

# Janine Birnbaum, PhD

j.birnbaum@lmu.de

## Education

Sept. 2014 – June 2018, Stanford University, Stanford, CA

- Bachelor of Science in Geological Sciences and Geophysics, conferred with departmental honors in Geophysics, conferred with Distinction; Notation in Science Communication with Distinction

Aug. 2018 – Aug. 2023, Columbia University in the City of New York, New York, NY; Lamont-Doherty Earth Observatory, Palisades, NY

- Master of Arts in Earth and Environmental Sciences, 2020
- Master of Philosophy in Earth and Environmental Sciences, 2022
- Doctor of Philosophy in Earth and Environmental Sciences, 2023

## Research Experience

Oct. 2023 – present, Ludwig-Maximilians-Universität München, Department of Earth and Environmental Sciences, Section for Mineralogy, Petrology and Geochemistry

*Post-doctoral Researcher*

Research advisor: Prof. Yan Lavallée, Prof. Jackie E. Kendrick

- High-temperature vesiculation and flow experiments and numerical modeling of bubble growth in magmas
- Numerical simulation of magma response to drilling
- Upscaling to large (decimeter) scale on natural rhyolitic glasses

Aug. 2018 – Aug. 2023, Columbia University, Department of Earth and Environmental Sciences (DEES)

*Doctoral Researcher*

Research advisor: Dr. Einat Lev

- Paired analogue experiments and numerical modeling of confined channel, dam-break flows to investigate rheological effects of solid particles and gas bubbles with application to lava flows.
- Numerical model development of solidifying, free surface flows with applications to lava flows and lava domes.

July 2017 – June 2018, Stanford University, Department of Geophysics

*Undergraduate Researcher*

Research advisor: Dr. Jenny Suckale, Dr. Tobias Keller

- Numerical modeling of periodic convection in Ray Lava Lake, Mount Erebus, Antarctica

June 2015 – Dec. 2015, Stanford University, Department of Geophysics

*Undergraduate Researcher*

Research advisor: Dr. Eric Dunham

- Numerical modeling of tidal flexure at grounding line of Whillans Ice Stream, Antarctica

## Teaching

Fall 2019, Columbia University, DEES, Research Computing in the Earth Sciences  
*Teaching Assistant*

- Developed rubrics, graded assignments for ~30 students, hosted weekly office hours and assisted with in-class coding assignments. Produced supplemental materials for students and gave an in-class guest lecture.

Summer 2021, Columbia University, DEES, Introduction to Mineralogy  
*Teaching Assistant*

- Developed, administered, and graded twice-weekly laboratory assignments and quizzes on mineral identification for 6 students. Organization of the teaching sample collection.

### **Leadership**

Sept. 2021 – Aug. 2021, Department of Earth and Environmental Sciences Graduate Student Council  
*Academic Co-Chair*

Sept. 2021– June 2021, Columbia Center for Teaching and Learning  
*Lead Teaching Fellow*

- Organize pedagogy events for graduate students in the Department of Earth and Environmental Sciences and act as a liaison between students, faculty, and the Center for Teaching and Learning
- Hosted events on “Accessible and Inclusive Teaching through Universal Design for Learning (UDL) in the Classroom, Lab, and Field” and “Beyond the TA: Planning and marketing your teaching experiences for the job market”
- Hosted “Learning Lunches” that brought together graduate students and a faculty mentor to discuss pedagogy

Sept. 2019 – Aug. 2021, Department of Earth and Environmental Sciences Graduate Student Council  
*Alumni and Career Development Co-Chair*

- Organize career events for graduate students in the Department of Earth and Environmental Sciences and coordinate with alumni.

### **Honors and Awards**

Earth Educators Rendezvous 2022 Academic Career Prep Award, July 2022, \$300

Columbia University, Center for Teaching and Learning, Teaching Conference Support Award (for Earth Educators Rendezvous 2022), July 2022, \$550

Geological Society of America Annual Meeting 2019 Kenneth N. Weaver Student Travel Award, Sept. 2019, \$150

Stanford University, School of Earth, Energy & Environmental Sciences Dean’s Award for Undergraduate Academic Achievement, June 2018

Stanford University, Department of Geological Sciences Outstanding Senior Award 2017-2018, in recognition of outstanding academic achievement and valuable contributions to the undergraduate community in the Department of Geological Sciences, June 2018

Stanford University Department of Geophysics 2018 Exceptional Paper Award for outstanding senior thesis, June 2018

### **Publications**

- Birnbaum, J., Wadsworth, F. B., Kendrick, J. E., Kennedy, B., Wallace, P. A., da Silva, M. M., Lavallée, Y. (submitted). Directly tapping crustal magma reveals storage conditions.
- Birnbaum, J., Schaurath, J., Weaver, J., Kendrick, J. E., Lamur, A., Lavallée, Y. (submitted). Shear-enhanced permeability development of magma vesiculating in cylindrical conduits.
- Baur, J., Birnbaum, J., Halverson, B., Dietterich, H. R., Hammer, J. E., Whittington, A., Lev, E. (submitted). Dynamics and Evolution of the Kīlauea Lower East Rift Zone 2018 Fissure 8 lava flow and implications for multiphase magma properties.
- Moussallam, Y., rose-Koga, E. F., Fischer, T. P., Georgeais, G., Lee, H. J., Birnbaum, J., Pfeffer, M. A., Barnie, T., Regis, E. (2024). Kinetic isotopic degassing of CO<sub>2</sub> during the 2021 Fagradalsjall eruption and the δ<sup>13</sup>C signature of the Icelandic mantle. *G<sup>3</sup>* 25 (12) e2024GC011997. <https://doi.org/10.1029/2024GC011997>
- Zorn, E. U., Kendrick, J. E., Lamur, A., Birnbaum, J., Kueppers, U., da Silva, M. M., Lavallée, Y. (2024). Experimental investigation of volcanoclastic compaction during burial. *Volcanica* 7 (2) 765-783. <https://doi.org/10.30909/vol.07.02.765783>
- Bordbar, A., Zia, W., Birnbaum, J., Omid, J., Lee, R. F., Lev, E., Boyce, C. M. (2024). Magnetic resonance imaging of a stream of bubbles injected into liquid suspensions. *Chem. Eng. J.* 494 (153282) 1-14. <https://doi.org/10.1016/j.cej.2024.153282>
- Birnbaum, J., Lev, E., Hernandez, P. A., Barrancos, J., Padilla, G. D., Asensio-Ramos, M., Calvo, D., Rodríguez, F., Pérez, N. M., D'Auria, L., Calvari, S. (2023). Temporal variability of explosive activity at Tajogaite volcano, Cumbre Vieja (Canary Islands), 2021 eruption from ground-based infrared photography and videography. *Frontiers in Earth Sci.* 11, 1193436. <http://doi.org/10.3389/feart.2023.1193436>
- Birnbaum, J., Zia, W., Bordbar, A., Lee, R. F., Boyce, C. M., Lev, E. (2023). Magnetic resonance imaging of multi-phase lava flow analogs: Velocity and rheology. *JGR: Solid Earth* 128 (5) e2023JB026464. <https://doi.org/10.1029/2023JB026464>
- Namiki, A., Lev, E., Birnbaum, J., Baur, J. (2022). An experimental model of unconfined bubbly lava flows: Importance of localized bubble distribution. *JGR: Solid Earth* 127 (6) e2022JB024139. <https://doi.org/10.1029/2022JB024139>
- Birnbaum, J., Lev, E., Llewellyn, E. W. (2021). Rheology of three-phase suspensions determined via dam-break experiments. *PRSA* 477 (2254), 20210394. <https://doi.org/10.1098/rspa.2021.0394>
- Birnbaum, J., Keller, T., Suckale, J., Lev, E. (2020). Periodic outgassing as a result of unsteady convection in Ray lava lake, Mount Erebus, Antarctica. *EPSL* 530, 115903. <https://doi.org/10.1016/j.epsl.2019.115903>
- Birnbaum, J. (2018). Episodic degassing from unsteady lava lake convection in Ray Lava Lake, Mount Erebus, Antarctica. Stanford Digital Repository. Available at: <https://purl.stanford.edu/ks996xx9045>

### **Selected Presentations**

- Birnbaum, J., Lev, E., Spiegelman, M., Kendrick, J. E., Lavallée, Y. Numerical simulation of the effect of solidifying crusts on lava propagation and arrest. Oral presentation given at EGU Annual Meeting, April. 2024.
- Birnbaum, J., Lev, E., Dietterich, H.. Towards lava flow breakouts: Finite element modeling of free-surface flows with a solidifying crust. Poster presentation given at IAVCEI Scientific Assembly, Feb. 2023.
- Birnbaum, J., Lev, E., Hernandez, P., Barrancos, J., Padilla, G., Asensio-Ramos, M., Calvo, D., Rodríguez, F., Pérez, N., D'Auria, L., Calvari, S.. Temporal variability of explosive activity and ash plumes from ground-based infrared and visible cameras at Cumbre Vieja Volcano. Oral presentation given at IAVCEI Scientific Assembly, Feb. 2023.
- Birnbaum, J., Lev, E.. A new finite-element model for solidifying lavas. Poster presentation given at GSA Annual Meeting, Oct. 2022.

- Birnbaum, J., Zia, W., Bordbar, A., Lee, R. F., Lev, E., Boyce, C. M.. Imaging the interior of multi-phase analog lava flows: MRI measurements of velocity and rheology. Oral presentation given at GSA Annual Meeting, Oct. 2022.
- Birnbaum, J., Christopher, C., Lee, M., Sawi, T., Russell, J.. Browser-based visualization tool for seismic records. Interactive demonstration given at NAGT Earth Educators Rendezvous, July 2022.
- Birnbaum, J., Lev, E., Hernandez, P., Barrancos, J., Padilla, G., Asensio-Ramos, M., Calvo, D., Rodríguez, F., Pérez, N., Calvari, S.. Temporal evolution of Cumbre Vieja explosive activity and ash plumes from ground-based infrared and visible cameras. Oral presentation given at EGU Annual Meeting, May 2022 (virtual).
- Birnbaum, J., Lev, E., Llewellyn, E. W., Zia, W., Bordbar, A., Boyce, C.. Evaluation of Bulk Rheology Assumptions in the Interior of Dam-break Flows. Oral presentation given at AGU Fall Meeting, Dec. 2021 (virtual).
- Birnbaum, J., Carchedi, C., Lee, M., Sawi, T., Russell, J., Browser-based Visualization of Seismic Records to Build Seismogram Literacy. Poster presentation given at AGU Fall Meeting, Dec. 2021 (virtual).
- Lev E., Birnbaum, J., Whittington, A., Halverson, B., Hammer, J. and Llewellyn, E.. The Rheology of Three-Phase Lavas and Magmas. Recorded oral presentation given at Goldschmidt Annual Meeting, June 2020 (virtual).
- Birnbaum, J. and Lev, E., Dam-break experiments of particle- and bubble-bearing suspensions for understanding lava flow rheology. Poster presentation given at AGU Fall Meeting, Dec. 2019.
- Birnbaum, J. and Lev E., Investigating the rheology of particle- and bubble-bearing lava using analogue flows and numerical simulations. Oral presentation given at GSA Fall Meeting, Sept. 2019.