

Ryan Ben Ickert

CURRICULUM VITAE

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Jan 14/2020

RESEARCH INTERESTS

I use geochemistry, especially isotope geochemistry, to attack a broad range of scientific problems. This includes using high-precision ID-TIMS U-Pb geochronology to determine timescales of magmatic processes and to date geological events; using radiogenic isotopes (Sr-Nd-Pb) to trace the age and origin of rocks, meteorites, teeth, and archeological materials; and using light stable isotopes to trace the origin of diamonds and the deep carbon cycle. I am also interested in the fundamental basis of isotope measurements and geochronology. This has led me to work on improving our understanding of decay rates of radioactive nuclides, mass spectrometry techniques, and optimizing data handling and reduction.

POSITIONS HELD

2019 – present Senior Research Scientist & Research Faculty, Purdue University

2015-2019 Lecturer (Assistant Professor), Scottish Universities Environmental Research Centre

2012-2015 Postdoctoral Fellow, Berkeley Geochronology Center and UC Berkeley

2009-2012 Postdoctoral Fellow, Canadian Centre for Isotopic Microanalysis, University of Alberta

EDUCATION

2010 – PhD Research School of Earth Sciences, The Australian National University
Advisor: Ian S. Williams

2006 – MSc Department of Earth Sciences, Simon Fraser University
Advisor: Derek J. Thorkelson

2003 – BSc Department of Earth and Atmospheric Sciences, University of Alberta
Advisor: Octavian Catuneanu

SERVICE

- Joint IUPAC-IUGS Task Group on Isotope Date in Geosciences (2017-present)
- Language editor of Central European Journal of Geoscience, 2010-2016
- Journal reviewer for Earth and Planetary Science Letters, Chemical Geology, Geochimica et Cosmochimica Acta, Lithos, Journal of Analytical Atomic Spectroscopy, Journal of Volcanology and Geothermal Research, Economic Geology, Earth Science Reviews, Precambrian Research, Journal of the Geological Society of India, Scientific Reports, Contributions to Mineralogy and Petrology, Rapid Communications in Mass Spectrometry
- Grant proposal reviewer for NSF and NSERC

STUDENT SUPERVISION

Rasika S. Mahajan (PhD) SUERC. 2016-present.

Emma Roberts (PhD) SUERC. 2017-present.

FUNDING

- (Co-I) NERC Standard Grant “*Convection clashes: Plume splitting beneath eastern Australia*”. (PI: Lara Kalnins) £1 127 353.05; Funded 2019
- (Co-I) STFC Standard Proposal “*Building capability for Mars Sample Return: development of geochronological tools for dating of jarosite*”. £87 570; Funded 2019
- (PI) Royal Society Research Grant “*Evaluating the use of the Rb-Sr system to date young (Amazonian) aqueous alteration on the surface of Mars*” (£19 728.50) Funded 2018
- (PI) Carnegie Research Incentive Grant “*Pb isotopes: A novel high-resolution correlation tool for cyclostratigraphy*” (£7 357 (Funded 2017)
- (Postdoc) NSR EAR “*Collaborative Research: Filling a 30 Ma gap: Building a chronostratigraphic framework for Late Triassic sedimentary and paleobiologic archives*” (Lead PI – Roland Mundil and Randall Irmis) \$169 975 (Funded 2014)

PUBLICATIONS

- Villa I.M., Holden N.E., Possolo A., **Ickert R.B.**, Hibbert B., Renne P.R. *in revision*. IUPAC-IUGS recommendation on the half-lives of ^{147}Sm and ^{146}Sm . *Geochimica et Cosmochimica Acta*.
- Iles K.A., Hergt J.M., Woodhead J.D., **Ickert R.B.**, Williams I.S., 2020. Petrogenesis of granitoids from the Lachlan Fold Belt, southeastern Australia: the role of disequilibrium melting. *Gondwana Research*. v.79, p. 87-109. <https://doi.org/10.1016/j.gr.2019.08.011>
- Tulan E., Sachsenhofer R.F., Tari G., Flecker R., Fairbank V., Pupp M., **Ickert R.B.**, 2020. Source rock potential and depositional environment of the Lower Oligocene Ihsaniye Formation in NW Turkey (Thrace, Karaburun). *Turkish Journal of Earth Sciences*. v.28, p. 64-84. <http://dx.doi.org/10.3906/yer-1906-14>
- Casetta F., **Ickert R.B.**, Mark D.F., Bonadiman C., Giacomoni P.P., Coltorti M., 2019. The alkaline lamprophyres of the Dolomitic Area (Southern Alps, Italy): markers of the Late Triassic change from orogenic-like to anorogenic magmatism. *Journal of Petrology*. v.60(6), p. 1263-1298. <http://dx.doi.org/10.1093/petrology/egz031>
- Regier M., Mišković A., **Ickert R.B.**, Pearson G.D., Stachel T., Stern R.A., Kopylova M. 2018. An oxygen isotope test for the origin of Archean mantle roots. *Geochemical Perspectives Letters*, v.9, p.6-10. <http://dx.doi.org/10.7185/geochemlet.1830>
- Casetta F., Coltorti M., **Ickert R.B.**, Bonadiman C., Giacomoni P.P., Ntaflou T., 2018. Intrusion of shoshonitic magmas at shallow crustal depth: T-P path, H₂O estimates and AFC modelling of the Middle Triassic Predazzo Intrusive Complex (Southern Alps, Italy). *Contributions to Mineralogy and Petrology*, v.173, 27pg. <https://doi.org/10.1007/s00410-018-1483-0>
- Riches A.J.V., **Ickert R.B.**, Pearson D.G., Stern R.A., Jackson S.A., Ishikawa A., Kjarsgaard B.A., Gurney J.J., 2016. In situ oxygen-isotope, major-, and trace-element constraints on the metasomatic modification and crustal origin of a diamondiferous eclogites from Roberts Victor, Kaapvaal Craton. *Geochimica et Cosmochimica Acta* v.174, p. 345-359. <http://dx.doi.org/10.1016/j.gca.2015.11.028>
- Fox M., **Ickert R.B.**, 2015. Model selection during sample-standard-bracketing using reversible jump Markov chain Monte Carlo. *Journal of Analytical Atomic Spectrometry* v.30, p. 2208-2213. <http://dx.doi.org/10.1039/c5ja00102a>
- Ickert R.B.**, Mulcahy S.R., Sprain C.J., Manaszak J.F., Renne P.R., 2015. Chemical and Pb isotope composition of phenocrysts from bentonites constrains the chronostratigraphy around the Cretaceous-Paleogene boundary in the Hell Creek region, Montana. *Geochemistry, Geophysics, Geosystems* v.16, p. 2743-2761. <http://dx.doi.org/10.1002/2015GC005898>
- Ickert R.B.**, Stachel T., Stern R.A., Harris J.W., 2015. Extreme ^{18}O -enrichment in majorite constrains a crustal origin of transition zone diamonds. *Geochemical Perspectives Letters* v.1, p. 65-74. <http://dx.doi.org/10.7185/geochemlet.1507>
- Ickert R.B.**, Mundil R., Magee C.W., Mulcahy S.R., 2015. The U-Th-Pb systematics of zircon from the Bishop Tuff: A case study in the challenges to high-precision Pb/U geochronology at the millennial

- scale. *Geochimica et Cosmochimica Acta* v.168, p. 88-110.
<http://dx.doi.org/10.1016/j.gca.2015.07.018>
- Smit, K.V., Stachel, T., Creaser, R.A., **Ickert, R.B.**, DuFrane, S.A., Stern, R.A., Seller, M. 2014. Origin of eclogite and pyroxenite xenoliths from the Victor kimberlite, Canada, and implications for Superior craton formation. *Geochimica et Cosmochimica Acta* v.125, p. 308-337.
<http://dx.doi.org/10.1016/j.gca.2013.10.019>
- Ickert R.B.**, Stern R.A. 2013. Matrix corrections and error analysis in high-precision SIMS $^{18}\text{O}/^{16}\text{O}$ measurements of Ca-Mg-Fe garnet. *Geostandards and Geoanalytical Research*.
<http://dx.doi.org/10.1111/j.1751-908X.2013.00222.x>
- Ickert, R.B.**, Stachel, T., Stern R.A., Harris, J.W., 2013. Diamond from recycled crustal carbon documented by coupled $\delta^{18}\text{O}$ - $\delta^{13}\text{C}$ measurements of diamonds and their inclusions. *Earth and Planetary Science Letters* v.364, p. 85-97. <http://dx.doi.org/10.1016/j.epsl.2013.01.008>
- Ickert, R.B.** 2013. Algorithms for estimating uncertainties in initial radiogenic isotope ratios and model ages. *Chemical Geology* v.340, p 131-138. <http://dx.doi.org/10.1016/j.chemgeo.2013.01.001>
- Park, J.-W., Campbell, I.H., **Ickert, R.B.**, Allen, C.M., 2012. Chalcophile element geochemistry of the Boggy Plain zoned pluton, southeastern Australia: a S-saturated barren compositionally diverse magmatic system. *Contributions to Mineralogy and Petrology*, v.165(2), 217-236.
<http://dx.doi.org/10.1007/s00410-012-0806-9>
- Smart, K.A., Chacko, T., Stachel, T., Tappe, S., Stern, R.A., **Ickert, R.B.**, EIMF, 2012. Eclogite formation beneath the northern Slave craton constrained by diamond inclusions: Oceanic lithosphere origin without a crustal signature. *Earth and Planetary Science Letters* v.319-320, p. 319-320.
<http://dx.doi.org/10.1016/j.epsl.2011.12.032>
- Ickert R.B.**, Williams I.S, 2011. U- Pb Zircon Geochronology of Siluro-Devonian Granites in Southeastern Australia: Implications for the Timing of the Benambran Orogeny and the I-S Dichotomy. *Australian Journal of Earth Sciences*, v.58(5), p. 501-516.
<http://dx.doi.org/10.1080/08120099.2011.562922>
- Ickert R.B.**, Williams I.S., Wyborn D, 2011. Ti in Zircon from the Boggy Plain Zoned Pluton; Implications for Zircon Petrology and Hadean Tectonics. *Contributions to Mineralogy and Petrology*. v.162(2), p. 447-461. <http://dx.doi.org/10.1007/s00410-010-0605-0>
- Ickert R.B.**, Thorkelson D.J., Marshall D.D., Ullrich T.D., 2009. Eocene adakitic volcanism in southern British Columbia: Remelting of arc basalt above a slab window. *Tectonophysics*, v.464(1-4), p. 164-185. <http://dx.doi.org/10.1016/j.tecto.2007.10.007>.
- Ickert R.B.**, Hiess J., Williams I.S., Holden P., Ireland T.R., Lanc P., Schram N., Foster J.J., Clement S.W., 2008. Determining high precision in situ, oxygen isotope ratios with a *SHRIMP II*: Analyses of MPI-DING silicate-glass reference materials and zircon from contrasting granites. *Chemical Geology*, v.257(1-2), p. 114-128. <http://dx.doi.org/10.1016/j.chemgeo.2008.08.024>.
- Yeo G.M., Percival J.B., Jefferson C.W., **Ickert R.**, and Hunt P., 2007. Environmental significance of oncoids and crypto-microbial laminites from the Late Paleoproterozoic Athabasca Group, Saskatchewan and Alberta; in *EXTECH IV: Athabasca Uranium Multidisciplinary Study*, Saskatchewan and Alberta, (ed.) C.W. Jefferson and G. Delaney; Geological Survey of Canada, Bulletin 588, p. 315-323.
<http://geoscan.nrcan.gc.ca/starweb/geoscan/servlet.starweb?path=geoscan/shorte.web&search1=R=223777>.

CONFERENCE PROCEEDINGS

- Casetta F., **Ickert R.B.**, Mark D.F., Bonadiman C., Giacomoni P.P., Ntaflos T., Coltorti M., 2020. Volatile-rich melts as markers of the asthenospheric influx prior to rifting events: the case of the alkaline-carbonatitic lamprophyres of the Dolomitic Area (Southern Alps, Italy). EGU General Assembly 2020.
- Mahajan R.S., **Mark D.F.**, Ickert R.B., 2019. Building an accurate and precise chronological framework for the British Palaeogene Igneous Province. AGU Fall Meeting, San Francisco.
- Ickert R.B.**, Carter J.N., Mark D.F., Tremblay M.M., Cresswell A., Sanderson D.C.W., Percent-level production of ^{40}Ar by an overlooked mode of ^{40}K decay. AGU Fall Meeting, San Francisco.
- Mahajan R.S., **Ickert R.B.**, Mark D.F., 2019. Building an accurate and precise chronological framework for the British Paleogene Igneous Province. EGU: Mass extinctions, recovery and resilience meeting, Utrecht.
- Papadopoulos V., Boyce A., Mark D., **Ickert R.**, Tsikos H., 2019. Investigation of large-scale brine circulation as mechanism of ore formation in the Kalahari and Postmasburg Fe-Mn fields, South Africa. Society for Geology applied to Mineral Deposits Biennial Meeting, Glasgow.
- Ickert R.B.**, Mahajan R.S., Carter J., Gallagher V., Kelly A., Mark D.F., 2017. Extending the utility of multi-dynamic MC-TIMS by optimal use of redundant data. Goldschmidt 2017.
- Mahajan R.S., **Ickert R.B.**, Mark D.F., 2017. Assembly of the British Tertiary Igneous Province. Goldschmidt 2017.
- Mark D.F., Ickert R.B., Mahajan R.S., Dymock R., Imlach J., 2017. Interrogation of apparent age dispersion in $^{40}\text{Ar}/^{39}\text{Ar}$ neutron fluence monitor minerals. Goldschmidt 2017.
- Pearson D.G., Stachel T., Palot M., **Ickert R.B.**, 2015. History of crustal recycling recorded in transition zone diamonds. AGU Fall Meeting, San Francisco, California.
- Mundil R., **Ickert R.B.**, Simon J.I., Renne P.R., 2015. Considering the Complexities of U-Pb geochronology at the millennial scale. AGU Fall Meeting, San Francisco, California.
- Ickert R.B.**, Mundil R., Sharp W.D., 2014. High-precision Th-Pb dating by isotope-dilution TIMS+MC-ICPMS – Preliminary Results. AGU Fall Meeting, San Francisco, California.
- Ickert R.B.**, Mundil R., Magee C.W., 2014. U-Th-Pb systematics of the Bishop Tuff zircon. Goldschmidt 2014.
- Ickert R.B.**, Renne P.R., Deino A.L., Sharp W.D., 2014. Rapid and precise Pb isotope analysis of K-feldspar: A new tool for tephrochronology. Goldschmidt 2014.
- Mundil R.**, Irmis R.B., **Ickert R.B.**, 2014. Integrated Chronostratigraphy from outcrop and drill core samples (Late Triassic, Colorado Plateau). Goldschmidt 2014.
- Ickert R.B.**, Magee C.W., Mundil R., 2013. SIMS and TIMS U-Th-Pb geochronology of zircon from the Bishop Tuff. AGU Fall Meeting.
- Ickert R.B.**, Mundil R. 2013. Alternative approaches to evaluating geochemical data: Beyond the weighted-mean. William Smith Meeting 2013: The first century of isotope geochronology. London.
- Mundil R., Irmis R. B., **Ickert R.B.**, 2013. Understanding the early Mesozoic world: New geochronological data from terrestrial and marine strata. EGU General Assembly, Vienna.
- Ickert R.B.**, and Mundil R., 2012. An objective method to determine the probability distribution of the minimum apparent age of a sample of radio-isotopic dates. AGU Fall Meeting, San Francisco, California.
- Ickert R.B.**, Stachel T., Stern R.A., Harris J.W., 2012. Diamond growth from organic carbon suggested by coupled $\delta^{18}\text{O}$ - $\delta^{13}\text{C}$ variations in diamonds and garnet inclusions. *Goldschmidt 2012*.
- Smit K.V., Stachel T., Creaser R.A., Dufrane S.A., **Ickert R.B.**, Stern R.A., Seller M., 2012. Formation of eclogites and pyroxenites below Attawapiskat, Superior Craton (Canada). *Goldschmidt 2012*.
- Smart, K.A., Chacko, T., Stachel, T., Tappe, S., Muehlenbachs, K., **Ickert, R.B.**, Stern, R.A. 2012. Jericho diamond eclogite formation revealed by diamond inclusions: Oceanic origin without crustal signature? 10th International Kimberlite Conference, Abstract 10IKC-238, Bangalore, India.

- Riches, A.J.V., Pearson, D.G., Stern, R.A., **Ickert, R.B.**, Jackson, S.E., Ishikawa, A., Kjarsgaard, B.A., 2012. Metasomatism of a Roberts Victor eclogite linked to the formation and destruction of diamond. 10th International Kimberlite Conference, Abstract 10IKC-207, Bangalore, India.
- Ickert, R.B.**, Stachel T.S., Stern, R.A., Harris J.W., 2011. Diamond growth from subducted carbon implied by correlated $\delta^{18}\text{O}$ - $\delta^{13}\text{C}$ variations in diamonds and garnet inclusions. AGU Fall Meeting, San Francisco, California.
- Ickert R.B.**, Stern R.A., 2011. Precise and accurate $^{18}\text{O}/^{16}\text{O}$ measurements of Ca-Mg-Fe garnet by SIMS. Biennial Geochemical SIMS Workshop, Honolulu, Hawai'i.
- Ickert R.B.**, Stern R.A., Stachel T.S., 2011. Diamonds from the sea floor: SIMS oxygen isotope data from eclogitic garnet inclusions in diamonds from the Damtshaa kimberlites (Botswana) and Argyle lamproite (Australia). GAC/MAC (Ottawa).
- Ickert R.B.**, Stern R.A., Stachel T.S., 2010. MC-HR-SIMS oxygen isotope analysis of ferropericlasite inclusions in diamond. *Goldschmidt 2010*. <http://dx.doi.org/10.1016/j.gca.2010.04.034>
- Stern R.A., **Ickert R.B.**, 2010. Zircon oxygen isotopes by SIMS: performance evaluation of the Canadian IMS1280. *Goldschmidt 2010*. <http://dx.doi.org/10.1016/j.gca.2010.04.045>
- Ickert R.B.**, Williams I.S., 2010. Ti concentrations in Zircon from the Boggy Plain Zoned Pluton; Implications for Zircon Petrology and Hadean Tectonics. *Geocanada2010*. http://www.geocanada2010.ca/uploads/abstracts_new/view.php?item_id=548
- Ickert R.B.**, Williams I.S., Chappell, B.W., 2008. *In situ* U-Pb, O and Hf isotope measurements in zircon from I- and S-type granites from SE Australia. *Goldschmidt 2008*. <http://dx.doi.org/10.1016/j.gca.2008.05.012>
- Williams I.S., Trotter J.A., **Ickert R.B.**, Chappell B.W., 2008. Applications of SHRIMP II to O isotopic analysis of granite zircon and conodont apatite. *Goldschmidt 2008*. <http://dx.doi.org/10.1016/j.gca.2008.05.025>
- Ickert R.B.**, Hiess J., Williams I.S., Holden P., Ireland T.R., Lanc P., Schram N., Foster J.J., Clement S.W., 2008. Determining high precision *in situ* O isotope ratios with a SHRIMP II. *Fourth SHRIMP Workshop, St. Petersburg, Russia*. [Link to PDF document](#)
- Ickert R.B.**, Williams, I.S., Chappell, B.W., 2008. *In situ* U-Pb, O, and Hf isotope measurements of I- and S-type granites from the Berridale and Kosciuszko Batholiths. *Australian Earth Sciences Convention v.89, p. 143*.
- Williams I.S., **Ickert R.B.**, Hiess J., Holden P., Chappell B.W., 2008. Advances in SHRIMP zircon U-Pb geochronology and oxygen isotopic analysis. *Australian Earth Sciences Convention v.89, p. 254*.
- Ickert R.B.**, Williams, I.S., 2007. Correlated, *in situ* analysis of U/Pb, $\delta^{18}\text{O}$ and $\delta^{18}\text{O}$ and $\delta^{18}\text{O}$ and $\delta^{18}\text{O}$ in zircon from Siluro-Devonian granite in the eastern Lachlan Orogen: Constrains on juvenile additions to the continental crust. *Geological Society of Australia Specialist Group in Geochemistry, Mineralogy and Petrology Second Bi-Annual Conference v.86, p.49-53 (abstr.)*.
- Ickert R.B.**, Thorkelson D.J., and Marshall D.D., 2006. Petrogenesis of adakite and high-Mg# andesite in the Eocene Princeton Group (BC): Remelting of metamorphosed Mesozoic arc basalt in the lithospheric mantle. *Geological Association of Canada-Mineralogical Association of Canada, Program with Abstracts v.31, p. 70*. [Link to PDF document](#)
- Ickert R.B.**, Hiess J., Williams I.S., 2006. Electron Induced Secondary Ion Emission (EISIE): An important consideration in the analysis of light isotopes in insulators. *Third SHRIMP Workshop, Perth, Australia*.
- Williams I.S., Hiess J., **Ickert R.B.**, Holden, P., 2006. The current status of zircon oxygen micro-analysis using SHRIMP II. *Goldschmidt 2006*. <http://dx.doi.org/10.1016/j.gca.2006.06.1524>
- Gleeson S.A., and **Ickert R.B.**, 2005. The relationship between aluminium contents and cathodoluminescence in hydrothermal quartz veins. *Goldschmidt 2005*. <http://dx.doi.org/10.1016/j.gca.2005.03.033>
- Breitsprecher K., Madsen J.K., **Ickert R.B.**, and Thorkelson D.J., 2004. Geologic signature of Paleogene ridge subduction and slab window formation beneath the central North American

Cordillera. *Geological Society of America Abstracts with Programs* v.36(4), p. 7.

http://gsa.confex.com/gsa/2004RM/finalprogram/abstract_72827.htm

Ickert R.B., and Gleeson, S.A. 2003. Cathodoluminescence zonation in hydrothermal vein-quartz linked to enrichment in aluminium. *Geological Society of America Abstracts with Programs* v.35(6), p. 268. http://gsa.confex.com/gsa/2003AM/finalprogram/abstract_66020.htm