

SANTIAGO TASSARA, Ph.D.

Nationality: Argentina

Date of birth: 11 April 1991 (33 years old)

E-mail: santiago.tassara@uoh.cl**RESEARCH INTERESTS**

My research interests lie at the intersection of petrology, geochemistry, and mineral resources. I seek to understand the magmatic and tectonic processes that control the formation and regional-scale distribution of large base and precious metal deposits and metallogenic provinces.

APPOINTMENTS

2023-present **Head of the Geoscience Engineering undergraduate program:** School of Engineering Sciences, Universidad de O'Higgins.

2022-present **Assistant Professor:** Institute of Engineering Sciences, Universidad de O'Higgins.

2019–2021 **Bateman Postdoctoral Scholar:** Department of Earth and Planetary Sciences, Yale University.

EDUCATION

2015–2019 **Ph.D., Earth Sciences – University of Chile**
Thesis: "The role of the subcontinental lithospheric mantle in metallogenesis". Summa Cum Laude.

2014–2015 **M.Sc., Mineral Resources – University of Barcelona**
Thesis: "The origin of Fe-Ni-rich serpentines in the saprolite horizon of Ni-laterite Caribbean deposits". Magna Cum Laude.

2009–2014 **B.Sc., Geology – National University of La Plata**
(5-year program) *Magna Cum Laude.*

PEER-REVIEWED PUBLICATIONS

18. Tardani, D., Tassara, S.*, Sánchez-Alfaro, P., Reich, M., Pérez-Flores, P., Robidoux, P., Contreras, C., Pinti, D.L., Cembrano, J., Ague, J.J. (2024) The orientation of intra-arc crustal fault systems influences the copper budget of magmatic-hydrothermal fluids. *Communications Earth and Environment*, 5, 477.

17. **Tassara, S.***, Ague, J., Kelle, D.S., Rooney, A.D., Wostbrock, J.A.G., Axler, J.A., Tardani, D. (2024). Osmium and oxygen isotope constraints on magma-crust interactions and the transport of copper at the roots of arcs. *Chemical Geology*, 664, 122301.
16. Tardani, D., Taussi, ... Tassara, S., et al. (2024) Gas geothermometry, soil CO₂ degassing, and heat release estimation to assess the geothermal potential of the Alpehue Hydrothermal Field (Sollipulli volcano, Southern Chile). *Geothermics*, 122, 103092.
15. Navarrete, C., Gianni, G., **Tassara, S.**, et al. (2024) Massive Jurassic slab break-off revealed by a multidisciplinary reappraisal of the Chon Aike silicic large igneous province. *Earth Science Reviews*, 249, 104651.
14. Keller D., **Tassara, S.**, Robbins, J.L., Lee, C-T.A., Ague, J.J. & Dasgupta, R. (2023). Links between large igneous provinces and subducted iron formations. *Nature Geoscience* 16, 527–533.
13. **Tassara, S.***, Rooney, A.D., Ague, J.J., Guido, D., Reich, M., Barra, F., & Navarrete C. (2022) Osmium isotopes fingerprint mantle controls on the genesis of an epithermal gold province. *Geology* 50, 1291-1295.
12. **Tassara, S.*** & Ague, J.J. (2022) A Role for Crustal Assimilation in the Formation of Copper-Rich Reservoirs at the Base of Continental Arcs. *Economic Geology* 117, 1481-1496.
11. Ague, J.J., **Tassara, S.**, Holycross, M., Li, J., Cottrell, E., John, T., Schwarzenbach, E.M., and Charalamos G.F. (2022) Oxidation of slab-derived devolatilization fluids by subducted metasedimentary rocks. *Nature Geoscience* 15, 320–326.
10. Li, J., Schwarzenbach, E.M., John, T., Ague, J.J., **Tassara, S.**, Gao, J. and Konecke, B. (2021) Sulfur mobilization and redistribution by intraslab fluid-rock interaction revealed by in-situ pyrite $\delta^{34}\text{S}$ values from high-pressure rocks. *Geochimica et Cosmochimica Acta* 297, 40–64.
9. **Tassara, S.***, Ague, J.J., and Valencia, V. (2021) The deep magmatic cumulate roots of the Acadian orogen, eastern North America. *Geology* 49, 168–173.
8. Blanks, D., Holwell, D., Fiorentini, M., Moroni, M., **Tassara, S.**, González-Jiménez, J.M., Boyce, A. and Ferrari, E. (2020) Fluxing of mantle carbon as a physical agent for metallogenic fertilization of the crust. *Nature Communications* 11, 4342.
7. González-Jiménez, J.M., **Tassara, S.**, Schettino, E., et al. (2020) Mineralogy of the highly siderophile elements in the subcontinental lithospheric mantle – an interpretive review. *Lithos* 372–373, 105681.
6. **Tassara, S.***, Reich, M., Konecke, B., González-Jiménez, J.M., Simon, A.C., Morata, D., Barra, F., Fiege, A., Schilling, M. and Corgne, A. (2020) Unravelling the effects of melt-mantle interactions on the gold fertility of magmas. *Frontiers in Earth Science* 8, 10.3389/feart.2020.00029.

5. **Tassara, S.***, Reich, M., Cannatelli, C., Konecke, B.A., Kausel, D., Morata, D., Barra, F., Simon, A.C., Fiege, A., Morgado, E. (2020) Post-melting oxidation of primitive arc basalts from the southern Andes. *Geochimica et Cosmochimica Acta* 273, 291–312.
4. González-Jiménez, J.M., Roqué-Rosell, J., Jiménez-Franco, A., **Tassara, S.**, Nieto, F., Gervilla, F., Baurier, S., Proenza, J.A., Saunders, E., Deditius A.P., Schilling, M., Corgne, A. (2019) Magmatic platinum nanoparticles in metasomatic silicate glasses and sulfides from Patagonian mantle xenoliths. *Contributions to Mineralogy and Petrology* 174:47.
3. **Tassara, S.***, González-Jiménez J.M., Reich, M., Saunders, E., Luguet, A., Morata, D., Grégoire, M., Van Acken, D., Schilling, M.E., Barra, F., Nowell, G., Corgne, A. (2018) Highly siderophile elements mobility in the subcontinental lithospheric mantle beneath southern Patagonia. *Lithos* 314-315, 579–596.
2. **Tassara, S.***, González-Jiménez J.M., Reich, M., Schilling, M.E., Morata, M., Begg, G., Saunders, E., Griffin, W.L., O'Reilly, S.Y., Grégoire, M., Barra, F. & Corgne, A. (2017) Plume-subduction interaction forms large auriferous provinces. *Nature Communications* 8, 843.
1. Villanova-de-Benavent, C., Domènech, C., Tauler, E., Galí, S., **Tassara, S.** & Proenza, J.A. (2017) Fe-Ni-bearing Serpentes from the Saprolite Horizon of Caribbean Ni-Laterite Deposits: New Insights from Thermodynamic Calculations. *Mineralium Deposita* 52, 979–992.

INVITED TALKS

- El manto terrestre y los depósitos minerales: ¿Qué los conecta? – *Semana de la Geología: Universidad Mayor (Santiago, 2024)*.
- From mantle plumes to epithermal deposits: tracing the journey of gold to form an auriferous province – *Gordon Research Conference: Geochemistry of Mineral Deposits, 2022 (Spain, 2022)*.
- Crustal assimilation during arc magmatism and the genesis of porphyry copper deposits – *Postdoc Seminar: Yale University, 2021 (New Haven, USA)*.
- Crustal Barriers to the flux of copper during arc magmatism – *Departmental Colloquium Seminar: University of Regina, 2021 (Regina, Canada; online)*.
- Plumas mantélicas y zonas de subducción: cómo formar provincias auríferas según xenolitos del manto terrestre – *Universidad Nacional de Rio Cuarto, 2021 (Rio cuarto, Cba., Argentina; online)*.
- “Gold mineralization, the deep lithosphere, and mantle plumes: a tale told by mantle rocks”. *Departmental Colloquium Seminar: University of Arizona, 2021. (Tucson, AZ, USA; online)*.
- “Assessing the role of deep mantle processes on the development of large ore-forming systems”. *Postdoc Seminar: Yale University, 2020 (New Haven, CT, USA)*.
- “Moving metals throughout the mantle: the formation of metal-rich mantle domains”. *Leibniz Student Seminar, 2019 (Santiago de Chile, RM, Chile)*

- “The role of the subcontinental lithospheric mantle in metallogenesis”. *Gordon Research Seminar: Geochemistry of Mineral Deposits, 2018 (Waterville Valley, NH, USA)*.

SELECTED CONFERENCE ABSTRACTS (first author only)

- **Tassara, S.**, et al. Probing the origins of sub-arc copper-rich cumulates through direct analysis of osmium and oxygen isotopes. *Goldschmidt 2024 (Chicago, IL, USA)*.
- **Tassara, S.**, Rooney, D.A., Ague, J.J., Guido, D., Reich, M., Barra, F., Navarrete, C. The flux of gold across the lithosphere: from the mantle to epithermal deposits. *Chilean Geological Conference, 2023 (Santiago, Chile)*.
- **Tassara, S.**, and Ague, J.J. Crustal barriers to the flux of copper during arc magmatism. *Congreso de la Asociación Geológica Argentina, 2022 (Chubut, Argentina)*.
- **Tassara, S.**, Ague, J., and Valencia, V. Uncovering the ultramafic roots of the Acadian orogen. *Geological Society of America Connects, 2020 (online/remote conference)*
- **Tassara, S.**, Reich, M., González-Jiménez, J.M., Morata, D., Schilling, M., Barra, F., Corgne, A. Lithospheric mantle control on the formation of auriferous provinces: Insights from southern Patagonian peridotite xenoliths. *Chilean Geological Conference, 2018 (Concepción, Chile)*.
- **Tassara, S.**, Reich, M., Konecke, B., González-Jiménez, J.M., Fiege, A., Simon, A.C., Morata, D., Barra, F. Sulfur XANES investigation of upper mantle metasomatic apatite. *Goldschmidt Conference, 2018 (Boston, MA, USA)*.
- **Tassara, S.**, González-Jiménez, J.M., Reich, M., Morata, D., Schilling, M., Barra, F. Gold particles in upper mantle xenoliths. *Goldschmidt Conference, 2017 (Paris, France)*.
- **Tassara, S.**, González-Jiménez, J.M., Reich, M., Morata, D., Barra, F., Grégoire, M., Saunders, E., Cannatelli, C. Refertilization of the Subcontinental Lithospheric Mantle and its link to the formation of Metallogenic Provinces. *American Geophysical Union Fall Meeting, 2017 (New Orleans, USA)*.
- **Tassara, S.**, Garrido, L., Romero, R., González-Jiménez, J.M., Reich, M., Barra, F., Morata, D., Schilling, M. & Plissart, G. Noble Metals in Sulfides and Arsenides from Ultramafic rocks within the Andean Subduction Factory. *2nd European Mineralogical Conference, 2016 (Rimini, Italy), n. 42, page 710. “Winner of Best Poster Award”*.
- **Tassara, S.**, González-Jiménez J.M., Reich M., Barra, F. & Morata, D. Unraveling the role of the Subcontinental Lithospheric Mantle in the genesis of metal-rich melts beneath the Andes. *Gordon Research Conference: Geochemistry of Mineral Deposits, 2016 (Les Diablerets, Switzerland)*.

FELLOWSHIPS, HONORS, AND AWARDS

- **National Academy of Sciences (Chile)** award for a distinguished Ph.D. thesis in the field of Physical and Natural Sciences (2022).
- **Bateman Postdoctoral Fellow** at the Department of Earth and Planetary Sciences, Yale University (2019-2022).

- Twice invited speaker at the **Gordon Research Conference, Geochemistry of Mineral Deposits** (2018 and 2022).
- Ph.D. Fellowship, **National Council for Sciences and Technology of Chile** (2016-2019).
- Best Poster Award at the 2nd **European Mineralogical Conference** (2016).

FUNDED GRANTS

- 2024-2028: **FONDECYT Regular, National Agency of Research and Development** (Chile). Magmatic and Metallogenic Evolution of the Maricunga–El Indio Belt. **Co-investigator**.
- 2024–2027: **FONDECYT Iniciación, National Agency of Research and Development** (Chile). "Tracing the links between the volatile composition and oxygen fugacity of magmas, their ore fertility, and crustal thickness: A regional scale investigation of the Miocene to Mio-Pliocene arc segment of the Andes of central Chile. **Principal Investigator**.
- 2023–2027: **FONDEQUIP, National Agency of Research and Development** (Chile). Fortalecimiento de la investigación y formación científica en la Universidad de O’Higgins mediante la incorporación de un espectrómetro de fluorescencia de rayos X dispersivo de longitudes de onda. **Principal Investigator**.
- 2022: **National Agency of Research and Development** (Chile) Postdoctoral Fellowship (*Granted but not accepted due to Assistant Professorship offer*).
- 2016-2019: CONICYT Ph.D. Scholarship, **National Council for Sciences and Technology of Chile**. The role of the subcontinental lithospheric mantle in metallogenesis.

TEACHING EXPERIENCE

Teaching:

- **Instructor (Profesor de Cátedra):** Mining and Ore Deposits (GEO-3101; Fall 2023, 2024), Mineral Exploration (GEO-4702; Fall 2023), Rocks and Minerals (GEO-2002; Spring 2023), Field Geology (GEO-3102; Spring 2023, 2024).
- **Field instructor:** Six-day field trip in the Chilean Coastal Cordillera (Field Geology, Spring 2023, 2024); Two-day field trip in the Chancón Epithermal District (Mineral Exploration, Fall 2023).
- **Teaching Assistant at Universidad de Chile and Universidad Nacional de La Plata:** Silicates Mineralogy x4 (Spring and Fall 2017, 2018), Geology of Ore Deposits (Year-round, 2013), Igneous Petrology x2 (Year-round, 2012, 2013).

Mentoring:

- **M.Sc. thesis supervisor:** Arnaldo Olivares Moncada (’26); Alan Inostroza (’26).
- **Undergraduate honor’s thesis supervisor:** Arnaldo Olivares Moncada (Geoscience Engineer ’24), Javiera Mercado Schott (Geoscience Engineer ’24), Gabriela Pereira (Geoscience Engineer ’24).
- **Ph.D. committee member:** Felipe Velásquez Ruiz (PhD. Geoscience, Universidad de Chile ’23), Diego Muñoz (PhD. Geoscience, Universidad de Chile ’24).

- **M.Sc. committee member:** Andres Ojeda (M.Sc. Geoscience, Universidad de Chile '23), Maria José Tapia Tapia (M.Sc. Geoscience, Universidad de Chile '24).
- **Undergraduate honor's thesis committee member:** Martin Cellis (Geoscience Engineer '22), Ignacio Herrera (Geoscience Engineer '23), Paloma Sepulveda (Geoscience Engineer '23), Ignacia Herrera (Geologist '24).

SCIENTIFIC SERVICE

- **Associate Editor:** Geological Society of America Bulletin (period 23-25); Communications Earth and Environment (starting January '25).
- **Manuscript Reviewer:** Geology (x3), Nature Communications (x2), Minerals (x2); Lithos (x1); Geochimica et Cosmochimica Acta (x6); Gondwana Research (x1); American Journal of Science (x1); Geophysical Research Letters (x1); Science Advances (x2); Communications Earth and Environment (x1); Chemical Geology (x1); Contributions to Mineralogy and Petrology (x1).
- **Affiliation to Scientific Societies:** European Association of Geochemistry (member); Society of Economic Geologists (member); Society of Geologists Applied to Mineral Exploration (member).