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CURRICULUM VITAE

Fidel Costa Rodriguez
Associate Professor
Asian School of the Environment (CoS)

Academic Qualifications

2000: Ph.D. in Earth Sciences, Department of Mineralogy, University of Geneva, Switzerland.

1994: Bachelor degree in Earth Sciences. University of Barcelona (Spain).

Summary of Working Experience

- | | |
|------------------|--|
| 08/2019-present. | Interim Director, Earth Observatory of Singapore, NTU, Singapore. |
| 04/2019-08/2019. | Designated Interim Director, Earth Observatory of Singapore, NTU, Singapore. |
| 08/2018-08/2019. | Associate Chair (Faculty) of Asian School of the Environment. NTU, Singapore. |
| 01/2017-07/2018. | Acting Chair of Asian School of the Environment. NTU, Singapore. |
| 09/2015-12/2016. | Associate Chair (Faculty) of Asian School of the Environment. NTU, Singapore. |
| 09/2015-present. | Associate professor and Principal Investigator at the Earth Observatory of Singapore. NTU, Singapore. |
| 02/2010-08/2015. | Assistant professor and Principal Investigator at the Earth Observatory of Singapore. NTU, Singapore. |
| 10/2006-01/2010. | Ramon y Cajal Research Fellowship at the CSIC, Institut de Ciencies de la Terra 'Jaume Almera', Barcelona, Spain. |
| 12/2002-09/2006. | Post-doctoral position at the Institut für Geologie, Mineralogie und Geophysik, Ruhr-Universität, Bochum, Germany. |
| 11/2000-11/2002. | Marie-Curie Research Fellowship at the Institut des Sciences de la Terre d'Orléans-CNRS, France. |
| 12/1999-10/2000. | Post-doctoral position at the Department of Mineralogy of the University of Geneva, Switzerland. |
| 03/1995-11/1999: | Ph.D. thesis research funded by the Swiss National Science Foundation. |
| 1994-1995: | Employee of the Spanish Geological Survey. Detailed mapping and characterization of mineral deposits. Metalogenetic map, sheet 25 (Figueres), 1:200,000. |

Academic Honours and Awards

Year	Academic Honour / Award
2019	Provost's Chair in Earth Sciences, NTU, Singapore
2017	National Research Foundation Investigator (Singapore)
2015	Fellow of the University Scholars Program (NTU)
2013	Wager Medal by the International Association of Volcanology and Chemistry of the Earth's Interior

RESEARCH SUMMARY

Key Areas of Research

- Volcanology, Petrology, Mineralogy, Geochemistry
- Natural hazards

Keynote Presentations

1. Asian Consortium of Volcanology, November, Academia Sinica (Taiwan) on November 2th, 2019.
2. Merging Geophysical, Petrochronologic, and Modeling Perspectives of Large Silicic Magma Systems. Chapman conference, American Geophysical Union. Chile, January 2018.
3. Cities on Volcanoes 8, September 2014 (Jogjakarta, Indonesia), Plenary talk: What can geology and volcanology do to help anticipate and mitigate volcanic eruption".
4. Goldschmidt Conference June 2012 (Montreal, Canada), session 'SS25- Geochemical evolution of silicic magma systems'.

Invited Presentations

1. Invited speaker at the Cities on Volcanoes meeting, Crete, May 2020.
2. Invited speaker at American Geophysical Union Fall meeting, December 2019 (San Francisco, USA).
3. Invited speaker at Sorbonne Universite (Paris, France), on November 27th, 2019.
4. Invited speaker at Maine University (Maine, USA) on October 27th, 2019.
5. Invited speaker at Institute Physique du Globe de Paris (CNRS, Universite de Paris, France), on May 27th, 2019.
6. Invited speaker at European Geophysical Union (Vienna, Austria) on April 10th, 2019.
7. Invited speaker at Institute Sciences de la Terre d'Orleans-CNRS (France) on April 5th, 2019.
8. Invited speaker at Yamagata University (Japan) on March 4th, 2019.

9. Invited speaker at Tohoku University (Japan) on May 29th, 2018.
10. Invited speaker at Cambridge University (UK), 1st December 2107.
11. Invited speaker at University of Wisconsin, Madison, February 2017.
12. AGU Fall meeting, December 2014 (San Francisco, USA), Session: Accelerated and Punctuated: Using Geochronology, Diffusion Modeling, and Numerical Models to Understand Magmatic Processes II'
13. Goldschmidt Conference June 2014 (Sacramento, USA), session "'12a. Crystallization histories vs. eruption histories: what do geospeedometry and geochronology tell us?'".
14. AGU Fall meeting 2013 (San Francisco, USA), session 'V44B. Innovations and Challenges in Microanalysis and Isotope Mass Spectrometry'.
15. AGU Fall meeting 2012 (San Francisco, USA), session 'V041: Space, Time, and Transport in Petrology and Geochemistry'.
16. AGU Fall meeting 2012 (San Francisco, USA), session 'V007: Combining petrological studies of volcanic systems with geophysical, gas, and other information sources'
17. Asia-Oceania Geophysical Society, August 2012 (Singapore), session 'SE85 Time Scales of Magmatic Evolution and Eruption in Intermediate to Silicic Magmatic Systems'.
18. IUGG-IAVCEI meeting 2011 (Melbourne, Australia), session 'V01 Magma Chambers and Their Dynamics: how big are they, their time scales of formation and longevity, how do we detect them, crystals and their stories'
19. EGU meeting 2011 (Vienna, Austria), session, 'GMPV12-Measuring and modelling of volcano eruption dynamics: I. shallow magma storage and ascent'.
20. AGU Fall meeting 2010 (San Francisco, USA), session 'V24C-Volatiles in Magmas: Breath of the Deep Earth'.
21. EGU meeting 2009 (Vienna, Austria), session 'GMPV4- Unraveling magma generation and differentiation: Field, analytical, experimental and numerical investigation of magmatic and volcanic systems'.
22. AGU Fall meeting 2008 (San Francisco, USA), session 'V43J- Thermobarometry and implications for magma storage and transport'.
23. AGU Fall meeting 2008 (San Francisco, USA), session 'MR21C- Diffusion and related transport processes in Geomaterials'.
24. AGU Fall meeting 2006 (San Francisco, USA), session 'V53E- From crystals to plutons: crystal-scale records of magmatic processes'.
25. Goldschmidt Conference 2005 (Moscow, Idaho, USA), session 'SS25- Geochemical evolution of silicic magma systems'.
26. AGU Fall meeting 2004 (San Francisco, USA), session 'V23C-Quantitative Constraints on Rates of Reaction, Deformation, and Mass Transfer: Crustal Processes'.
27. AGU Fall meeting 2004 (San Francisco, USA), session 'V23D- Arenal Volcano: Magma Genesis, Volcanological Processes, and Societal Responses '

Research Funding

External Grants

Role	Year	Project Title	Amount (S\$)	Source of Grant
PI	2017 - 2022	Calibrating the lifetimes of magma reservoirs below active volcanoes	2,730,600	NRF investigator
PI	2017 - 2019	Assessing volcano hazards to megacities: Tokyo and Singapore	53,000	NRF-JSPS
PI	2015 - 2017	Causes, Processes, and Forecasts of Eruptions of Open Vent Volcanoes in SE Asia	559,731	MOE AcRF Tier 2
PI	2012 - 2013	Understanding the rates of magmatic processes and their relationship to volcanic unrest and monitoring signals	38,000	French Embassy-NRF (Merlion)

Internal Grants

Role	Year	Project Title	Amount (S\$)	Source of Grant
Co-PI	2019-2021	A multi-disciplinary integrated approach to natural laboratory volcanoes	100,428 (1,545,048)	RCE core funding
PI	2017-2020	The processes and rates of magma ascent	518,550	RCE core funding
PI	2014-2021	The World Observatories Volcano Organization database of volcanic unrest	2,456,298	RCE core funding
Co-Pi	2014-2018	Laboratory volcanoes: Mayon (Philippines), Marapi, Gede and Salak (Indonesia).	148,324 (2,060,064)	RCE core funding
PI	2014-2016	The architecture of the system below active volcanoes	778,327	RCE core funding
PI	2012-2016	Statistical analysis of volcanic crystals	554,254	RCE core funding
PI	2011 - 2013	Plumbing systems and magmatic processes	1,728,11	RCE core funding
PI	2011 - 2012	The Rabaul caldera complex in Papua New Guinea	160,103	RCE core funding

Citation Summary (according to the citation report at Appendix 1)

Database	Citation Count		H-index
	without self-citations	with self-citations	
Scopus	1923	2474	26
Web of Science (SCI)	2029	2240	25
Google Scholar		2965	27

Publications (in chronological order, starting with the most recent)

- Bold** Denotes main author (22 papers)
****** Denotes directly supervised research staff, i.e. POs, RAs, RFs, postdocs, etc. (10 papers)
***** Denotes PhD students (supervised or co-supervised) (17 papers)
Denotes Tier 1A papers (28 papers)
Denotes Tier 1B papers (30 papers)

Journal Papers

- 1- * Li, W. and Costa, F. (2020) A thermodynamic model of F-Cl-OH partitioning between silicate melts and apatite including non-ideal mixing with applications to constraining melt volatile budgets. *Geochimica Cosmochimica Acta* 269: 203–222.##
- 2- ** Albert, H., Costa, F., DiMuro, A., Herrin, J., Metrich, N., Deloule, E. (2019). Magma interactions, crystal mush formation, timescales, and unrest during caldera collapse and lateral eruption at ocean island basaltic volcanoes (Piton de la Fournaise, La Réunion). *Earth and Planetary Science Letters* 515: 187-199.##
- 3- ** Cheng, L., **Costa, F.** (2019) Statistical analysis of crystal populations and links to volcano deformation for more robust estimates of magma replenishment volumes: *Geology*, 47, 1171–1175.##
- 4- **Costa, F.**, Widiwijayanti C, Humaida, H. (2019a) Data from Past Eruptions Could Reduce Future Volcano Hazards. *Eos*, 100, <https://doi.org/10.1029/2019EO118941>.
- 5- **Costa, F.**, Widiwijayanti C, Nang, T.W., Fajiculay, E., Espinosa-Ortega, T., Newhall, C. (2019b) WOVOdat – the global volcano unrest database aimed at improving eruption forecasts. *Disaster Prevention and Management: An International Journal* 28, 738-751.
- 6- ** Schonwalder-Angel D.A., Albert, H., Lam, N.T., Phi, N.X., Utami, S.U., Li, W., Phung Minh Khanh, P.M., Widiwijayanti, C., **Costa, F.** (2019) PWD: A Petrological Workspace & Database tool. *Geochemistry, Geophysics, Geosystems*. 20. doi.org/10.1029/2019GC008710#
- 7- Shea, T., Hammer, J., Hellebrand, E., Mourey, A., Costa, F., First, E., Lynn, K., Melnik, O. (2019) Phosphorus and aluminium zoning in olivine: contrasting behaviour of two nominally incompatible trace elements. *Contributions to Mineralogy and Petrology*. 174, 85.#
- 8- Andersen, N., Singer, Costa, F., Fournelle, J., Herrin, J.S., Fabbro, G.N. (2018) Petrochronologic perspective on rhyolite volcano unrest at Laguna del Maule, Chile. *Earth and Planetary Science Letters* 493, 57-70.##

- 9- Flaherty, T., Druitt, T., Tuffen, H., Higgins, M.D., Costa, F., Cadoux, A. (2018): Multiple timescale constraints for high flux magma chamber assembly prior to the Late Bronze Age eruption of Santorini (Greece). *Contributions to Mineralogy and Petrology* 173, 75; doi.org/10.1007/s00410-018-1490-1.#
- 10- * Liqing, J., Tapponnier, P., Costa, F., Donze, F.-V., Scholtes, L., Taisne, B., Wei, S. (2018). Necking and fracking may explain stationary seismicity and full degassing in volcanic silicic spine extrusion. *Earth and Planetary Science Letters* 503, 47-57.##
- 11- Lynn, K., Shea, T., Garcia, M., Costa, F., Norman, M.D. (2018) Lithium diffusion in olivine records priming of explosive basaltic eruptions. *Earth and Planetary Science Letters* 500, 127-135.##
- 12- ** Ruth, D., Costa, F., Bouvet de Maisonneuve, C., Franco, L., Cortés J.A., Calder, E. S (2018) Crystal and melt inclusion timescales reveal the evolution of magma migration before eruption. *Nature Communications* 9 : 2657, doi.org/10.1038/s41467-018-05086-8.##
- 13- ** Zeng, L., Cheng, L., **Costa, F.**, Herrin, J. (2018) CEmin: A MATLAB-based software for computational phenocryst extraction and statistical petrology. *Geochemistry, Geophysics, Geosystems*. 19. https://doi. org/10.1002/2017GC007346.#
- 14- * Fabbro, G., Druitt, T., and Costa, F. (2017). Storage and Eruption of Silicic Magma across the Transition from Dominantly Effusive to Caldera-forming States at an Arc Volcano (Santorini, Greece). *Journal of Petrology*; doi: 10.1093/petrology/egy013.#
- 15- Cooper, K.M., Till, C.B., Kent, A.J.R., Costa, F., Rubin, A.E., Bose, M., Gravley, D., Deering, C., Cole J. (2017) Response to comment on "Rapid cooling and cold storage in a silicic magma reservoir recorded in individual crystals". **Science** 358, 10.1126/science.aap9145.##
- 16- Rubin, A.E., Cooper, K.M., Till, C.B., Kent, A.J.R., Costa, F., Bose, M., Gravley, D., Deering, C., Cole J. (2017) Rapid cooling and cold storage in a silicic magma reservoir recorded in individual crystals. **Science** 356, 1154–1156.##
- 17- Lynn, K., Garcia, M., Shea, T., Costa, F., Swanson D.A. (2017): Timescales of mixing and storage for Keanakāko'i Tephra magmas (1500-1823 C.E.), *Contributions to Mineralogy and Petrology* 172:76 DOI 10.1007/s00410-017-1395-4.#
- 18- Newhall C., Costa F., Ratdomopurbo A, Venezky D.Y., Widiwijayanti C, Nang Thin Zar Win, Tan K, Fajiculay E. (2017): WOVOdat – an online, growing library of worldwide volcanic unrest. *Journal of Volcanology and Geothermal Research* 345: 184-199.##
- 19- Marchev, P., Arai, S., Orlando, V., Costa F., Zanetti, A., Downes H. (2017) Metasomatic Reaction Phenomena from Entrainment to Surface Cooling: Evidence from Mantle Peridotite Xenoliths from Bulgaria. *Journal of Petrology* 58: 599–640. #
- 20- ** Cheng, L., Costa, F., and Carniel, R. (2017). Unraveling the presence of multiple plagioclase populations and identification of representative two dimensional sections using a statistical and numerical approach. *American Mineralogist* 102:1894-1905. #
- 21- * Krimer, D. and Costa F. (2017) Evaluation of the effects of 3d diffusion, crystal geometry, and initial conditions on retrieved time-scales from Fe-Mg zoning in natural oriented orthopyroxene crystals. *Geochimica et Cosmochimica Acta*, 196: 271–288.##
- 22- Singer, B., Costa, F., Herrin, J.S., Hildreth, W., Fierstein, J. (2016) The timing of compositionally-zoned magma reservoirs and mafic 'priming' weeks before the 1912 Novarupta-Katmai rhyolite eruption. *Earth and Planetary Science Letters*. 451, 125-137.##

- 23- ** Bouvet de Maisonneuve, C., Costa, F., Huber, C., Vonlanthen, P., Bachmann, O., Dungan, M. (2016) How do olivines record magmatic events? Insights from major and trace element zoning. *Contributions to Mineralogy and Petrology*, 171, 10.1007/s00410-016-1264-6.#
- 24- * Albert, H., Costa F., Marti, J. (2016) Years to weeks of seismic unrest and magmatic intrusions precede monogenetic eruptions. *Geology* 44, 211-214.##
- 25- * Kahl, M., Chakraborty, S., Pompillio, M., Costa, F. (2015) Constraints on the nature and evolution of the magma plumbing system of Mt. Etna volcano (1991 – 2008) from a combined thermodynamic and kinetic modelling of the compositional record of minerals. *Journal of Petrology* 56: 2025-2068.#
- 26- * Girona, T., Costa, F., Schubert, G. (2015): Degassing during quiescence as a trigger of magma ascent and volcanic eruptions. *Scientific Reports* 5: 18212 | DOI: 10.1038/srep18212.#
- 27- * Albert, H., Costa F., Marti, J. (2015) Timing of magmatic processes and unrest associated with mafic historical monogenetic eruptions in Tenerife Island. *Journal of Petrology* 56: 1945-1966.#
- 28- ** Bouvet de Maisonneuve, C., Costa, F., Patia, H., Huber, C. (2015): Unrest and eruption in a caldera setting: Insights from the 2006 eruption of Rabaul (Papua New Guinea). Geological Society of London, Special publications. 422, doi.org/10.1144/SP422.2
- 29- Shea, T., Costa F., Hammer, J., Krimer, D*. (2015) Accuracy and precision of timescales retrieved from diffusion modeling in olivine: a 3D perspective. *American Mineralogist* 100, 2026-2042.#
- 30- Belousov, A., Belousova, M., Krimer, D*, Costa, F., Zaenuddin, A., Prambada, O. (2015): Volcaniclastic stratigraphy of Gede volcano, West Java, Indonesia: how it erupted and when. *Journal of Volcanology and Geothermal Research* 310, 238-252.##
- 31- ** Fontijn, K., Costa, F., Sutawidjaja, I., Newhall, C., Herrin, J. (2015) A five thousand year record of multiple highly explosive mafic eruptions from Gunung Agung (Bali, Indonesia): Implications for eruption frequency and volcanic hazards. *Bulletin of Volcanology* 77.#
- 32- * Girona, T., Costa, F., Taisne, B., Aggangan, B., Ildefonso, S. (2015) Fractal degassing from Erebus and Mayon volcanoes revealed by a new method to monitor H₂O emission cycles. *Journal of Geophysical Research*, doi:10.1002/2014JB011797.##
- 33- Jay, J., Costa, F., Pritchard, M., Lara, L., Singer, B., Herrin, J. (2014) Locating magma reservoirs using InSAR and petrology before and during the 2011-2012 Cordón Caulle silicic eruption. *Earth and Planetary Science Letters*, 395: 254–266.##
- 34- * Girona, T., Costa, F., Newhall, C., Taisne, B. (2014) On depressurization of volcanic magma reservoirs by passive degassing. *Journal of Geophysical Research*, Doi: 10.1002/2014JB011368.##
- 35- Longpre, M.A., Stix, J., Costa, F., Espinoza, E., Muñoz, A. (2014) Magmatic processes and associated timescales leading to the January 1835 eruption of Cosigüina volcano, Nicaragua. *Journal of Petrology* 55, 1173-1201.#

- 36- Marzoli A., Jourdan F., Bussy F., Chiaradia M., Costa, F. (2014) Petrogenesis of tholeiitic basalts from the Central Atlantic magmatic province as revealed by mineral major and trace elements and Sr isotopes. *Lithos*, 188: 44-59.#
- 37- ** Moore, A., Coogan, L., Costa, F., Perfit, M.R. (2014) Primitive melt replenishment and crystal-mush disaggregation in the weeks preceding the 2005-2006 eruption 9° 50'N, EPR. *Earth and Planetary Science Letters* 403: 15-26.##
- 38- * Winson, A., Costa, F., Newhall, C., Woo, G. (2014) An analysis of the issuance of volcanic alert levels during volcanic crises. *Journal of Applied Volcanology* 3: 14-26.#
- 39- * Andújar J, Costa, F., and Scaillet, B. (2013) Storage conditions and eruptive dynamics of central versus flank eruptions in volcanic islands: the case of Tenerife (Canary Islands, Spain). *Journal of Volcanology and Geothermal Research* 260: 62-79. ##
- 40- **Costa, F.**, Andreastuti, S., Bouvet de Maisonneuve, C., Pallister, J. (2013) Petrological insights into the storage conditions, magmatic processes, and time scales that yielded the centennial 2010 Merapi explosive eruption. *Journal of Volcanology and Geothermal Research* 261: 209-235.##
- 41- * Girona, T. and Costa, F. (2013) DIPRA: a user-friendly program to model multi-element diffusion in olivine with applications to timescales of magmatic processes. *Geochemistry, Geophysics, Geosystems*. doi:10.1029/2012GC004427.#
- 42- * Kahl, M., Chakraborty, S., Costa, F., Pompilio, M., Liuzzo, M., Viccaro, M (2013) Compositionally zoned crystals and real-time degassing data reveal changes in magma transfer dynamics during the 2006 summit eruptions of Mt. Etna. *Bulletin of Volcanology* 75: 692, doi: 10.1007/s00445-013-0692-7.#
- 43- Martí, J., Castro, A., Rodríguez, C., Costa, F., Carrasquilla, S., Pedreira, R., De Bolos, X., (2013) Correlation of magma evolution and geophysical monitoring at El Hierro (Canary Islands) 2011-2012 submarine eruption. *Journal of Petrology* 54: 1349-1373.#
- 44- Druitt, T.H., Costa, F., Deloule, E., Dungan, M., Scaillet, B. (2012) Decadal to monthly timescales of magma transfer and reservoir growth at a caldera volcano. **Nature** 482: 77–80.##
- 45- Surono, Jousset, P., Pallister JS, Boichu M, Buongiorno F, Budisantoso A., Costa, F., Andreastuti S., Prata F, Schneider DJ, Clarisse L., Humaida, H., Bignami C., Griswold J.P., Carn S., and Oppenheimer C. (2012). The 2010 explosive eruption of Java's Merapi volcano—A '100-year' event. *Journal of Volcanology and Geothermal Research*, 241-242, 121-135.##
- 46- * Kahl M, Chakraborty S, Costa F, and Pompilio M (2011) Dynamic plumbing system beneath volcanoes revealed by kinetic modeling, and the connection to monitoring data: An example from Mt. Etna. *Earth and Planetary Science Letters* 308, 11-22.##
- 47- * Andújar J, Costa, F., and Martí, J (2010) Magma storage conditions of the last eruption of Teide volcano (Canary Islands, Spain). *Bulletin of Volcanology* 72, 381-395.#
- 48- **Costa, F.** (2010) Residence times and magmatic evolution (translated from Spanish). *Macla* 12, 10-16.
- 49- **Costa, F.**, Coogan, L., and Chakraborty S. (2010) The time scales of magma mixing and mingling involving primitive melts and melt–mush interaction at mid-ocean ridges. *Contributions to Mineralogy and Petrology* 159, 371–387.#

- 50- * Andújar, J., Costa, F., Martí, J., Wolff, J.A., and Carroll M.R (2008) Experimental constraints on pre-eruptive conditions of the phonolitic magma from caldera-forming El Abrigo eruption, Tenerife (Canary Islands). *Chemical Geology* 257, 173-194.##
- 51- **Costa, F.**, and Chakraborty, S. (2008). The effect of water on Si and O diffusion rates in mantle olivine and implications for transport properties and processes in the upper mantle. *Physics of the Earth and Planetary Interiors* 166, 11-29.##
- 52- **Costa, F.**, Dohmen, R., and Chakraborty S. (2008) Time Scales of Magmatic Processes from Modeling the Zoning Patterns of Crystals. *Reviews in Mineralogy and Geochemistry* 69, 545-594. ##
- 53- Martí, J., Geyer, A., Andujar, J., Teixidó, F., and Costa, F. (2008): Assessing the potential for future explosive activity from Teide–Pico Viejo stratovolcanoes (Tenerife, Canary Islands). *Journal of Volcanology and Geothermal Research*, 178, 529-542.##
- 54- Pichavant, M., Costa, F., Burgisser, A., Scaillet, B., Martel, C., and Poussineau, S. (2007). Equilibration scales in silicic to intermediate magmas - Implications for phase equilibrium studies. *Journal of Petrology* 48, 1955-1972.##
- 55- Turner, S., and Costa, F. (2007) Measuring time scales of magmatic evolution. *Elements* 3, 267-272.##
- 56- **Costa F.**, and Dungan M (2005) Short time scales of magmatic assimilation from diffusion modeling of multiple elements in olivine. *Geology* 33, 837-840.##
- 57- **Costa, F.**, and Chakraborty, S. (2004). Decadal time gaps between mafic intrusion and silicic eruption obtained from chemical zoning patterns in olivine. *Earth and Planetary Science Letters* 227, 517-530.##
- 58- **Costa, F.**, Scaillet, B. and Pichavant, M. (2004). Petrologic and experimental constraints on the pre-eruption conditions of Holocene dacite from Volcán San Pedro (36o S, Chilean Andes) and the importance of sulfur in silicic subduction-related magmas. *Journal of Petrology* 45, 855-881.##
- 59- Camprubí, A., Melgarejo, J.C., Proenza, J., Costa, F., Bosch, J., Yushkin, N. and Andreichev, V. (2003). Mining techniques and geological knowledge during the Neolithic: the case of the variscite mines at Gavà, Catalonia. *Episodes* 26, 295-301.
- 60- **Costa, F.**, Chakraborty, S. and Dohmen, R. (2003). Diffusion coupling between trace and major elements and a model for calculation of magma residence times using plagioclase. *Geochimica et Cosmochimica Acta* 67, 2189-2200.##
- 61- **Costa, F.**, Scaillet, B. and Gourgaud, A. (2003). Massive atmospheric sulfur loading of the AD 1600 Huaynaputina eruption and implications for petrologic sulfur estimates. *Geophysical Research Letters* 30, 1068, doi: 10.1029/2002GL016402.##
- 62- **Costa, F.** and Singer, B.S. (2002). Evolution of Holocene dacite and compositionally zoned magma, Volcán San Pedro, Southern Volcanic Zone, Chile. *Journal of Petrology* 43, 1571-1593.##
- 63- **Costa, F.**, Dungan, M. and Singer, B. (2002). Hornblende and phlogopite-bearing gabbroic crustal xenoliths from Volcán San Pedro (36o S), Chilean Andes: evidence for melt and fluid migration and reactions in subduction-related plutons. *Journal of Petrology* 43, 219-241.##

64- **Costa, F.**, Dungan, M. and Singer, B. (2001). Magmatic Na-rich phlogopite in a suite of gabbroic crustal xenoliths from Volcán San Pedro, Chilean Andes: Evidence for a solvus relation between phlogopite and aspidolite. *American Mineralogist* 86, 29-35.#

65- Moscariello, A. and **Costa, F.** (1997). The Upper Laacher See Tephra in Lake Geneva sediments: paleoenvironmental and paleoclimatological implications. *Schweizerische Mineralogische und Petrographische Mitteilungen* 77, 175-185.

66- **Costa, F.**, Camprubí, A. and Melgarejo, J.C. (1994). Geology of the Neolithic mines of Gavà (Spain) (translated from Spanish). *Boletín Geológico y Minero de España* 105, 436-443.

67- Camprubí, A., Costa, F. and Melgarejo, J.C. (1994). Characterization of the phosphate deposits from Gavà (Spain) (translated from Spanish). *Boletín Geológico y Minero de España* 105, 444-453.

Book Chapters

1- **Costa, F.** and Morgan D, (2010) Time constraints from chemical equilibration in magmatic crystals. In: (Eds: A. Dosseto, S.P. Turner, and J.A. Van Orman), *Timescales of magmatic processes: from core to atmosphere*, 125-159 pp.

2- Dosseto, A., Turner, S.P., Costa, F., and Van Orman, J.A (2010) Introduction to the Timescales of Magmatic Processes; In: (Eds: A. Dosseto, S.P. Turner, and J.A. Van Orman), *Timescales of magmatic processes: from core to atmosphere*, 1-8 pp.

3- **Costa, F.**, (2008) Residence times of silicic magmas associated with calderas. In: Caldera Volcanism: Analysis, Modelling and Response. Gottsmann, J., Martí, J., (eds) *Developments in Volcanology* 10: 1-55.

Working Papers / Pipeline

In prep

Costa, F. Clocks in Rocks. *Annual Reviews of Earth and Planetary Sciences* (invited review paper to be submitted by July 2020).

In review

**Albert, H., Larrea, P., Costa, F., Widom, E., Siebe, C. (*in review*) Crystals reveal magma convection and melt transport in dyke-fed eruptions. *Nature Communications*

**Cheng, L., Costa, F., Bergantz, G. (*in review*) Linking fluid dynamics and olivine crystal scale zoning during magma intrusion and implications for the inversion of time scales of magmatic processes and volcano monitoring data. *Contributions to Mineralogy and Petrology*.

Costa, F., Shea, T. & Ubide, T. Timescales of magmatic processes. *Nature Reviews of Earth and the Environment* (*invited review paper*).

Larrea, P., Albert**, H., Ubide, T., Costa, F., Colás, V., Widom, E., Siebe, C. (*in review*) From explosive vent opening to effusive outpouring: mineral micro-analytical constraints on magma dynamics and timescales at Parícutin monogenetic volcano. *Journal of Petrology*

*Li, W., Costa, F., Nagashima, K. (*in review*). Apatite reveals melt volatile budgets and magma storage depths at Merapi volcano, Indonesia. *Journal of Petrology*

*Li, W., Chakraborty, S., Nagashima, K., **Costa, F.**, (in review). Multicomponent diffusion of F, Cl and OH in apatite with application to magma ascent rates. *Earth and Planetary Science Letters*.

Salman, R., Lindsey, E.O., Lythgoe, K.H., Bradley, K.E., Muzli M, Yun, S.-H., Chin, S.T., Tay, C.W., Costa, F., Wei, S., Hill, E. (in review) Cascading partial rupture of the Flores thrust during the 2018 Lombok earthquake sequence, Indonesia. *Seismological Research Letters*

TEACHING SUMMARY

Courses Taught (since joining NTU)

Course Code	Course Title	Academic Year	Course Level
ES7005	Foundations of Earth Sciences (DES)	AY10-AY11	PG
ES7005	Foundations of Earth Sciences (DES)	AY11- AY12	PG
SP004	Planet Earth (USP)	AY13-AY14	UG
SP004	Planet Earth (USP)	AY14-AY15	UG
ES7007	Volcanology	AY14-AY15	PG
ES2002	Earth Materials	AY15-AY16	UG
ES3003	Introduction to Geochemistry	AY16-AY17	UG
ES2002	Earth Materials	AY16-AY17	UG
ES3005	Advanced Field Geology	AY16-AY17	UG
ES7015	Independent Studies	AY16-AY17	PG
ES3003	Introduction to Geochemistry	AY17-AY18	UG
ES7015	Independent Studies	AY18-AY19	PG
ES3003	Introduction to Geochemistry	AY18-AY19	UG
ES7007	Volcanology	AY18-AY19	UG
ES3003	Introduction to Geochemistry	AY19-AY20	UG

Short Courses taught at international workshops/schools (since joining NTU)

Venue	Course Title	Academic Year	Course Level
Asian Consortium of Volcanology (Academia Sinica, Taiwan)	All you want to know about volcanoes but were afraid to ask	October 2019	UG-PG
Asian Consortium of Volcanology (Academia Sinica, Taiwan)	Introduction to phreatic eruptions	October 2019	UG-PG
GRANITES II: A summer school on Magmatic Differentiation (Brest, France)	Time scales of magmatic and volcanic differentiation	July 2019	UG-PG
International Workshop on Pre-eruptive Magmatic Processes (Tokyo, Japan)	Nanometer-scale observations in volcanic minerals	May 2018	UG-PG
Asian Consortium of Volcanology (Kagoshima, Japan)	Introduction to volcanic Processes	April 2017	UG-PG
Asian Consortium of	Introduction to Event trees in	April 2017	UG-PG

Volcanology (Kagoshima, Japan)	volcanic crises		
MemoVolc European Summer School (Santorini, Greece)	Time scales of volcanic processes	October 2015	UG-PG

Academic Supervision and Mentoring

International PhD student internships at NTU (*Funded by the East Asia Pacific Summer Institute Program*)

No.	PhD Student	Period	Role	Thesis/ Project Title	Current Status
Current					
1	Casey Tierney (Northern Arizona University)	June-August 2017	Mentor	Record of the youngest Toba tuff by diffusional relaxation of Ti and Al in Quartz	Soon to defend PhD
2	Taya Flaherty (Michigan Tech).	June-August 2016	Mentor	Trace element study of pyroxene crystals from the Minoan eruption of Santorini (Greece)	Continuing PhD at Clermont Ferrand
3	Kendra Lynn (University of Hawaii)	June-August 2015	Mentor	Magmatic processes and time scales from olivine zoning	RF at University of Delaware
4	Allison Rubin (University of California, Davis; USA),	June-August 2014	Mentor	Understanding temporal and spatial variations in thermal histories in volcanic centers	Completed PhD
5	Nathan Andersen (University of Wisconsin, Madison, USA)	June-August 2014	Mentor	Magma dynamics and ongoing unrest at a large caldera system, the Laguna del Maule Volcanic Field, Chile	Completed PhD. Research Scientist at USGS
6	Dawn Ruth (University of Buffalo, USA)	June-August 2013	Mentor	Modeling olivine zoning of eruptions from Llaima volcano (Chile)	Completed PhD. Research scientist at USGS

PhD students

No.	PhD Student	Period	Role	Thesis/ Project Title	Current Status
Current					
1	Damia Benet (NTU)	2018 - present	Sole supervisor	Unravelling the sources of volcanic ash and their use in anticipating major eruptions.	-
2	Charlotte Barrington (NTU)	2018 - present	Main supervisor	Understanding volcanic degassing	
3	Sri Budhi Utami (NTU)	2016-present	Sole supervisor	The magma plumbing system and unrest of Kelut volcano, Indonesia	
4	Sagar Murti (NTU)	2015-Thesis submitted	Main supervisor	Understanding mantle rheology through modeling experimental and natural observations	Thesis awarded expected in March 2020
Graduated					
1	Weiran Li (NTU)	2015 - 2020	Main Supervisor	Eruptive styles of subduction-zone volcanoes : investigation of magmatic volatile budgets and ascent rates using apatite	RF at EOS
2	Rosa Didonna (Macquarie University, Australia)	2015-2019	Co-supervisor	A window into magmatic systems: mineralogical constraints on the nature and timing of magma interactions and ascent	RF at Macquarie University, Australia
3	Helena Albert (University of Barcelona, Spain)	2013-2016	Co-supervisor	Magmatic processes, time scales, and seismic unrest of monogenetic eruptions	Asst. Prof. at University of Barcelona (Spain)
4	Jiao Liqing (NTU)	2011-2016	Co-supervisor	Discrete Element	RF at Institute

				Modelling of Continental Deformation and Volcanic Spine Extrusion'	Physique du Globe, Paris, France
5	Annie Winson (NTU)	2010-2016	Sole supervisor	Alert level Analysis and eruption forecasts at open vent volcanoes	Research Scientist at the British Geological Survey
6	Daniel Krimer (NTU)	2010-2015	Sole supervisor	Geochemistry and Petrology of Gede volcano, Indonesia'	Project manager at European Research funding for Hungary [Best PhD award by Springer]
7	Tarsilo Girona (NTU)	2010 - 2014	Sole Supervisor	Numerical modeling of permanent degassing volcanoes	Research Scientist at Jet Propulsion Laboratory NASA, USA [American Geophysical Union-Natural Hazards section award for best PhD]
8	Gareth Fabbro (Universite Blaise Pascal, France)	2010-2014	Co-supervisor	The timescales of magmatic processes prior to a caldera-forming eruption	Asst. Prof at University of Fiji
9	Maren Kahl (Ruhr-Universitat Bochum, Germany)	2006-2011	Co-supervisor	Timescales of magma mixing and magma recharge. A case study from Mount Etna (Sicily, Italy)	Young Professor at University of Heidelberg (Germany)

Post-doctoral fellows

No.	Post-doc Fellow	Appointment	Period	Thesis/ Project Title	Current Status
<i>In employment</i>					
1	Tania Espinosa-Ortega	Research Fellow	2019-present	Forecasting volcanic eruptions using statistical analysis and AI of volcanic unrest	
2	Lilu Cheng	Senior Research Fellow	2017 - present	Statistical analysis of crystal zoning patterns as insights into magmatic processes	-
3	Riko I Made	Senior Research Fellow	2017 - present	Exsolution lamellae in pyroxenes as a record of thermal histories of magmas	
4	Christina Widiwijayanti	Senior Research Fellow	2014-present	World Observatory Volcanoes Organization database of volcanic unrest	
<i>Left service</i>					
1	Helena Albert	Research Fellow	2016 – 2019	Volcanic unrest and magmatic processes at Mt Fuji (Japan).	Asst. Prof. at University of Barcelona (Spain)
2	Dawn Ruth	Research Fellow	2014-2017	Understanding open vent volcanoes: the case of Mayon	Research Scientist at United States Geological Survey
3	Caroline Bouvet de Maisonneuve	Research Fellow	2012-2014	Understanding seismic and deformation unrest at Rabaul caldera	Asst. Prof. (NRF Fellow) at ASE, NTU
4	Joan Cabato	Research Fellow	2010-2012	'Unraveling the plumbing system of Mayon volcano and its relation to degassing and monitoring data'	Researcher at University of New Hampshire

SERVICE SUMMARY

School

Period of appointment	Role
08/2018-08/2019	Associate Chair (Faculty) at ASE
09/2015-12/2016	Associate Chair (Faculty) at ASE

University

Period of appointment	Role
08/2019 - present	Interim Director, Earth Observatory of Singapore
04/2019-08/2019	Designated Interim Director, Earth Observatory of Singapore
01/2017-07/2018	Acting Chair, Asian School of the Environment
2018-19	Review Panel Member of NRF and NRFi applications
2016	Member of the NTU Senate (Faculty Development committee)
2016-present	Captain of EOS/ASE/SCELSE running team
2016	Member of Review panel of EP5 research proposals

Academic Community

Period of appointment	Role
2018 - present	Associate Editor, Frontiers in Earth Sciences (IF: 2.89)
2018 - present	Associate Editor, Journal of Volcanology and Geothermal Research (IF: 2.61)
2013 - 2017	Associate Editor, American Mineralogist (IF: 2.20)
2014 - 2014	Associate Editor, Geochemistry, Geophysics, Geosystems (IF: 2.95)
2009 - 2017	Associate Editor, Geologica Acta (IF: 1.15)

Other Service (Workshop/meeting organizer/convener/coordinator)

Period of service	Role
2020	Organizer of International Workshop on volcano monitoring infrastructure on the ground and in space (Cities on Volcanoes, Crete, Greece, May 2020)
2019	Theme coordinator (06: Magmas and Volcanoes) of 15 sessions at the Goldschmidt Geochemistry Conference 2019 August (Barcelona, Spain).
2019	Session Convener, SE18: Linking Numerical, Analytical and Experimental Modelling with Remote and Local Volcano Monitoring Data, Asia Oceania Geosciences Society, Singapore

2018	Organizer of International Workshop on: Optimizing the use of Volcano Monitoring Database to Anticipate Unrest (Yogyakarta, Indonesia)
2018	Session Convener S-VC39, Pre-eruptive magmatic processes: petrologic analyses, experimental simulations and dynamics modeling at the Japanese Geological Union, Chiba, Japan.
2018	Co-organizer of Chapman Conference (American Geophysical Union) Merging Geophysical, Petrochronologic, and Modeling Perspectives of Large Silicic Magma Systems. Chile,
2016	Session convener, V13F: Crystal Records of the Timescales and Thermal Evolution of Plutonic, Hydrothermal, and Volcanic System, American Geophysical Union Fall Meeting (San Francisco, USA).
2016	Session convener, Symposium 8e: Crystallization Histories and Degassing: From Melt Inclusions to Plumbing Systems. 26th Annual Goldschmidt Conference
2012	Session convener, V12B. Petrologic Insights on Magmatic Processes Controlling Shifts in Eruption Style, American Geophysical Union Fall Meeting, (San Francisco, USA).
2012	Session convener SE105-107 Magmatic Processes and Possible Links to Volcano Monitoring Data, Asia Oceania Geosciences Society, Singapore.
2011	Session convener SE52 Volatiles in Volcanic Processes, Asia Oceania Geosciences Society (Taipei, Taiwan).
2011	Session convener Time-scales of Magmatic Processes and Volcanological Implications, IUGG-IAVCEI Conference,(Melbourne, Australia)
2009	Convener, Symposium '5h Kinetics of Metamorphic and Igneous Processes', 19th Annual Goldschmidt Conference, (Davos, Switzerland).
2008	Convener, Symposium "V38: Minerals, Inclusions and Volcanic Processes: Crystal-scale records of magma dynamics", American Geophysical Union Fall Meeting (San Francisco, USA).
2007	Co-organizer, Geological Society of America Field Forum 'Assessing the state of our knowledge of continental arc volcanism: The Tatara-San Pedro complex, 36 oS, Andean Southern Volcanic Zone' Chile
2007	Convener Symposium 'Links between radioactive isotopes and diffusion modelling to constrain the timescales of magmatic processes' 17th Annual Goldschmidt Conference (Koln, Germany).
2005	Convener, Symposium 'Will the real phenocrysts please stand up?', American Geophysical Union Fall Meeting,(San Francisco, USA).

International committees/review panels

Period of appointment	Role
2019 – present	Member of Executive Committee of the International Association of Volcanology and Chemistry of the Earth's Interior
2018 - present	Scientific Review Panel for the EUROVOLC program of the European Union.
2018 - present	Member of Evaluation Panel for European Research Council "Consolidator Grants". Earth System Science (PE10).
2016	Core founder of the "Asian Chapter" of the Marie Curie Association (EU).
2015-present	Steering committee member of the Global Volcano Model
2015	Core founder of the Asian Consortium of Volcanology
2012-2013	American Geophysical Union: Executive Committee of the Volcanology, Geochemistry, Petrology section. Chair of the Western Pacific Meeting.