

TUSHAR MITTAL

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EDUCATION & EMPLOYMENT	<i>Penn State University,</i> Assistant Professor Department of Geosciences -	Fall 2022-Present
	<i>Massachusetts Institute of Technology,</i> MIT Crosby Postdoctoral Fellow Department of Earth, Atmospheric and Planetary Sciences -	Spring 2020-2022
	<i>University of California, Berkeley,</i> PhD Advisor : Mark Richards Earth & Planetary Science Department -	Fall 2013-Feb 2020
	<i>Johns Hopkins University, Baltimore, MD</i> B.S (With Honors) in Physics	Fall 2009- Fall 2012
PUBLICATIONS (STUDENTS AND POSTDOCS PRIMARILY ADVISED BY ME - *)	79. <i>Emplacement of Continental Flood Basalt lavas: a field volcanological perspective</i>, Aristle Monteiro*, Tushar Mittal, Raymond Duraiswami, and Stephen Self, GSA Books Special Issue on Continental Flood Basalts (in review) 2025 78. <i>The Tunnel Dike, Chief Joseph Dike Swarm: Dike Architecture and Emplacement Conditions of a Choked Conduit</i>, Ryan Currier, Paulo Hidalgo, Tushar Mittal, Aristle Monteiro, Michael Ackerson, and Bil Schneider, GSA Books Special Issue on Continental Flood Basalts (in review) 2025 77. <i>Thermodynamic Consistent Neural Networks for Constitutive Modeling : A Data Driven approach to learn complex rheologies</i>, Kangan Li*, Tushar Mittal, Seth Saltiel, and Ben Holtzman, JGR Machine Learning (in review) 2025 76. <i>ExoCycle: A Novel Composite Algorithm for Robust Spherical Community Detection and its Application to Ocean Basin Delineation</i>, Matthew Bogumil*, Carolina Lithgow Bertelloni, Tushar Mittal, Geoscientific Model Development (in review) 2025 75. <i>A sticky situation: Melt transport via magma mush unlocking in analog experiments</i>, Liam James Kelly*, Tushar Mittal, Kristen E Fauria, Erik Schoonover, and Guilherme Gualda , Earth and Planetary Science Letters (in review) 2025 74. <i>Fault Slip and Fluid Flow: Seismic Source Analysis to Assess Role of Multiple Slip Patches in Fault Permeability</i>, Muhammad Edo Marshal Nurshal*, Junpeng Wang, Pengliang Yu, Tushar Mittal, and Derek Elsworth, Geophysical Review Letters (in review) 2025 73. <i>Meteoritic sedimentation on the seafloor of ocean worlds: implications for seafloor heat and fluid flow</i>, Noah Randolph-Flagg, Andrew T. Fisher, Tushar Mittal, Adam N. Price, Kristin Dickerson, Ausin Benningfield, Christophe Sotin, German Christopher, and Donna K. Blackman, Geophysical Review Letters (in review) 2025	

72. *Fluid-driven cohesive strengthening: critical role of reaction kinetics as the determinant for frictional stability*, Raphael Affinito*, Giuseppe Volpe, Laura Calzolari, **Tushar Mittal**, Giacomo Pozzi, and Chris Marone, AGU Advances (in review) **2025**
71. *Multi-Pulse and Crystal-Laden Emplacement of Tunnel Dike: Implications for Flood Basalt Volcanism*, Ryan Currier, Paulo J. Hidalgo, **Tushar Mittal**, Jada Nimblett, Lucian Bitner, Taiylor Williams, and Bil Schneider, Earth and Planetary Science Letters (in review) **2025**
70. *Effects of External Water on Explosive Eruption Plume Height*, Edgar L. Carrillo, Kristen E. Fauria, **Tushar Mittal**, and Larry Mastin, Volcanica (in revision) **2025**
69. *Eruptive flux drives atmospheric lightning rates and submarine hydroacoustic signals during the 2021 Fukutoku-Oka-no-Ba eruption*, Kathleen F. McKee, Kristen E. Fauria, Jackie Caplan-Auerbach, Jelle D. Assink, Mikkel Louis, **Tushar Mittal**, Fukashi Maeno, Mie Ichihara, Dirk Metz, and Chris Vagasky, Volcanica (in revision) **2025**
68. *Brittle and Plastic Defect Dynamics of Calcite Single Crystals*, Hoaghy OGHaffari, Andy Cross and Matej Pec, **Tushar Mittal**, JGR Solid Earth (submitted after revisions) **2025**
67. *Refining the Migrating Differentiated Planetesimal Model for CTTS RW Aur As Lightcurve Downturns*, C. M. Lisse , M. L. Sitko, S. J. Wolk, H. M. Gunther, S. Brittain, T. Beck, C. Chen, B. Sargent, J. D. Green, J. Steckloff, B. C. Johnson, C. C. Espaillat, M. Koutoulaki1, A. P. Jackson, Silverberg, **Tushar Mittal**, RNAAS Note (Accepted), **2025**
66. *Real-Time Early Solar System Evolution in RW Auriga A: A Timely Note as A New Major Downturn Has Started*, C. M. Lisse , M. L. Sitko, S. J. Wolk, H. M. Gunther, S. Brittain, T. Beck, C. Chen, B. Sargent, J. D. Green, J. Steckloff, B. C. Johnson, C. C. Espaillat, M. Koutoulaki1, A. P. Jackson, S. Silverberg, **Tushar Mittal**, RNAAS Note (Accepted), **2025**
65. *The January 2022 Hunga eruption cooled the southern hemisphere in 2022 and 2023*, Ashok Gupta*, **Tushar Mittal**, Kristen E. Fauria, Ralf Bennartz, and Jasper F. Kok, Nature Communications Earth & Environment, 6(1), 240. **2025**
64. *Rate and Pressure Dependence of Dilatancy and Fault Strength in Partially-Drained Laboratory Fault Zones*, Raphael Affinito*, Derek Elsworth, **Tushar Mittal**, Marco Scuderi, and Chris Marone, Journal of Geophysical Research: Solid Earth, 130(8), e2024JB030596. **2025**
63. *A Disintegrating Rocky World Shrouded in Dust and Gas: Mid-IR Observations of K2-22b using JWST*, Nick Tusay, Jason T. Wright, Thomas G. Beatty, Steve Desch, Knicole Colon, **Tushar Mittal**, Hugh P. Osborn, Beatriz Campos Estrada, James E. Owen, Jessica Libby-Roberts, Arvind F. Gupta, Brad Foley, Erik Meier Valdes, Daniel J. Stevens, Ashley Herbst, The Astrophysical Journal Letters, 987(1), L6. **2025**
62. *Towards Multi-scale Coupled Thermo-Hydro-Mechanical Constitutive Models: Experiments on Thermal Cracking Under Stress with Near-field Acoustic Data*, Benjamin Holtzman, Hoagy OGHaffari, Eric Beauce, **Tushar Mittal**, Anna Barth, Ulrich Mok, Matj Pec, Proceedings, 50th Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, February 10-12, SGP-TR-229 **2025**.

61. *Refining the Eruption Chronology of Atitlan Caldera through Zircon Double-Dating*, Alejandro Cisneros de Leon, Martin Danisik, Axel K. Schmitt, Julie C. Schindlbeck-Belo, Steffen Kutterolf, **Tushar Mittal**, Jennifer M. Garrison, Kenneth W.W. Sims, *Geochemistry, Geophysics, Geosystems*, 26(3), e2024GC011953. **2025**.
60. *Large Igneous Province sulfur emissions have long-term (1000 years) effects on the ocean carbon cycle*, Hee Jun Cheong*, **Tushar Mittal**, Courtney Sprain, and Isabel Fendley, *Geochemistry, Geophysics, Geosystems*, 26(3), e2024GC011893. **2025**
59. *Sequencing Silicates in the IRS Debris Disk Catalog I: Methodology for Unsupervised Clustering*, Cicero Lu*, **Tushar Mittal**, Christine H. Chen, Alexis Y. Li, Kadin Worthen, B. A. Sargent, Carey M. Lisse, G. C. Sloan, Dean C. Hines, Dan M. Watson, Isabel Rebollido, and Joel D. Green, *The Astrophysical Journal Supplement Series*, 276(2), 65. **2025**
58. *Comment on A Bayesian age from dispersed plagioclase and zircon dates in the Los Chocoyos ash, Central America by Baudry et al. (2024)*, A. Cisneros de Leon, A. K. Schmitt, **Tushar Mittal**, M. Danisik, S. de Silva, S. Kutterolf, J. C. Schindlbeck-Belo, S. Self, *Earth and Planetary Science Letters*, 653(119214) **2025**.
57. *The Viscosity of a Partially Molten Layer in a Paleo-Orogenic Plateau* Zoe Molitor*, **Tushar Mittal**, Oliver Jagoutz, *Earth and Planetary Science Letters*, 648, 119060 **2024**
56. *Resilience of Snowball Earth to Stochastic Events* Guillaume Chaverot, Andrea Zorzi, Xuesong Ding, Jonathan Itcovitz, Bowen Fan, Siddharth Bhatnagar, Aoshuang Ji, R.J. Graham, **Tushar Mittal** *Geophysical Research Letters* <https://doi.org/10.1029/2024GL109512> **2024**
55. *The crystallization of Continental Flood Basalt (CFB) lavas: insights from textural studies*, Aristotle Montiero*, **Tushar Mittal**, Raymond Duraiswami, Steve Self, *Journal of Petrology*, 65(8), egae082. **2024**
54. *Determining Mid-Ocean Ridge Geography from Upper Mantle Temperature*, Xiyuan Bao*, **Tushar Mittal**, Carolina Lithgow-Bertelloni, *EPSL Volume* 641, 118823, **2024**
53. *LinkingLines: Using the Hough Transform to Cluster Line Segments and Mesoscale Feature Extraction*, Allison Kubo Hutchison, Leif Karlstrom, and **Tushar Mittal**, *Journal of Open Source Software*, 9(98), 6147, **2024**
52. *The effects of bathymetry on the CCD: Implications for the long-term carbon cycle*, Matthew Bogumil*, **Tushar Mittal**, and Carolina Lithgow-Bertelloni, *Proceedings of the National Academy of Sciences*, 121(21), e2400232121. **2024**
51. *Towards an Integrated Texture Toolkit, 1: Unveiling the Complex Relationship Between Crystal Size, Shape, and Fabric in EBSD Data*, Ryan Michael Currier, **Tushar Mittal**, Paulo Hidalgo, *Contributions to Mineralogy and Petrology Contributions to Mineralogy and Petrology* 179, no. 4 (2024): 38. **2024**
50. *Heat sources for Variscan high-temperature/low-pressure metamorphism: petrochronological constraints from the Trois Seigneurs Massif, French Pyrenees*, Charlotte H. Connop, Andrew J. Smye, Joshua M. Garber, **Tushar Mittal** *Journal of Metamorphic Petrology* 141 **2024**

49. *Estimation of airfall volume from ocean color changes, Hunga eruption, 2022*, Liam James Kelly, Kristen E Fauria, Michael Manga, Shane J Cronin, Folauihola Helina Latuila, Joali Paredes-Mario, **Tushar Mittal**, and Ralf Bennartz, *Bulletin of Volcanology* 86(6), 59 **2024**
48. *Quench-Spallation Drilling: A Novel Drilling Head Design for Routine Heat Mining Above the Brittle-Ductile Transition*, Ben Holtzman, Nate Groebner, **Tushar Mittal**, Rob Skarbek, In *Proceedings of the 48th Workshop on Geothermal Reservoir Engineering*, Stanford, CA, USA (pp. 6-8). **Oct 2023**
47. *Divergent behavior of hydrothermal plumes in fresh versus salty icy ocean worlds.*, Suyash Bire, **Tushar Mittal**, Wanying Kang, Ali Ramadhan, Philip Tuckman, Christopher R German, Andreas M. Thurnherr, John C Marshall, *Journal of Geophysical Research: Planets*, 128(11), e2023JE007740. **2023**
46. *Microscopic Defect Dynamics during a Brittle-to-Ductile Transition*, H. O. Ghaffari[®], Matej Pec[®], **Tushar Mittal**[®], Ulrich Mok, Hilary Chang, and J. Brian Evans, *Proceedings of the National Academy of Sciences*, 120(42), e2305667120. [[®] - equal authors] **2023**
45. *Ash deposition triggers phytoplankton blooms at Nishinoshima Volcano, Japan*, Liam James Kelly*, Kristen E Fauria, **Tushar Mittal**, Jan Riad El Kassari; Ralf Bennartz; David Nicholson; Ajit Subramanian; Ashok Kumar Gupta, *Geochemistry, Geophysics, Geosystems* 24, no. 11 (2023): e2023GC010914. **2023**
44. *Multiscale Spatial Patterns in Giant Dike Swarms Identified through Objective Feature Extraction*, Allison Kubo Hutchison, Leif Karlstrom, **Tushar Mittal**, *Geochemistry, Geophysics, Geosystems* 24, no. 9 (2023): e2022GC010842 **2023**
43. *Simultaneous creation of a large vapor plume and pumice raft by the 2021 Fukutoku-Oka-no-Ba shallow submarine eruption*, Kristen Fauria, Martin Jutzeler, **Tushar Mittal**, Ashok Gupta, Liam Kelly, John Rausch, Ralf Bennartz, Brent Delbridge, Lise Retaillieu, *Earth and Planetary Science Letters*, 609, 118076. **2023**
42. *Trends in Silicates in the β Pictoris Disk* Cicero X. Lu, Christine H. Chen, B. A. Sargent, Dan M. Watson, Carey M. Lisse, Joel D. Green, Michael L. Sitko, **Tushar Mittal**, V. Leboutteiller, G. C. Sloan, *The Astrophysical Journal* 933, no. 1 **2022**
41. *Eruption chronology of the December 2021 to January 2022 Hunga Tonga-Hunga Haapai eruption sequence.*, Ashok Gupta, Ralf Bennartz, Kristen Fauria, **Tushar Mittal**, *Communications Earth & Environment*, 3(1), 314. **2022**
40. *Long-term eruption forecasting*, **Tushar Mittal** *Nature Geoscience*, 15(7), 516-517 **2022**
39. *Ocean dynamics and tracer transport over the south pole geysers of Enceladus*, Wanying Kang, John Marshall, **Tushar Mittal**, and Suyash Bire, *Monthly Notices of the Royal Astronomical Society* 517, no. 3: 3485-3494. **2022**
38. *Mayotte 2018 Eruption likely sourced from a magmatic mush*, **Tushar Mittal**, Jacob S. Jordan, Lise Retaillieu, Francois Beauducel, and Aline Peltier, *Earth and Planetary Science Letters* 590, 117566 **2022**
37. *Deccan volcanism at K-Pg time. In From the Guajira Desert to the Apennines, and from Mediterranean Microplates to the Mexican Killer Asteroid: Honoring the Career of Walter Alvarez*, **Tushar Mittal**, Courtney J. Sprain, Paul R. Renne, and Mark A. Richards. *Geological Society of America Special Publications Paper* 557 **2022**

36. *On synchronous super-eruptions*, Cisneros de Leon, Alejandro, **Tushar Mittal**, Shanaka L. de Silva, Stephen Self, Axel K. Schmitt, and Steffen Kutterolf. *Frontiers in Earth Science* 10 (2022): 827252. **2022**
35. *How does salinity shape ocean circulation and ice geometry on Enceladus and other icy satellites?*, Wanying Kang, **Tushar Mittal**, Suyash Bire, Jean-Michel Campin, and John Marshall, *Science Advances*, 8(29), eabm466 **2022**
34. *Pumice Raft Detection Using Machine-Learning on Multispectral Satellite Imagery*, Maggie Zheng, **Tushar Mittal**, Kristen Fauria, Ajit Subramaniam, Martin Jutzeler *Front. Earth Sci., Sec. Volcanology* **2022**
33. *Towards Understanding Deccan Volcanism : A Volcanological Perspective*, Stephen Self, **Tushar Mittal**, Gauri Dole, Loyc Vanderkluysen, *Annual Review of Earth and Planetary Sciences* 50 (2022): 477-506. **2022**
32. *Some lava flows may not have been as thick as they appear*, Katona, Jonas, Xiaojing Fu, **Tushar Mittal**, Michael Manga, and Stephen Self. *Geophysical Research Letters* 48, no. 24 (2021): e2021GL095202. **2021**
31. *Magmatic architecture of continental flood basalts I : Observations from Deccan Traps*, **Tushar Mittal**, Mark Richards, Isabel Fendley, *JGR:Solid Earth* 126(12), e2021JB021808 **2021**
30. *Magmatic architecture of continental flood basalts II : A new conceptual model*, **Tushar Mittal**, and Mark Richards, *JGR:Solid Earth* 126(12), e2021JB021807 **2021**
29. *Cooling history and emplacement dynamics within rubbly lava flows, southern Deccan Traps: insights from textural variations and crystal size distributions*, Aristle Monteiro, Raymond A. Duraiswami, **Tushar Mittal**, Shrishail Pujari, Upananda Low, Ahsan Absar, *Bulletin of Volcanology*, 83(11), 1-23 **2021**
28. *Calcium isotope evidence for early Archaean carbonates and subduction of oceanic crust*, Michael Antonelli, Jillian Kendrick, Chris Yakymchuck, Martin Guitreau, **Tushar Mittal**, Frdric Moynier, *Nature Communications* **2021**
27. *Thickness characteristics of phoeohoe lavas in the Deccan Province, Western Ghats, India, and in continental flood basalt provinces elsewhere*, Stephen Self, **Tushar Mittal**, Anne Jay, *Frontiers in Earth Science*, doi: 10.3389/feart.2020.630604 **2020**
26. *No CretaceousPaleogene Boundary in Exposed Rajahmundry Traps: A Refined Chronology of the Longest Deccan Lava Flows From $^{40}\text{Ar}/^{39}\text{Ar}$ Dates, Magnetostratigraphy, and Biostratigraphy*, Isabel M. Fendley, Courtney J. Sprain, Paul R. Renne, Ignacio Arenillas, Jos A. Arz, Vicente Gilabert, Stephen Self, **Tushar Mittal**, *Geochemistry, Geophysics, Geosystems*, 21(9), e2020GC009149 **2020**
25. *Bristle-state' friction: How to simulate high-velocity rupture experiments using rate and state dependent constitutive relations, towards a loading-independent 'universal' friction*, Seth Saltiel, **Tushar Mittal**, Jorge Crempien; Jaime Campos. *Frontiers in Earth Science*, 8, 373 **2020**
24. *Assessing the environmental consequences of the generation and alteration of mafic volcanoclastic deposits during Large Igneous Province emplacement*, Benjamin Black, **Tushar Mittal**, Francesca Lingo, Jeff Karson, Kristina Walowski, Andres Hernandez, Ellen Gales, *Large Igneous Provinces: A Driver of Global Environmental and Biotic Changes* 255: 117, Book - AGU Publications. **2020**

23. *Precipitation of multiple light elements to power Earth's early dynamo*, **Tushar Mittal**, Nicholas Knezek, Sarah M. Arveson, Chris P. McGuire, Curtis D. Williams, Timothy D. Jones, and Jie Li. *EPSL* 532 116030. **2020**
22. *Ongoing Dispersal of the August 7, 2019 Pumice Raft from the Tonga Arc in the Southwestern Pacific Ocean*, Martin Jutzeler, Erik Van Seville, Robert Marsh, **Tushar Mittal**, Rebecca Carey, Kristen Fauria, Michael Manga, Jocelyn McPhie. *Geophysical Research Letters* (47.5), e2019GL086768. **2020**
21. *Volatile Degassing From Magma Chambers as a Control on Volcanic Eruptions* **Tushar Mittal**, MA Richards, *J. Geophys. Res Solid Earth*, 124(8), 7869-7901. **2019**
20. *Ca isotopes record rapid crystal growth in volcanic and sub-volcanic systems* Michael A Antonelli, **Tushar Mittal**, Anders McCarthy, Barbara Tripoli, James M. Watkins, and Donald J. DePaolo., *PNAS* 116 (41), 20315-20321 2019
19. *Detection of submarine eruptions using Argo floats and its implications for ocean dynamics*, **Tushar Mittal**, and Delbridge, Brent, *EPSL* 511, 105-116 **2019**
18. *Shell Structure of Enceladus from Satellite Gravity and Topography*, Doug Hemingway and **Tushar Mittal**, *Icarus* 332, 111-131 **2019**
17. *Kinetic and equilibrium Ca isotope effects in high-T rocks and minerals*, Antonelli, Michael A., Martin Schiller, Edwin A. Schauble, **Tushar Mittal**, Donald J. DePaolo, Thomas Chacko, Edward S. Grew, and Barbara Tripoli, *EPSL* 517, 71-82 **2019**
16. *Constraints on the volume and rate of Deccan Traps flood basalt eruptions using a combination of high-resolution terrestrial mercury records and geochemical box models* Isabel Fendley, **Tushar Mittal**, Courtney Sprain, Mark Marvin Di Pasquale, Paul Renne, *EPSL* 524, 115721 **2019**
15. *The Eruptive Tempo of Deccan Volcanism in Relation to the Cretaceous-Paleogene Boundary*, Courtney Sprain, Paul Renne, Loyc Vanderkluysen, Kanchan Pande, Steve Self, **Tushar Mittal**, *Science* 363 (6429), 866-870 **2019**
14. *An ExoKuiper Belt with an Extended Halo around HD 191089 in Scattered Light*. Ren, B., Choquet, E., Perrin, M. D. ... **Tushar Mittal** et al. *The Astrophysical Journal*, 882(1), 64. **2019**
13. *Plume-ridge interaction via melt channelization at Galpagos and other near - ridge hotspot provinces* **Tushar Mittal**, MA Richards, *Geochemistry, Geophysics, Geosystems* 18 (4), 1711-1738 **2017**
12. *The demise of Phobos and development of a Martian ring system* BA Black, **T Mittal**, *Nature Geoscience* 8 (12), 913 - **2015**
11. *Fast Modes and Dusty Horseshoes in Transitional Disks*, **T Mittal**, and E Chiang; *The Astrophysical Journal Letters* 798 (1), L25 21 **2014**
10. *The Spitzer infrared spectrograph debris disk catalog. II. Silicate feature analysis of unresolved targets*, **T Mittal**, CH Chen, H Jang-Condell, P Manoj, BA Sargent, DM Watson; *The Astrophysical Journal* 798 (2), 87 25 **2014**
9. *The Spitzer infrared spectrograph debris disk catalog. I. Continuum analysis of unresolved targets* CH Chen, **T Mittal**, M Kuchner, WJ Forrest, CM Lisse, P Manoj, *The Astrophysical Journal Supplement Series* 211 (2), 25 22 **2014**

8. *Experimental evidence for dynamic friction on rock fractures from frequency-dependent nonlinear hysteresis and harmonic generation*, Seth Saltiel, B Bonner, **T. Mittal**, B Delbridge, J Ajo-Franklin, *Journal of Geophysical Research: Solid Earth* - **2017**
7. *Infrared Spectroscopy of HR 4796A's Bright Outer Cometary Ring+ Tenuous Inner Hot Dust Cloud*, Carey Lisse, ML Sitko, ..., **T. Mittal**, *The Astronomical Journal* 154 (5), 182 - **2017**
6. *Spectral Evidence for an Inner Carbon-rich Circumstellar Belt in the Young HD 36546 A-star System*, CM Lisse, ML Sitko,..., **T. Mittal**, *The Astrophysical Journal Letters* 840 (2), L20 - **2017**
5. *Discovery and spectroscopy of the young jovian planet 51 Eri b with the Gemini Planet Imager*, B Macintosh, JR Graham, ... **T. Mittal** *Science* 350 (6256), 64-67 169 **2015**
4. *IRS Spectra of Debris Disks in the Scorpius-Centaurus OB Association*, H Jang-Condell, CH Chen, **T. Mittal**, P Manoj, D Watson, CM Lisse, *The Astrophysical Journal* 808 (2), 167 13 **2015**
3. *Discovery of resolved debris disk around HD 131835*, LW Hung, MP Fitzgerald, CH Chen, **T. Mittal**, PG Kalas, JR Graham *The Astrophysical Journal* 802 (2), 138 8 **2015**
2. *Polarimetry with the Gemini planet imager: methods, performance at first light, and the circumstellar ring around HR 4796A* MD Perrin, G Duchene,..., **T. Mittal** *The Astrophysical Journal* 799 (2), 182 68 **2015**
1. *Five debris disks newly revealed in scattered light from the Hubble space telescope NICMOS archive*, R Soummer, MD Perrin,..., **T. Mittal**; *The Astrophysical Journal Letters* 786 (2), L23 39 **2014**

SELECT ORAL
PRESENTATIONS

Understanding the climate impacts of Large Igneous Provinces : A multi-disciplinary perspective, **Talk**, Cornell Earth and Atmospheric Sciences Departmental Seminar Nov 2025

Understanding the climate impacts of Large Igneous Provinces : A multi-disciplinary perspective, **Talk**, Department of Earth and Environmental Sciences, University of Rochester, Departmental Seminar Nov 2025

Mushes in magmatic systems : Importance for magma surges and long lived eruptions, **Talk**, Purdue EAPS Departmental Seminar Sep 2025

Understanding the Impact of Submarine Volcanism on the Earths Climate and Biosphere, **Talk**, Packard Fellow's Meeting Sep 2025

Multiscale Habitability: Roles of seafloor bathymetry and large volcanic eruptions, **Talk**, Georgia Tech Departmental Seminar Jan 2025

Towards developing a new microphysical model for rock rheology: Integrating acoustic data and thermodynamic constraints, **Talk**, Georgia Tech Geophysics Seminar Jan 2025

Mushes in magmatic systems : Importance for magma surges and long lived eruptions, **Talk**, Carnegie The Earth and Planets Laboratory Department Seminar Oct 2024

Using Paleosecular Variation And Volcanology To Constrain Eruptive Rates Of Continental Flood Basalts, **Talk**, Invited Talk GSA 2024

Towards developing a new microphysical model for rock rheology: Integrating acoustic data and thermodynamic constraints, **Talk**, UCLA EPSS Departmental Seminar Oct 2024

Earth Science in the Energy Transition: Tackling the dual challenges of heterogeneity and low-cost measurements, **Talk**, UCLA EPSS-Institute for Carbon Management Seminar Oct 2024

Hydrothermal Plume dynamics on Icy-ocean worlds, **Talk**, Fluids and MHD seminar series at the University of Leeds, Oct 2024

Hunga Tonga eruption as an exemplar for shallow submarine volcanism : Analyzing the plume dynamics & radiative effects, **Talk**, Stanford Departmental Seminar May 2024

Longest Lava flows - what determines their length and morphology, **Talk**, University of Oregon May 2024

Towards developing a new microphysical model for rock rheology: Integrating acoustic data and thermodynamic constraints, **Talk**, PSU Geodynamics Seminar Oct 2023

Mixing water with volcanic plumes: The making of double umbrellas and stratospheric aerosols, **Talk**, UBC Seminar Sep 2023

Multiscale Habitability: Roles of seafloor bathymetry and large volcanic eruptions, **Talk**, STScI Astrobiology Series Jan 2023 & UBC (Department Colloquium) Sep 2023

Multiscale Carbon Cycle Dynamics, **Talk**, Vanderbilt Jan 2023

Dynamics of Hydrothermal Plumes on Icy-ocean worlds, **Talk**, Penn State Astronomy Department Seminar Aug 2022

Understanding the magmatic architecture of volcanic systems: A magma dynamics perspective, **Talk**, Princeton Geosciences Department Seminar April 2022

Understanding the magmatic architecture of volcanic systems: A magma dynamics perspective, **Talk**, Stanford Earth Sciences Department Seminar April 2022

Mayotte 2018-2021 Eruption likely sourced from a magmatic mush, **Talk** AGU Fall Meeting Dec 2021

Hydrothermal Plume dynamics on Icy-ocean worlds, **Talk**, Lamont Earth Sciences Seminar Nov 2021

Understanding the magmatic architecture of volcanic systems: A magma dynamics perspective, **Talk**, UC Davis Earth Sciences Department Seminar Oct 2021

Understanding the magmatic architecture of volcanic systems : A Flood Basalt perspective, **Talk**, UCLA Earth Sciences Department Seminar Oct 2021

Deccan Volcanism at K-Pg Time, **Talk** GSA Fall Meeting Oct 2021

Earth's largest volcanic systems : Understanding Large Igneous Province eruptions, **Talk**, University of Florida Earth Sciences Department Seminar & NC State Earth Sciences Department Seminar March 2021

Remote Detection of Pumice Rafts and Discolored Water from Submarine Volcanic Eruptions Using Satellite Imagery, Maggie Zheng, Tushar Mittal, Kristen Fauria **Student Talk**, AGU Fall Meeting Meeting 2020

Magmatic Architecture of Continental Flood Basalts A New Deccan Traps Perspective, **Talk**, AGU Fall Meeting Meeting 2020

Development of an open source, machine learning based toolset for the identification of dikes in satellite images through semantic segmentation, Ryan Gray, Tushar Mittal **Student Talk**, GSA Meeting 2020

Development of an open source, machine learning based toolset for the identification of dikes in satellite images through semantic segmentation, Matthew Bogumil, Tushar Mittal, Carolina Lithgow-Bertelloni, **Student Talk**, GSA Meeting 2020

Magmatic Architecture of Continental Flood Basalts A Deccan Traps Perspective, **Talk**, Godschmidt Meeting 2020

Podcast: Et tu, Etna? Lisa Lester, Eos, 101 (Discussing work done by student Rafael Castro, Tushar Mittal, et al., presented at AGU Fall Meeting 2019) **AGU Press Conference and Podcast-** <https://eos.org/articles/podcast-et-tu-etna>, 2020

The eruptive timescale and magmatic architecture of the Deccan Traps flood basalt, **Talk**, UC Berkeley Department Seminar 2019

Melt transport through the mantle lithosphere - Challenges of a dike based mode, **Talk**, RCN Fluid and melt Transport, Invited Talk 2019

The eruptive timescale and magmatic architecture of the Deccan Traps flood basalt, **Talk**, UCLA Invited Talk 2019

Detection of submarine eruptions using Argo floats and its implications for ocean dynamics, **Talk**, Harvard Invited Talk 2018

Submarine eruption detection using Argo floats, **Talk**, WHOI Invited Talk 2018

Submarine Volcanism : How to detect it ?, **Talk**, Columbia-Lamont Invited Talk 2018

Influence of volatile degassing on eruptibility of LIP magmatic systems, **Talk**, American Geophysical Union, Fall Meeting 2017

Volatile degassing as a control on volcanic eruptions, **Talk**, IAVCEI 2017

Volatile degassing as a control on the magnitude and frequency of volcanic eruptions, **Talk**, USGS Menlo Park - Volcano Science Seminar April 2017

A Future Martian Ring System? **Talk**, Mars Institute "Asaph Hall Best Student Paper Award" Talk - Third International Conference on the Exploration of Phobos and Deimos, Nasa Ames, June 2016

Spitzer IRS Spectroscopy of Debris Disks : A comprehensive Survey, **Talk**, Department Seminar/Journal Club, Earth and Planetary measurement Sciences Department, JHU - May 2012

Analysis of Dust Mineralogy using Spitzer IRS Spectroscopy of Debris Disks, **Talk**, Signposts of Planets Conference, 2011

PROFESSIONAL ACTIVITY

1. *Convener AGU Session - Submarine Volcanism, 2019, 2020, 2021, 2022, 2023, 2024*
2. *Vice Chair - Commission on Submarine Volcanism, IAVCEI (2022-present)*
3. *Member - Advisory Committee, Modeling Collaboratory for Subduction (MCS - SZ4D)*
4. *Review Editor : Frontiers in Earth Sciences (Volcanology) : 2020 - 2022*
5. *Reviewer for Nature, Science, GRL, JGR, EPSL, Frontiers, Nature Geosciences, Geosciences, Astrophysical Journal, Lithos, GSA Bulletin, NSF, DOE, and NASA Review Panels*
6. *Panelist on AGU Podcast : Third Pod from the Sun, March 2020 - Featuring work by student Rafael Castro <https://thirdpodfromthesun.com/2020/03/24/et-tu-etna/>*
7. *Submarine Volcanism: Advances in Observations, Methods, and Models I, Session Chair*, AGU Fall Meeting 2020 - Lise Retailleau, Tushar Mittal, Adam Soule
8. *Environmental Effects and Eruptive Dynamics of Large Igneous Provinces: A Multidisciplinary Perspective, Session Convener and Chair*, AGU Fall Meeting 2019 - Fendley, Isabel; Mittal, Tushar; Schmidt, Anja; Hull, Pincelli M;
9. *Environmental Effects and Eruptive Dynamics of Large Igneous Provinces: A Multidisciplinary Perspective II Posters, Session Convener*, AGU Fall Meeting 2019 - Fendley, Isabel; Mittal, Tushar; Schmidt, Anja; Hull, Pincelli M;

10. *Hydrovolcanic, Submarine, and Subglacial Eruptions: Exploring Hydrosphere-Volcano Interactions III*, **Session Chair**, AGU Fall Meeting 2019 - Kristen Fauria, Tushar Mittal et al.

AWARDS

- **Packard Fellows for Science and Engineering 2024-2029**
- **Fellow for Scialog: Sustainable Minerals, Metals and Materials 2024-2027**
- **Wilson Faculty Fellowship in the College of Earth and Mineral Sciences 2024-2027**
- MIT Crosby Postdoctoral Fellow, EAPS MIT, 2020
- George D. Louderback Graduate Student Award, EPS Department, UC Berkeley 2018
- Mars Institute “Asaph Hall Best Student Paper Award” - Third International Conference on the Exploration of Phobos and Deimos, Nasa Ames, Summer 2016
- Financial funding and travel award for 2016 Newton Workshop - Melts in the Mantle, Summer Workshop
- Graduate Student Internship, STScI : February 2013 - July 2013
- Summer internship at the Department of Mineral Sciences as part of Smithsonian Natural History Museum Summer Research Experience program, May - July 2012
- Financial funding and travel award for 2012 Sagan Exoplanet Summer Workshop
- Space Telescope Science Institute Summer Internship program, May - July 2011
- Sigma Pi Sigma National Physics Honor Society

SOFTWARE SKILLS

- Programming experience in Julia, Python, MATLAB, IDL, C + +, C, Java, UNIX shell scripting, SQLite, ImageJ, LaTeX as well as cloud computing (Google Cloud computing).
- Expertise in doing Large-Scale Numerical Simulations and analysis of large datasets (oceanographic, astronomical, remote sensing).
- Machine Learning and time-series analysis

TEACHING EXPERIENCE

- Teacher - PSU* **Fall 2022-Present**
- Course: Geodynamics (GEOSC 203) - 3 years
 - Course: Earth Systems (Earth 2) - 1 year
 - Course: Hard rock Cafe Reading seminar (Graduate class) - 2 years
 - Course: Geofluids and Geomechanics (Graduate class) - 1 year
 - Course: Time series & Causal Analysis (Graduate class) - 1 year
- Graduate Student Instructor, UCB* **Fall 2015-16**
- Course: Geodynamics (EPS 108, Lecture)
- Teaching Assistant, JHU* **Fall 2011-12**
- Class Lectures, JHU*
- Course: Freshman Seminar: Conversation with the Earth (AS.270.102, Lecture)
 - Course: Nature of the Solid Planets (AS.270.340, 4 Lectures - Planet Formation Theory; Fall 2011-12)
 - Course: Freshman Seminar: Conversation with the Earth (AS.270.102, 1 Lecture - Scientific Method; Fall 2011-12)