

**Department of Geology & Planetary Science**  
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**EDUCATION:**

**Arizona State University:** Ph.D. (1996), Geological Sciences

Dissertation Title: *Quantitative analysis of geological surfaces: A deconvolution algorithm for midinfrared remote sensing data*

Advisors: Dr. Philip Christensen and Dr. Jonathan Fink

**Drexel University:** B.S. (1990), Mechanical Engineering / Geology Minor (1990)

Senior Design Title: *Geothermal power plant design and geologic analysis of the Salton Sea region, CA*

Advisors: Dr. Edward Doheny and Dr. Harry Brown

**APPOINTMENTS:**

**University of Pittsburgh, Department of Geology and Planetary Science**

2007: sabbatical leave (*Arizona State Univ., Alaska Volcano Observatory, Univ. of Hawaii*)

2006 - present: Associate Professor with tenure

2000 - 2006: Assistant Professor

**University of Alaska - Fairbanks, Department of Geology and Geophysics**

2004 - present: Affiliate (*Adjunct*) Associate Professor

**Arizona State University, Department of Geological Sciences**

1998 - 2000: Visiting Assistant Professor

1997 - 1998: Faculty Research Associate

1996 - 1997: Postdoctoral Research Associate

1990 - 1996: Graduate Teaching/Research Associate

**MAJOR RESEARCH THEMES:****Remote Sensing of Volcanic Eruptions and Processes:**

A primary focus is that of thermal infrared (TIR) remote sensing as applied to physical volcanology and eruption monitoring. Of specific interest is the linkage between the renewal of activity at an explosive volcano and the ability of remote sensing to detect that activity and help monitor subsequent hazardous activity. The tools employed include laboratory-based infrared spectroscopy, field-based TIR imaging and differential global positioning system (dGPS) data collection, as well as satellite image analysis.

**Planetary Surface Geomorphology:**

Small-scale (< 2km) impact craters on Mars can represent some of the most recent surface processes on the planet. Distinguishing these from similarly-sized volcanic craters (maars) is not straightforward, but could lead to the identification of water-rich regions of the subsurface. By examining terrestrial analogs and their associated deposits with field observations and remote sensing data, a classification scheme is being developed in order to distinguish these two processes on Mars.

### **Lava Flow Petrology and Emplacement Dynamics:**

Fundamental to understanding the behavior of lava flow emplacement and its surface structure is the ability to extract key physical parameters. This is accomplished by way of near-field observations using thermal cameras or laboratory TIR spectroscopy. The formation of glassy rinds, vesicular textures, and phenocrysts are each measurable using the tools. These data allow for the modeling of properties such as flow inflation, viscosity changes, and crustal formation.

### **Laboratory Infrared Spectroscopy:**

High precision vibrational spectroscopy provides information on the atomic structure of the minerals and glasses that comprise any geologic material. This research is focused on the structural and chemical changes in minerals and rocks as the samples are heated above their melting point. Such experiments have not been previously attempted, but could lead to fundamental information about mineral phase changes and their spectral response on lava flows.

### **Eolian Processes and Desertification:**

In an investigation complementary to the work on active volcanoes, research is being conducted into eolian processes, including sediment transport and desertification. Using similar remote sensing techniques to study dynamic dune fields provides a synoptic view of an entire eolian system. The ability to examine changes over time also allows for the monitoring of marginal drought-prone regions that are point-sources for larger dust storms and are susceptible to future drought and desertification.

### **Urban Environmental Science and Hazards:**

Another research interest involves the application of remote sensing and a geographical information system (GIS) to monitor and analyze urban growth, its impact on the surrounding environment, and the associated hazards. By using approaches similar to the data analysis and visualization used for volcanic studies, key urban data products can be generated such as calibrated/geometrically accurate land use change, material identification, and heat island maps.

## **MAJOR RESEARCH FUNDING:**

### **Mineral and Gas Identification Using a High-Performance Thermal Infrared Imaging Spectrometer**

Period: 2008-2011

NASA, Instrument Incubator Program

PI: Jeff Hall (*Aerospace Corporation*)

Co-I: Michael Ramsey

### **Expansion and synergistic use of the ASTER Urgent Request Protocol (URP) for natural disaster monitoring and scientific analysis**

Period: 2008-2011

NASA, Earth System Science Research Program

PI: Michael Ramsey

### **Mars Odyssey participating scientist: Super-resolving THEMIS data for improved temperature, composition, and spatial resolution**

Period: 2006-2010

NASA, Mars Odyssey Research Program

PI: Michael Ramsey

### **Infrared spectroscopy of silicic glasses & melts: Deriving volcano-scale processes from laboratory-scale measurements**

Period: 2007-2010

NSF, Petrology and Geochemistry Program

PI: Michael Ramsey

### **Investigations of terrestrial and planetary lava flows**

Period: 2007-2010

NASA, Planetary Geology and Geophysics Program

PI: David Crown (*Planetary Science Institute*)

Co-I: Michael Ramsey

**Characterization of terrestrial primary, eroded, and mantled volcanic surfaces for a more complete understanding of Martian volcanic deposit modification**

Period: 2006-2010

NASA, Mars Fundamental Research Program

PI: Jeffrey Byrnes (*Oklahoma State University*)

Co-PI: Michael Ramsey

**PENDING PROPOSALS:**

**Thermophysical properties of mantled volcanic surfaces: Constraints on lava composition and emplacement processes**

Period: 2010-2013

NASA, Planetary Geology and Geophysics Program

PI: Michael Ramsey

**Long-term investigation of thermal infrared signatures associated with active faults**

Period: 2010-2015

NASA, Earth Venture-1 Program

PI: David Tratt (*Aerospace Corporation*)

Co-I: Michael Ramsey

**Urban 4D: Connecting urban environmental processes and climate**

Period: 2010-2013

NASA, Earth Venture-1 Program

PI: Marc Imhoff (*NASA/Goddard Space Flight Center*)

Co-I: Michael Ramsey

**Volcano Eruption Surveillance and Process Application (VESPA)**

Period: 2010-2015

NASA, Earth Venture-1 Program

PI: Paul Lundgren (*Jet Propulsion Laboratory*)

Co-I: Michael Ramsey

**PAST/COMPLETED PROJECTS:**

***Mars lava flow surface morphology: An avenue for answering fundamental questions regarding the rates and styles of volcanism***

Period: 2005-2009

NASA, Mars Fundamental Research Program

PI: Steve Anderson (*University N. Colorado*)

Co-I: Michael Ramsey

***Automation of the ASTER emergency data acquisition protocol for volcanic disaster monitoring and preparedness***

Period: 2004-2009

NASA, Earth System Science Research Program

PI: Michael Ramsey

***Thermal infrared observations of explosive volcanoes: A comparative study of Bezymianny (Russia) and Colima (Mexico)***

Period: 2007-2008

NGS, Committee for Research and Exploration Program

PI: Michael Ramsey

Co-PI: Adam Carter

***Investigation of rapid urbanization processes using ASTER, MODIS, and Landsat data***

Period: 2004-2008

NASA, Earth System Science Research Program

PI: Philip Christensen (*Arizona State University*)

Co-I: Michael Ramsey

***Eolian processes in arid regions: Tracking land surface change using orbital data***

Period: 2003-2008

NASA, Solid Earth and Natural Hazards Program

PI: Nicolas Lancaster (*Desert Research Institute*)

Co-I: Michael Ramsey

***Quantitative analyses of terrestrial crater deposits: Integrated remote sensing studies of Martian surfaces***

Period: 2003-2007

NASA, Mars Fundamental Research Program

PI: Michael Ramsey

***Emission spectroscopy of silicic lavas: Implications for dome processes and hazards***  
Period: 2003-2007 NSF, Petrology and Geochemistry Program  
PI: Michael Ramsey

***Geochemical analysis of S-bearing species using Differential Optical Absorption Spectroscopy (DOAS) and infrared imaging at Cerro Negro's (Nicaragua) fumarole field***  
Period: 2005-2006 NSF, Exploration Research Program  
PI: Matthew Watson (Michigan Technological Institute) Co-I: Michael Ramsey

***Emplacement of terrestrial and planetary lava flows***  
Period: 2003-2006 NASA, Planetary Geology and Geophysics Program  
PI: David Crown (Planetary Science Institute) Co-I: Michael Ramsey

***Multi-spectral remote sensing of brush fire scars in arid urban regions: Analysis of future fire and flooding hazards***  
Period: 2000-2003 NASA, Office of Earth Science  
PI: Michael Ramsey Co-I: J Ramón Arrowsmith (Arizona State University)

***Monitoring the hazards of silicic volcanoes with remote sensing***  
Period: 2000-2003 NASA, Office of Earth Science  
Co-PI: Michael Ramsey Co-PI: John Fink (Arizona State University)

#### **INVITED SEMINAR & COLLOQUIA TALKS:**

- 8/09 **Deriving soil moisture and sediment mobility using future HypsIRI-derived thermal inertia**, Second HypsIRI Science Workshop, Pasadena, CA.
- 8/09 **Human health and urbanization**, Second HypsIRI Science Workshop, Pasadena, CA.
- 8/08 **Thermal infrared emission spectroscopy: Deciphering surface processes on Earth and Mars**, University of Bristol, Department of Earth Sciences, Bristol, UK.
- 3/08 **Thermal emission infrared spectroscopy for geological research**, Thermo Electron Scientific Symposium, Montreal, QC.
- 2/08 **NASA's future lunar exploration program: What can we learn about Earth processes from the lunar surface?**, University of Pittsburgh, Geology and Planetary Science Department Colloquium, Pittsburgh, PA.
- 4/07 **Thermal infrared remote sensing of volcanoes**, Michigan Technological University EHaz Course Lecture, Houghton, MI.
- 3/07 **Thermal infrared data from the Moon: Hazards & hot-spots**, Workshop on Science Associated with the Lunar Exploration Architecture, Tempe, AZ.
- 2/07 **Deciphering planetary geological surface processes using thermal infrared vibration spectroscopy**, Thermo Electron Scientific Symposium, Santa Clara, CA.
- 9/06 **Quantitative surface observations of the Earth and Mars: Seeing through the "eyes" of the thermal infrared**, Ohio University, Geological Sciences Department Colloquium, Athens, OH.
- 1/06 **Quantitative surface observations of the Earth and Mars: Seeing through the "eyes" of the thermal infrared**, University of Pittsburgh, Geology and Planetary Science Department Colloquium, Pittsburgh, PA.
- 9/05 **Comparative infrared observations of dome growth processes at Mt. St. Helens and the volcanoes of Russia's Kamchatka Peninsula**, Michigan Technological University Colloquium, Houghton, MI.
- 9/04 **Through the "eyes" of the thermal infrared: Observations and results from the surfaces of Mars and Earth**, Michigan Technological University Colloquium, Houghton, MI.

- 5/04 **Quantitative geological surface processes extracted from infrared spectroscopy and remote sensing**, Mineralogical Association of Canada Thermal Infrared Spectroscopy Workshop, London, Ontario, Canada.
- 3/03 **Monitoring, assessment and mitigation of volcanic hazards using data from space and the field**, Pittsburgh Geological Society Meeting, Pittsburgh, PA.
- 6/02 **Two years of observations and results from the ASTER volcano monitoring program: Silicic dome mapping at Medicine Lake, CA and Bezymianny, Kamchatka**, Cascade Volcano Observatory Seminar, Vancouver, WA.
- 6/02 **Using terrestrial multispectral images as a proxy for constraining new thermal infrared data of Mars**, Mars Infrared Spectroscopy Workshop, Lunar and Planetary Science Inst., Houston, TX.
- 10/01 **Active volcanology close up: Results from the new class of NASA satellites and the lessons learned from field work on explosive volcanoes**, University of Western Ontario, Geology Colloquium, London, Ontario.
- 7/01 **Lessons learned from field work on active, explosive volcanoes: Comparison of Shishaldin, Alaska and Semeru, Indonesia**, University of Hawaii, Geology Department Special Seminar, Honolulu, HI.
- 11/00 **The Advanced Spaceborne Thermal Emission and Reflectance Radiometer (ASTER) Urban Environmental Monitoring program: Local results using airborne MASTER data from Phoenix, AZ, (MASTER airborne special session)**, Las Vegas, NV, November, 2000.
- 10/00 **Contrasting volcanic hazard mitigation in Japan and Indonesia: Can remote sensing help augment these efforts?**, Indiana University of Pennsylvania, Geology Department Special Seminar, Indiana, PA.
- 5/99 **Understanding the "big picture": Strategy development for the global monitoring of planetary processes on Earth and Mars**, University of Pittsburgh, Geology and Planetary Science Department Colloquium, Pittsburgh, PA.
- 11/98 **Beyond thermal anomaly detection: The next decade of volcanic monitoring and hazard mitigation using infrared remote sensing**, State University of New York - Buffalo, Department of Geology Pegrum Seminar, Buffalo, NY.
- 5/98 **Big bucks and tiny bubbles: What can multi-million dollar satellites tell us about lava vesicularity, volcanic mapping, and eruption monitoring?**, Alaska Volcano Observatory (AVO) Seminar, Anchorage, AK.
- 11/97 **From dunes to domes: Geologic analysis using a deconvolution approach to thermal infrared remote sensing data**, University of Washington, Geology Department Seminar, Seattle, WA.

#### **HONORS AND AWARDS:**

- 2008 Selected as Outstanding Student Paper within the AGU VGP Section  
Rose, S. and **Ramsey, M.S.**, *Rose, S., The Eruptive Behavior of Klyuchevskoy Volcano, Kamchatka, Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abst. V43A-2141, 2008.*
- 2006 Awarded promotion to Associate Professor with tenure, University of Pittsburgh
- 2002 Selected as Outstanding Student Paper within the AGU Biogeosciences Section  
Misner, T., **Ramsey, M.S.**, and Arrowsmith, J.R., *Analysis of Brush Fire Scars in Semi-Arid Urban Environments: Implications for Future Fire and Flood Hazards Using Field and Satellite Data*
- 2001 National Finalist, David and Lucile Packard Foundation Fellowship  
*chosen as one of only two nominees from the University of Pittsburgh*
- 1996 Best of Session Award, ERIM Second International Airborne Remote Sensing Conference  
**Ramsey, M.S.**, *Object detection utilizing a linear retrieval algorithm for thermal infrared imagery*
- 1992 Sigma Gamma Epsilon National Honor Society for the Earth Sciences

### PROFESSIONAL ORGANIZATIONS:

- 2000-- International Association of Volcanology and Chemistry of the Earth's Interior  
1993-- Geological Society of America  
1991-- American Geophysical Union

### COLLABORATORS:

**Steven Anderson** (Univ. of N. Colorado), **Ramón Arrowsmith** (Arizona State Univ.), **Dan Blumberg** (Ben-Gurion Univ., Israel), **Jeffrey Byrnes** (Oklahoma State Univ.), **Philip Christensen** (Arizona State Univ.), **Amanda Clark** (Arizona State Univ.), **Robert Craddock** (CEPS/Smithsonian Inst.), **David Crown** (Planetary Science Inst.), **Ken Dean** (Univ. of Alaska Fairbanks), **Jonathan Dehn** (Univ. of Alaska Fairbanks), **Kenneth Edgett** (Malin Space Science Systems, CA), **Jonathan Fink** (Arizona State Univ.), **Luke Flynn** (Univ. of Hawaii), **Vicky Hamilton** (Southwest Research Inst.), **Jeff Hall** (Aerospace Corp.), **Andrew Harris** (Univ. Blaise Pascal, Clermont-Ferrand), **Simon Hook** (Jet Propulsion Laboratory), **Penny King** (Univ. of New Mexico), **Nicholas Lancaster** (Desert Research Inst., NV), **John Mustard** (Brown Univ.), **David Pieri** (Jet Propulsion Laboratory), **Mike Poland** (USGS/HVO), **Vincent Realmuto** (Jet Propulsion Laboratory), **Steven Ruff** (Arizona State Univ.), **William Stefanov** (Johnson Space Center), **Matthew Watson** (Univ. Bristol, UK), **Rick Wessels** (USGS/AVO), **Martin Wooster** (King's College, UK)

### SYNERGISTIC RESEARCH ACTIVITIES:

Science team member (MAGI instrument – NASA): Chosen as a science team member assisting in the development of the future airborne Mineral and Gas Identifier (MAGI). Funded under the Instrument Incubator Program and built by Aerospace Corporation, MAGI will be a new multispectral thermal infrared design and serve as a prototype for the next generation of Earth-orbiting TIR sensors.

Participating scientist (THEMIS instrument – NASA): Selected as a participating scientist/team member for the Mars-orbiting Thermal Emission Imaging System. Responsible for developing new spatial enhancement algorithms for more accurate detection of sub-pixel mineral and thermal anomalies on the martian surface.

Science team member (ASTER instrument – NASA): Responsible for various instrument calibration/validation and coordination of the new multi-satellite integration program for volcanic monitoring. Work also entails presenting 3-4 talks two times per year at the international ASTER science team meetings detailing/updating ongoing progress.

International workshop organization: Co-organized the Geological/Mineralogical Association of Canada (GAC-MAC) short course, *"Molecules to planets: Infrared spectroscopy in geochemistry, exploration geochemistry, and remote sensing"*. In conjunction, led two splinter workshops on satellite image processing and thermal infrared spectroscopy principles & applications (May, 2004).

Co-organized and co-led the remote sensing workshop in Cordoba, Argentina in conjunction with the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) general assembly meeting in Pucon, Chile. Workshop included several interactive image analysis laboratories and lectures for South American scientists (November, 2004).

International field campaign organization: Coordinated, participated, and planned international field campaigns to investigate eolian processes/desertification (Saharan Desert & Mexico) and active volcanic processes (Chile, Iceland, Indonesia, Japan, Nicaragua & Russia).

## TEACHING EXPERIENCE:

2000-present: University of Pittsburgh (*Assistant/Associate Professor*)

### Undergraduate Coursework:

#### *Natural Disasters (GEOL-0820)*

Natural Disasters was proposed, approved by the School of Arts and Science, and developed to expose introductory students to the geologic, hydrologic, and atmospheric processes that affect the human environment in catastrophic ways. This course covers numerous hazards including: earthquakes, volcanic eruptions, tornadoes, hurricanes, tsunamis, & wildfires. In its first offering it became the largest course taught in recent Departmental history (224 students), and increased significantly in the second and third years (~290 students).

**Instructor:** Ramsey (Spring 05-06, 08-09)

**Average class size:** 300

#### *Earth System Science (GEOL-0840)*

This course was initially developed based on the integrated discipline of Earth System Science that has been rapidly developing over the last two decades. The fundamental concept is a linkage of the four spheres of the Earth: hydrosphere, cryosphere, atmosphere, and lithosphere. By focusing on the biophysical cycles that operate through these spheres, an understanding is developed of many aspects of anthropogenic global change.

**Instructor:** Ramsey (Spring 02, 04)

**Average class size:** 46

#### *Introduction to Remote Sensing (GEOL-1460)*

Remote Sensing was adapted from a previously offered course in the Department. It provides a foundation in the theory and techniques of image processing and data visualization spanning the electromagnetic (EM) spectrum from the ultraviolet to microwave. Students utilize a state-of-the-art image processing laboratory, software, and newly acquired satellite data. It is a required core course for students in the GIS Certificate and Pro-MS programs.

**Instructor:** Ramsey (Spring 02-03; Fall 04-06, 08)

**Average class size:** 30

#### *Geohazards (GEOL-1640)*

Geohazards examined the geological and natural processes that affect the human environment in catastrophic ways in terms of science, prediction, mitigation, avoidance and policy/safety issues involved. These problems commonly result from human activity in modifying the natural geologic process. *This course is no longer offered in the Department, having been divided into two new courses: Natural Disasters and Advanced Geohazards and Risk Management.*

**Instructor:** Ramsey (Fall 00, 02)

**Average class size:** 26

### Graduate Coursework:

#### *Applied Remote Sensing & GPS Techniques (GEOL-2460)*

This course was developed primarily for graduate students (and advanced undergraduates) as a follow-on to the Introduction to Remote Sensing course. There is strong emphasis on quantitative EM theory, with the unique addition of field-oriented problems and data collection. The ultimate goal of this course is to explore the connection between remotely-gathered imagery and the physical world.

**Instructor:** Ramsey (Fall 02; Spring 01, 04, 06)

**Average class size:** 13

#### *Advanced Geohazards & Risk Management (GEOL-2640)*

This newly-developed course was designed to be a more rigorous replacement for the previously-offered GeoHazards course. It explores the geological and natural processes that affect the human environment in catastrophic ways. In addition, policy issues, risk management, and Homeland Security aspects are highlighted, focusing on specific case studies of recent hazards.

**Instructor:** Ramsey (Spring 05)

**Initial class size:** 10

***Volcanology (GEOL-2750)***

This is an introductory physical volcanology course offered at the graduate level. The main topics covered are the physical properties of lavas, the geomorphology of volcanic landforms, the dynamics and monitoring of volcanic eruptions, and the emplacement of volcanic deposits. *Starting in 2005, this course will be taught by Prof. Skilling, with Prof. Ramsey focusing on the Remote Sensing and Hazards sequences.*

**Instructor: Ramsey** (Fall 01)

**Class size: 11**

**Instructors: Ramsey & Skilling** (Fall 03)

**Class size: 8**

***Remote Exploration of Mars (GEOL-3970)***

This advanced seminar-style course focuses on the theory, technology, and science of the recent and upcoming remote sensing data sets of Mars. Numerous missions from rovers to orbiters have been sent to Mars, with each carrying remote sensing instruments. The data returned from those instrument have led to important discoveries about the Red Planet and are the focus of this course and an independent project performed by the students.

**Instructor: Ramsey** (Spring 03; Fall 05)

**Average class size: 5**

**1997-1999: Arizona State University (*Visiting Assistant Professor*)**

*Introduction to Physical Geology (GLG-101):* average class size: 160 (Spring, 97; Spring, 98)

*Applied Remote Sensing (GLG-598):* average class size: 15 (Fall, 98)

**1995-1996: Arizona State University (*Guest Lecturer*)**

Volcanology (GLG-420)

Geology of Mars (GLG-406)

Advanced Remote Sensing (GLG-598)

**1990-1993: Arizona State University (*Teaching Assistant*)**

Introduction to Geology (GLG-101)

Introduction to Physical Geology I Laboratory (GLG-103)

Introduction to Planetary Science (GLG-105)

Geology of Mars (GLG-406)

Geology Field Camp (GLG-450)

Advanced Field Geology (GLG-455)

Advanced Physical Volcanology (GLG-520)

Remote Sensing (GLG-598)

Advanced Remote Sensing (GLG-598)

**POST-DOCTORAL ADVISING:**

**Adam Carter**

Now at Exxon-Mobile Corporation (Houston, TX)

term at Univ. Pittsburgh: 2008 - 2009

**Jeffrey Byrnes**

Now at Oklahoma State University (Stillman, OK)

term at Univ. Pittsburgh: 2003 - 2005

**GRADUATE STUDENT ADVISING:**

**Current Graduate Students:**

**Topher Hughes** (Ph.D. candidate)

began studies: August, 2005

Dissertation Topic: Thermal infrared (TIR) spatial resolution enhancement algorithm development for planetary surfaces

**Rachel Lee** (Ph.D. candidate) began studies: August, 2004  
Dissertation Topic: Thermal infrared (TIR) spectroscopy and petrology of phase transitions in volcanic glasses and melts

**Redha Mohammad** (Ph.D. student) began studies: August, 2008  
Dissertation Topic: Eolian processes and dust generation in the Middle East

**Kevin Reath** (M.S. student) beginning studies: August, 2009  
Dissertation Topic: Scientific data analysis from the new Mineral and Gas Identifier (MAGI) airborne instrument

**Shellie Rose** (Ph.D. candidate) began studies: August, 2004  
Dissertation Topic: Effects of thermally-heterogeneous surfaces over active volcanic surfaces on the accurate extraction of TIR spectra data

**Stephen Scheidt** (Ph.D. candidate, *awarded: NASA ESS Fellowship*) began studies: June, 2004  
Dissertation Topic: Multispectral TIR data analysis of large eolian systems in order to trace the sediment transport pathways and the effects of dust on atmospheric properties

#### Previous Graduate Students:

**Adam Carter** (Ph.D.) completed: August, 2008  
Dissertation Title: *Quantitative thermal infrared analyses of volcanic processes and products: Application to Bezymianny Volcano, Russia*  
Currently: Research Geologist, ExxonMobile Corporation, Houston, TX.

**Melanie Hellman** (M.S.) completed: July, 2002  
Thesis Title: *Analysis of hot springs in Yellowstone National Park using ASTER and AVIRIS remote sensing*  
Currently: New York City Teaching Fellow (NYCTF), NY

**Sally Kuhn** (M.S.) completed: November, 2003  
Thesis Title: *Characterization of dome processes at Soufrière Hills Volcano, Montserrat: Synthesis of infrared remote sensing data with a multi-parameter database*  
Currently: Global Volcanism Program (GVP), Smithsonian Institution, Washington, DC

**Tamara Misner** (M.S.) completed: December, 2003  
Thesis Title: *Multi-frequency, multi-temporal, brush fire scar analysis in a semi-arid urban environment*  
Currently: Ph.D. program in the Department of Geology and Planetary Science, University of Pittsburgh (advisor: Michael Rosenmeier)

**Shawn Wright** (M.S.) completed: July, 2003  
Thesis Title: *Thermal infrared data analyses of Meteor Crater, Arizona: Implications for Mars spaceborne data from the Thermal Emission Imaging System*  
Currently: completed Ph.D. program at Arizona State University (advisor: Philip Christensen). Now a post-doctoral researcher at the University of New Mexico.

#### Pro-M.S. Students:

Responsibilities include co-advisement and co-supervision of all students within the Professional Science Master's degree program, which is starting its fifth year in the Fall of 2006. Work includes recruitment, curriculum development, course scheduling, and project advisement/final evaluation. Students do not perform a traditional research-based thesis, but rather take two years of intensive, highly multidisciplinary coursework, including emphasis in

the Schools of Law, Business, Information Science, and Arts and Science (Geology, Communication, Statistics Departments), as well as a summer-long internship in industry.

Current: Jessica Benner, Randy Lentz, James Morar, Patricia Roncevich, Aron Schmid, Tina Shendge, Steven Van Vliet

Graduated: Christopher Bostwick, Thomas Bouch, Kari Cavada, Kelly Dreibelbis, Sean Fulton, Lorraine Funkhouser, Bradley Hurlburt, David Knowlton, Jeff Mihalik, Emmett Rafferty, Timothy Seiple, Bonnie Stayer, Christopher Urik, Ann VanderSchrier, Kevin Warner, Amanda Wasielewski, Mark Zellman

### UNDERGRADUATE STUDENT ADVISING:

GIS Certificate Advisor: responsibilities include supervising each student on a one semester independent study project, which involved some aspect of GIS and/or remote sensing data synthesis. Students are required to submit a final project summary in digital form.

2009: **Nicole Fontanella**, *T.B.D.*

2004: **Moss Clark**, *Analysis of TIR data from the handheld FLIR camera of the Mt. St. Helens Eruption*

2002: **Nicole Nastanski**, *Smithsonian Museum internship: Remote sensing of Mt. Rainier Volcano*

2002: **Kevin Perkey**, *GIS web-based search tool development for ASTER data*

2001: **Morgan Callahan**, *Using GIS and remote sensing to examine grizzly bear habitat in Yellowstone National Park, WY*

Undergraduate Research Advisor: responsibilities include advisement and supervision of an undergraduate research project typically lasting two semesters.

2009: **Nicole Fontanella**, *Data processing and analysis of multispectral FLIR data*

2009: **Michael Muder**, *Analysis of TIR temporal trends in North Pacific Volcanoes*

2007: **Sonja Melander**, *Thermal IR image and spectral analysis of Hawaiian pahoehoe lava flows*

2006: **Kelly Larotonda**, *ASTER image analysis and mosaic composite of the Sahara Desert*

2005: **Kevin Reath**, *Thermal IR analysis of Hawaiian pahoehoe lava emplacement and inflation*

2004: **Topher Hughes**, *IVIS network administration and further expansion/maintenance of the ASTER data scene viewer*

2003: **Brad Strittmatter**, *Expansion of the ASTER Scene Viewer using Java and Arc-IMS*

2002: **Alex Hanko**, *GIS and airborne TIR analysis of surface textures at Crater Glass lava domes, Medicine Lake, CA*

2002: **Erich Zorn**, *Petrographic study of the Mt. Unzen (Japan) lava dome: Comparisons to TIR spectroscopy results*

### SYNERGISTIC TEACHING ACTIVITIES:

Co-Director/Advisor: Professional M.S. (Pro-M.S.) Degree Program in Geographical Information Systems (GIS) and Remote Sensing (RS)

The Professional Science Master's degree program began in the Fall of 2002 with funding from the Alfred P. Sloan Foundation. Unlike a traditional thesis/research based M.S. degree, this program is unique in the physical sciences, drawn more from the paradigm of an M.B.A. The unique curriculum provides direct training on the latest GIS/RS software and equipment, while preparing students for careers in the geospatial sciences and management in such diverse fields as consulting, environmental non-profit organizations, research management, government agencies, technology applications, and others.

Planned/Organized: Biennial Volcanology field trip

The field trip is a week long and occurs the summer prior to the start of the semester in which Volcanology is taught (2001, 2003, 2005). Students travel to Long Valley, California to observe numerous volcanological examples, geological mapping and monitoring techniques. Those that participate are commonly more motivated in class, respond quicker and more accurately to questions, and do a more detailed final report.

**SERVICE:**

Lunar Exploration Analysis Group (LEAG):

2009 -- present: Lunar Exploration Roadmap planning committee panel member

NASA HypsIRI Mission Science Support Group (SSG):

2008 -- present: science support and analysis for the mission planning

NASA Advisory Council (NAC):

2006 -- 2009: Earth Sciences Subcommittee (ESS) panel member

International Society for Photogrammetry and Remote Sensing (ISPRS):

2005 - present: Arid Lands, Land Degradation and Desertification Working Group Co-Chair

Editorial Responsibilities:

Co-Editor, Journal of Volcanology and Geothermal Research, (special issue): *Volcanic Observations From Space: New Results From the EOS Satellite Instruments*, Elsevier Press, 2004

Co-Editor, (research textbook): *Infrared Spectroscopy in Geochemistry, Exploration, and Remote Sensing*, Mineralogical Association of Canada, 2004

Chaired conference/workshop sessions:

*Arc Dynamics of Kamchatka: Recent Volcanological, Geophysical, and Petrologic Results*, American Geophysical Union, Co-chairs: A. Simon (Univ. Nevada Las Vegas) and M. West (Univ. of Alaska Fairbanks), Fall, 2008

*NASA Workshop on Science Associated with the Lunar Exploration Architecture*, Planning Committee, Feb, 2007

*Geophysical observations of volcanic processes: Linking surface, air, and space based measurements*, American Geophysical Union, Co-chair: M. Poland (Hawaii Volcano Observatory), Spring, 2004

*Infrared spectroscopy in geochemistry, exploration & remote sensing*, Mineralogical Association Canada Annual Meeting, Co-chairs: P. King (Univ. Western Ontario) and G. Swayze (U.S. Geological Survey), May, 2004

*Closing the Loop: Remote Analysis of Terrestrial and Planetary Surfaces*, American Geophysical Union, Co-chair: J. Mustard (Brown Univ.), Fall, 2002

*Volcanic Observations From Space: New Results From the EOS Satellite Instruments*, American Geophysical Union, Co-chair: L. Flynn (Univ. Hawaii), Fall, 2001

*Planetary Sciences II - Posters*, American Geophysical Union (Spring, 2001)

*Volcano Monitoring - Posters*, American Geophysical Union (Fall, 1999)

Manuscript reviews for the following journals:

Advances in Environmental Monitoring and Modeling; Bulletin of Volcanology; Geological Society of America Bulletin; Geophysical Research Letters; International Journal of Remote Sensing; Journal of Arid Environments; Journal of Geomorphology; Journal of Geophysical Research (*Solid Earth, Planets*); Journal of Volcanology and Geothermal Research; Photogrammetric Engineering and Remote Sensing; Remote Sensing of the Environment

Proposal reviews for the following programs:

Earth Surface Interior (NASA); Mars Data Analysis Program (NASA); Mars Fundamental Research Program (NASA); Planetary Geology and Geophysics Program (NASA); Solid Earth and Natural Hazards Program (NASA); Petrology and Geochemistry Program (NSF); International Program (NSF); International Science and Technology Center (DOS)

NASA panel reviews:

Earth System Science Fellowship (ESS); Mars Data Analysis Program (MDAP); Mars Fundamental Research Program (MDAP); Planetary Geology and Geophysics Program (PGG); Planetary Instrument Definition and Development Program (PIDDP); Petrology and Geochemistry Program (NSF)

University of Pittsburgh service:

2006 - present: elected member of the Plant Utilization and Planning Committee (University of Pittsburgh Faculty Senate)

2002 - 2008: Institutional representative, Universities Space Research Association (USRA)

2001 - 2004: Departmental representative, Climate Change Research Group

Department of Geology and Planetary Science service:

Graduate Committee (2005 - 2007)

*aided in the review and reorganization of the graduate student requirements*

Curriculum Committee (2003 - 2006)

*assisted with the reorganization of the undergraduate B.S. curriculum and the planning of a new graduate core curriculum*

Faculty Search Committee (2001, 2002)

*assisted with the creation of the job advertisement and coordinated interviews/visits for the volcanology faculty candidates*

Space Committee, chairman (2000 - 2002)

*coordinated the planning and oversight with the A&S Dean's Office for the Department's renovation and relocation of several teaching computer laboratories, faculty offices, and research laboratories*

Departmental interactive multimedia kiosk (2001 - present)

*designed and programmed the point-of-presence kiosk at the entrance of SRCC, which offers a mineral display area, department directory, as well as showing educational videos and a custom-designed, touch screen computer monitor*

Webmaster (2002 - present):

*design and ongoing maintenance of the following sites:*

- IVIS Laboratory [<http://ivis.eps.pitt.edu/>]
- Pro-MS internet websites [<http://pro-ms.geology.pitt.edu/>]

Webmaster (2001 - 2009):

*assumed the responsibility for complete restructuring and redesign of the Departmental web site*

- Original Department Site (circa 2009) [<http://www.geology2.pitt.edu/>]

Outreach Activities:

***Research highlighted:***

National cable TV

- CNN, CNN International, BBC, Discovery Channel, National Geographic Channel

National Public Radio (Earth & Sky program)

- "["Volcanic Domes"](#) (2002)
- "["Watching Volcanoes from Space"](#) (2008)

Chronicle of Higher Education Article

- [“Under the Volcano”](#) (3/30/01)

NASA Earth Observatory Feature Article

- [“Domes of Destruction”](#) (2002)
- [“Flame & Flood”](#) (2003)
- [“Martian Craters”](#) (2005)

NASA Visible Earth Web Page Feature (2000, 2001, 2004, 2006)

Local TV (*Night Talk*, PCNC, 6 appearances; KDKA, 1 appearance)

Local newspapers (Pittsburgh Post-Gazette & Tribune Review, 2 articles each)

University of Pittsburgh newspapers (Pitt Chronicle, Pitt Campaign Chronicle)

**Public talks/seminars:**

**October, 2008:** University of Pittsburgh’s Science 2008 (Pittsburgh, PA)

*The interrelated wicked problems of lava flow emplacement and explosive volcanic hazard mitigation*

**April, 2008:** Allegheny Observatory Public Lecture Series (Pittsburgh, PA)

*Thermal infrared geologic observations: Past results and future directions of NASA's Mars, Moon, and Earth programs*

**June, 2007:** Challenger Learning Center of Alaska (Kenai, AK)

*Understanding Volcanic Processes on Earth and Mars Using Thermal Infrared Remote Sensing, Teacher Seminar*

**January, 2005:** Twentieth Century Club (Pittsburgh, PA)

*How can satellite data be used for the monitoring and mitigation of natural disasters?*

**April, 2004:** Carnegie Science Center’s SciTech Festival (Pittsburgh, PA)

*Mars Mission: “Beyond the nightly news”*

**March, 2004:** Central Catholic Advanced Placement Science Class (Pittsburgh, PA)

*Watching Cities from Space*

**January, 2003:** Astronomers Association of Pittsburgh (Pittsburgh, PA)

*Keeping an eye on active eruptions: Volcanology from the ground and from space*

**March, 2002:** Carnegie Museum of Natural History, Earth Explorer Series (Pittsburgh, PA)

*Exploring active volcanoes: What can be learned from an often deadly field-based science?*

**October, 2001:** Westinghouse Science Honors Institute (Pittsburgh, PA)

*Explosive science: Volcanology on the ground and from space*