

CURRICULUM VITAE – AMANDA BACHTELL CLARKE

Arizona State University
School of Earth and Space Exploration
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Research Interests: The physics of volcanic eruptions, especially short-lived, highly-unsteady explosive eruptions and dome-building systems; fluid mechanics of multiphase volcanic systems, including viscous magmas and high-Reynolds number gas/solid mixtures; developing and using numerical models and laboratory experiments to understand volcanic systems; eruption prediction and hazards assessment; field and satellite observation of plumes and domes to understand physical processes; volcano deformation and its role in eruption prediction; interpretation of pyroclastic deposits on Earth and Mars; highly-explosive basaltic volcanism; cinder cone erosion and volcanic geomorphology; eruption triggering and interaction between geologic processes (e.g., earthquake-triggered volcanic activity; the interaction between volcanic plumes and Earth's atmosphere).

Education

Pennsylvania State University	Geosciences	Ph.D.	2002
University of Notre Dame	Aerospace Engineering/Philosophy	B.S./B.A.	1994

Professional Appointments

Assoc. Prof., School of Earth and Space Exploration, Arizona State University	2009 – present
Associated Researcher, INGV-Pisa, Pisa, Italy	2009 – present
Asst. Prof., School of Earth and Space Exploration, Arizona State University	2003 - 2009
Royal Society Postdoctoral Research Fellow, University of Bristol, Bristol, UK	2002 - 2003

RESEARCH ACTIVITY

Peer-reviewed Publications (* indicates student or post-doctoral advisees at ASU; **student at another institution, member of advisory committee)

Carr*, B. B., **A. B. Clarke**, J R. Arrowsmith, L. Vanderkluysen*, (*in press*) Mechanisms of lava flow emplacement during the effusive eruption of Sinabung Volcano (Sumatra, Indonesia). *J. Volcanol. Geotherm. Res.*

Carr*, B. B., **A. B. Clarke**, J R. Arrowsmith, L. Vanderkluysen*, B. Eko Dhanu, (*in press*) The emplacement of the active lava flow at Sinabung Volcano, Sumatra, Indonesia, documented by structure-from-motion photogrammetry. *J. Volcanol. Geotherm. Res.*

- Carr*, B. B., **A. B. Clarke**, M. de' Michieli Vitturi, (2018) Earthquake induced variations in extrusion rate: a numerical modeling approach to the 2006 eruption of Merapi Volcano (Indonesia). *Earth and Planet. Sci. Lett.* (482) 377–387.
- La Spina**, G, M. de' Michieli Vitturi, **A.B. Clarke** (2017) Transient numerical model of magma ascent dynamics: application to the explosive eruptions at the Soufrière Hills Volcano. *J. Volcanol. Geotherm. Res.* (336) 118-139.
- Bryan, S. **A.B. Clarke**, L. Vanderkluysen*, C. Groppi, S. Paine, D. W. Bliss, J. Aberle, P. Mauskopf (2017) Measuring Water Vapor and Ash in Volcanic Eruptions with a Millimeter-Wave Radar/Imager. *IEEE Trans. on Geoscience and Remote Sensing* 55 (6), 3177-3185.
- Rader*, E., Vanderkluysen*, L., **Clarke, A.B.**, (2017) The role of unsteady effusion rates on inflation in long-lived lava flow fields.' *Earth and Planet. Sci. Lett.* (477) 73-83.
- Polacci et al. (2017) From magma ascent to ash generation: investigating volcanic conduit processes by integrating experiments, numerical modeling, and observations. *Annals of Geophysics* vol 60, issue 6, DOI: 10.4401/ag-7449.
- Carr*, B. B., **A. B. Clarke**, L. Vanderkluysen* (2016), The 2006 lava dome eruption of Merapi Volcano (Indonesia): detailed analysis using MODIS TIR. *J. Volcanol. and Geotherm. Res.* 311, 60-71.
- Smekens*, J-F, **A. B. Clarke**, M. R. Burton, A. Harijoko, and H. E. Wibowo (2015) SO₂ emissions at Semeru volcano, Indonesia: characterization and quantification of persistent and periodic explosive activity. *J. Volcanol. Geotherm. Res.* v. 300, 121-128: doi:10.1016/j.jvolgeores.2015.01.006.
- Van Eaton* A.R., L.G. Mastin, M. Herzog, H.F. Schwaiger, D.J. Schneider, K.L. Wallace & **A. B. Clarke** (2015) Hail formation as a mechanism of rapid aggregation in volcanic plumes. *Nature Communications*. 6:7860 | DOI: 10.1038/ncomms8860.
- Chojnicki*, K.N, **A. B. Clarke**, J.C. Phillips, R. J. Adrian (2015) The evolution of volcanic plume morphologies from short-lived eruptions. *Geology*, doi:10.1130/G36642.1.
- Clarke, A.B.**, T. Esposti-Ongaro, A. Belousov (2015) "Vulcanian Eruptions", In Sigurdsson, Houghton, McNutt, Rymer, and Stix, *Encyclopedia of Volcanoes*, 2nd edition, Academic Press, London.
- Smekens*, J-F, M. R. Burton, and **A.B. Clarke** (2015) Validation of the SO₂ camera for high temporal and spatial resolution monitoring of SO₂ emissions, *J. Volcanol. Geotherm. Res.* v. 300: 37-47: doi:10.1016/j.jvolgeores.2014.10.014.
- Chojnicki*, K. N., **A. B. Clarke**, R. J. Adrian, and J. C. Phillips (2014) The flow structure of jets from transient sources and implications for modeling short-duration explosive volcanic eruptions, *Geochem. Geophys. Geosyst.*, 15, 4831–4845, doi:10.1002/2014GC005471.
- Chojnicki*, K.N., **A.B. Clarke**, J.C. Phillips, R. J. Adrian (2014) Rise dynamics of unsteady laboratory jets with implications for volcanic plumes. *Earth and Planet. Sci. Lett.*, 412, 186-196.
- Brand* B.D., D Gravley, **A.B. Clarke**, J. Lindsay, S.H. Bloomberg, J. Agustin-Flores, K. Németh (2014) A combined field and numerical approach to understanding dilute pyroclastic density current dynamics and hazard potential: Auckland Volcanic Field, New Zealand. *J. Volcano. Geotherm. Res.* 276, 215 - 232.
- Ruff, S.W. P.B. Niles, F. Alfano* and **A.B. Clarke** (2014) Evidence for a Noachian-aged playa lake in Gusev crater, Mars. *Geology*, 42, 359 - 362.

- Vanderkluysen* L., M.R. Burton, **A.B. Clarke**, H.E. Hartnett, and J-F Smekens* (2014) Composition and flux of explosive gas release at LUSI mud volcano (East Java, Indonesia) *Geochemistry, Geophysics, Geosystems*, 15(7), 2932 – 2946.
- de' Michieli Vitturi, M., **A.B. Clarke**, A. Neri, & B. Voight (2013) Extrusion cycles during dome-building eruptions, *Earth and Planet Sci Lett*, 371–372, 37 – 48.
- Clarke, A.B.**, 'Vulcanian Eruptions', (2013) in *Modeling Volcanic Processes: The Physics and Mathematics of Volcanism* (textbook, eds. S. Fagents, T. Gregg, R. Lopes), Cambridge University Press, pp. 129-152.
- Fink, J.H. and **A.B. Clarke** (2012) 'Volcanic Flows' in *Handbook of Environmental Fluid Dynamics* (ed. H.J.S. Fernando), pp. 189-206.
- Brand* B.D., & **Clarke, A.B.** (2012) An Energetic Basaltic Phreatomagmatic Eruption at the Table Rock Complex in South-central Oregon (USA): Using deposit characteristics to constrain surge dynamics. *J. of Volcanol. Geotherm. Res.* 243–244: 81–90.
- Esposti-Ongaro, T., **A.B. Clarke**, B. Voight, A. Neri, and C. Widiwijayanti (2012) Multiphase flow dynamics of pyroclastic density currents during the May 18, 1980 lateral blast of Mount St. Helens (USA). *J. Geophys. Res.*, JB 009081R.
- Esposti-Ongaro, T., C. Widiwijayanti, **A.B. Clarke**, A. Neri, B. Voight (2011) Multiphase-flow numerical modelling of the May 18, 1980 lateral blast at Mount St. Helens (USA). *Geology*, June 2011; v. 39; no. 6; p. 535–538; doi:10.1130/G31865.1.
- Neill, O.K., Hammer, J.E., Izbekov, P.E., Belousova, M.G., Belousov, **A.B., Clarke**, A.B. and Voight, B. (2010) Influence of pre-eruptive degassing and crystallization on the juvenile products of laterally directed volcanic explosions. *J. Volcanol. Geotherm. Res.*, 198(1-2), 264-274. doi:10.1016/j.jvolgeores.2010.09.011.
- de' Michieli Vitturi, M., **A.B. Clarke**, A. Neri and B. Voight (2010) Transient effects of magma ascent dynamics along a geometrically variable dome-feeding conduit, *Earth and Planetary Science Letters*, 295, 541-553.
- Genareau*, K.D., & **A.B. Clarke**, (2010) In situ measurements of plagioclase growth using SIMS depth profiles of $^{7}\text{Li}/^{30}\text{Si}$: A means to acquire crystallization rates during short-duration decompression events. *American Mineralogist*, v. 95, 592 - 601.
- Chardot, L., B. Voight, R. Foroozan, S. Sacks, A. Linde, R. Stewart, D. Hidayat, **A. Clarke**, D. Elsworth, N. Fournier, J.-C. Komorowski, G. Mattioli, R. S. J. Sparks, and C. Widiwijayanti (2010), Explosion dynamics from strainmeter and microbarometer observations, Soufrière Hills Volcano, Montserrat: 2008–2009, *Geophys. Res. Lett.*, 37, L00E24, doi:10.1029/2010GL044661.
- Linde, A. T., S. Sacks, D. Hidayat, B. Voight, **A. Clarke**, D. Elsworth, G. Mattioli, P. Malin, E. Shalev, S. Sparks, and C. Widiwijayanti (2010), Vulcanian explosion at Soufrière Hills Volcano, Montserrat on March 2004 as revealed by strain data, *Geophys. Res. Lett.*, 37, L00E07, doi:10.1029/2009GL041988
- Voight, B., D. Hidayat, S. Sacks, A. Linde, L. Chardot, **A. Clarke**, D. Elsworth, R. Foroozan, P. Malin, G. Mattioli, N. McWhorter, E. Shalev, R. S. J. Sparks, C. Widiwijayanti, and S. R. Young (2010), Unique strainmeter observations of Vulcanian explosions, Soufrière Hills Volcano, Montserrat, July 2003, *Geophys. Res. Lett.*, 37, L00E18, doi:10.1029/2010GL042551.
- Genareau*, K.D., **A.B. Clarke**, (2010) Heterogeneous clasts as windows into magma mingling at Soufrière Hills volcano. *Geophys. Res. Lett.*, 37, doi:10.1029/2009GL041968.

- Genareau*, **K.D.**, **A.B. Clarke**, R.L. Hervig (2009) New insight into explosive volcanic eruptions: Connecting crystal-scale chemical changes with conduit-scale dynamics. *Geology*, 37(4): 367-370. doi: 10.1130/G25561A.
- Brand*, **B.D.**, **A.B. Clarke** (2009) The architecture, eruptive history, and evolution of the Table Rock Complex, Oregon (USA): from a Surtseyan to an energetic maar eruption. *J. Volcanol. Geotherm. Res.* 180: 203-224. <http://dx.doi.org/10.1016>.
- Clarke, A.B.**, J.C. Phillips, K.N. Chojnicki* (2009) An Investigation of the Dynamics of Vulcanian Eruptions using Laboratory Analogue Experiments and Scaling Analysis. From: THORDARSON, T., SELF, S., LARSEN, G., ROWLAND, S. K. & HOSKULDSSON, A. (eds) *Studies in Volcanology: The Legacy of George Walker*. Special Publications of IAVCEI. 2, 155–166. Geological Society, London.
- Brand*, **B.D.**, **A.B. Clarke**, S.C. Semken (2009). Conditions and Depositional Processes of Narbona Pass Maar Volcano, Navajo Volcanic Field, Navajo Nation, New Mexico (USA). *Bull. Volcanol.* DOI: 10.1007/s00445-008-0209-2008.
- de' Michieli Vitturi, M., **A.B. Clarke**, A. Neri, B. Voight (2008). Effects of conduit geometry on magma ascent dynamics in dome-forming eruptions. *Earth and Planetary Science Letters*, 272: 567-578.
- Esposti Ongaro, T., **A. Clarke**, A. Neri, B. Voight, C. Widiwijayanti (2008). Fluid dynamics of the 1997 Boxing Day volcanic blast on Montserrat, W.I. *J. Geophys. Res.* doi:10.1029/2006JB004898.
- Genareau*, **K.**, R. Hervig, **A.B. Clarke** (2007). Development of a SIMS depth-profiling technique to examine geochemical variations in the surfaces of volcanic phenocrysts. *American Mineralogist*. 92, 1374–1382.
- Clarke, A.B.**, S. Stephens*, R. Teasdale, R.S.J. Sparks, K. Diller* (2007). Petrological constraints on the decompression history of magma prior to Vulcanian explosions at the Soufrière Hills volcano, Montserrat. *J. of Volcanol. Geotherm. Res.* 161, 261–274.
- Chojnicki* K.N., **A.B. Clarke**, J.C .Phillips (2006). A shock-tube investigation of the dynamics of gas particle mixtures: implications for explosive volcanic eruptions. *Geophys. Res. Lett.* 33, L15309, doi:10.1029/2006GL026414.
- Diller*, **K.D.**, **A.B. Clarke**, B. Voight, A. Neri (2006). Mechanisms for Conduit Plug Formation: implications for Vulcanian explosions. *Geophys. Res. Lett.* 33, L20302, doi:10.1029/2006GL027391.
- Voight *et al.* (2006). Unprecedented pressure increase in deep magma reservoir triggered by lava-dome collapse. *Geophys. Res. Lett.* 33 L03312, doi: 10.1029/2005GL024870.
- Widiwijayanti, C., **A.B. Clarke**, D. Elsworth, B. Voight (2005). Geodetic Constraints on the Shallow Magma System at Soufrière Hills Volcano, Montserrat. *Geophys. Res. Lett.* 32, L11309, doi:10.1029/2005GL022846.
- Clarke, A.B.**, A. Neri, G. Macedonio, B. Voight, T.H. Druitt (2002). Computational modelling of the transient dynamics of the August 1997 Vulcanian explosions at Soufrière Hills volcano, Montserrat: influence of initial conduit conditions on near-vent pyroclastic dispersal. In: Druitt, T.H. & Kokelaar, B.P. (eds) *The eruption of Soufrière Hills Volcano, Montserrat, from 1995 to 1999*. Geological Society, London, *Memoir* 21, 319-348.
- Druitt, T.H., S. Young, B. Baptie, E. Calder, **A. Clarke**, P. Cole, C. Harford, R. Herd, R. Lockett, G. Ryan, S. Sparks, B. Voight (2002). Episodes of cyclic Vulcanian explosive activity with fountain collapse at

Soufrière Hills volcano, Montserrat. In: Druitt, T.H. & Kokelaar, B.P. (eds) *The eruption of Soufrière Hills Volcano, Montserrat, from 1995 to 1999*. Geological Society, London, Memoir 21, 281-306.

Cole, P.D., E.S. Calder, R.S.J. Sparks, **A.B. Clarke**, T.H. Druitt, S.R. Young, R.A. Herd, C.L. Harford, G.E. Norton, R.E.A. Robertson (2002). Pyroclastic flow deposits formed during 1996-99 at Soufrière Hills volcano, Montserrat. In: Druitt, T.H. & Kokelaar, B.P. (eds) *The eruption of Soufrière Hills Volcano, Montserrat, from 1995 to 1999*. Geological Society, London, Memoir 21, 231-262.

Loughlin, S.C., E.S. Calder, **A.B. Clarke**, P.D. Cole, R. Luckett, M.T. Mangan, D.M. Pyle, R.S.J. Sparks, B. Voght, R.B. Watts (2002). Pyroclastic flows generated by the 25 June 1997 dome collapse, Soufrière Hills volcano, Montserrat. In: Druitt, T.H. & Kokelaar, B.P. (eds) *The eruption of Soufrière Hills Volcano, Montserrat, from 1995 to 1999*. Geological Society, London, Memoir 21, 191-209.

Clarke, A.B., A. Neri, G. Macedonio, B. Voight (2002). Transient dynamics of Vulcanian explosions and column collapse. *Nature*, v. 415, 897-901.

Clarke, A.B. and B. Voight (2000). Pyroclastic current dynamic pressures from aerodynamics of tree or pole blow-down. *J. Volc. Geothermal Res.*, v. 100, No. 1 - 4, 395-412.

Watson, I.M., C.M.M. Oppenheimer, B. Voight, P.W. Francis, **A. Clarke**, J. Stix, A. D. Miller, D. Pyle, M.R. Burton, S.R. Young, G. Norton, S. Loughlin, B. Darroux (2000). The relationship between degassing and ground deformation at the Soufrière Hills Volcano, Montserrat. *J. Volc. Geothermal Res.*, v.98, no.1-4, 117-126.

Voight B., R.S.J. Sparks, A.D. Miller, R.C. Stewart, R.P. Hoblitt, **A.B. Clarke**, J. Ewart, and MVO Staff (1999). Magma flow instability and cyclic activity at Soufrière Hills Volcano, Montserrat, *SCIENCE*, 283 (5405), 1138-1142.

Voight, B., R.P. Hoblitt, **A.B. Clarke**, A.B. Lockhart, A.D. Miller, L. Lynch, and J. McMahon (1998). Remarkable cyclic ground deformation monitored in real time on Montserrat and its use in eruption forecasting, *Geophys. Res. Lett.*, v. 25, No. 18, 3405-3408.

Peer-reviewed Publications in review (* indicates student or post-doctoral advisees at ASU; **student at another institution, member of advisory committee)

Alfano* F.A., M. Ort, L. Pioli, S. Self, **A.B. Clarke**, S. Hanson, K. Roggensack, C. Allison*, R. Amos (*post review; in revision*) The sub-Plinian monogenetic basaltic eruption of Sunset Crater, Arizona, USA. *GSA Bulletin*.

Other Publications

Michael Manga, Simon Carn, Katharine Cashman, **Amanda Clarke**, Charles Connor, Kari Cooper, Tobias Fischer, Bruce Houghton, Jeffrey Johnson, Terry Plank, Diana Roman, Paul Segall (2017) **Eruptions, Repose, Unrest, Precursors, and Timing**, by The Committee on Improving Understanding of Volcanic Eruptions (2017) A Report of the National Academies of Science, Engineering, and Medicine.

Shervais, J.W., Evans, J.P., Toy, V.; Eichelberger, J.C., Kirkpatrick, J., and **Clarke, A.**, (2013) Drilling Active Tectonics and Magmatism (Volcanics, Geoprisms, Fault Zones Post-SAFOD) Proceedings of a Workshop. Geology Faculty Publications. Paper 387. http://digitalcommons.usu.edu/geology_facpub/387.

Valentine, G.A., Bonadonna C., Manzella I, **Clarke A.B.**, Dellino, P. (2011) Large-scale experiments on volcanic processes. *Eos, Transactions, American Geophysical Union* 92:89-96.

Clarke, A.B., A. Neri, B. Voight, G. Macedonio, T.H. Druitt (2001). Computational modeling of the transient dynamics of the August 1997 vulcanian explosions at Soufriere Hills Volcano, Montserrat: Influence of initial conduit conditions on near-vent pyroclastic dispersal. Volcano Simulation Group, Gruppo Nazionale per la Vulcanologia, Istituto Nazionale di Geofisica e Vulcanologia. VSG Report No. 2001-5, 59 pp.

Montserrat Volcano Observatory Staff (1997). Special Report 04: The explosive eruptions of August 1997.

Montserrat Volcano Observatory Staff (1997). Special Report 03: The pyroclastic flow of June 25, 1997.

Clarke A.B., D. Hidayat, B. Voight (1997). Navier-Stokes equations revisited: A review of the physics of explosive volcanism. *IAVCEI Bulletin*.

Meeting abstracts available upon request

Funding

Active Grants (sole PI except where noted)

Source: Swiss National Science Foundation

Title: Modelling settling-driven gravitational instabilities from volcanic clouds

Amount to ASU: \$0 (Senior Collaborator, Funds awarded to C. Bonadonna, Univ. of Geneva)

Grant period: 9/01/2017-8/30/2020

Source: National Science Foundation / NERC (UK Natural Environment Research Council)

Title: *NSFGEO-NERC(UK) Quantifying disequilibrium processes in basaltic volcanism (DisEqm)*

Amount to ASU: \$325,000 (50%, ASU co-I is K. Roggensack)

Grant period: 8/01/2016 – 7/31/2021

Source: National Science Foundation

Title: *Risk Retirement for WAMS: The Water and Ash MM-wave Spectrometer*

Amount: \$72,577 (33%, co-I, with PI C. Groppi and co-I P. Mauskopf)

Grant period: 2/15/2016 - 1/31/2017

Source: National Science Foundation

Title: *Collaborative Research: Understanding The Causes Of Highly Explosive Basaltic Eruptions Using The Ad 1085 Sunset Crater Eruption And Its Deposits*

Amount to ASU: \$292,522 (co-PI K. Roggensack)

Grant period: 7/1/2013 - 6/31/2017

Pending Proposals

Source: National Science Foundation

Title: *Collaborative Research: From Deposits to Dynamics: Constraining the hazard potential of dilute pyroclastic density currents*

Amount to ASU: \$199,060

Grant period: 8/15/2016 - 8/14/2019

Source: NASA Solar System Workings
Title: *Numerical Modeling of Explosive Volcanism on the Moon*
Amount to ASU: \$77,000 (PI Edwards at Northern Arizona University)
Grant period: 8/15/2017 - 8/14/2020

Previous Funding

Source: National Science Foundation
Title: *Building The Deccan Traps: What Can We Learn From Lava Flow Morphology In Large Igneous Provinces?*
Amount: \$317,745 (co-PI L. Vanderkluisen*)
Grant period: 8/1/2013 - 7/31/2016

Source: National Science Foundation/Northern Arizona University
Title: *Collaborative Research: REU Site: Integrative Approach To Landscape Evolution In A Monogenetic Volcanic Field. San Francisco Volcanic Field, Northern*
Amount: \$40,172 (co-PI JR Arrowsmith)
Grant period: 5/26/2013 - 5/25/2015

Source: ASU Foundation/Minarak Industries
Title: *The Bakrie Initiative in Geological Hazards at Arizona State University (Foundation Award)*
Amount: \$180,000
Grant period: 07/01/12 – 06/30/14

Source: NSF-EAR Instrumentation and Facilities
Title: *Acquisition of Imaging Equipment to Understand the Dynamics of Explosive Volcanic Flows through Laboratory Experiments and Field Observations*
Amount: \$176,000
Grant period: 08/15/09 – 08/14/12

Source: NSF-EAR Petrology and Geochemistry
Title: *The Dynamics of Short-Duration, Unsteady Volcanic Eruptions*
Amount: \$304,678
Grant period: 08/16/08 – 06/16/12

Source: European Community, Marie Curie International Outgoing Fellowship
Title: *Magma Ascent Mathematical Modeling and Analysis*
Role: Host of PI de' Michieli Vitturi
Amount: €190,000 (funds to INGV-Pisa; portion transferred to ASU)
Grant period: 01/2010 – 12/2012

Source: NSF-EAR Petrology and Geochemistry
Title: *Rapid decompression of pressurized magma and laterally-directed blasts: determining required initial conditions and predicting hazards using 3D multi-phase numerical simulations*
Amount: \$255,859
Grant period: 12/01/06 – 11/30/11

Source: NSF-EAR Continental Dynamics

Title: *Collaborative Research: The Calipso Project-Imaging the Magma Chamber On Montserrat*

Amount to ASU: \$165,068

Grant period: 10/01/06 – 10/01/09

Source: NASA-NESSF

Title: *Investigating characteristic bedforms of base surge deposits: implications for cross-stratified deposits at mars exploration rover (MER) landing sites and the dynamics of phreatomagmatic eruptions*

Amount: \$24,000 per year

Funds to support PhD student B.D. Brand

Source: NSF-EAR Petrology and Geochemistry

Title: *Explosive Volcanism Workshop. Integrating Numerical and Laboratory Models of Explosive Eruptions with Field Observations: Understanding Pyroclastic Transport*

Amount: \$29,957

Grant period: 01/15/07-01/15/08

Source: NSF-EAR Petrology and Geochemistry

Title: *Understanding Controls on the Scale and Style of Explosive Volcanic Eruptions with Observational and Multi-Phase Computational Techniques*

Amount: \$275,772

Grant period: 08/01/03 – 07/31/07

Source: NSF-EAR Small Grants for Exploratory Research

Title: *Exploring Vulcanian explosions and sedimentation patterns leading to pyroclastic density currents using scaled laboratory experiments and Particle Image Velocimetry (PIV)*

Amount: \$35,000

Grant period: 08/15/05 – 07/31/06

Source: The Royal Society of London

Title: *Experimental exploration of volcanic processes*

Amount: 16,000 pounds sterling

Grant period: 09/02 – 09/03

TEACHING AND MENTORING

Current graduate students, post-docs, and undergraduates (Arizona State University):

Chelsea Allison	graduating PhD candidate
Title: <i>The role of H₂O and CO₂ in causing unusually explosive basaltic eruptions</i>	
Vincenzo Cataldo	PhD candidate (co-advisor David Williams)
Sean Peters	PhD student (co-advisor Phil Christensen)
Kyle Mohr	PhD student
Fabrizio Alfano	Swiss National Science Foundation Fellow/post-doctoral scholar
Rob Dekko	Undergraduate researcher in experimental lab
Amanda Meyer	Undergraduate researcher, eruption simulations – Earth and Mars
Cassie Collins	Undergraduate researcher, MODIS thermal IR of Sinabung Volcano
Heather Zunino	PhD candidate, SEMTE, shock tube expts (SEMTE advisor Prof. Adrian)
Blair Johnson	Post-doc, SEMTE, shock tube PIV (SEMTE advisor Prof. Adrian)

Graduated students & former post-docs (ASU, except where noted; current position in parentheses)

Brett Carr, PhD 2016

Title: *Thermal remote sensing of active volcanism: transitions from effusive to explosive eruptions*

(NSF Post-doctoral Fellow; LDEO, Columbia University)

Sarah Cichy, SESE Exploration Fellow (co-advised with C. Till)

Erika Rader, Post-doctoral scholar

(Post-doctoral Researcher, NASA Ames; Assistant Professor University of Idaho)

Shelby Cave, PhD 2015 (formerly a student of Prof. Greeley)

(Senior Geologist, Freeport-McMoRan)

Title: *The Sentinel-Arlington Volcanic Field, Arizona*

Alexa Van Eaton, NSF Post-doctoral Fellow

(US Geological Survey, Cascades Volcano Observatory, Volcano Hazards Program)

Jean-Francois Smekens, PhD 2015 (Post-doctoral Fellow, Université Blaise Pascal, France)

Title: *Degassing Processes at Persistently Active Explosive Volcanoes*

Löyc Vanderkluisen, SESE Exploration Fellow (Assistant Professor, Drexel University)

Kirsten Chojnicki, PhD 2012

(Staff Scientist Sandia National Laboratories)

Title: *Unsteady Jet Dynamics with Implications for Volcanic Plumes*

Leon Manfredi, MS 2012 (formerly a student of Prof. Greeley)
(**Mars Student Imaging Project Staff, NASA Mars Exploration Program at ASU**)
Title: *Volcanic History of the Tempe Volcanic Province, Mars*

Angela Magee, MS 2010 (co-advised with M. Fouch) (**Malin Space Science Systems**)
Title: *Triggered Seismicity*

Kimberly Genareau, PhD 2009 (co-advised with R. Hervig)
(**Associate Professor, University of Alabama**)
Title: *SIMS depth profiling to determine volcanic conduit processes*

Brittany Brand, PhD 2008 (co-advised with S. Semken)
(**Assistant Professor, Boise State University**)
Title: *Mafic Phreatomagmatic Volcanism and Density Current Dynamics*

Kristina Diller, MS 2006 (**Senior Geologist at AMEC, Boulder, CO**)
Title: *Numerical modeling of subsurface controls on short-lived volcanic explosions*

Kirsten Chojnicki, MS 2006
Title: *A shock-tube investigation of the dynamics of gas-particle mixtures: implications for explosive volcanic eruptions*

Spencer Riley, MS 2006 (**Schlumberger Limited, Houston, TX**)
Title: *Ground deformation analysis of Mount Cameroon, Cameroon Africa*

Sally Stephens, MSci 2003 from the University of Bristol, Bristol, UK
Title: *Petrological constraints on explosion dynamics at the Soufrière Hills Volcano, Montserrat*

Classroom teaching [2010 – present]

Spring 2018	GLG 422/598 (Planetary Volcanology, with D. Williams); GLG110 & GLG111 (Geologic Disasters and lab, online)
Fall 2017	GLG111 (Geologic Disasters lab, online)
Fall 2016/Spring 2017	Sabbatical
Summer 2016	GLG110 & GLG111 (Geologic Disasters and lab, online)
Summer 2016	GLG110/GLG394, ASU Study Abroad Program in Florence, Italy
Spring 2016	Geologic Disasters (GLG110) & Geologic Disasters Lab (GLG111)
Summer 2015	Geologic Disasters (GLG110) & Geologic Disasters Lab (GLG111)
Spring 2015	Geologic Disasters (GLG110) & Geologic Disasters Lab (GLG111)
Fall 2015	Introduction to Volcanology (GLG420)

Fall 2014	Planetary Volcanology (with David Williams)
Summer 2014	Geologic Disasters (GLG110) & Geologic Disasters Lab (GLG111)
Spring 2014	Geologic Disasters (GLG110) & Geologic Disasters Lab (GLG111)
Fall 2013	Introduction to Volcanology
Summer 2013	Geologic Disasters (GLG110) & Geologic Disasters Lab (GLG111)
Spring 2013	Geologic Disasters (GLG110) & Geologic Disasters Lab (GLG111)
Fall 2012	Introduction to Volcanology
Summer 2012	Geologic Disasters (GLG110) & Geologic Disasters Lab (GLG111)
Spring 2012	Geologic Disasters (GLG110) & Geologic Disasters Lab (GLG111) (two sections – face-to-face and online)
Fall 2011	Introduction to Volcanology Advanced Numerical Methods (with Mattia de' Michieli Vitturi)
Spring 2011	Geologic Disasters and Geologic Disasters Lab Planetary Volcanology (with Ron Greeley and David Williams)
Fall 2010	Geologic Disasters and Lab
Prior to 2010	Introduction to Geology (3x) Advanced Physical Volcanology (3x) Advanced Field Geology (2x) Introduction to Fluid Mechanics for Geologists (3x)
Selected honors	
2016	Fulbright Fellow to Italy
2011	Wager Medalist (IAVCEI; http://www.iavcei.org/IAVCEI_awards/wagner_IAVCEI.htm) <i>“In recognition of outstanding contributions made to volcanology by a scientist up to 15 years after Ph.D. acquisition, particularly in the eight-year period prior to the Award.”</i>
2002-2003	Royal Society Fellowship recipient, Mentor: RSJ Sparks FRS
2001	Exxon Graduate Fellow, Penn State University
1997-2000	Academic Computing Fellow, Penn State University
1994-1995	Fulbright Scholar to the Philippines <i>hosted by the University of the Philippines and PHIVOLCS - Project Title: “Long-term socio-economic and cultural impacts of volcanic eruptions of Mayon volcano on nearby communities.”</i>

Visiting Colleagues

Mattia de' Michieli Vitturi (INGV-Pisa)

Marie Curie Research Fellow (2011-2012)

Alexander Belousov (Earth Obs. Singapore)	Mount St. Helens research (2007, 2012)
Marina Belousova (Earth Obs. Singapore)	Mount St. Helens research (2007, 2012)
Jeremy C. Phillips (U. of Bristol, UK)	Laboratory experiments (multiple years)

Selected Invited Lectures

IAVCEI General Assembly, Kagoshima, Japan, 2013
 AGU Fall Meeting, San Francisco, 2008, 2011 & 2012
 Department of Terrestrial Magnetism, Carnegie Institution of Washington, 2012
 Workshop on the Physics of Fluid Oscillations in Volcanic Systems, Waikoloa, Hawaii, 2009
 Michigan Technical University, Geological Engineering and Sciences, 2009
 University of Florida, Mechanical and Aerospace Engineering, 2009
 American Society of Mechanical Engineers Annual Meeting, 2009
 Center for GeoHazards Conference, SUNY Buffalo, 2008
 Cascades Volcano Observatory, USGS, 2007
 University of Michigan, 2007
 New Mexico Tech, 2006
 University of Arizona, 2006
 Soufrière Hills Volcano -- Ten-Years On Scientific Conference. Montserrat, B.W.I., Keynote
 Arizona State University, Environmental Fluid Dynamics Seminar, Department of Mechanical & Aerospace Engineering, Arizona State University, 2004, 2005, 2006
 Northern Arizona University, 2004
 University of Washington, Department of Earth & Space Sciences, 2003
 University of Leeds, Leeds UK, Department of Earth Sciences, 2003
 University of Cambridge, Department of Applied Mathematics & Theoretical Physics, 2002
 University of Bristol, Department of Earth Sciences, 2002

SERVICE

Service to ASU

2017	Annual Program Review Committee
2010 – 2016	Graduate Program Oversight Committee (Chair 2011-2012 & 2015-2016)
2015	Awards Committee Member
2013	Member of Dean of the Graduate College Search Committee
2012	Chair of Earth Surface Processes Search Committee
2012	Member Isotope Geochemistry Search Committee
2011	IT Search Committee (Member)
2009	SESE ad hoc search committee

2009	SESE curriculum committee
2006 - 2008	Engineering Faculty search committee, SESE
2006 - 2008	Environmental Fluid Dynamics faculty search committee – Fulton School of Engineering
2007	Faculty Search Committee – SESE
2006 - 2007	Faculty Computing Committee (ad hoc)
2005	SESE Director search committee
2005	Systems engineer search committee
2003 - present	Volcanoes for Lunch seminar coordinator
Fall 2004	Faculty Research Seminar coordinator
2004 - 2005	SESE steering committee, SESE governance committee

Service to Profession and Synergistic Activities

2017 – present	Member US National Committee for Geodesy and Geophysics. <i>National Academies of Science, Engineering, and Medicine.</i>
2016 - 2017	Member of The Committee on Improving Understanding of Volcanic Eruptions, responsible for writing a report of the <i>National Academies of Science, Engineering, and Medicine.</i>
2014 – present	Secretary, Volcanology, Petrology & Geochemistry Section (AGU)
2013 – 2014, 2016	NSF Panelist, Petrology and Geochemistry Program
2012	Volcanology Roundtable Participant, National Research Council Committee on Seismology and Geodynamics
2009 – present	Chairperson, Commission on Explosive Volcanism, IAVCEI
2011 – present	AGU OSPA Committee Member and Judge
2008 - 2009:	Editorial board, <i>J. Volcanol. Geotherm. Res.</i>
2003 – present	Manager VolcanoList Listserve
2007:	Explosive Volcanism Workshop organizer; Prescott, AZ 2007
2003 - present	Active participant in Environmental Fluid Dynamics seminar series, Fulton School of Engineering

OUTREACH ACTIVITIES

2012 – present	Night of the Open Door presenter, Arizona State University
2009	Adult Night Out presenter, Arizona Science Center
2009	Science Activities for Girls, Arizona Science Center
2008	Featured Scientist at <i>Forces of Nature</i> permanent exhibit, Arizona Science Center
2007	Featured volcanologist in <i>Under Arizona</i> , a television/DVD production of Eight/KAET (Arizona's PBS affiliate)

2006 - 2007	Earth and Space Exploration Day, Presenter, ASU
2003 - 2006	Volcanology presentations for Arizona middle and high schools
2004 - 2005	Sally Ride Festival, Presenter, ASU
2003 - 2005	Earth Science Day, Speaker, ASU
2004	Summer Science Exhibition, Presenter – The Royal Society of London
2003	High School student research mentor (Jennifer Monninger)
2003	Desert Vista High School, Earth Science class, Presenter and Interviewee
1997 - 2002	State College, PA, Primary Schools, Presenter (volcano hazards)
1997 - 2008	Montserrat Volcano Observatory (MVO) representative (volcano hazards education)
1994 - 1995	Albay Province, Philippines, Primary Schools, Presenter (volcano monitoring and hazards)

SELECTED LABORATORY EXPERIENCE

Shock Tube

Apparatus designed and built at ASU; funded by NSF; high speed video (10kfps); high-frequency pressure wave measurement (100kHz); development of Particle Image Velocimetry (PIV) analysis for very high velocities

One geology MS project, one engineering PhD project, one engineering post-doc project, two undergrad interns

Short-lived volcanic jets and plumes

Designed and built at ASU; funded by NSF; simple high-speed video analysis; PIV measurements; ongoing Planar Laser Induced Fluorescence (PLIF) measurements of concentration and mixing; future simultaneous PIV and PLIF

One PhD project; one undergrad intern

Lava flow experiments – wax analogue

Designed and built at ASU; funded by NSF; programmable pulsatory source conditions; simple video analysis; quantitative and qualitative morphological analysis; planetary and terrestrial applications, including Large Igneous Provinces

One post-doc project; one PhD project ongoing

Erosion experiments

Designed and built at ASU; funded by NSF REU; eroding cinder cones; laboratory-scale Structure-from-Motion (SfM) topography analysis

Two undergraduate researchers

Flumes – variable slope and re-circulating

Dilute density currents and instabilities at the base of spreading volcanic clouds; PIV and PLIF analysis; simple video analysis; funded by ASU and newly-awarded joint project with the University of Geneva

Two new PhD projects; one post-doc project

SELECTED FIELD EXPERIENCE

2009 - present	Observations of pyroclastic stratigraphy and volcano geomorphology (San Francisco Volcanic Field)
2008 – present	Gas flux, ground-based remote thermal, and geochemical measurements at LUSI mud volcano (Sidoarjo, Indonesia)
2008 – present	Gas flux, video, and pyroclastic deposit observations at volcanoes in East Java, Indonesia (Semeru, Bromo, and Pennang Gunung volcanoes)
2003 – present	Field excursion leader for students (Superstitions volcanic field, Hopi Buttes volcanic field, San Francisco volcanic field)
2005 - 2008	Sample collection in Montserrat
2004	Tiltmeter deployment Mt. Cameroon, Cameroon
2002	Geophysics subsurface survey of potential borehole instrument sites, Montserrat
2002	Field trip leader, pyroclastic deposits, Montserrat
1999	Pyroclastic stratigraphy observations, field sieving and sample collection, Montserrat
1997	Member of Montserrat Volcano Observatory scientific team; lead <i>Team Tilt</i>
1996, 2007	Pyroclastic stratigraphy and tree-damage observations and sample collection, Mount St. Helens
1994 - 95	Socioeconomic field studies (interviews and surveys) and volcanological observations - Mayon Volcano, Legazpi City, Albay, Philippines

Professional Affiliations

American Geophysical Union

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