

Georgia Institute of Technology  
School of Earth and Atmospheric Sciences  
311 Ferst Drive  
Atlanta, GA 30332-0340

Email: [ryan.cahalan@eas.gatech.edu](mailto:ryan.cahalan@eas.gatech.edu)  
Website: [www.dufek.eas.gatech.edu/rccahalan/](http://www.dufek.eas.gatech.edu/rccahalan/)

## **PERSONAL DATA**

Born: November 1<sup>st</sup>, 1989, Houston, Texas, United States

## **EDUCATION**

**University of Texas at Austin, The Jackson School of Geosciences**      **GPA: 3.59/4.0**  
**B.S. Honors, December 2012**

Major: Geology

Thesis Title: Determination of lithium diffusion rates in garnet and coupled diffusion of lithium and yttrium in garnet

Advisor: Dr. William D. Carlson

**Georgia Institute of Technology, Earth and Atmospheric Sciences**      **GPA: 3.75/4.0**  
**Ph.D. Candidate, Expected graduation August 2018**

Major: Volcanology/Geophysics

Minor: Marine Science

Thesis Title: Experimentation and numerical modeling of explosive subaqueous eruption dynamics and application to the 2012 eruption of Havre Seamount, Kermadec Arc, NZ

Advisor: Dr. Josef Dufek

## **RESEARCH INTERESTS**

Physical volcanology, subaqueous explosive volcanology, subaqueous and subaerial plume and pyroclastic density current dynamics, multiphase flow, thermal evolution of pyroclastic density currents, experimental volcanology, crystal and bubble nucleation and growth in silicate melts, pumice raft development/evolution

## **AWARDS & HONORS**

NSF Graduate Fellowship, accepted, 2015

Graduate Student of the Month, November 2014, School of Earth and Atmospheric Sciences, Georgia Tech

Recipient of the Outstanding Student Paper Award, American Geophysical Union meeting 2012 recognizing: *“Coupled diffusion of lithium and yttrium (+HREE) in garnet”*

Special Honors from the JSG Undergraduate Honors Research Program (UHRP) at The University of Texas at Austin, 2012

Undergraduate Research Fellowship from The University of Texas at Austin, accepted, 2011

The Jackson School of Geosciences Undergraduate Scholarship, 2008-2012

Boy Scouts of America, Eagle Scout Award, Fall 2007

## **RESEARCH EXPERIENCE**

Physical Volcanology, Graduate Research Assistant – 8/2013 – Present

Georgia Institute of Technology, School of Earth and Atmospheric Sciences

Description: Development of numerical models to assess the eruption dynamics and thermal evolution of subaqueous explosive volcanic eruptions. An experimental subaqueous eruption simulation tank was built to validate the numerical model at the experimental scale before scaling up to eruption scales. The programming languages used in the numerical modeling are Fortran and Matlab. The numerical model will be used to reproduce the dynamics of the 2012 Havre Seamount eruption, Kermadec Arc, NZ. Additional projects include: (1) Constraining cooling rates of explosive eruptions via a hydrous speciation geospeedometer and numerical modeling; (2) Assessing comminution and rounding of pumice clasts in subaqueous water-supported granular flows and pyroclastic density currents.

Research Advised by: Dr. Josef Dufek

Mapping, Exploration, and Sampling at Havre (MESH) expedition, R/V Roger Revelle  
Science Team Member – 3/2015 (3 weeks)

Description: Research cruise to Havre Seamount, Kermadec Arc, New Zealand to study the deposits from the 2012 eruption. This eruption was the first of its kind to be observed in recorded history. The MESH science goals were to collect sufficient data and samples to assess large-scale transport dynamics, vesiculation and fragmentation changes with water depth, and how magma ascent rates and conduit processes control subaqueous eruptions. Research using these data and samples from the cruise is ongoing.

Chief Scientists: Dr. Rebecca Carey, University of Tasmania; Dr. Adam Soule, Woods Hole Oceanographic Institute

Metamorphic Petrology, Undergraduate Research Assistant - 3/2010 – 8/2013

The University of Texas at Austin, Jackson School of Geosciences

Description: Quantitatively derived intracrystalline diffusivities for lithium in garnet by numerical modeling of stranded diffusion profiles obtained by LA-ICP-MS analysis of partially resorbed metamorphic garnets.

Research Advised by: Dr. William D. Carlson

Physical Volcanology, Undergraduate Research Assistant - 4/2012 – 8/2013

The University of Texas at Austin, Jackson School of Geosciences

Description: FTIR analysis of homogenized quartz-hosted melt inclusions from the Mesa Falls Tuff, Yellowstone NP to measure volatile contents of the pre-eruptive magma chamber.

Research Advised by: Dr. James Gardner

Carbonate Geochemistry, Undergraduate Research Assistant - 1/2011 – 10/2011

The University of Texas at Austin, Jackson School of Geosciences

Description: Quadropole ICP-MS analysis of a 10m cyclic sequence of limestone and dolomite from the Monterrey Fm. to determine variations in the REE patterns at 10cm sampling intervals.

Research Advised by: Dr. Nathan Miller

## **PUBLICATIONS**

**R.C. Cahalan**, E.D. Kelly, and W.D. Carlson (2014). Rates of Li diffusion in garnet: Coupled transport of Li and Y+REEs. *American Mineralogist* v. 99 no. 8-9 p.1676-1682. doi: 10.2138/am.2014.4676

## **PRESENTATIONS**

**R.C. Cahalan**, E.D. Kelly, W.D. Carlson (2012), Couple diffusion of lithium and yttrium (HREE) in garnet, Abstract V23D-2856 presented at 2012 Fall Meeting, AGU, San Francisco, California, 3-7 Dec.

N.R. Miller, **R.C. Cahalan** (2011) What do rare earth element distributions in pelagic and hemipelagic sequences reveal about deposition and diagenesis?, Abstract 253-4 presented at 2011 Fall Meeting, GSA, Minneapolis, Minnesota, 9-12 Oct.

## **FIELD EXPERIENCE**

MESH expedition to Havre Seamount, Kermadec Arc, NZ; Santiaguito dome complex, Guatemala; Kos Plateau Tuff, Greece; San Juan caldera complex, Colorado; Yellowstone Caldera, Wyoming; Taal Volcano and Mt. Pinatubo, The Philippines; Southwestern US (UT field camp)

## **TEACHING EXPERIENCE**

CETL 8000 – TA Preparation Course (Spring 2014)

EAS 2600 – Earth Processes Lab (1 semester)

## **TECHNICAL AND ANALYTICAL SKILLS**

Fortran, Matlab, Linux operating system, C++, petrographic microscopy, melt inclusion sample preparation and analysis, FTIR, LA-ICPMS

## **SERVICE AND ACTIVITIES**

Committee Chair, Graduate Student-hosted EAS Seminar Series, School Earth and Atmospheric Sciences, Georgia Tech, 2014 – present

Geophysics and Planetary Seminar Coordinator, School Earth and Atmospheric Sciences, Georgia Tech, 2014 – 2015

Member of Graduates of EAS student government, 2014 – present

Planetary Society member, School Earth and Atmospheric Sciences, Georgia Tech, 2014  
– 2015

### **PROFESSIONAL MEMBERSHIPS**

Geological Society of America member (2011-Present)

American Geophysical Union member (2012-Present)

Mineralogical Society of America member (2011-Present)