

Professor of Volcanology & Planetary Science
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TEACHING / SERVICE

EDUCATION:

Arizona State University: Ph.D. (1996), Geology

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

2021 - 2022: sabbatical leave (*T.B.D.*)

2013 - present: Professor

2014 - 2015: sabbatical leave (*Australian National Univ., AU; Univ. of Bristol, UK*)

2013 - 2014: Associate Department Chair

2007 - 2008: sabbatical leave (*Arizona State Univ.; Alaska Volcano Observatory; Univ. of Hawaii*)

2006 - 2013: Associate Professor with tenure

2000 - 2006: Assistant Professor

University of Alaska - Fairbanks, Department of Geology and Geophysics

2004 - present: Affiliate (*Adjunct*) 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

RESEARCH:

MAJOR THEMES:

Instrument and Mission Design:

Developing new laboratory, field, airborne and orbital instrumentation is an important focus area that connects all other research themes. Laboratory and field based instrument development funded by NSF and NASA centers on new ways to measure infrared emitted energy from high-temperature surfaces such as lava flows. A NASA funded airborne imaging instrument, the Mineral and Gas Identifier (MAGI), was developed, flown, and serves as a possible future orbital prototype. Recent NASA proposals seek to develop new orbital TIR systems to examine gas and ash emissions from volcanoes and their impact on the climate.

Remote Sensing of Volcanic Eruptions and Processes:

Using orbital or airborne remote sensing provides the synoptic data of an active eruption and allows integration of the laboratory and field-based studies into a complete picture. Research using the ASTER sensor is centered on a decade-long funded project to develop a sensor-web approach to monitor the globe's most active volcanoes. The Urgent Request Protocol (URP) Program enables data to study the linkage between the renewal of activity at a volcano, the ability of remote sensing to detect that activity, and monitoring the subsequent hazards.

Planetary Surface Volcanology/Geomorphology:

Planetary research focuses on various volcanic and impact crater studies on Mars and the moon (as well as terrestrial analog sites). Thermal inertia data is being used to develop a model of interpreting eolian mantling on some of the youngest lava flows on Mars. Results should allow us to separate the spectral effects of mantling and better analyze the underlying flow compositions. Small-scale (< 2km) impact craters on Mars and the moon represent some of the most recent processes on the surface. Distinguishing impact craters 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 developing new remote sensing techniques, models can be tested for both of these processes.

Laboratory Infrared Spectroscopy:

High precision TIR vibrational spectroscopy provides information on the atomic structure of the minerals that form geologic materials. This research is focused on the spectral response that result as samples are physically mixed, varied in particle size, or heated to the point of a phase change. Measurements of entrained fine-grained ash and high-temperature melts have not been previously attempted in the laboratory, but results are leading to fundamental information about the structural and chemical changes that occur in volcanic materials.

Lava Flow Emplacement Dynamics:

Fundamental to understanding the behavior of lava flow and dome emplacement is the ability to extract key physical parameters about their surfaces such as temperature, vesicularity and morphology. This is accomplished by way of near-field observations using thermal cameras, field-based multispectral TIR data, and differential global positioning system (dGPS) data collection. The formation of glassy rinds, vesicular textures, and phenocrysts are each measurable using these tools. These data provide constraints for the modeling of properties such as flow inflation, viscosity changes, and flow propagation models.

Eolian Processes and Desertification:

Ongoing research is being conducted into eolian processes, including sediment transport, the radiative effects of dust, desertification and detection of soil moisture in a changing climate. Using satellite and ground-based techniques to study dynamic features such as dunes provides the synoptic ability to examine changes in sediment supply and climate conditions over time. It also allows for the monitoring of marginal drought and fire prone regions susceptible to future desertification and the point-sources for larger atmospheric dust storms. New work is focused on using thermal inertia to detect soil moisture at smaller scales during periods of drought.

Urban Environmental Science and Hazards:

A long-term research interest involves the application of remote sensing and geographical information system (GIS) modeling to monitor and analyze urban growth, its impact on the surrounding environment, and the associated hazards. By using approaches similar to those used for the data analysis and visualization of volcanoes and eolian targets, key urban data products are generated such as calibrated/geometrically accurate land use change, material identification, heat island maps and their changes over time.

MAJOR RESEARCH FUNDING:

Infrared detection of gas and ash compositions in volcanic plumes

Period: 2021-2023

NASA, Earth Surface and Interior Program

PI: Michael Ramsey

Geostationary analysis of volcanic activity: Improving the near real-time monitoring, modeling, and forecasting of ash- and SO₂-rich plumes

Period: 2020-2023

NASA, Earth Science Research from Operational

PI: Michael Ramsey

Geostationary Satellite Systems Program

Modeling emplacement of the recent Tolbachik basaltic flow field to improve constraints on past lava flow forming eruptions on Mars

Period: 2018-2021

NASA, Solar System Workings Program

PI: Michael Ramsey

Quantifying volcanic eruption thermal and degassing precursors through expansion of the ASTER Urgent Request Protocol

Period: 2018-2021

NASA, The Science of Terra, Aqua, and Suomi NPP Program

PI: Michael Ramsey

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

Period: 2006-2021

NASA, Mars Odyssey Participating Scientist Program

PI: Michael Ramsey

PENDING PROPOSALS:

Precursor: The first orbital volcano observatory acquiring hypertemporal 3D data of ongoing and future eruption precursors

Period: 2022-2029

NASA, Earth Venture Mission - 3 (EVM-3) Program

PI: Michael Ramsey

PAST/COMPLETED PROJECTS:

Improving thermal modeling of effusive volcanism: Quantifying the variability in radiant emission from active lava flows and lakes

Period: 2017-2020

NASA, Earth and Space Science Graduate Fellowship Program

PI: Michael Ramsey

Funded GSR: James Thompson

Modeling the recent volcanic and eolian processes in Daedalia Planum, Mars using thermophysical, spectral, and morphological data

Period: 2017-2019

NASA, Earth and Space Science Graduate Fellowship Program

PI: Michael Ramsey

Funded GSR: Christine Simurda

Quantifying active volcanic processes and hazards with HypIRI

Period: 2015-2019

NASA, HypIRI Preparatory Program

PI: Michael Ramsey

Analysis of proximal volcanic emissions

Period: 2015-2018

NASA, Earth and Space Science Graduate Fellowship Program

PI: Michael Ramsey

Funded GSR: Daniel Williams

Mapping volcanic ash plumes using ground and satellite thermal imaging: A new approach to understanding explosive eruptions and reducing population risks

Period: 2015-2018

NGS, Research and Exploration Program

PI: Michael Ramsey

Co-PI: Daniel Williams

The spectral and thermal response of active basaltic surfaces: Constraining lava cooling, petrology and flow propagation models

Period: 2014-2018

NSF, Petrology and Geochemistry Program

PI: Michael Ramsey

Near-real time data acquisition and modeling of volcanic processes using a multi-instrument approach: Effects on climate, the solid earth and the prospect of eruption forecasting

Period: 2014-2018

NASA, The Science of Terra, Aqua and Aura Program

PI: Michael Ramsey

Pyroclastic flow and lahar hazards in populous, developing regions: Integrated TIR and SAR data analysis

Period: 2014-2017

NASA, Earth and Space Science Graduate Fellowship Program

PI: Michael Ramsey

Funded GSR: Janine Krippner

Development of a long-wavelength infrared camera for planetary exploration

Period: 2012-2014

NASA, Planetary Instrument Definition and Development Program

PI: Philip Christensen (Arizona State University)

Co-I: Michael Ramsey

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

Period: 2011-2016

NASA, Planetary Geology and Geophysics Program

PI: Michael Ramsey

Volcanic forcing effects on climate and solid-earth systems: Integration of Terra and Aqua datasets into the ASTER Urgent Request Protocol (URP)

Period: 2011-2015

NASA, The Science of Terra and Aqua Program

PI: Michael Ramsey

Infrared spectroscopy of melts: New approaches to understanding lava flow emplacement

Period: 2010-2014

NSF, Petrology and Geochemistry Program

PI: Michael Ramsey

Mineral and gas identification using a high-performance thermal infrared imaging spectrometer

Period: 2008-2012

NASA, Instrument Incubator Program

PI: Jeffrey 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: 2008-2012

NASA, Earth System Science Research Program

PI: Michael Ramsey

Investigations of terrestrial and planetary lava flows

Period: 2007-2011

NASA, Planetary Geology and Geophysics Program

PI: David Crown (Planetary Science Institute)

Co-I: Michael Ramsey

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

Period: 2007-2011

NSF, Petrology and Geochemistry Program

PI: Michael Ramsey

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

Period: 2007-2008

NGS, Research and Exploration Program

PI: Michael Ramsey

Co-PI: Adam Carter

Using multi-sensor data fusion to estimate dust aerosol composition and its effect on longwave radiative forcing

Period: 2006-2010 NASA, Earth and Space Science Graduate Fellowship Program
PI: Michael Ramsey Funded GSR: Stephen Scheidt

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-I: 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

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

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

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:

- 4/21 **Enabling volcano science through thermal infrared spectroscopy, image analysis, and designing cool instruments**, Department of Physics and Astronomy, Northern Arizona University
- 5/19 **Modeling lava flow cooling and propagation: Thermal infrared imaging from the micron to the global scale**, Department of Earth Sciences, University of Turin, Italy
- 9/18 **Remote sensing of volcanic plume gas-solid interactions using laboratory, ground and orbital thermal infrared data**, Elizabeth & Frederick White Conference 2018, Australia National University, Canberra, Australia
- 4/18 **Developing ground- and space-based thermal infrared sensors: The orbital monitoring and science of volcanic processes**, Electrical and Computer Engineering Graduate Seminar, University of Pittsburgh, Pittsburgh, PA
- 9/16 **Orbital monitoring and science of geologic processes: Seeing worlds in the thermal infrared**, Office of Research Faculty Speaker Series, University of Pittsburgh, Pittsburgh, PA
- 2/16 **Terrestrial volcanology from the micron to the global scale**, Department of Geosciences Colloquium, University of Arizona, Tucson, AZ
- 1/16 **Imaging volcanoes from the micron to the global scale**, School of Earth and Space Exploration Special Seminar, Arizona State University, Tempe, AZ
- 10/15 **Thermal infrared properties of active lava flows: Using remote sensing, laboratory and field data to constrain cooling and flow propagation**, Department of Geological Sciences Colloquium, University of Missouri, Columbia, MO
- 5/15 **Infrared properties of active lava flows: Using remote sensing, laboratory and field thermospectral data to constrain cooling and flow propagation**, Volcanology Seminar, School of Earth Sciences, University of Bristol, Bristol, UK
- 4/15 **Thermal infrared spectroscopy and remote sensing: A new approach to understand the silicate structure and petrology of lavas**, Petrology Seminar, School of Earth Sciences, University of Bristol, Bristol, UK
- 12/14 **Application of ground and spaceborne thermal infrared data for monitoring dryland surface processes**, Ocean & Climate Geosciences Seminar, Research School of Earth Sciences, Australia National University, Canberra, Australia
- 11/14 **Application of ground and spaceborne thermal infrared data for monitoring dryland surface processes**, Geoscience Australia Distinguished Lecture Series, Canberra, Australia
- 6/14 **Thermophysical and thermospectral analysis of terrestrial and planetary surfaces**, Southwest Research Institute Colloquium, Boulder, CO
- 2/14 **Application of thermal infrared data to geoscience research and natural disasters**, Geosciences Department Colloquium, UNLV, Las Vegas, NV
- 9/13 **A super-resolution application for improved thermal infrared multispectral image data**, Imaging in Geospatial Applications Conference, Minneapolis, MN
- 12/12 **Dynamics of the lava dome at Shiveluch volcano, Kamchatka assessed using near-field remote sensing**, AGU Fall Meeting, San Francisco, CA
- 11/11 **Thermal infrared imaging science of active volcanoes and other geological processes**, Keynote Talk, InfraMation 2011 Annual Conference, Las Vegas, NV
- 10/11 **From active volcanoes to active dunes: Application of thermal infrared data to geoscience research**, Geosciences Department Colloquium, Stony Brook University, Stony Brook, NY
- 3/11 **Thermal infrared spectroscopy and remote sensing: Deciphering natural disasters and other surface processes**, Department of Geology and Environmental Science Colloquium, Univ. of Akron, OH
- 5/10 **What are we learning from quantitative thermal infrared data of volcanoes other than they are hot?**, Hawaii Volcano Observatory Seminar, Kilauea, HI

- 12/09 **What more have we learned from thermal infrared remote sensing of active volcanoes other than they are hot?**, AGU Fall Meeting, San Francisco, CA
- 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**, Department of Earth Sciences Colloquium, University of Bristol, 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?**, Geology and Planetary Science Department Colloquium, University of Pittsburgh, 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**, Geological Sciences Department Colloquium, Ohio University, Athens, OH
- 1/06 **Quantitative surface observations of the Earth and Mars: Seeing through the "eyes" of the thermal infrared**, Geology and Planetary Science Department Colloquium, University of Pittsburgh, Pittsburgh, PA
- 9/05 **Comparative infrared observations of dome growth processes at Mt. St. Helens and the volcanoes of Russia's Kamchatka Peninsula**, Geological/Mining Engineering & Sciences Department Colloquium, Michigan Technological University, Houghton, MI
- 9/04 **Through the "eyes" of the thermal infrared: Observations and results from the surfaces of Mars and Earth**, Geological/Mining Engineering & Sciences Department Colloquium, Michigan Technological University, 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**, Geology Department Colloquium, University of Western Ontario, London, Ontario
- 7/01 **Lessons learned from field work on active, explosive volcanoes: Comparison of Shishaldin, Alaska and Semeru, Indonesia**, Geology & Geophysics Department Seminar, University of Hawaii, 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?**, Geology Department Colloquium, Indiana University of Pennsylvania, Indiana, PA
- 5/99 **Understanding the “big picture”: Strategy development for the global monitoring of planetary processes on Earth and Mars**, Geology and Planetary Science Department Colloquium, University of Pittsburgh, Pittsburgh, PA
- 11/98 **Beyond thermal anomaly detection: The next decade of volcanic monitoring and hazard mitigation using infrared remote sensing**, Department of Geology Pegrum Seminar, State University of New York - Buffalo, 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**, Geology Department Seminar, University of Washington, Seattle, WA

HONORS AND AWARDS:

- 2016 Selected by the National Academy of Science as a member of the 2017 Decadal Survey for Earth Science from Space
- 2015 Selected as a National Geographic Explorer, National Geographic Society (NGS)
- 2015 Selected as Outstanding Student Presenter Award (OSPA) within the AGU VGP Section
Krippner, J.B., Belousov, A., Belousova, M., **Ramsey, M.**, The 2005 and 2010 dome collapse driven block and ash flows on Shiveluch volcano, Kamchatka: Morphological analysis using satellite- and field-based data, 2015 Fall Meeting, AGU, San Francisco, 2015.
- 2014 Nominated: Provost's Award for Excellence in Mentoring, University of Pittsburgh
- 2012 Awarded promotion to Professor, University of Pittsburgh
- 2009 Selected as Best Student First-Author Presentation within the AGU VGP Section
Lee, R.J. and **Ramsey, M.S.**, A high-temperature micro-furnace for in-situ spectral analysis of quartzofeldspathic melts, *Eos Trans. AGU*, 90(52), Fall Meet. Suppl., Abst. V13B-2030, 2009.
- 2008 Selected as Best Student First-Author Presentation within the AGU VGP Section
Rose, S. and **Ramsey, M.S.**, The Eruptive Behavior of Klyuchevskoy Volcano, Kamchatka, *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abst. V43A-2141, 2008.
- 2007 Selected as a National Geographic Explorer, National Geographic Society (NGS)
- 2006 Awarded promotion to Associate Professor with tenure, University of Pittsburgh
- 2002 Selected as Best Student First-Author Presentation 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, *Am. Geophys. Union Fall Meeting, Abs. B61C-0740*, 2002.
- 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
- 1991 Phi Kappa Phi National Honor Society

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), **Kyle Ashley** (Univ. Pittsburgh), **Alexander Belousov** (Inst. Volc. & Seis., Russia), **Oryaelle Chevrel** (Univ. Clermont Auvergne), **Philip Christensen** (Arizona State Univ.), **Diego Coppola** (Univ. Turino), **David Crown** (Planetary Science Inst.), **Jonathan Fink** (Portland State Univ.), **Jeffrey Hall** (Aerospace Corp.), **Vicky Hamilton** (Southwest Research Inst.), **Andrew Harris** (Univ. Clermont Auvergne), **Simon Hook** (Jet Propulsion Laboratory), **Penny King** (Australian National University), **Nicholas Lancaster** (Desert Research Inst., NV), **Rachel Lee** (SUNY Oswego), **Matthew Patrick** (USGS/HVO), **David Pieri** (Jet Propulsion Laboratory), **Michael Poland** (USGS/CVO), **Vincent Realmuto** (Jet Propulsion Laboratory), **Tyrone Rooney** (Michigan State Univ.), **Steven Ruff** (Arizona State Univ.), **Stephen Scheidt** (Univ. Arizona), **David Tratt** (Aerospace Corp.), **Matthew Watson** (Univ. Bristol, UK), **Peter Webley** (Univ. of Alaska Fairbanks); **Rick Wessels** (USGS/VDAP), **Robert Wright** (Univ. of Hawaii)

SYNERGISTIC RESEARCH ACTIVITIES:

Science team member (MAGI instrument – NASA): Assisted in the development and calibration of the airborne Mineral and Gas Identifier (MAGI) and responsible for science/site selection. Funded under the Instrument Incubator Program and built by Aerospace Corporation, MAGI is a new hyperspectral thermal infrared design and serves as a prototype for the next generation of Earth-orbiting TIR sensors (2008 – 2013).

Science team member (ASTER instrument – NASA): Responsible for numerous instrument calibration/validation/science activities. Science PI and coordinator of the multi-satellite integration program for volcanic monitoring. Duties also entail presenting 3-4 talks at each yearly international ASTER science team meetings as well as chair of the Ecosystems Working Group for ASTER (2004 – present).

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 (2006 – present).

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 Puçon, 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 (Tenerife, Spain; Gran Desierto, Mexico, Atacama Desert, Chile, and multiple U.S. locations); and active volcanic processes (Chile, Guatemala, Iceland, Indonesia, Japan, Nicaragua, Russia, and multiple US locations including Hawaii and the Aleutian Islands).

TEACHING EXPERIENCE:

Undergraduate Coursework (University of Pittsburgh, 2000-present)

Natural Disasters (GEOL-0820)

Natural Disasters was originally proposed in 2003, 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 such as earthquakes, volcanic eruptions, tornadoes, hurricanes, tsunamis, & wildfires, and includes a one-hour per week recitation. A recitation manual was written and published in 2012. In its first offering the course became the largest taught in recent Departmental history (224 students), and increased significantly in the following years. (*Spring 2005-2006, 2008-2014, 2016-2021*)

Instructor: Ramsey

Average class size: 300

Earth System Science (GEOL-0840)

This course was developed based on the integrated discipline of Earth System Science that rapidly developed 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. This course is no longer offered in the Department. (*Spring 2002, 2004*)

Instructor: Ramsey

Average class size: 46

The Planets (GEOL-0870)

This course is a staple in the Department and examines the historical context and current state of the science for the various bodies that make up the planetary system, including planets, satellites, asteroids and comets, how they were formed, and the factors that control the nature of their surfaces and atmospheres. (*Fall 2010-2012*)

Instructor: Ramsey

Average class size: 30

Introduction to Remote Sensing (GEOL-1460)

This course 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. (*Spring 2002-2003; Fall 2004-2006, 2008-2013, 2015-2020*)

Instructor: Ramsey

Average class size: 45

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. (*Fall 2000, 2002*)

Instructor: Ramsey

Average class size: 26

Graduate Coursework (University of Pittsburgh, 2000-present)

A Geologic Odyssey (GEOL-2001)

The geologic odyssey course is required for all new MS and PhD students in Geology and Planetary Science. It is designed to introduce students to the professors in the department and the science they conduct. Each week is organized by a different professor who presents their background, research, and conducts a "micro-class" on some aspect of this work. (Fall 2013)

Instructor: Ramsey

Initial class size: 10

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 images, ground-based data and the physical world. (Fall 2002; Spring 2001, 2004, 2006, 2009, 2011, 2013, 2016, 2018, 2020)

Instructor: Ramsey

Average class size: 10

Advanced Remote Sensing (GEOL-2641)

This course is offered to graduate students at the same time as the GEOL-1460 course. It is designed to allow students with previous remote sensing experience to conduct an independent, semester-long remote sensing/GIS project that is presented to the GEOL-1460 class at the end of the term. (Fall 2011-2013, 2015-2019)

Instructor: Ramsey

Average class size: 6

Advanced Geohazards & Risk Management (GEOL-2640)

The AGRM course was designed to be a more rigorous graduate-level 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. (Spring 2005, 2010, 2012, 2014, 2017, 2019)

Instructor: Ramsey

Average class size: 8

Volcanology (GEOL-2750)

This introductory physical volcanology course offered at the graduate level covers the physical properties of lavas, the geomorphology of volcanic landforms, the dynamics and monitoring of volcanic eruptions, and the emplacement of volcanic deposits. *After 2005, this course was taught by Ian Skilling, while Ramsey developed the new Natural Disaster/Geohazards sequence.* (Fall 2001, 2003, 2005)

Instructor: Ramsey

Class size: 11

Remote Exploration of the Moon & 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 the moon and Mars. Numerous missions from rovers to orbiters have been sent to these bodies, with each carrying remote sensing instruments. The data returned from those instruments led to important discoveries and are the focus of this course with an independent project conducted by the students. (Spring 2003, 2019; Fall 2005, 2010, 2015, 2019)

Instructor: Ramsey

Average class size: 5

Orbital Imaging of the Earth (GEOL-3971)

This advanced seminar-style class follows on to the GEOL-3970 course and focuses on the theory, technology, and science over the history of remote sensing missions of the Earth from the 1960's to present day. The data returned from those instruments have led to important discoveries and are the focus of this course with an independent project conducted by the students. (Spring 2016)

Instructor: Ramsey

Average class size: 7

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

Introduction to Physical Geology (GLG-101): average class size: 160 (Spring 1997, 1998)

Applied Remote Sensing (GLG-598): average class size: 15 (Fall 1998)

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:

James Thompson

term at Univ. Pittsburgh: 2020-2022

Currently: Postdoctoral Researcher, Baylor University (Waco, TX) and University of Pittsburgh (Pittsburgh, PA)

Daniel Williams

term at Univ. Pittsburgh: 2018-2019

Currently: Visiting Assistant Professor, University of Pittsburgh (Pittsburgh, PA)

Shawn Wright

term at Univ. Pittsburgh: 2017-2018

Currently: Researcher Professor, The University of Hong Kong (Hong Kong, PRC)

Kevin Reath

term at Univ. Pittsburgh: 2016

Currently: Deputy Program Manager, Earth Surface and Interior (ESI), NASA Headquarters (Washington, DC)

Rachel Lee

term at Univ. Pittsburgh: 2011 - 2013

Currently: Associate Professor, SUNY Oswego (Oswego, NY)

Christopher Hughes

term at Univ. Pittsburgh: 2011

Currently: University of Missouri, Kansas City (Kansas City, MO)

Stephen Scheidt

term at Univ. Pittsburgh: 2009 - 2010

Currently: Associate Research Scientist, Howard University (Washington, DC)

Adam Carter

term at Univ. Pittsburgh: 2008 - 2009

Currently: Principal I Geologist, BHP Petroleum (Houston, TX)

Jeffrey Byrnes

term at Univ. Pittsburgh: 2003 - 2005

Currently: Senior Research Scientist, Radiance Technologies (Dayton, OH)

GRADUATE STUDENT ADVISING:

Current Graduate Students:

Ian Flynn (*Ph.D. candidate*)

began studies: August, 2017

Dissertation Topic: Thermorheological modeling lava flow emplacement on Earth and Mars

Tyler Leggett (*Ph.D. candidate*) began studies: August, 2019
Dissertation Topic: Thermal anomaly detection in IR images and multispectral IR camera development for volcanic gas studies

Ben McKeeby (*Ph.D. candidate*) began studies: August, 2017
Dissertation Topic: Thermal infrared emissivity analysis for improved planetary surface roughness modeling

Past Graduate Students (Ph.D. degree):

Adam Carter completed: August, 2008
Dissertation Title: *Quantitative thermal infrared analyses of volcanic processes and products: Application to Bezymianny Volcano, Russia*
Currently: Principal I Geologist, BHP Petroleum (Houston, TX)

Alison Graettinger completed: June, 2012
Dissertation Title: *Building ice-age Askja: Processes, products and paleoclimate*
Currently: Assistant Professor, University of Missouri, Kansas City (Kansas City, MO)

Topher Hughes completed: November, 2010
Dissertation Title: *Improved mapping accuracy of planetary surfaces using super-resolution of thermal infrared data*
Currently: University of Missouri, Kansas City (Kansas City, MO)

Jefferson Hungerford completed: November, 2013
Dissertation Title: *The mechanics of subglacial basaltic lava flow emplacement: Inferring paleo-ice conditions*
Currently: Park Geologist, Yellowstone National Park (Yellowstone, WY)

Janine Krippner completed: August, 2017
Dissertation Title: *Dome collapse driven block-and-ash flows on Shiveluch, and pyroclastic flows on Mount St. Helens: Deposit morphology and distribution analysis using multiparameter remote sensing-and field-based methods*
Currently: Global Volcanism Program (GVP), Smithsonian Institution (Washington, DC)

Rachel Lee completed: April, 2011
Dissertation Title: *Thermal emission spectroscopy of silicate glasses and melts: Applications to remote sensing of glassy volcanic environments*
Currently: Associate Professor, SUNY Oswego (Oswego, NY)

Redha Mohammad completed: May, 2012
Dissertation Title: *Using thermal infrared (TIR) data to characterize dust storms and their sources in the Middle East*
Currently: Instructor, Kuwait University (Kuwait City, Kuwait)

Shellie Rose completed: December, 2010
Dissertation Title: *Thermal infrared remote sensing of active basaltic volcanoes: A thermal and spectral deconvolution approach*
Currently: Research Specialist, Army Corps of Engineers (Honolulu, HI)

Kevin Reath completed: Dec, 2015
Dissertation Title: *Thermal infrared analysis of volcanic processes*
Currently: Deputy Program Manager, Earth Surface and Interior (ESI), NASA Headquarters (Washington, DC)

Stephen Scheidt completed: November, 2009
Dissertation Title: *Aeolian system dynamics derived from thermal infrared data*
Currently: Associate Research Scientist, Howard University (Washington, DC)

Christine Simurda completed: March, 2019
Dissertation Title: *Quantitative Analysis of Thermophysical Properties of Lava Flows on Earth and Mars*
Currently: Postdoctoral Researcher, University of Texas Applied Research Laboratories (Austin, TX)

James Thompson completed: May, 2020
Dissertation Title: *Quantifying thermal infrared emission from active lava surfaces to improve models of effusive volcanism*
Currently: Postdoctoral Researcher, University of Pittsburgh (Pittsburgh, PA) and Baylor University (Waco, TX)

Daniel Williams completed: August, 2018
Dissertation Title: *An Analysis of Proximal Volcanic Ash Emissions*
Currently: Visiting Assistant Professor, University of Pittsburgh (Pittsburgh, PA)

Past Graduate Students (M.S. degree):

Nathan Beauchamp completed: December, 2017
Dissertation Title: *Numerical modeling of the Daedalia Planum lava flows, Mars*
Currently: Data Archivist, IVIS Laboratory, University of Pittsburgh (Pittsburgh, PA)

Melanie Hellman 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) (New York, NY)

Sally Kuhn completed: December, 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 completed: November, 2003
Thesis Title: *Multi-frequency, multi-temporal, brush fire scar analysis in a semi-arid urban environment*
Currently: Assistant Professor, Edinboro University PA (Edinboro, PA)

Mark Price completed: May, 2013
Thesis Title: *Thermophysical characteristics of mantled terrestrial volcanic surfaces: Infrared analogs to Arsia Mons*
Currently: Staff Professional, Antea Group (Cleveland, OH)

Kevin Reath completed: August, 2011
Thesis Title: *Hyperspectral thermal infrared analysis of the Salton Sea geothermal field*
Currently: Deputy Program Manager, Earth Surface and Interior (ESI), NASA Headquarters (Washington, DC)

Shawn Wright 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: Researcher Professor, The University of Hong Kong (Hong Kong, PRC)

Additional Graduate Committee Appointments (2000 - present): ~ 35

Pro-M.S. Students:

Responsibilities include co-advisement and co-supervision of all students within the Professional Science Master's (Pro-MS) degree program in GIS/Remote Sensing. Work includes recruitment, curriculum development, course scheduling, and project advisement/final evaluation. Students in the Pro-MS program 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 (e.g., Geology, Communication, Statistics), as well as a summer-long internship in industry.

Current: David Knecht, Shangbin Tang, Robert Max Winn

Graduated: Jessica Barnabei, Alexander Bear, Jessica Benner, Darryl Bishop, Christopher Bostwick, Thomas Bouch, Kari Cavada, Langkun Chen, Kelly Dreibelbis, Xuejiao Feng, Christopher Fisher, Erick Fox, Sean Fulton, Lorraine Funkhouser, Bradley Hurlburt, Katherin Kirchen, David Knowlton, Randy Lentz, Anqi Lin, Jeff Mihalik, Elizabeth Monk, James Morar, Jonathan Mori, Alex Muckle, Michelle Neustein, Emmett Rafferty, Patricia Roncevich, Timothy Seiple, Tina Shendge, Charles Spicer, Elisabeth Spindler, Ryan Stahl, Bonnie Stayer, Meirman Syzdykbayev, Christopher Urik, Ann VanderSchrier, Kevin Warner, Xiaokun Ma, Yanbo Wang, Amanda Wasielewski, Kristin Yahner, Mark Zellman

UNDERGRADUATE STUDENT ADVISING:

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

2021: **Lauren Lesniak**, *Landslide assessment in Allegheny County*

2016: **Alex Hutcheson**, *ASTER DAR and STAR web-based GIS viewer project*

2016: **Joseph McFarland**, *Santa Maria volcano hazard assessment*

2014: **Peter Feczko**, *GIS and remote sensing analysis of vegetation coverage for the Monongahela National Forest and Allegheny National Forest*

2014: **Derek Feger**, *GIS viewshed analysis of Pittsburgh billboards*

2013: **Susan King**, *Decline in vegetation health in the Allegheny National Forest*

2013: **Alex Dalla Piazza**, *Hurricane Sandy impact analysis*

2012: **Justin Skrabec**, *Greene County Pennsylvania Oil and Gas Wells*

2009: **Nicole Fontanella**, *Petrology and infrared spectroscopy of the Medicine Lake, CA volcanic rocks*

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.

2021: **Anne Bouley**, *planetary science study (TBD)*

2021: **Samuel Alten**, *Descriptive analysis of real-time satellite data of new volcanic eruptions*

2020: **Cole Miller**, *Thermal baseline study of the 2020-2021 Kliuchevskoi eruption*

2020: **Frances Russo**, *Mars lava flow dimensional analysis and eruption modeling*

2018: **Rachel Albert**, *Petrologic and photogrammetric analysis of Hawaiian lava samples*

2012: **Nate Wigton**, *Analysis of TIR temporal trends in North Pacific volcanoes*

2012: **Anna Downy**, *NASA PGG Intern (SUNY Oneonta), THEMIS analysis of Arsia Mons*

- 2011: **Aleeza Harburger**, *Analysis of Hawaii FLIR data to estimate crust formation rates and thickness*
- 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:

United Nations Office for Disaster Risk Reduction (UNDRR):

2020 – present: Global Risk Assessment Framework (GRAF) Working Group Member

NASA Headquarters:

2017 – present: Deep Space Gateway and Lunar Surface Science Advisory Group Member

National Academy of Science 2017 Decadal Survey for Earth Sciences:

2016 – 2017: Solid Earth and Integrated Themes panel member

Lunar Exploration Analysis Group (LEAG):

2009 – 2010: Lunar Exploration Roadmap planning committee panel member

NASA HypIRI 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 – 2008: 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:

Quantitative Volcanic Hazard Assessment and Uncertainty Analysis in Satellite Remote Sensing and Modeling, American Geophysical Union, Co-chairs: C. Del Negro (Nat. Inst. of Geophy. and Volc.), A. H erault (Nat. Conserv. Arts and Trades) and M. Watson (Univ. Bristol), Fall, 2018.

Earth observations: External instruments, Deep Space Gateway Science Workshop, February, 2018.

Lava Flow Hazard Monitoring, American Geophysical Union, Co-chairs: C. Del Negro (Nat. Inst. of Geophy. and Volc.) and E. Lev (Columbia Univ.), Fall, 2017

Capturing Dynamic Processes with Satellite Imaging, Geological Society of America Mtg., Northeastern and North-Central Joint Meeting, March, 2011

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:

Advances in Environmental Monitoring and Modeling; Bulletin of Volcanology; Geological Society of America Bulletin; Geophysical Research Letters; Icarus; 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; Remote Sensing of the Environment; Scientific Reports

Research proposal reviews:

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)

Panel proposal reviews:

NASA: Discovery Mission Program; Earth System Science Fellowship (ESS); HypsIRI Preparatory Program (HPP); Mars Data Analysis Program (MDAP); Mars Fundamental Research

Program (MFRP); New Investigator Program (NIP); Planetary Geology and Geophysics Program (PGG); Planetary Instrument Definition and Development Program (PIDDP)
NSF: Petrology and Geochemistry Program (CH)

University of Pittsburgh service:

2019 – 2020: Drone Policy Group

2017 – 2018: elected member, Faculty Tenure Council

2014 – 2016: elected member, Faculty Senate Council

2013 – 2016: elected member, Faculty Senate Assembly

2006 – 2015: elected member, Plant Utilization and Planning Subcommittee (*standing committee of the Faculty Senate*)

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

2001 - 2004: Departmental representative, Climate Change Research Group

Departmental service:

Associate Department Chair (2013 – 2014)

responsible for duties required by the Department Chair

Director of Graduate Studies (2010 – 2011)

responsible for the graduate program in the Department

Graduate Committee (2005 – 2011)

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, 2011)

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 – 2017)

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/>]

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:

Press/National News:

NASA Earthdata Website Feature:

- Researcher Profile (2018)

National TV

- CNN, CNN International, ABC's Nightline, BBC, Discovery Channel, National Geographic Channel

National Public Radio (Earth & Sky program)

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

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, 2015: "Saturday Morning Science" Speaker Series, University of Missouri, Columbia, MO.

Seeing Worlds in the Thermal Infrared

April, 2013: NASA "Know Your Earth 3.0".

Selected by NASA HQ as the scientific representative for the Terra Mission as part of a featured social media, billboard, and speaker campaign.

October, 2012: AVID Speaker, Hamilton County High School, Jasper, FL.

Life in the "hot seat": So, how did I end up studying natural disasters like erupting volcanoes for a living?

November, 2011: InfraMation 2011 Annual Conference - Keynote Speaker, Las Vegas, NV.

Thermal infrared imaging science of active volcanoes and other geological processes

April, 2009: Allegheny Observatory Public Lecture Series (Pittsburgh, PA)

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

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

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

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