Robert T. Goldman

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EDUCATION

PhD in Geology **Anticipated May 2022**
University of Illinois at Urbana-Champaign, Urbana, IL
Dissertation title: "An interdisciplinary approach toward improving volcanic risk management"
Advisor: Patricia M. Gregg

Certificate of Proficiency Science (Postgraduate) **November 2016**
University of Canterbury, Christchurch, New Zealand
Advisor: Darren M. Gravley

BA in Geology, Minor in Physics, *magna cum laude* **May 2015**
Pomona College, Claremont, CA
Bachelor's thesis title: "Assessing volcanic caldera formation using elastic finite element models"
Advisor: Eric B. Grosfils

RESEARCH INTERESTS

Forecasting volcanic eruptions using field, petrologic, geophysical and numerical methods.
Investigating how stresses within a volcanic system influence eruption location.
Improving volcano hazard mitigation and disaster response.

RESEARCH EXPERIENCE

NSF Graduate Research Intern **January 2020 – Present**
USGS Cascades Volcano Observatory, Vancouver, WA

- Conducted in-person interviews with residents of Hawaii's Big Island in January 2020 to learn about which sources of information were most widely available and helpful to people affected by the 2018 lower East Rift Zone eruption and summit collapse of Kīlauea volcano.
- Currently analyzing Facebook and Twitter posts by the USGS Volcanoes group from the 2018 eruption to provide an independent analysis of the effectiveness of those posts in 1) relieving anxiety, 2) educating people, and 3) combatting misinformation about eruption hazards.

NSF Graduate Research Fellow **January 2017 – Present**
Department of Geology, University of Illinois

- Developed and compared temperature-dependent elastic and viscoelastic finite element models (FEMs) of the Akaroa Volcanic Complex to constrain the geometry of its magma plumbing system and provide a foundation for simulating flank eruptions on active volcanoes.
- Currently developing a project that will utilize FEMs improve our understanding of the volcano-tectonic interplay between Hawaii's Kīlauea and Mauna Loa volcanoes.
- Began research as a Graduate College Fellow (GCF) in January 2017.
- Awarded National Science Foundation (NSF) Graduate Research Fellowship in March 2017.

Fulbright Graduate Student Fellow **February – December 2016**
University of Canterbury, Christchurch, New Zealand

- Conducted a multifaceted investigation of the extinct Akaroa Volcanic Complex in the South Island of New Zealand to reconstruct the system's paleo-stress field.
- Utilized field and petrographic observations, seismic models, and elastic numerical simulations to map Akaroa's ancient stress field.
- Revised the location of a stress barrier necessary for the deflection of dikes emplaced in radial orientations around Akaroa's erosional crater rim.
- Discovered that a downward sloping boundary along the base of the Akaroa volcano is required to produce a stress barrier consistent with field and petrographic dike flow orientation observations.

RESEARCH EXPERIENCE CONTINUED

LPI Summer Intern **June – August 2015**

Lunar and Planetary Institute, Houston, TX

- Analyzed lunar free-air gravity anomaly data to probe the Moon's interior.
- Helped my mentor develop code in Fortran to generate free-air gravity anomaly models of the Moon that would apply values of lithospheric thickness and crustal density to calculations predicting lithospheric flexure in response to overlying surface topography.
- Compared models with data from NASA's GRAIL mission to constrain the lithospheric thermal gradient and gain insight into the Moon's thermal and volcanic history.

Undergraduate Thesis Research **September 2014 – April 2015**

Pomona College, Claremont, CA

- Implemented an axisymmetric COMSOL FEM to investigate factors promoting or inhibiting ring fault formation at the summits of volcanoes.
- Utilized a fault visualization tool that I developed with a colleague the previous summer to discover that increasing the mass at the center of a volcano inhibits the propagation of caldera-forming ring faults, while increasing the ratio of reservoir-to-edifice volume and decreasing reservoir depth promote caldera-forming ring faults.
- Applied model to a Venusian shield volcano and Aleutian Arc stratovolcano, and observed that caldera-forming ring faults form more readily in shallowly sloping shield volcanoes than steep stratovolcanoes, which may require remote tectonic stresses to initiate fault propagation.

Geology Research Assistant **May – July 2014**

Pomona College, Claremont, CA

- Developed 3D numerical FEMs of ring fault initiation and caldera formation beneath a flat surface using COMSOL Multiphysics, including calibration against existing axisymmetric model results and subsequent analysis of key parameters.
- Assembled new visualization tools highlighting locations where ring-faulting is most likely to occur.

Geology Research Assistant **June – August 2013**

American Museum of Natural History, New York, NY

- Measured the volumes of chondrules and CAIs imaged with the AMNH VtomeX-S scanner.
- Identified and isolated mineral inclusion volumes for measurement using *VGStudio Max 2.2*.
- Compared measured volumes with cross-sectional areas of corresponding mineral inclusions obtained with the AMNH 5-spectrometer Cameca SX-100 electron microprobe.
- Developed a numerical relationship to estimate inclusion volume from cross-sectional area.

PUBLICATIONS

IN PREPARATION

Goldman, R.T., Albright, J.A., Gravley, D.M., Grosfils, E.B., Gregg, P.M., and Hampton, S.J., Stress control of dike deflection and flank eruption at Akaroa Volcano, New Zealand.

CONFERENCE PRESENTATIONS

POSTER PRESENTATIONS

Goldman, R.T., Albright, J.A., Gravley, D.M., Grosfils, E.B., Gregg, P.M., and Hampton, S.J., 2018, Characterization of Flank Eruptions using Paleo-stress Fields: Akaroa, New Zealand. American Geophysical Union 2018 Annual Meeting, Washington, District of Columbia.

Goldman, R.T., Albright, J.A., Gravley, D.M., Grosfils, E.B., Gregg, P.M., and Hampton, S.J., 2018, Characterization of Flank Eruptions using Paleo-stress Fields: Akaroa, New Zealand. Geological Society of America 2018 Annual Meeting, Indianapolis, Indiana.

CONFERENCE PRESENTATIONS CONTINUED

Goldman, R.T., Gravley, D.M., Grosfils, E.B., and Gregg, P.M., 2017, Reconstructing the paleo-stress field of New Zealand's Akaroa Volcano: Insights from field, petrographic, seismic and numerical methods. IAVCEI 2017 Scientific Assembly, Portland, Oregon.

Goldman, R.T., Albright, J.A., and Grosfils, E.B., 2015, Ring Fault and Caldera Formation: Insights Provided by Three-Dimensional Elastic Finite Element Models. 46th Lunar and Planetary Science Conference, Houston, Texas.

Goldman, R.T., Crapster-Pregont, E.J., and Ebel, D.S., 2014, Comparison of Chondrule and CAI Size Measured by Electron Microprobe (2D) and Computed Tomography (3D). 45th Lunar and Planetary Science Conference, Houston, Texas.

FELLOWSHIPS

NSF Graduate Research Fellow **September 2017 – 2022**

National Science Foundation

- Awarded to outstanding graduate students in STEM disciplines pursuing research-based Master's and doctoral degrees at accredited U.S. institutions, who have demonstrated the potential to make significant contributions to American research, teaching, and innovations in science and engineering.
- Provides financial support for three years (consecutive or non-consecutive) of graduate study.
- Offers federal and international research collaboration opportunities over a five-year period.

Graduate College Fellow **August 2017 – 2022**

University of Illinois at Urbana-Champaign

- Awarded to exceptional applicants to the University of Illinois Graduate College.
- Provides financial support for up to three years (consecutive or non-consecutive) of graduate study.

Evergreen Endowed Fellowship **January – July 2017**

Department of Geology, University of Illinois at Urbana-Champaign

- Awarded to meritorious geology graduate students with an interest in developing an interdisciplinary background, combining their area of expertise with other areas in geoscience or other disciplines, and applying geoscience knowledge to address problems facing society.
- Provides financial support for several months of graduate study.

Fulbright U.S. Graduate Student Fellowship **February – December 2016**

Fulbright New Zealand

- Awarded to American graduate students to conduct research at a New Zealand institution, and promote mutual understanding between people of both nations through educational and cultural exchanges.
- Grantees are chosen based on their high academic achievement, leadership potential, and ambassadorial qualities.
- Provided financial support for two semesters of graduate study and research.

HONORS AND AWARDS

NSF Graduate Research Internship Project **January 2020 – Present**

University of Illinois at Urbana-Champaign and United States Geological Survey

- Awarded a $5,000 travel and research stipend in support of a one-year research project at the USGS Cascades Volcano Observatory (Vancouver, WA) and Hawaiian Volcano Observatory (Hilo, HI).
- Award also supported travel to Hawaii to interview residents about hazard communications they received during the 2018 eruption of Kīlauea volcano, discuss volcano geology and geophysics research with HVO scientists, and volunteer with HVO staff to hold a community meeting.

HONORS AND AWARDS CONTINUED

North-Central Representative, GPPC **January 2019 – Present**

Geological Society of America

- North-Central Section Representative of the Geological Society of America's (GSA) Geology and Public Policy Committee (GPPC).
- Provide advice on public policy matters to the GSA Council and leadership.
- Participated in the virtual March 1, 2020 GPPC meeting to discuss revisions to position statements and planning for the 2020 GSA Annual Meeting in Montreal, Canada.
- Participated in the September 21-22, 2019 GPPC meeting in Phoenix, AZ.
- Participated in the February 24, 2019 GPPC meeting to discuss revisions to positions statements and planning for the 2019 GSA Annual Meeting in Phoenix, AZ.
- Participated in Capitol Hill visits in Washington, DC on February 25, 2019 to advocate for sustained federal science funding for Fiscal Year 2020.

Harriet Wallace Geology Graduate Student Service Award **April 2018**

University of Illinois at Urbana-Champaign

- Conferred to a graduate student in recognition of their contributions to the geology department through participation in Research Review, Engineering Open House, and outreach to the community.

AGU Voices for Science Participant **March 2018 – March 2019**

University of Illinois at Urbana-Champaign

- Selected by the American Geophysical Union (AGU) to participate in their inaugural Voices for Science initiative. Participants of this year-long program collaborate with AGU staff to organize monthly science policy activities, and attend two workshops held in Washington, DC.

AAAS CASE Workshop Participant **March 2018**

University of Illinois at Urbana-Champaign

- Sole representative for the College of Liberal Arts and Sciences at the 2018 Catalyzing Advocacy for Science and Engineering (CASE) Workshop hosted by the American Association for the Advancement of Science (AAAS) in Washington, DC from March 18-21.

Graduate College Award for Academic Excellence **March 2018**

University of Illinois at Urbana-Champaign

- Selected by the Department of Geology to receive campus-wide recognition for outstanding academic achievement.

***Research Live!* 2017 People's Choice Award** **November 2017**

University of Illinois at Urbana-Champaign

- 3-minute research talk voted most engaging by audience of the Graduate College's 2017 *Research Live!* competition.

Geological Society of America Representative, 2017 Geo-CVD **September 2017**

Geological Society of America

- Representative of the North-Central Section of the Geological Society of America (GSA) at the Geosciences Congressional Visits Days (Geo-CVD) workshop held from September 12-13, 2017.
- Briefed on federal geoscience funding, legislation, and communication strategies.
- Met with Congressional staff to argue for the importance of sustained federal geoscience funding.

Elected to the Pomona College Chapter of Phi Beta Kappa **May 2015**

Pomona College

HONORS AND AWARDS CONTINUED

Donald B. McIntyre – H. Stanton Hill Award **May 2015**

Pomona College

- Given to an outstanding student in any field of geological sciences, at the discretion of the department faculty.

Pomona College Scholar **2011 – 2014**

Pomona College

- GPA within top 25% of graduating class.

Elected to the Claremont Colleges Chapter of Sigma Xi, the Scientific Research Society **May 2014**

Pomona College

Tileston Sophomore Physics Prize **September 2013**

Pomona College

- Given to sophomore students in the physics department whose record is judged most promising.

Moncrieff Astronomy Prize **September 2012**

Pomona College

- Awarded to students in the first-year course in astronomy whose interest in the subject and proficiency in observatory work are indicated by the best notebooks kept in accordance with the teacher's suggestions.

VOLUNTEER AND OUTREACH EXPERIENCE

Volunteer – Hawaiian Volcano Observatory Community Meeting **January 2020**

- Assisted Hawaiian Volcano Observatory staff with setting up, photographing, and cleaning up a community meeting held in Ocean View, a town located on the slope of Mauna Loa volcano.
- This meeting informed the 100 residents in attendance about the current behavior of Mauna Loa volcano, hazards that an eruption from this volcano would pose to Ocean View, and necessary actions to take in preparation for those hazards.

Chair – 2019 SESE Research Review Committee **July 2018 – February 2019**

University of Illinois at Urbana-Champaign

- Lead role in organizing the 2019 School of Earth, Society, and Environment (SESE) Research Review held on February 15, 2019.
- Recruited and led committee of 10 other student volunteers.
- Managed logistics for event venue and catering, poster and photo contests, event photography, lightning talks, and awards ceremony.
- Instrumental in soliciting poster submissions and RSVPs.

Advocacy Committee Chair – Science Policy Group at UIUC **January 2018 – April 2019**

University of Illinois at Urbana-Champaign

- Lead role in organizing science advocacy activities for the University of Illinois community.
- Organized a panel discussion on national science policy featuring the Democratic candidate for Illinois' 13th House District and three science professors (October 2018).
- Organized and moderated a renewable energy panel featuring Champaign's state senator and three subject-matter experts (September 2018).
- Organized a trip to Springfield, IL, in collaboration with the Northwestern Science Policy and Outreach Taskforce, to lobby for scientifically-sound and environmentally-sustainable policy (April 2018).
- Co-hosted a Congressional letter-writing workshop on campus with a Union of Concerned Scientists policy advocate (March 2018).

VOLUNTEER AND OUTREACH EXPERIENCE CONTINUED

TRASHCANO Exhibitor – Engineering Open House 2019 **March 2019**

University of Illinois at Urbana-Champaign

- Volunteer for the "TRASHCANO" exhibit at the 2019 Engineering Open House.
- Coordinated liquid nitrogen supply with Physics Dept.
- Second year of volunteering (was lead exhibitor in 2018)

TRASHCANO Lead Exhibitor – Engineering Open House 2018 **January – March 2018**

University of Illinois at Urbana-Champaign

- Lead organizer for the "TRASHCANO" exhibit at the 2018 Engineering Open House.
- Our exhibit simulated explosive volcanic eruptions using a trash can, water, and liquid nitrogen.
- Ensured that we had the proper equipment and sufficient liquid nitrogen for our demonstrations.

Volunteer and MC – 2018 SESE Research Review Committee **Nov. 2017 – March 2018**

University of Illinois at Urbana-Champaign

- Proposed guidelines and solicited student and faculty nominations for 5-minute lightning talks given at the 2018 School of Earth, Society, and Environment (SESE) Research Review on March 2.
- Organized lightning talk schedule, welcome and closing addresses, and awards presentations in coordination with School Head and Department Chairs.
- Met with IT Coordinator to ensure that audio-visual media ran smoothly.
- As Master of Ceremonies, coordinated transitions between all presentations.

Project Manager – Science Policy Group at UIUC **May – December 2017**

University of Illinois at Urbana-Champaign

- As a member of the student-led Science Policy Group, helped organize two events.
- Coordinated an invited talk and Beckman Institute lab tour for IL State Senator Scott Bennett.
- Organized and participated in a student trip to Springfield, IL to meet and network with state policymakers, including Senator Scott Bennett and Representative Carol Ammons.

Geology Department Liaison **January – December 2013**

Pomona College

One of two geology students, elected by peers, charged with facilitating communication between faculty and students, sending regular email updates on information regarding colloquia or research opportunities, and organizing social gatherings and department retreats.

TECHNICAL SKILLS

- Programming languages and mathematical packages: Matlab, Mathematica, Maple, Python
- Numerical modeling package: COMSOL Multiphysics
- Qualitative thematic analysis software: Nvivo
- Geographic information system: ArcGIS
- Geochemical modeling: IgPet
- Computer graphic design: Adobe Illustrator, Adobe Photoshop, Corel Draw
- Instrumentation: Scanning Electron Microscope (including Backscattered Electron imagery), Electron Microprobe, X-ray Diffraction, X-ray Fluorescence, LA-ICP-MS
- Other: macOS, Windows OS, Microsoft Excel

PROFESSIONAL AND ACADEMIC HONOR SOCIETY MEMBERSHIPS

American Geophysical Union (AGU)	**2014 – Present**
Geological Society of America (GSA)	**2013 – Present**
International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI)	**2017 – Present**
Phi Beta Kappa, Pomona College Chapter	**2015 – Present**
Sigma Xi, the Scientific Research Society	**2014 – Present**

TEACHING EXPERIENCE

Guest Lecturer for Undergraduate Volcanology Class **April 2019**

University of Illinois at Urbana-Champaign

- Led an in-class exercise on U.S. volcano monitoring and implementing a National Volcano Early Warning System, which was authorized for federal funding by the U.S. Congress in March 2019.

High School Physics Guest Instructor **April 2018**

University of Illinois Laboratory High School

- Organized and taught two exploration geophysics lessons to three high school physics classes.

Geology Teaching Assistant **September – December 2013**

Pomona College

- Supported introductory geology students in designing and implementing semester-long physical experiments simulating terrestrial and extraterrestrial geologic processes.

Physics Lab Teaching Assistant **January – April 2012**

Pomona College

- Assisted introductory physics students with conducting weekly mechanical laboratory experiments, and graded laboratory notebooks.

FIELD EXPERIENCE

Frontiers Abroad Geology Field Camp **January – February 2016**

Taupo Volcanic Zone

- Mapped lava flows on Mt. Ngauruhoe, reconstructed the sequence of events resulting in hydrothermal, intrusive and extrusive deposits found on Mt. Ruapehu, inferred fault-induced changes in water table location at the Orakei Korako geothermal springs by comparing locations of freshwater ponds and mud pools, formulated research questions for Taupo caldera ignimbrite deposits observed in the field, and articulated a plan to answer those questions by writing a mock-grant-proposal.

Akaroa Volcanic Complex

- Mapped primary volcanic features (dikes, scoria cones, lava domes, lava flows, ash falls) in several localities of the extinct Akaroa volcano of New Zealand's Banks Peninsula, as part of an overarching, multi-year research initiative to decipher the eruptive history of the entire 50-km-wide volcanic system

REFERENCES

Patricia M. Gregg, Ph.D., Assistant Professor
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Eric B. Grosfils, Ph.D., Minnie B. Cairns Memorial Professor of Geology
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