burnaby, British Columbia.
 Leading and participating in marine and land-based geophysical surveys for geotechnical and mining initiatives, including dyke construction in the Canadian Arctic. Experience includes survey design, implementation, data reduction and reporting of singlebeam bathymetric, Sidescan Sonar, boat based EM detection, sub-bottom profiling, GPS positioning surveys, EM induction, electrical resistivity imaging, ground penetrating radar and electromagnetic toning surveys.
 40+ hours per week.
- 2007** **Field Geophysicist**, Kennecott Canada Exploration Inc., Vancouver, British Columbia.
 Geophysical exploration for kimberlite and uranium in the Canadian Arctic and Quebec, Canada. Analysis of airborne magnetic data using Geosoft, including target picking for kimberlite identification. Inversion of ground magnetic and gravity survey data using UBC Geophysical Inversion Facility software.
 Geophysical fieldwork: ground magnetic survey using a magnetometer and magnetic susceptibility meter in the Northwest Territories; geological prospecting for uranium using scintillometers in northeastern Quebec.
 40+ hours per week.
- 2007 - 2004** **Research Assistant**, Structured Surface Physics Laboratory, University of British Columbia.
 Research activities: experiment design, completion, data reduction, analysis and publication writing. Assisted in logistics and administration of lab including: supply orders, chemical and equipment inventories, and lab tours.
 15-40 hours per week.

PEER REVIEWED JOURNAL ARTICLES

Kushnir, A.R.L., Martel, M., Champallier, R., Arbaret, L. (2017) *In situ* confirmation of permeability development in shearing bubble-bearing melts and implications for volcanic outgassing; *Earth and Planetary Science Letters*. 458: 315-326. DOI: <http://dx.doi.org/10.1016/j.epsl.2016.10.053>

Okumura, S., **Kushnir, A.R.L.**, Martel, C., Champallier, R., Thibault, Q., Takeuchi, S. (2016) Rheology of crystal-bearing natural magmas: Torsional deformation experiments at 800C and 100 MPa; *Journal of Volcanology and Geothermal Research*. 328: 237-246. DOI: <http://dx.doi.org/10.1016/j.volgeores.2016.11.009>

Kushnir, A.R.L., Martel, C., Bourdier, J.-L., Heap, M.J., Reuschlé, T., Erdmann, S., Komorowski, J.-C., Cholik, N. (2016) Probing permeability and microstructure: Unravelling the role of a low-permeability dome on the explosivity of Merapi (Indonesia); *Journal of Volcanology and Geothermal Research*. 316: 56-71. DOI: [10.1016/j.jvolgeores.2016.02.012](http://dx.doi.org/10.1016/j.jvolgeores.2016.02.012).

Heap, M.J., Xu, T., **Kushnir, A.R.L.**, Kennedy, B.M., Chen, C.-f. (2015) Fracture of magma containing overpressurised pores; *Journal of Volcanology and Geothermal Research*. 301: 180-190. DOI: <http://dx.doi.org/10.1016/j.jvolgeores.2015.05.016>.

Kushnir, A.R.L., Kennedy, L.A., Misra, S., Benson, P., White, J.C. (2015): The mechanical and microstructural behaviour of calcite-dolomite composites: An experimental investigation; *Journal of Structural Geology*. 70: 200-216. DOI: [10.1016/j.jsg.2014.12.006](http://dx.doi.org/10.1016/j.jsg.2014.12.006).

Erdmann, S., Martel, C., Pichavant, M., **Kushnir, A.** (2014): Amphibole as an archivist of magmatic crystallization condition: problems, potential, and implications for inferring magma storage prior to the paroxysmal 2010 eruption of Mount Merapi, Indonesia; *Contributions to Mineralogy and Petrology*. 167:1016. DOI 10.1007/s00410-014-1016-4.

Whitehead, L., Mossman, M., and **Kushnir, A.** (2008) Observations of TIR at a natural super-hydrophobic surface; *Physics in Canada*. 64 (1): p. 7-11.

Whitehead, L., **Kushnir, A.**, Kan, P. (2006) Hybrid imaging using linear retroreflectors; *Applied Optics*. 45 (27): p. 6998-7004.

TECHNICAL/GOVERNMENT REPORTS

Kushnir, A., Andrews, G., Russell, J.K., Enkin, R.J., Kennedy, L.A., Heap, M.J. and Quane, S. (2012): Rock physical-property measurements for the Nechako Basin oil and gas region, central British Columbia (parts of NTS 093B, C, E, F, G, K, L); in *Geoscience BC Summary of Activities 2011*, Geoscience BC, Report 2012-1, p. 125–150.

Andrews, G., Quane, S., Enkin, R.J., Russell, K., **Kushnir, A.**, Kennedy, L., Hayward, N. and Heap, M. J (2011): Rock physical property measurements to aid geophysical surveys in the Nechako Basin oil and gas region, central British Columbia; *Geoscience BC, Report 2011-10*, 40 p.

CONFERENCE ABSTRACTS

Kushnir, A., Martel, C., Champallier, R., Reuschlé, T., (2015) What about temperature? Measuring permeability at magmatic conditions. European Geosciences Union (EGU) 2015 General Assembly, Vienna, Austria.

Kushnir, A., Martel, C., Champallier, R., Heap, M., Reuschle, T., Arbaret, L., (2014). A comparative study of techniques for measuring permeability at varying temperature. Workshop: The challenge of studying low permeability materials: Laboratory, *in situ* (field) and numerical methods. Cergy-Pontoise, France.

Kushnir, A., Martel, C., Erdmann, S., Heap, M., Reuschle, T., Champallier, R., Komorowski, J.L., (2014). Dome rock permeability at Mt Merapi from 1992 to 2010: Implication for eruptive style. *Cities on Volcanoes 8 (CoV8)*. Yogyakarta, Indonesia.

Erdmann, S., Martel, C., Pichavant, M., **Kushnir, A.**, Komorowski, J.-C., Bourdier, J.-L., (2014). A cold resident magma cap: the key player in the highly explosive 2010 eruption of Merapi volcano, Indonesia? *Cities on Volcanoes 8 (CoV8)*. Yogyakarta, Indonesia.

Komorowski, J.-C., Jenkins, S., Charbonnier, S., Baxter, P.J., Gertisser, R., Cholikh, N., Raditya, P., Suroono, A., Budi-Santoso, A., Preece, K., Devi S. Dayyudi, Jousset P., Martel, C., Arbaret, L., Burgisser, A., Erdmann, S., **Kushnir, A.**, Metaxian, J.-P., Beauducel, F., A. Piquout, Lavigne, F., (2014). A review of timescales, processes, and impacts of explosive activity during the 2010 paroxysmal eruption of Merapi: evidence of a change in style? *Indonesia? Cities on Volcanoes 8 (CoV8)*. Yogyakarta, Indonesia.

Komorowski, J.-C., Jenkins, S., Charbonnier, S., Cholikh, N., Raditya, P., Gertisser, R., Preece, K., Arbaret, L., Brugisser, A., Martel, C., Erdmann, S., **Kushnir, A.**, Piquout, A., (2014) New insights into the processes and facies of blast-like pyroclastic density currents from small-volume paroxysmal dome explosions at Merapi in 2010. *Cities on Volcanoes 8 (CoV8)*. Yogyakarta, Indonesia.

Kushnir, A., Kennedy, L.A., Misra, S., Benson, P., White, J.C., (2014). The mechanical behaviour of synthetic calcite-dolomite composites: An experimental investigation. Geological Association of Canada and the Mineralogical Association of Canada (GAC-MAC) General Assembly. Fredericton, New Brunswick, Canada.

Kushnir, A., Kennedy, L.A., Misra, S., Benson, P., (2012). Carbonates in thrust faults: High temperature investigations into deformation processes in calcite-dolomite systems. European Geosciences Union (EGU) 2012 General Assembly, Vienna, Austria.

PRESENTATIONS

- 2016** Invited seminar, Ludwig Maximilian University of Munich, Munich, Germany (November) **Breaking through: How magma become permeable in the laboratory.**
- Presentation, European Geosciences Union 2016, Vienna, Austria (April) **Outgassing in the lab: Permeability development in two-phase magmas during simple shear.**
- 2015** Poster, European Geosciences Union 2015 General Assembly, Vienna, Austria (April) **What about temperature? Measuring permeability at magmatic conditions.**
- 2014** Invited seminar, Institut de la Science de la Terre d'Orléans, Orléans, France (December) **A recipe for plug formation at Mt. Merapi.**
- Presentation, Low permeability Workshop, Cergy-Pontoise, France (December) **A comparative study of techniques for measuring permeability at varying temperature.**
- Presentation, Cities on Volcanoes 8 (CoV8). Yogyakarta, Indonesia (September) **Dome rock permeability at Mt Merapi from 1992 to 2010: Implication for eruptive style.**
- 2012** Invited seminar, Ecole et Observatoire des Sciences de la Terre, Strasbourg, France (October) **An experimental investigation of the mechanical behaviour of synthetic calcite-dolomite composites.**
- Presentation, European Geosciences Union 2012 General Assembly, Vienna, Austria (April) **Carbonates in thrust faults: The role of coarse-grained dolomite in fine-grained limestone.**
- 2011** Presentation, Volcanology and Petrology Laboratory, University of British Columbia
Presented to Dr. P. Benson and Dr. B. Cordonnier, Structural Geology and Tectonics Group, ETH Zurich, Switzerland (December)
High temperature investigations into carbonate rheology: high strain deformation in synthetic carbonates
- Presentation, Volcanology and Petrology Laboratory, University of British Columbia (March)
The Nechako Basin: defining geophysical properties
- 2008** Poster, Department of Earth and Ocean Sciences, University of British Columbia (May)
Understanding Multi-Peak Anomalies for Unexploded Ordnance Discrimination

RESEARCH AWARDS AND PRIZES

- 2015** Outstanding Student Poster (OSP) Award, European Geosciences Union (EGU)

- 2013** Natural Sciences and Engineering Research Council of Canada (NSERC)
Canadian Postgraduate Scholarship (PGS D) \$63,000.00 over three years
- Natural Sciences and Engineering Research Council of Canada (NSERC)
Alexander Graham Bell Canada Graduate Scholarship (CGS D) \$105,000.00 over three years
(*not accepted due to tenure at a foreign university*)
- 2012** Departmental Teaching Assistant Award, Department of Earth, Ocean, and Atmospheric Sciences,
University of British Columbia \$500.00
- Scholarship of the Embassy of France 5500€
- Keith Runcorn Travel Award for Non-Europeans, European Geosciences Union (EGU) 440€
- 2011** Natural Sciences and Engineering Research Council of Canada (NSERC)
Alexander Graham Bell Canada Graduate Scholarship (CGS M) \$17,500.00
- 2010** University of British Columbia George E Winkler Memorial Scholarship \$3,000.00
- University of British Columbia Thomas and Marguerite MacKay Memorial Scholarship \$5,990.00
- 2008** Association of Professional Engineers and Geoscientists Achievement Award in Geoscience
- 2007** British Columbia Geophysical Society Scholarship \$750.00
- University of British Columbia Thomas and Marguerite MacKay Memorial Scholarship \$4,000.00
- 2006** University of British Columbia Thomas and Marguerite MacKay Memorial Scholarship \$1,200.00
- 2003** British Columbia Government Scholarship \$1,000.00
-
- TEACHING**
-
- 2016** Invited lecturer, Université de Strasbourg (December) **Introduction to volcanic processes**
- Invited lecturer, Université d'Orléans, (January) **Permeability in geological materials**
- 2014** Invited lecturer, Université de Strasbourg (March) **Deformation Mechanisms and Microstructure**
- 2012** Substitute lecturer, EOSC 323: Structural Geology I, University of British Columbia (September)
The Mohr Circle
- Substitute lecturer, EOSC 422: Advanced Structural Geology, University of British Columbia (March)
Foliations
- 2011** Substitute lecturer, EOSC 323: Structural Geology I, University of British Columbia (October)
Ductile Deformation Mechanisms
- 2012 - 2010** **Teaching assistant**, Dept. of Earth and Ocean Sciences, University of British Columbia.
Introducing new concepts and instructing weekly lab sessions (2-3 hours per session), including 20-40
minute lectures at the beginning of each lab session, related course grading, leading related online
tutorials. 4.5-12 hours per week.

EOSC 422 Structural Geology II
 EOSC 323 Structural Geology I
 EOSC 110 The Solid Earth: A Dynamic Planet
 EOSC 118 Earth's Treasures: Gold and Gems
 EOSC 310 The Earth and the Solar System

VOLUNTEER EXPERIENCE

- 2011-2012** **Graduate Council Coordinator**, Dept. of Earth and Ocean Sciences, University of British Columbia. Coordinating, facilitating, and leading graduate council meetings; relaying important departmental news to graduate students; acting as liaison between graduate students and graduate council.
- 2010-2011** **Graduate Council Social Coordinator**, Dept. of Earth and Ocean Sciences, University of British Columbia.
 Planned, advertised, and fundraised for graduate students events including a winter ski trip, a salsa dancing party and a free year-end barbecue for all Earth Science graduate students.
- 2010-2011** **Head's Advisory Committee Representative**, Dept. of Earth and Ocean Sciences, University of British Columbia.
 Attended and participated in advisory meetings with the head of department and acted as graduate liaison to the head of department.
- 2010** **Willing Workers on Organic Farms (WWOOF) Volunteer**, Tasmania, Australia
 Volunteered on a horse ranch. Daily tasks included: stable maintenance and cleaning; horse grooming, breaking-in, and training; long-distance horse racing; house maintenance; animal feeding.