

Curriculum Vitae

Dr. Joaquín Cortés
Senior Lecturer in Geology

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Research Interest

I have broad interests across igneous petrology. My research, however, principally focuses on the petrology and geochemistry of volcanic rocks. I study the thermodynamics of magma mixing, evolution of magma geochemistry and crystallization using combined analytical, theoretical and geostatistical tools.

Education

- 2003–2005 PhD. School of Earth Sciences, The University of Leeds, Leeds, UK. *Thesis Title:* Thermodynamics of magma recharge in open volcanic systems : a case study from Stromboli volcano, Italy. (Thesis Advisor, Prof. Marjorie Wilson).
- 1995–1996 Master of Sciences in Geology (MSc). Department of Geology, Faculty of Physical Sciences and Mathematics, University of Chile. Santiago, Chile. *Thesis title:* Geology of the Area between Lago Verde and Alto Rio Cisnes, Aisén Region, Chile¹. (Thesis Advisor, Prof. Francisco Hervé).
- 1996 Qualification as a Professional Geologist. Department of Geology, Faculty of Physical Sciences and Mathematics, University of Chile, Santiago, Chile.
- 1986–1994 Bachelor of Sciences (specialization in Geology). Faculty of Physical Sciences and Mathematics, University of Chile. Santiago, Chile.

Appointments

- 2017– Senior Lecturer in Geology. Edge Hills University, England.
- 2016–2017 Lecturer in Geology. University of Newcastle, England.
- 2013– Visiting Fellow. University of Edinburgh, Scotland.
- 2010–2013 Research Assistant Professor. State University of New York at Buffalo, USA.
- 2006–2010 Visiting Assistant Professor. State University of New York at Buffalo, USA.
- 2003–2005 Graduate Research Assistant. European Research on Understanding Processes and Timescales in magma systems (ERUPT) Project. University of Leeds, UK.
- 1993–2002 Permanent Staff Geologist. Chilean Geological and Mining Survey (SERNA-GEOMIN), Chile.
- 1992 Undergraduate Research Assistant. Department of Geology, University of Chile.
- 1992 Internship. Las Cenizas of Cabildo Mining Company.
- 1990 Undergraduate Research Assistant. Department of Geology. University of Chile.

¹Actual title in Spanish: “Geología del área comprendida entre Lago Verde y Alto Rio Cisnes, Aisén, Chile”

Professional Development

- 2017 Workshop: The magma chamber simulator (MCS). IAVCEI 2017, Portland, USA.
- 2013 Workshop: Developing a Cyberinfrastructure Vision for Petrology & Geochemistry. Earth Cube Domain, NSF. Washington D.C., USA.
- 2012 Workshop: Volcanism in the American Southwest, U.S. Geological Survey, Flagstaff, Arizona, USA.
- 2011 Short Course: Melt, Glasses & Magmas, Ludwig Maximilian Universität, München, Germany.
- 2011 Short Course & Seminar: Compositional Data analysis “CoDa Course”, Universidad de Girona, Girona, Spain.
- 2010 Workshop: Andesitic volcanism in Colombia organized by Ingeominas, Pasto, Colombia.
- 2010 Workshop: On the Cutting Edge: Professional Development for Geosciences Faculty, organized by the Science Education Resource Center at Carleton College (SERC).
- 2008 Short course on Minerals, Inclusions and Volcanic Processes by Mineral Society of America by Keith Putirka (California State University, Fresno) & Dr. Frank Tepley III (Oregon State University).
- 2008 Workshop: “How to Get Your Proposal Funded”, organized by the Research Foundation, University at Buffalo.
- 2001 Short course on Structural Geology with emphasis in micro structures by Dr. José Cembrano (Catholic University of Antofagasta, Chile).
- 1998 Short course on structural control of mineralization by Dr. Jorge Skarmeta (Codelco, Chile).
- 1997 Short course on isotopic systems and deformation: actual knowledge and applications to deformation dating by Dr. Steve Reddy (University of Liverpool).
- 1997 Short course on micro structures in deformed rocks by Dr. Dave Prior (University of Liverpool).
- 1995 Short course on geological interpretation of seismic reflection profiles by Dr. Felipe Audermar (Sipetrol-Sociedad Geológica de Chile).
- 1995 Short course on hydrothermal alteration with special reference to porphyry copper deposits given by Dr. John Dilles (University of Stanford) and Lucía Cuitiño (SERNAGEOMIN).

Other Skills

Fluent spoken and written English & Spanish native speaker.

Competent computer user under GNU/Linux, UNIX and Mac OS X. Competent programmer in C, C++, QT 5, Perl, Java and Javascript. Competent user of MATLAB, GNU-Octave, Gnuplot and *R*. Basic user of Mathematica. Competent user of the \LaTeX typesetting system, basic user of \TeX .

Competent user of the Scanning Electron Microscope (SEM) and the Electron Microprobe (EPMA) instruments. Working experience with the CAMECA ims-4f ion microprobe SIMS instrument.

Working knowledge of sample preparation for XRF analyses.

Grant Support

4. **Calder, E.S. (PI); Cortés J.A. (co-I):** *Volatile degassing and magma recharge; constraints provided by the Navidad eruption, Lonquimay volcano, Chile* Natural Environment Research Council (NERC), United Kindom (2015). Application for Ion Microprobe Analysis.
3. **Valentine, G. (PI); Cortés, J.A. (co-I):** *Collaborative Research: Links Between Magma Source Characteristics, Shallow Plumbing, and Eruptive Styles in Mafic Intraplate Volcanic Fields (Lunar Crater Volcanic Field, Nevada)* National Science Foundation–EAR Petrology and Geochemistry Program. (2009–2012). UB \$ 204,613. Partner Institutions: University of Nevada, Las Vegas (Eugene Smith, PI); University of Miami, Ohio (Elizabeth Widom, PI).
2. **Calder, E.S. (PI); Cortés, J.A. (co-I); Valentine, G. (co-I):** *An Unusual Explosive Basaltic Eruption: Llaima 2008* National Science Foundation–SGER Program. (2008–2009). \$ 25,083
1. **Self, S. (PI); Cortés, J.A. (co-I); Pavez, A. (co-I):** *La Pacana Caldera System, Northern Chile;* Natural Environment Research Council (NERC), United Kindom. £ 60,000

Refereed Publications; Published

18. **Valentine, G.A., Cortés, J.A., Rasoazanamparany, C., Widom, E., Smith, E.I., Johnsen, R., Briner, J., Harp, A.G., Turrin, B.** 2017. Lunar Crater Volcanic Field (Reveille and Pancake Ranges, Basin and Range Province, Nevada, USA. *Geosphere*, 13(2), 1–48, doi: 10.1130/GES01428.1
17. **Ruth, D.C.S., Cottrell, E., Cortés, J.A., Kelley, K.A., Calder, E.S.** 2016. From Passive Degassing to Violent Strombolian Eruption: the Case of the 2008 Eruption of Llaima Volcano, Chile. *Journal of Petrology*, 57(9). 1833–1864. doi:10.1093/petrology/eqw063
16. **Rasoazanamparany, C., Widom, E., Valentine, G.A., Smith, E.I., Cortés, J.A., Kuentz, D., Johnsen, R.,** 2015. Origin of Chemical and Isotopic Heterogeneity in a Mafic, Monogenetic Volcanic Field: A Case Study of the Lunar Crater Volcanic Field, Nevada. *Chemical Geology*, 397,76–93. doi:10.1016/j.chemgeo.2015.01.004
15. **Cortés, J.A., Smith, E., Valentine, G.A., Johnsen, R., Rasoazanamparany, C., Widom, E., Sas, M., Ruth, D.** 2015. Intrinsic conditions of magmas from the Lunar Crater Volcanic Field (Nevada). Implications for internal plumbing and magma ascent. *American Mineralogist*, 100, 396–413. doi:10.2138/am-2015-4812 (Selected as Notable Paper for February–March 2015 by the chief-editor Keith Putirka)
14. **Tadini, A., Bonali, F.L., Corazzato, C., Cortés, J.A., Tibaldi, A., Valentine, G.A.,** 2014. Spatial distribution and structural analysis of vents in the Lunar Crater Volcanic Field (Nevada, USA). *Bulletin of Volcanology*, 76,877. doi: 10.1007/s00445-014-0877-8
13. **Johnson, P., Valentine, G.A., Cortés, J.A., Tadini, A.** 2014. Basaltic tephra from monogenetic Marcath Volcano, Central Nevada. *Journal of Volcanology and Geothermal Research*, 281, 27–33. doi:10.1016/j.jvolgeores.2014.05.007
12. **Pouget, S., Bursik, M., Cortés, J.A., Hayward, C.L.** 2014. Use of principal component analysis for identification of Rockland and Trego Hot Springs tephra in the Hat Creek Graben, northeastern California, USA. *Quaternary Research*, 81, 125–137. doi:10.1016/j.yqres.2013.10.012
11. **Valentine, G.A., Cortés, J.A.,** 2013. Time and space variations in magmatic and phreatomagmatic eruptive processes at Easy Chair (Lunar Crater Volcanic Field, Nevada, USA. *Bulletin of Volcanology*, 75, 752. doi:10.1007/s00445-013-0752-z
10. **Cortés, J.A., Palma, J.L.** 2013. Geological Applications of Self-Organizing Maps to Multidimensional Compositional Data. *Pioneer Journal of Advances in Applied Mathematics*. 7(2): 7:49.

9. **Chiasera, B., Cortés, J.A.**, 2011. Predictive Regions for Geochemical Compositional Data of Volcanic Systems. *Journal of Volcanology and Geothermal Research*, 207(3-4):83-92, doi:10.1016/j.jvolgeores.2011.07.009
8. **Cortés, J.A.**, 2009. On the Harker Variation Diagrams; a Comment on “The Statistical Analysis of Compositional Data. Where Are We and Where Should We Be Heading” by Aitchison and Egozcue (2005). *Mathematical Geosciences*, 41(7):817-828, doi: 10.1007/s11004-009-9222-8
7. **Self, S., De Silva, S., Cortés, J.A.**, 2008. Enigmatic Clastogenic Rhyolitic Volcanism: The Corral de Coquena Spatter Ring, North Chile, *Journal of Volcanology and Geothermal Research*, 177:812-821, doi:10.1016/j.jvolgeores.2008.01.047.
6. **Cortés, J.A., Palma, J.L., Wilson, M.**, 2007. Deciphering Magma Mixing: the Application of Cluster Analysis to the Mineral Chemistry of Crystal Populations. *Journal of Volcanology and Geothermal Research*, 165:163-188, doi: 10.1016/j.jvolgeores.2007.05.018.
5. **Cortés, J.A., Wilson, M., Condliffe, E., Francalanci, L.** 2006. The Occurrence of Forsterite and Highly Oxidising Conditions in Basaltic Lavas from Stromboli Volcano. Italy. *Journal of Petrology*, 47(7):1345-1373, doi:10.1093/petrology/eg1012.
4. **Calder, E., Cortés, J.A., Palma, J.L., Luckett, R.**, 2005. Probabilistic Analysis of Rockfall Frequencies during an Andesite Lava Dome Eruption: The Soufrière Hills Volcano, Montserrat. *Geophysical Research Letters*, 32:L16309, doi: 10.1029/2005GL023594.
3. **Cortés, J.A., Wilson, M., Condliffe, E., Francalanci, L.** 2005. The Evolution of the Magmatic System of Stromboli Volcano during the Vancori Period (26–13.8 ky). *Journal of Volcanology and Geothermal Research*, 147(1-2): 1–38.
2. **Arriagada, C., Roperch, P., Mpodozis, C., Dupont-Nivet, Q., Cobbold, P., Chauvim, C., Cortés, J.A.**, 2003. Paleogene Clockwise Rotations in the Fore-Arc of Central Andes, Antofagasta Region, Northern Chile. *Journal of Geophysical Research-Solid Earth*. 108 (B1):2032 JAN 21 2003.
1. **Aguirre, L., Cortés, J.A., Morata, D., Hervé, F.**, 1997. Low Grade Metamorphism of Mesozoic and Cenozoic Sequences of Patagonia (43°–46°), Chile. *Revista Geológica de Chile*. Vol. 24, N°2, 187-201.

Refereed Publications; In Preparation/Submitted/in Review/in Press

3. **Blake, S., Cortés, J.A.**, Forecasting deflation, intrusion and eruption at inflating volcanoes. *Accepted, EPSL*.
2. **Schonwalder-Angel, Cortés, J.A., Calder, E.S.**, On the plumbing system and the formation of satellite scoria cones at Llaima volcano, Chile: The interplay of magmatic processes and local tectonics. *In preparation for JVGR*.
1. **Ruth, D.C.S., Costa, F., Bouvet de Maisonneuve, C., Franco, L., Cortés, J.A., Calder, E.S.** Melt inclusion residence times reveal the magma dynamics of open vent volcanoes. *In preparation for Nature Communications*.

Published Geological Maps and Associated Reports (internally peer-reviewed)

Colombian Geological Survey (SGC)

11. Cortés, J.A. 2017. Informe petrográfico de muestras MLG-26A & MLG-26C SGC Internal Report, 9p. Bogotá.
10. Cortés, J.A. 2017. Segundo informe de petrografía de muestras de cenizas del Volcán Nevado del Ruiz. SGC Internal Report, 16p. Bogotá.
9. Cortés, J.A. 2015. Petrografía de muestras de cenizas del Volcán Nevado del Ruiz. SGC Internal Report, 16p. Bogotá.

Chilean National Survey of Geology and Mining (SERNAGEOMIN)

8. De la Cruz, R., Cortés J.A., 2012 Rio Cisnes Sheet. Región de Aisén. Servicio Nacional de Geología y Minería. Mapas Geológicos. 1:100.000, Santiago.
7. Cortés, J.A., 2012 Sierra Mariposas Sheet. Región de Antofagasta. Servicio Nacional de Geología y Minería. Mapas Geológicos. 1:100.000, Santiago.
6. Cortés, J.A., Marquardt, C., González, G., Wilke, H., Marinović, N., 2007 Mejillones Sheet. Región de Antofagasta. Servicio Nacional de Geología y Minería. Carta Geológica de Chile. Serie Geología Básica. N°103–104. 1:100.000, Santiago.
5. Cortés, J.A., 2000. Palestina Sheet. Región de Antofagasta. Servicio Nacional de Geología y Minería. Mapas Geológicos N°19, 1:100.000, Santiago.
4. Marinović, N., Cortés, J.A., García, M., 1996. Estudio Geológico Regional de la zona comprendida entre Sierra del Buitre y Pampa San Román. Inédito SERNAGEOMIN. N° IR–96–8.
3. Prieto, X., Cortés, J.A., 1994. Geología del sector oriental de la Hoja Río Cisnes, Región de Aysén. Inédito SERNAGEOMIN. N°7172.
2. De la Cruz, R., Suárez, M., Quiroz, D., Cortés, J.A., Belmar, M., Covacevich, V., 1995. Estratigrafía y ambientes depositacionales de las unidades del Mesozoico superior–Cenozoico en la zona de Palena y Futaleufú, X Región. Inédito SERNAGEOMIN N°7373.
1. Prieto, X., Cortés, J.A., Suárez, M., 1994. Mapa Geológico del área oriental de la Hoja Puerto Cisnes. Inédito SERNAGEOMIN. N°5708.

Open Source Publications and Online Tools

7. Cortés, J.A., 2017. Stereop, a tool to plot equal area stereonet. <https://vhub.org/resources/stereop>
6. Cortés, J.A., 2017. CFU-Pingu, a tool to plot mineral-chemistry classification diagrams. <https://vhub.org/resources/cfupingu>
5. Cortés, J.A., 2017. Norma, a tool to calculate the CIPW norm. <https://vhub.org/resources/norma>
4. Cortés, J.A., 2017. CFU, a tool to calculate the cations per formula unit of mineral phases. <https://vhub.org/resources/cfu>
3. Cortés, J.A., 2016. Olive, a simple fractional crystallization calculator. <https://vhub.org/resources/olive>.
2. Cortés, J.A., Palma, J.L., 2016. Petrological INput - Graphical oUtput, plotting resource. <https://vhub.org/resources/pingu>
1. Cortés, J.A., 2015. Tritone, a tool to plot ternary diagrams. <https://vhub.org/resources/tritone>.

Invited Presentations and Workshops

- February 2017 Birth, life and death of volcanoes. Invited seminar Geosciences Seminar Series. Newcastle University.
- 23-26 Nov. 2015 Workshop on Igneous Petrology and Geochemistry. Universidad Tecnológica de Pereira, Pereira, Colombia.
- 21-23 May 2015 Workshop on Petrology and textural analysis. Colombian Geological Survey, Pasto, Colombia.
- March 2014 Evolution of volcanic plumbing. The University of Edinburgh, Edinburgh, Scotland.
- June 2011 The Recent Activity of Villarrica Volcano, Chile; a Quiescently Degassing Basaltic Andesite Arc System with a Violent Explosive History. University Blaise Pascal, Clermont Ferrand, France.
- June 2010 Petrogenesis of the Andean Andesite. Pasto (Colombia) Workshop. Instituto Colombiano de Geología y Minería (INGEOMINAS), Colombia.
- January 2008 Introduction to General Aspects of Continental and Oceanic Volcanic Arcs. Invited Lecture for the University Exchange Program in Earth Hazards (EHaz), Michigan Tech. University.
- December 2007 The Occurrence of Highly Oxidising Conditions as a Precursor to Paroxysmal Activity and Edifice Collapse: Stromboli Volcano Italy. Pegrum Lecture, Department of Geology, University at Buffalo.
- October 2007 From the Aeolian to the Andes. Invited Lecture, Andean Seminar Series. Cornell University, USA.

Conference Abstracts

48. **Cortés, J.A., Blake, S.**, 2017. Forecasting in real-time Volcanic Eruptions Based on Ground Deformation Data. PE51A-6. IAVCEI, General Assembly, Portland Oregon.
47. **Bain, A., Calder, E.S., Cortés, J.A., Cortés, G.P., Gómez, D., Torres, R., Loughlin, S.**, 2017. Repeated emplacement and destruction of stratified andesitic magma plugs in the shallow conduit of Galeras volcano between 2004-2012. ME41C-3. IAVCEI, General Assembly, Portland Oregon.
45. **Clarke, B.A., Calder, E.S., Cortés, J.A., Naylor, M., Dessalegn, F., Butler, I., Fontijn, K., Hutchison, W.**, 2017. Achneliths with Evidence of Post-Emplacement Vesiculation at Aluto Volcano, Main Ethiopian Rift: New constraints on Fragmentation and Eruptive Styles at Peralkaline Rhyolite Volcanoes. VH11A-4. IAVCEI, General Assembly, Portland Oregon.
44. **Chiwona, A.G., Manning, D.A.C., Gaulton, R., Cortés, J.A.**, 2017. Applied gamma ray spectrometry and remote sensing in delineation of nepheline syenites in rift tectonic settings. European Geosciences Union General Assembly, Abstract EGU2017-1208. 23-28 April, Vienna, Austria.
43. **Blake, S., Cortés, J.A.** 2016. Forecasting the onset time of volcanic eruptions based on ground deformation data. AGU fall meeting Dec 12-16, San Francisco, USA.
42. **Clarke, B.A., Calder, E., Cortés, J.A. Butler, I.B., Yirgu, G.**, 2016. Peralkaline Rhyolite Achneliths with Evidence of Post-Emplacement Vesiculation at Aluto Volcano, Main Ethiopian Rift: What can these unusual pyroclasts tell us? AGU fall meeting Dec 12-16, San Francisco, USA.
41. **Ruth, D.C.S., Costa, F., Bouvet de Maisonneuve, C., Franco, L., Cortés, J.A., Calder, E.S.** 2016. Tiny crystals give away the where and when of magma ascent. AGU fall meeting Dec 12-16, San Francisco, USA.

40. **Schonwalder, D., Cortés, J.A.** 2015. Insights on the plumbing system of a stratovolcano and its interaction with the local tectonics, based on the petrology, geochemistry and textural analysis of satellite scoria cones. Llaima volcano, Chile. AGU fall meeting Dec 14-18, San Francisco, USA.
39. **Bursik, M. I., Pouget, S., Cortés, J.A.** 2014. Use of PCA in tephra correlation and importance of thickness values for volume estimation. AGU fall meeting, Dec 15-19, San Francisco, USA.
38. **McGarvie, D., Pavez, A., Cortés, J.A., Faggetter, L., Burgess, R., McGarvie, D.** 2014. Glaciovolcanism at Volcán Quetrupillán, Chile. GSA Annual Meeting, October 19-22, Vancouver, Canada.
37. **Pouget, S., Bursik, M., Cortés, J.A., Rogova, G.L.** 2014. Use of PCA and clustering in tephra correlation. Tephra 2014 - Maximizing the potential of tephra for multidisciplinary science, Portland, Oregon, August 3-7, USA.
36. **Cortés, J.A.** 2014. Thermodynamic modeling of the evolution of a persistently active basaltic-andesite system. VSMG conference, Edinburgh.
35. **Cortés, J.A.** 2013. The dynamics of magma recharge in persistently active basaltic andesite systems. IAVCEI General Assembly, Kagoshima, Japan. Abstract 1A2-1C-O5
34. **Rasoazanamparany, C., Widom, E.I., Cortés, J.A., Smith, E.I., Valentine, G.A., Kuentz, D.C., Johnsen, R.L.** 2012. Mantle Source Characteristics and Petrogenesis in the Lunar Crater Volcanic Field. Goldschmidt Conference, Florence, Italy.
33. **Cortés, J.A., Leach, R., Gertisser, R., Calder, E.S., Gurioli, L.** 2012. Paroxysmal eruptions at a persistently degassing basaltic andesite stratovolcano : what changes ? EOS, Trans. AGU Fall Meeting Abstract V13D-2876.
32. **Tadini, A., Cortés, J.A., Valentine, G.A., Johnson, P., Tibaldi, A., Bonali, F.** 2012 Cluster Analysis of vents in monogenetic volcanic fields, Lunar Crater Volcanic Field (Nevada). EOS, Trans. AGU Fall Meeting Abstract V53C-2849.
31. **Cortés, J.A., Smith, E.I., Johnsen, R., Widom, E., Valentine, G.A.** 2012 Intrinsic conditions of magmas in Lunar Crater Volcanic Field, Nevada. Volcanism in the American Southwest, USGS, Flagstaff.
30. **Rasoazanamparany, C., Widom, E.I., Valentine, G.A., Smith, E.I., Cortés, J.A., Kuentz, D.C., *Johnsen, R.L.** 2012 The Petrogenesis of Monogenetic Volcanoes Inferred from Lunar Crater Volcanic Field, Central Nevada. Goldschmidt Conference, Montreal.
29. **Cortés, J.A., Smith, G., Johnsen, R.L., Rasoazanamparany, C., Valentine, G.A., Widom, E.I., Kuentz, D.C.** 2011. Plumbing of Continental Basaltic Volcanoes from the Mantle to the Surface 2: Geochemical Variations of the Pliocene to Recent Volcanic Products of Lunar Crater Volcanic Field (Nevada, USA) EOS, Trans. AGU Fall Meeting Abstract V33C-2663.
28. **Valentine, G.A., Cortés, J.A., Widom, E.I., Smith, E.I.** 2011. Plumbing of Continental Basaltic Volcanoes from the Mantle to the Surface 1: Insights from Field Relationships at the Lunar Crater Volcanic Field (Nevada, USA) AGU Fall Meeting Abstract V33C-2657.
27. **Sweeney, D., Hughes, M., Calder, E., Cortés, J.A., Valentine, G., Whelley, P., Lara, L.,** 2009. Unusual Volcanic Products from the 2008 Eruption at Volcán Llaima, Chile. GSA Abstracts. Vol 41, N°7.
26. **Sweeney, D., Hughes, M., Calder, E., Cortés, J.A., Valentine, G., Whelley, P., Lara, L.,** 2009. Unusual Volcanic Products from the 2008 Eruption at Volcán Llaima, Chile. AGU Joint Assembly. Toronto, Canada. May 2009.
25. **Cortés, J.A., Palma, J.L.,** 2009. Using Self Organizing Maps with Geochemical Compositional data. EOS, Trans. AGU 89(53), Fall Meet. Suppl., Abstract V13E-2159.

24. **Self, S., Wolff, J.A., Cortés, J.A.,** 2009. Fall Deposits Associated with Major Ignimbrites and the Question of Total Eruptive Volume. EOS Trans AGU 89(53), Fall Meet. Suppl., Abstract V21G-06.
23. **Calder, E.S., Cortés, J.A., Loughlin, S., de Angelis, S.,** 2008. The Use of Self-Organizing Maps to Identify Patterns in Multi-Variate Monitoring Data Associated with Lava Dome Collapse. IAVCEI General Assembly, Reykjavik, Iceland. August 2008.
22. **Nimlos, E., Calder, E.S., Cortés, J.A., De Angelis, S.** 2008. Energy-based Mapping of Rockfall Seismic Signals from Rockfalls at Growing Lava Domes: a Key-monitoring Tool for Hazard Analysis. IAVCEI General Assembly, Reykjavik, Iceland. August 2008.
21. **Chiasera, B., Cortés, J.A., Morgan, D.J.** 2008. Combining the Cluster Analysis of Mineral Chemistry with Isotopic Microanalysis and CDS: Evidence of Magma Mixing During the Lower Vancori Period, Stromboli Volcano, Italy. IAVCEI General Assembly, Reykjavik, Iceland, August 2008.
20. **Pavez, A., Cortés, J.A., Self, S., Kuwata, A.K., Gardeweg, M.** 2008. New Insights on La Pacana Caldera System, Northern Chile, and its Ignimbrite Sheets. IAVCEI General Assembly, Reykjavik, Iceland, August 2008.
19. **Cortés, J.A., Palma, J.L** Using Self Organizing Maps on Compositional Data. CODA Workshop Girona, Spain, May 2008.
18. **Cortés, J.A., Wilson, M., Francalanci, L.,** 2005. The Occurrence of Highly Oxidising Conditions as a Precursor to Paroxysmic Activity and Edifice Collapse: Stromboli Volcano, Italy. ERUPT Final Workshop, Naples-Stromboli, Italy.
17. **Calder, E., Harris, A., Palma, J.L., Cortés, J.A.,** 2005. Villarrica Volcano, Chile; an Integrated Monitoring Experiment. EGU05-A-08424. European Geosciences Union. Vienna, Austria.
16. **Cortés, J.A., Wilson, M., Condliffe, E.,** 2005. A Calibration of an Oxygen Geobarometer Based on Clinopyroxene Stoichiometry. EGU05-A-02888. European Geosciences Union. Vienna, Austria.
15. **Calder, E., Harris, A., Palma, J.L., Cortés, J.A.,** 2004. Villarrica Volcano, Chile; an Integrated Monitoring Experiment. IAVCEI General Assembly, Pucón, Chile, November 2004.
14. **Gertisser, R., Cortés, J.A., Calder, E.,** 2004. Petrological Constraints on the Recent Activity of Villarrica Volcano, Southern Chile. IAVCEI General Assembly, Pucón, Chile, November 2004.
13. **Cortés, J.A., Basso, M., Marinović, N.,** 2004. Geochemical Evolution of the Upper La Negra Formation Volcanic Succession in Northern Chile. IAVCEI General Assembly, Pucón, Chile, November 2004.
12. **Cortés, J.A., Wilson, M., Condliffe, E., Francalanci, L.** 2004. On the Occurrence of Fo₉₆-Olivine in the Products of Stromboli Volcano, Italy. IAVCEI General Assembly, Pucón, Chile, November 2004.
11. **Cortés, J.A., Wilson, M., Condliffe, E., Francalanci, L.** 2004. Changes in Mineral Chemistry and Thermodynamic Equilibrium Conditions as Indicators of Magma Chamber Recharge: the Vancori period (26–13.8 ky), Stromboli Volcano, Italy. 32th International Geological Congress. Florence, Italy.
10. **Cortés, J.A., Wilson, M.; Condliffe, E.; Francalanci, L.** 2004. Evidence of Magma Recharge Based on Mineral Chemistry and Thermodynamic Equilibrium Conditions in Lavas from the Vancori Period (26 – 13.8 ky), Stromboli Volcano, Italy. EGU04-A-03101. European Geosciences Union. Nice, France.

9. **Cortés, J.A., Wilson, M., Condliffe, E., Francalanci, L.** 2004. Changes in Mineral Chemistry and Thermodynamic Equilibrium Conditions as Indicators of Magma Chamber Recharge. The Vancori Period (26 – 13.8 ky), Stromboli Volcano, Italy. VMSG 2004, Bath, England.
8. **Basso, M., Cortés, J.A., Marinović, N.**, 2001. U–Pb Dates of Jurassic La Negra Formation, Antofagasta Region, Chile. In Isotope Symposium SSAGI. Pucón, Chile.
7. **Basso, M., Cortés, J.A., Marinović, N.**, 2000. Existence of Late Lower Cretaceous Rocks in Antofagasta, Chile. In 31th International Geological Congress. Brazil.
6. **Cortés, J.A., Marinović, N., Basso, M.**, 2000. Hallazgo de intrusivos Devónicos al este de Antofagasta: Edad U/Pb e implicancias tectónicas. In IX Congreso Geológico Chileno. Vol. 1. Pp 600–730.
5. **Cortés, J.A., Marinović, N., García, M.**, 1997. Evolución Geoquímica del volcanismo Meso-Cenozoico de la Región de Antofagasta utilizando los elementos inmóviles TiO₂, Nb, Y, Zr. In VIII Congreso Geológico Chileno. Vol. 2. pp. 1250–1253.
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3. **Marinović, N., Cortés, J.A., García, M.**, 1997. Edades Radiométricas de las rocas volcánicas e intrusivas del Cretácico Superior en la Región de Antofagasta. Chile. In VIII Congreso Geológico Chileno. Vol. 2. pp. 1369–1373.
2. **Aguirre, L., Cortés, J.A., Morata, D., Hervé, F.**, 1996. Low Grade Metamorphism of Mesozoic and Cenozoic Sequences of Patagonia (43°–46°), Chile In 2nd ISAG. Saint Malo, France. pp 535–538.
1. **Cortés, J., Godoy, E., Hervé, F.**, 1994. Geología del área de Lago Verde, Región de Aisén. Chile. In 7° Congreso Geológico Chileno, I pp, 23–26.

Academic Service

- 2011–2013 Chair of the Students Awards Committee. University at Buffalo.
- 2010–2013 Member of the Pegrum Conference Funds Committee. University at Buffalo.
- 2011–2013 Representative of the Department of Geology in the Faculty Senate. University at Buffalo.

Outreach and other Activities

- Oct 2010 University at Buffalo Faculty Expert, discussing the Chilean Mine Industry in a short video for UBCommunications (www.youtube.com/watch?v=5RtD0y5ozHo)
- Oct 2010 University at Buffalo Faculty Expert, several interviews to discuss Chilean Mine Industry and the San José mining accident:
 - Buffalo News (<http://www.buffalonews.com/city/communities/buffalo/article219386.ece>)
 - USA Today (http://findarticles.com/p/articles/mi_m1272/is_2787_139/ai_n57069685/)
 - UB Newscenter (<http://ubfacultyexperts.buffalo.edu/node/92>)
- February 2008 Effects on Climate and Life of the Largest Explosive Eruptions. Buffalo Geological Society, Buffalo, USA.
- Oct 2006 Conference “New Concepts for Old Basins” Eastern Section. American Association of Petroleum Geologists. 35th Annual Meeting, field trip (organizer and lead geologist): “Hard Rockers Paradise” to the Grenville area, Canada, Buffalo.
- Jul 2004 Participant in a public science exhibition. Royal Society (UK) Summer vScience Exhibition. London.

- Aug 2000 Organizing committee of the IX Chilean Geological Congress. Puerto Varas, Chile.

Reviews

- 2006–to date Research proposals reviews for NSF (2) and Earthquake Commission of New Zealand (1).
- 2006–to date Journal reviews: Journal of Petrology (7), Bulletin of Volcanology (5), Earth Planetary Sciences Letters (1), Geophysical Research Letters (1), Earth Science Informatics (1), Mathematical & Geosciences (3), G^3 (4), Terra Nova (2), Andean Geology (2), Lithos (1), Journal of Hazardous Materials (1), Journal of South American Earth Sciences (1).

Teaching

Student Research Supervision

Postgraduate Students with Cortés as main Advisor

Name	Degree	Project Title	Dates	Support
University at Buffalo				
Brandon Chiasera	M.Sc.	Geochemistry of Stromboli volcano using compositional data methods.	2008–2010	UB Teaching Assistant
Sean Hays	M.Sc.	Crystal Size Distribution of the Grenville province units.	2009–2011	Self-supported
Rebecca Leach	M.Sc.	Texture and Petrology of Villarrica volcano (Chile) historic lava flows.	2010–2012	UB T.A. / INVOGE Exchange
Alessandro Tadinni	M.Sc.	Volcanic hazard of Lunar crater	2011–2012	INVOGE Exchange
Juliette Maurice	M.Sc.	MELTS modelling of the evolution of the products at Llaima volcano	2011–2012	INVOGE Exchange
Thomas Cali	M.A.	Petrography of Villarrica volcano lavas	2009–2013	Self-Supported
Thomas Macomber	M.Sc.	Petrogenesis of the Navidad cone, Lonquimay volcano (Chile).	2012–2015	Self-supported
Dayana Schonwalder	Ph.D.	Petrogenesis of Scoria cones at Llaima Volcano (Chile).	2010–2015	RA / UB Teaching Assistant
Newcastle University				
Erland Tegelberg	M.Sc.	Debris flow modelling using Titan 2D	2016–2017	Newcastle University

Cortés as committee member/co-supervisor

Name	Degree	Project Title	Dates	Support
University at Buffalo				
Charles Meyn	M.Sc.	Theprochronology of Mono Inyo volcanoes	2006–2007	NSF(Bursik)
Brett Burkett	M.Sc.	Geology of Hualca Hualca, Peru	2007–2008	RA(Gregg)
Erik Nimlos	M.Sc.	Spatial variation of rockfalls, Montserrat	2006–2008	UB–TA (Calder)
Kelly Schokey	M.Sc.	Spatial relationship within Fields of shield volcanoes	2007–2009	RA (Gregg)
Stacy Hanson	M.Sc.	Fractures Mohawk Valley	2008–2010	RA (Jacobi)
Trevi Lough	M.Sc.	Geological Map of the Moon.	2008–2011	RA (Gregg)
Melissa Zelazny	M.Sc.	Lineament Mapping NY	2008–2011	RA (Csatho)
Eric Breard	M.Sc.	Llaima volcano mix avalanche deposits	2011–2012	INVOGE (Calder)
Paolo Benelli	M.Sc.	Chemistry of the Marcellus Shale	2011–2012	INVOGE (Banks)
Michael Lagamba	M.Sc.	Fracture patterns of the Marcellus shale NY.	2010–2012	RA (Jacobi)
Nicholas Young	Ph.D.	Holocene fluctuation of Jakobshavn glacier, Greenland	2009–2012	RA (Briner)
Jodi Fisher	M.Sc.	Fracture of the Appalachian Basin	2008–2012	RA (Jacobi)
Jamal Amin	M.Sc.	Physical volcanology of Bea’s crater Maar	2009–2013	Self-Supported (Valentine)
Peter Johnson	M.Sc.	Tephra dispersal of Marcath eruption, Nevada	2011–2013	RA (Valentine)
Kevin Kersten	M.Sc.	Tectonics assesment Pit #3 Dam (Northern California)	2011–2013	RA (Bursik)
Alex O’Hara	M.Sc.	Utica’s fracture and faults	2011–2013	RA (Jacobi)
Dawn Sweeney	Ph.D.	Petrology of Llaima volcano, Chile.	2008–2014	UB–TA (Calder)
Andrew Harp	M.Sc.	Shallow Plumbing Geometry of Monogenetic Volcano, Lunar Crater Volcanic Field (Nevada).	2012–2014	RA (Valentine)
Solene Pouget	Ph.D.	Tephra, field theory and application.	2011–2014	RA (Valentine)
University of Edinburgh				
Amelia Bain	Ph.D.	Vulcanian Explosion at Galeras Volcano, Colombia	2014–	DTP (Calder)
Benjamin Clarke	Ph.D.	Petrology of Aluto Volcano, Ethiopia	2015–	DTP (Calder)
Andrea Rønsen	MRSci	Dome collapse, Santa María Volcano	2015-2016	DTP (Calder)
Isla Simmonds	Ph.D.	Quetrupillán Volcano, Chile - Holocene eruptions and future hazards.	2016–	DTP (Calder)

Name	Degree	Project Title	Dates	Support
Newcastle University				
Annock Chiwona	Ph.D.	Nepheline Syenites from Malawi	2016–	RA (Manning)
Fiona Langston	M.Sc.	Investigation of the relationship between textural characteristics and the uniaxial compressive strength of Pennine Middle coal measure sandstone.	2016–2017	CEG (Acikalin)
William Hughes	M.Sc.	Compositional controls on the engineering properties of a sandstone	2016–2017	CEG (Acikalin)
Chris Armstrong	M.Sc.	The fabric control on the strength properties of sandstone	2016–2017	CEG (Acikalin)

Other Postgraduate Research Projects (not directly related with main thesis topic)

Name	Programme	Title	Year
University at Buffalo			
Greg Babonis	M.Sc.	Structure of the Canadian Shield	2007
Jacob Brady	Ph.D.	Basic petrography training for Archaeologists	2011

Supervision of Undergraduate Research Projects

Name	Project	Title	Year(s)
University at Buffalo			
Sean McGrane	Independent Studies	Structure of the Canadian Shield	2007
Dana Martin	Independent Studies	Structure of the Canadian Shield	2007
Meghan Hughes	Independent Studies	Structure of the Mohawk Valley	2009
Michael Lagamba	Independent Studies	Structure of the Canadian Shield	2009
Michael Lagamba	Honor Projects	Computer Modelling of Magmatic series	2009–2010
Rebecca Leach	Honor Projects	Petrology of the Archaean Mantle, Canadian Shield	2009–2010
Tanner West	Independent Studies	Structure of the Canadian Shield	2009
Nicholas Dahm	Independent Studies	Textural analysis of samples from Santiaguito Volcano, Guatemala	2010
Matthew Wendt	Independent Studies	Structure of Western New York	2011
Thomas Macomber	Independent Studies	Textural analysis from current products of Llaima volcano	2012
Ahmad Din Selamat	Independent Studies	Textural analysis from current products of Llaima volcano	2012
Matthew Oberg	Independent Studies	Petrological evolution of Teide volcanic system	2012
Kasey Zitnik	Independent Studies	Computer Modelling of rockfall time series	2012
Christopher Wood	Honor Projects	Structure of the Chilean Altiplano	2012

Course Teaching

Edge Hill University (2017–):

GEO1240: Rocks, Minerals and Fossils: This first year module aims to provide a suitable knowledge base allowing students to appreciate the origin, composition, dynamics and history of the Earth as a planet. It will show plate tectonics as a unifying concept in the geological sciences. It will illustrate the composition and formation of major mineral and rock groups and identify and classify marine and terrestrial fossils. The module will provide skills suitable to the description, identification and classification of these geological materials.

GEO1241: Geological Research Methods I: An introduction to a range of field and laboratory geological techniques covering the range of knowledge and skills that a geologist in training will need to successfully study and practise geology at more advanced levels.

GEO2240: Volcanic and Igneous Rocks and Processes: This module builds on foundation work completed in the first year and advances knowledge and understanding as well as presenting contemporary reviews of new ideas and controversies surrounding geological forms and processes associated with igneous and volcanic geology. An understanding of volcanic and igneous geology is crucial to the Earth Sciences because of the interactive nature of Earth's systems. A case study approach is adopted to study a variety of themes, which illustrate the need for integrated study in these areas.

GEO2242: Geological Research Methods II: This module is about application of knowledge in geology. The module will enhance the students range of laboratory and field skills. It will introduce students to independent field working and the development of geological field mapping skills in complex terranes. The field work understanding will be assisted by the use of digital geological techniques in particular the use of vector graphic drawing packages and ArcGIS. Rockmass properties using the engineering laboratory will be introduced to provide a wider perspective and how they might be used in geology field work. Students will be encouraged to apply for, and spend a short term internship, with a geological company (such as a site investigation operator) to demonstrate and extend their geological skill set. The module will incorporate group and independent work in areas of field observation, recording and the manual and digital presentation of such observations.

GEO2243: Stratigraphy, Geological Maps and Structural Geology: This module introduces the nature of small- and large-scale geological structures as well as the physical principles of stress and strain. By considering problem and real topographic and geological maps, and remotely sensed data, a basic understanding of geological maps as representations of geometry and stratigraphy will be realised.

Newcastle University (2016–2017):

CEG1602: Earth Surface Materials: A first year course to develop the understanding of the natural processes that shape the Earth's surface and the geological history of Great Britain. The students will be taught the formation of rocks and minerals, the rock cycle, basic geological structures, the formation and properties of groundwater and geological mapping.

CEG2602: Rock Materials: the petrology of igneous, sedimentary and metamorphic rocks:
(Module leader) The aim of this course is to give students the opportunity to learn what is needed to describe rocks in terms of the materials from which they are made, and to understand the processes of their formation. As a single course it allows connections to be made between igneous, sedimentary and metamorphic processes, thus expressing a connection within the dynamic Earth system. The course will equip students for independent work, especially in the field description of rocks, and includes development of practical skills in observation (microscope work) and data interpretation that are important in the Earth Sciences at all levels.

University of Edinburgh (2014–):

EASC10105, Field Skills for Geology: This course encompasses key field training provided for 3rd year BSc and MEarthSci Geology degrees, through the delivery of field courses in Spain and Scotland. To date I have participated in the Spain fieldtrip (Sorbas basin), in the Kinlochleven fieldtrip while I have led the Mull fieldtrip.

CIVE08018, Engineering Geology and Surveying 2: Introduces Civil Engineering students to the principles of Geology, i.e. the basic knowledge of sedimentary, igneous and metamorphic rocks, their formation and occurrence in different tectonic environments. The course also introduces the interpretation and construction of geological maps and cross-sections as well as the recognition and description of common geological formations of relevance to Civil Engineering.

SUNY at Buffalo (2006–2013):

GLY306, Petrology: Taught every spring semester (2006–2013). Presents the fundamental principles of petrological processes, including origin, occurrence, and evolution of igneous and metamorphic rocks. Integrates geochemistry, mineralogy and thermodynamics to present the current petrogenetic models for the different igneous or metamorphic environments. Requires a field trip.

GLY326, Structural Geology: Taught every fall semester (2006–2012). Introduces students to the description, classification and interpretation of geological structures (faults, folds and fractures) in term of the tectonic settings plus the practical techniques for structural analysis. Describes the different structures in terms of their tectonic setting (extensional, strike-slip, contractional). In labs, introduces practical techniques for structural analysis. Requires a field trip.

GLY407, Geological Field Training: Taught summer 2007 & 2008 as a part of a pool of instructors. Applied field methods in geology. Geologic field trips and mapping from a mobile base in the Western United States. Mapping projects include superficial deposits in Colorado and areas of increasingly complex sedimentary structure in Utah and Wyoming. This course is conducted outdoors and requires walking over difficult terrain and some exposure to the elements.

GLY431/531, Volcanology: Taught fall semester 2007. An introduction to a full spectrum of volcanic eruptions styles and eruptive products from effusive to explosive volcanism. Includes material on classic eruptions, tectonic setting of volcanism, the evolution of volcanic constructs through time and volcanic hazards and risk. Offered every year.

GLY574, Topics in Volcanology: Basaltic Andesite Petrogenesis in Arc Settings. Taught spring 2012. This is an advanced volcanology course undertaken in a seminar setting. Students learn about magma petrogenesis through revision and discussion of the primary literature.

Other teaching

Year	Appointment	Course	Institution
1991–1992	Teaching Assistant	Geology for Engineers	University of Chile
1991–1992	Teaching Assistant	Mineralogy for Geologists	University of Chile
1992–1995	Teaching Assistant	Thermodynamics for Geologists	University of Chile
2003–2005	Academic Assistant	Spanish Course, Level 2	The Open University
2004	Senior Demonstrator	The Geological History of the British Isles	The Open University
2004	Teaching Assistant	Chemistry for Geo-scientists	University of Leeds
2014-2015	Course Assistant	Earth Dynamics	University of Edinburgh
2016	Lecturer/tutor	Global Tectonics and the Rock Cycle	University of Edinburgh
2016	Marker	Geology Dissertations Geology Degree	University of Edinburgh

Member of Professional Associations (Past & Present)

Member of the Colegio de Geólogos de Chile

Member of Mineralogical Society of America

Member of the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI).

Member of the American Geophysical Union (AGU).

Member and developer for the Collaborative volcano research and risk mitigation (Vhub).

References

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Ormskirk, September 14, 2017