

PROFESSIONAL EXPERIENCE

18/04/2018 – present. *Research Associate*

Earth and Environmental Science Department, Macquarie University, Sydney, Australia.

22/05/2017 – 17/04/2018 *Research Assistant*

Earth and Planetary Science Department, Macquarie University, Sydney, Australia.

04/02/2013 – 18/04/2018. *PhD researcher.*

Earth and Planetary Science Department, Macquarie University, Sydney, Australia.

18/12/2012 – 31/02/2013 *Continuous Development Engineer*

Troqueles & Artes Graficas (TAG), Aduna, Spain.

EDUCATION

18/04/2018 *Doctor of Philosophy, Science and Engineering*

Earth and Planetary Science Department, Macquarie University, Sydney, Australia

Multiphase Multicomponent reactive transport in the Earth's Mantle. Vice-Chancellor commendation.

24/07/2012. *M.Sc. B.Eng. Civil Engineering.*

School of Civil Engineering, Universitat Politècnica de Catalunya, Barcelona

RELEVANT HIGHLIGHTS

- 7 peer-reviewed articles (4 as first author). +15 conference presentations.
- Attracted +500.000 AUD equivalent in competitive funding. Internationally awarded.
- Macquarie University representative in national Geoscience strategy meetings.
- International network in Academia and Industry.
- End-to-end management of research projects.
- Reviewer for top journals in Geosciences.
- Organization and convener of International Conferences and Workshops.
- Supervision and teaching experience.

SKILLS

- Numerical solution of systems of partial differential equations.
- Leadership.
- Forward and inverse predictive modelling (e.g. probabilistic inversion).
- MATLAB, R, Python, Latex, Perplex (FORTRAN), IPE, Europlexus, AutoCAD, Office and Adobe, HEC-RAS, HEC-HMS.
- English, Spanish, Basque, Catalan.

PUBLICATIONS

Journal Papers

- 1) **Oliveira, B.**, Griffin, W.L., Gain, S.E.M, Saunders, M., Shaw, J., Toledo, V., Afonso, J.C., O'Reilly, S.Y. Ti 3+ in corundum: Tracing crystal growth in a highly reduced magma. In pres. Scientific Reports. (**5-Year Impact Factor: 4.576; cit: 0**)
- 2) Lu, J., Tilhac, R., Griffin, W. L., Zheng, J., Xiong, Q., **Oliveira, B.**, O'Reilly, S. Y. (2020). Lithospheric memory of subduction in mantle pyroxenite xenoliths from rift-related basalts. Earth and Planetary Science Letters, 544, 116365. (**5-Year Impact Factor: 5.273; cit: 1**)
Contribution: development of idea and design of numerical experiments
- 3) **Oliveira, B.**, Afonso, J. C., Tilhac, R. (2020). A disequilibrium reactive transport model for mantle magmatism. Journal of Petrology. (**5-Year Impact Factor 4.332; cit: 1**)
- 4) Tilhac, R., **Oliveira, B.**, Griffin, W. L., O'Reilly, S. Y., Schaefer, B. F., Alard, O., ... Gregoire, M. (2020). Reworking of old continental lithosphere: Unradiogenic Os and decoupled HfNd isotopes in sub-arc mantle pyroxenites. Lithos, 354, 105346. (**5-Year Impact Factor: 4.511; cit: 4**)
Contribution: design, development and implementation of numerical model. Manuscript writing.
- 5) Nestola, F., Jacob, D. E., Pamato, M. G., Pasqualetto, L., **Oliveira, B.**, ..., Sgreva, N. (2019). Progenetic garnet inclusions and the age of diamonds. Geology, 47(5), 431-434. (**5-Year Impact Factor: 5.412; cit: 8**)
Contribution: design, development and implementation of numerical model. Manuscript writing article.
- 6) **Oliveira, B.**, Afonso, J. C., Zlotnik, S., Diez, P. (2018). Numerical modelling of multiphase multicomponent reactive transport in the Earth's interior. Geophysical Journal International, 212(1), 345-388. (**5-Year Impact Factor: 2.834; cit: 12**)

- 7) **Oliveira, B.**, Afonso, J. C., Zlotnik, S. (2016). A Lagrangian-Eulerian finite element algorithm for advection-diffusion-reaction problems with phase change. *Computer Methods in Applied Mechanics and Engineering*, 300, 375-401. **(5-Year Impact Factor: 5.697; cit: 8)**
- 8) Estela Carbonell, M. R., **Oliveira, B.** (2012). Talleres audiovisuales de cálculo en CaminsOpenCourseWare. In *Jornada d'innovació docent UPC: presentació de resultats dels projectes de millora de la docència* (pp. 488-493). Universitat Politècnica de Catalunya. Institut de Ciències de l'Educació. <http://hdl.handle.net/2099/12696> (cit: 1)
Contribution: design, development and implementation of project. Manuscript writing.

Thesis

- 9) **Oliveira, B.** (2017), Multi-Phase and Multi-Component Reactive Transport in the Earth's Interior. PhD Thesis. Macquarie University, Sydney, Australia.
- 10) **Oliveira, B.** (2012). Numerical simulation of fast transient phenomena in fluid-structure systems. Universitat Politècnica de Catalunya. <http://hdl.handle.net/2099.1/15920>
- 11) **Oliveira, B.** (2012). Regeneración de la Bahía de Pasaia: remodelación del Puerto Interior. Universitat Politècnica de Catalunya. <https://upcommons.upc.edu/handle/2099.1/21646>

Submitted/In prep

- 12) **Oliveira, B.**, Afonso, J.C., Klocking, M. Melting conditions and mantle source composition from probabilistic joint inversion of REE and major element concentrations. Submitted to *Geochimica et Cosmochimica Acta*.
- 13) Hong-Kun Dai, HK, **Oliveira, B.**, Jian-Ping Zheng, J.P., Griffin, W.L., Afonso, J.C., Xiong, Q., O'Reilly, S.Y. Melting dynamics of Late Cretaceous lamprophyres in central Asia suggest a mechanism to explain many continental intraplate basaltic suite magmatic provinces. Submitted to *JGR Solid Earth*.
- 14) Pamato M.G., Novella D., Jacob D.E., **Oliveira B.**, ..., Nestola F. Re-Os isotopes of sulphide inclusions provide true age of diamonds. Submitted to *Nature Geoscience*.
- 15) Afonso, J.C, **Oliveira, B.** and J.C., Klocking. Joint inversion of geophysical and geochemical data for melting conditions and physical state of the mantle. In prep.
- 16) Burcet, M., Giacomini, M., Zlotnik, S., **Oliveira, B.**, Afonso, J.C. A Face-Centered Finite Volume method for coupled mechanics and reactive transport problems. In prep.
- 17) Ceuleneer, G., Billo, S., Gr_egoire, M., Granier, N., Toplis, M.J., Monnereau, M., le Sueur, E., Tilhac, R., **Oliveira, B.** De-fertilization of mantle peridotite induced by melt rock/interaction. In prep.
- 18) Tilhac, R., **Oliveira, B.**, Begg, G., Afonso, J.C., R., O'Reilly, S.Y., Gri_n. Hf-Nd isotope decoupling in the lithospheric mantle. In prep.

Conference Papers and Oral Communications

- 1) Symposium on Australian Intraplate Volcanism, Australia. 2020
Invited oral presentation. Plato's Allegory of the Cave and Inverse Modelling: Application to Intraplate Volcanism.
- 2) Virtual Goldschmidt, Hawaii, USA. 2020
Oral presentation. Multi-Phase Multi-Component Reactive Transport: A Disequilibrium Reactive Transport Model for Mantle Magmatism.
- 3) Goldschmidt, Barcelona, Spain. 2019
Oral presentation. Multiphase Multicomponent Reactive Transport: Disequilibrium Melt-Rock Processes and Geochemical Geodynamics.
- 4) Goldschmidt, Barcelona, Spain. 2019
Oral presentation (Co-author). A Markov Chain Monte Carlo Approach to Trace Element Modelling of Disequilibrium Fractional Melting.
- 5) Goldschmidt, Barcelona, Spain. 2019
Oral presentation (Co-author). Metasomatic Re Addition Overprints Unradiogenic Os in Sub-Arc Mantle.
- 6) LaCàN, UPC, Spain. 2018
Invited oral presentation. A Multiphase Multicomponent Reactive Transport Formalism for Disequilibrium Melt-Rock Processes and Geochemical Geodynamics.
- 7) AGU, Washington, USA. 2018
Invited oral presentation. A Multiphase Multicomponent Reactive Transport Formalism for Disequilibrium Melt-Rock Processes and Geochemical Geodynamics.
- 8) 3rd EMAW, Pavia, Italy. 2018
Poster presentation. A diffusion-controlled trace-element disequilibrium model for two-phase reactive transport in mafic-ultramafic systems.
- 9) Goldschmidt, Paris, France. 2017
Poster & Oral presentations. Multi-Phase Multi-Component Reactive Transport in the Earth's Interior.
- 10) EGU, Vienna, Austria. 2017
Poster presentation. Multi-Phase Multi-Component Reactive Transport in the Earth's Interior.

- 11) LaCàN, UPC, Spain. 2016
Invited oral presentation. Multi-Phase Multi-Component Reactive Flow in Geodynamics.
- 12) EGU, Vienna, Austria. 2016
Oral presentation. Multi-Phase Multi-Component Reactive Flow in Geodynamics.
- 13) MIM, ISAAC NEWTOWN INSTITUTE, Cambridge, UK. 2016
Invited presentation. From Foundations to State-of-the-Art in Magma/Mantle. Workshop
Poster presentation. Multi-Phase Multi-Component Reactive Flow in Geodynamics.
- 14) AGU, San Francisco, USA. 2015
Poster presentation. Multi-Phase Multi-Component Reactive Flow in Geodynamics.
- 15) CCFS Lithosphere Dynamics Workshop, Perth, WA, Australia. 2013
Poster presentation. Modelling the Lithosphere-Asthenosphere System with Multi-Physics Finite Element Methods.

INTERNATIONAL WORKSHOPS

- 1) Thermodynamic modelling with alphaMELTS and other MELTS software, USA, 08-09/12/2018 UMD
- 2) MIM, ISAAC NEWTOWN INSTITUTE, Cambridge, UK. 2016
Workshop. From Foundations to State-of-the-Art in Magma/Mantle.
- 3) The 6th International PhD Course, University of Copenhagen, Denmark. 2014
Anisotropy and Mantle Deformation.

AWARDS

- GJI Outstanding reviewer, 2019
Geophysical Journal International. Citation as outstanding Reviewer for GJI in 2019.
https://academic.oup.com/gji/pages/outstanding_reviewers
- PhD Thesis with VC commendation, 2018
Macquarie University. Vice-Chancellor Commendation to the best PhD Thesis.
- Travel Grant (1000 £), 2016
Isaac Newton Institute for Mathematical Sciences, Cambridge
Workshop: MIMW01. From Foundations to State-of-the-Art in Magma/Mantle Dynamics.
- Best Poster Presentation, HDR day, June 2016
Macquarie University. Presentation title: “Multi-Phase Multi-Component Reactive Flow in Geodynamics”.
- PGRF with VC commendation (AUD\$ 5.500), 2015
Macquarie University. Vice-Chancellor Commendation to the best Post-Graduate Research Funding application.
- La Caixa Award (AUD\$ 140.000 in two years), 2014
Obra Social La Caixa, Barcelona, Spain. Most Prestigious Scholarship given by any Spanish institution,
<https://www.europapress.es/epsocial/responsables/noticia-universitario-guipuzcoano-benat-oliveira-recibe-beca-caixa-cursar-estudios-posgrado-extranjero-20150414144348.html>
Grant holder, 2011- 2012
Agencia de Gestio d'Ajuts Universitaris i de Recerca, AGAUR. Barcelona, Spain
Fellowship title: Beques per a l'alumnat d'enginyeria del sistema universitari catala que participi activament en l'orientacio d'estudiants de primer curs (ENGINYCAT 2011).
- Grant holder, 2010-2011
Agencia de Gestio d'Ajuts Universitaris i de Recerca, AGAUR. Barcelona, Spain
Fellowship title: Beques per a l'alumnat d'enginyeria del sistema universitari catala que participi activament en l'orientacio d'estudiants de primer curs (ENGINYCAT 2010).

RESEARCH FUNDING

- AuScope Opportunity Fund (Requested AUD\$ 150.000), 2020
TRAMA: unravelling the Earth's storyline using joint inversion of TRAcE and MAjor elements (Chief investigator, Dr. Beñat Oliveira). <https://www.auscope.org.au/>
- AuScope Project proposal. Digital Framework for Geoscience in Australia (Requested AUD\$ 994.627,5), 2021-2025
A process-based predictive platform for Multiphase Reactive Transport (Chief investigator, Dr. Beñat Oliveira). <https://www.auscope.org.au/>
- AuScope Project proposal. Digital Framework for Geoscience in Australia (Requested AUD\$ 1.580.000), 2021-2025
A data-driven, simulation-based platform for multi-disciplinary studies of the Earth's interior. (Prof. Juan C. Afonso, Dr. Beñat Oliveira (as partner investigator)).

<https://www.auscope.org.au/>

- Exchange Research Project Macquarie University - China University of Geosciences, Wuhan, 2020-2024 "111 Plan" (Prof. Steve Foley, ..., Dr. Beñat Oliveira (as partner investigator)).
- European Space Agency - Macquarie University (AUD\$ 140.000), 2018 Co-funding Scheme (DVCR) (Prof. Juan C. Afonso, Dr. Beñat Oliveira (as partner investigator)).
- La Caixa Scholarship holder (AUD\$ 140.000 in two years), 2015-2017 Obra Social La Caixa, Barcelona, Spain. Most Prestigious Scholarship given by any Spanish institution, <https://www.europapress.es/epsocial/responsables/noticia-universitario-guipuzcoano-benat-oliveira-recibe-beca-caixa-cursar-estudios-posgrado-extranjero-20150414144348.html>
- Funded Project, 2015 Macquarie University. Cluster Computing for Large-Scale Geophysical Simulations: Towards an Integrated Multidisciplinary Framework. <https://researchers.mq.edu.au/en/projects/cluster-computing-for-large-scale-geophysical-simulations-towards>
- iMQRS Scholarship holder (AUD\$ 231.176 in four years), 2013-2017 Macquarie University. International Macquarie University Research Excellence Scholarship.

INTERNATIONAL WORKSHOPS AND RESEARCH STAYS

- UPC, Spain, 2019, 2018, 2016 Research stays with Prof. P. Diaz and Ass. Prof. Sergio Zlotnik (30/04/2016-15/05/2016; 16/12/2018-26/12/2018; 22/07/2019-16/08/2019).
- Thermodynamic modelling with alphaMELTS and other MELTS software, USA, 08-09/12/2018 UMD.
- ETH, Zurich, 2016 Research stay with Prof. P. Tackley (23/04/2016-30/04/2016).
- MIM, ISAAC NEWTOWN INSTITUTE, Cambridge, UK. 2016 Workshop. From Foundations to State-of-the-Art in Magma/Mantle.
- MIM, ISAAC NEWTOWN INSTITUTE, Cambridge, UK. 2016 Research stay (15/02/2016-19/02/2016).
- The 6th International PhD Course, University of Copenhagen, Denmark. 2014 Anisotropy and Mantle Deformation.

CO-SUPERVISION OF MASTER AND PhD THESIS

- PhD Co-supervision, Marti Burcet (ongoing), Towards Geodynamic-Geochemical Modelling of Transcrustal Magmatic Systems.
- Master of Research Co-supervision, Lucas Gamertsfelder (completed, 2018), A Compressible Formulation For Multiphase Flows of Geophysical and Geodynamic Interest.

TEACHING

Courses

- Calculus / *Cálculo* lectures at the Civil Engineer first year degree, UPC (2010/2011 and 2011/2012).
- GEOS345 - Exploring the Earth's Interior: An introduction to Solid Earth Geophysics. Department of Earth and Planetary Sciences, Faculty of Science and Engineering (2016 – 2017 – 2018).

Videos

- Cónicas y cuádricas. <https://www.youtube.com/watch?v=iX3ofAjGGjo> and <https://www.youtube.com/watch?v=UhwUB3pqkgE>
- Ecuaciones diferenciales. https://www.youtube.com/watch?v=dq7_lfp4I54 and <https://www.youtube.com/watch?v=RoazFY8umGw>
- Aproximaciones de funciones. <https://www.youtube.com/watch?v=Mb9oSk9Ivg4> and <https://www.youtube.com/watch?v=mHZhSyxZq08>
- Trigonometría. <https://www.youtube.com/watch?v=rBsDkxVr990> and <https://www.youtube.com/watch?v=4HrGcB1Oiks>
- Integral de Riemann. <https://www.youtube.com/watch?v=jZbbJhI99qQ> and <https://www.youtube.com/watch?v=Q4d-kOwqrXo>

Workshops

- Calculus / *Cálculo* reinforcement workshops at the Civil Engineer first year degree, UPC (2010/2011 and 2011/2012).
- GEOS345 – Tailored workshops in algebra and calculus for students.