Executive Summary

The Department of Geosciences has undergone much change since 2011 with seven new assistant professors hired between 2011 and 2013. In 2013, we were successful in recruiting Sterling Nesbitt, a vertebrate paleontologist who earned his BA from the UC Berkeley and his MSc and PhD from Columbia University. Sterling was a Meeker Postdoctoral Fellow, a prestigious position in the Field Museum of Natural History in Chicago before joining the department. We also hired Michelle Stocker, an expert in vertebrate faunal dynamics, as a research scientist. Michelle received her B.Sc. from the University of Michigan, her M.Sc. from the University of Iowa and her Ph.D. at University of Texas at Austin.

With the influx of new faculty, fresh approaches to the discovery, learning and engagement missions of the department are emerging. There was also a transition among our staff as Ellen Mathena retired from the Department of Geosciences in December 2013 after 37+ years of exemplary service in the department. We were delighted to recruit Sharon Collins to join our department’s administrative staff with Ellen’s departure.

In addition to a stellar group of faculty and staff, the support of Prof. Robert Tracy (Associate Chair), Prof. Ken Eriksson (Graduate Program Director) and Ms. Connie Lowe (Student Coordinator) must be acknowledged. Their combined efforts have ensured that that we exceed the needs of our students and faculty and continue to grow our reputation as a department of excellence.

Patricia Dove’s induction in the NAS in April 2013.
Our faculty continue to attract many prestigious awards and honors as summarized below. Patricia Dove was inducted into the National Academy of Sciences in April 2013 (see above). She was also recognized as Virginia’s Outstanding Scientist in 2013 and was awarded a University Distinguished Professorship in 2013.

Our graduate programs continue to rank highly and enrolled 64 students in 2013-14. U.S. news and World report ranked the paleontology program 9th in the nation and the earth sciences program holds steady at 28th overall.

The department strengthened links with industrial sponsors. John Hole renewed a 3-year Landmark Graphics Corporation University Grant Program software license, with a commercial value $60,062,866. Brian Romans established a petroleum industry-sponsored research consortium with collaborators at the University of Calgary and University of Utah for stratigraphic research on outcropping deep-marine deposits in southern Chile. Thirteen companies that have agreed to sponsor the program.

I. Research and Innovation

The Department of Geosciences has active research grants totaling $13M from external funding agencies including NSF, DOE, NETL, USGS, NASA, and industrial companies. In 2013-14, the department had grants totaling $3.04M and $3.42M in research expenditures. These values compare with $3. M in awards and $3.43M expenditures in 2012-13.

Notable new research awards in 2013-14 (incl. PIs, Amount, Title and Funding Agency)

There were 24 new awards totaling $2.15M in 2013. The new awards totaling more than $250,000 in 2013 include:

- Mike Hochella and Peter Vikesland (CEE) were awarded new installments from the $1,750,000 from the National Science Foundation for the collaborative Center for Environmental Implications of Nanotechnology (CEINT).

- Mike also received $479,858 from DOE BES for “Comparative Reactivity of Bacteriogenic and Abiogenic Mineral Nanoparticle Analogs Amount”

- Patricia Dove was awarded $498,000 from DOE BES for “Investigating the Physical Basis of Biomineralization.”.

- Brian Roman’s proposal, “Chile Slope Systems: Architectural Analysis and Modeling of Outcropping Slope Deposits, Magallanes Basin, Chile”, is a multi-disciplinary and multi-institution research program with University of Calgary and University of Utah and 13 companies. $300,000 was awarded to Brian in 2013.

- Benjamin Gill was awarded $234,209 from the NSF for “Collaborative Research: Deciphering the regional-versus-global aspects of the Toarcian (Jurassic) Oceanic Anoxic Event in North America”.
• Scott King was awarded $257,155 from NASA for “Testing hypotheses of Venus resurfacing using 3D spherical convection models”.

• Martin Chapman was awarded $258,000 from Consol Energy, Inc. for “Seismic Monitoring of the Buchanan #1 Mine”.

Although not included in grant totals, John Hole was instrumental in obtaining a university grant software license for exploration geophysics and geology from Landmark Graphics Corporation with commercial value $60,062,866

Faculty awards/honors:

Our faculty continue to attract many prestigious awards and honors.

• Tom Burbey: Member of UNESCO’s Working Group on Land Subsistence and as a member of the Board of Directors of Environmental & Engineering Geoscience.
• Martin Chapman was elected President of the Eastern Section of the Seismological Society of America. Chapman: Chairman, Path Working Group, NGA-East Project, Pacific Earthquake Engineering Research Center, University of California, Berkeley.
• Patricia Dove’s induction into the National Academy of Sciences in April 2013 (see see Figure 1). She was also recognized as Virginia’s Outstanding Scientist in 2013 and was awarded a University Distinguished Professorship in 2013. She was also awarded the 2014 Dana Medal in 2013 from the Mineralogical Society of America.
• Mike Hochella: Selected as one of two new 2013/2014 Fellows of the International Association of GeoChemistry (IAGC).
• Rick Law is Chief Editor of Geological Society of London's books and monographs series.
• Scott King’s prestigious Alexander von Humboldt Research Award continued through 2013.
• Jim Spotila is Science Editor for the journal Geology one of the premier interdisciplinary journals of the geosciences.
• Robert Tracy was elected Fellow of the Geological Society of America.

Scholarly output: (CY 2013):

Faculty and graduate students in the Department of Geosciences published 110 papers and 10 book chapters in 2013. Examples of manuscripts published in high impact journals are shown below. Shuhai Xiao had an invited forum articles in Nature, one of the highest impact journals for science. A full listing of publications can be found in Appendix A.


*Graduate student in Geosciences.

**Number of presentations (CY 2013) and notable invited lectures:**

Faculty and graduate students in the Department of Geosciences gave 204 presentations at international and national meetings. A full listing of the abstracts can be found in Appendix B. Faulty also gave 48 invited and keynote lectures. Among the notable lectures:


• Mark Caddick gave an invited presentation on “Petrologic preconditioning: a predisposition to polymetamorphism?” 2013 Goldschmidt Meeting, Florence, Italy.

• Patricia Dove gave the Keynote lecture at the Water Rock International Conference, Avignon, France.

• Michael Hochella gave an invited talk at the Gordon Research Conference on Environmental Nanotechnology, Stowe, VT


• Madeline Schreiber was invited to the National Academy of Sciences' twenty fifth annual Kavli Frontiers of Science symposium.
• Robert Weiss: From every grain of sand to like a rolling stone. Nanyang Technological University, Singapore, May 2013.
• Shuhai Xiao presented the Sir Albert Charles Seward Memorial Lecture at the Birbal Sahni Institute of Paleobotany.

Links and support from university’s research investment institutes:

The department has support from ICTAS for the Center for Environmental Implications of Nanotechnology (CEINT) led by Mike Hochella. Assistant professor Marc Michel is also part of CEINT.

The department has three Ph.D. students supported on ICTAS Fellowships: Kyle Ashley, James Dale, Sebastian Mergelsberg

Number of post-doctoral positions in STEM-H research areas:

Geosciences has 17 postdoctoral associates, research scientists and visiting research scholars in STEM-H areas. Two of our most recent postdocs are Claudia Adam who works with Scott King and Besim Dragovic who works with Mark Caddick:

Examples of links with NCR for research into issues of security and resiliency:

• Patricia Dove is a Founding Member of the Board of Directors, *Virginia Academy of Science, Engineering and Medicine*. This new organization was started by Senator Mark Warner. The first meeting was held at the NAS in November, 2013. Workshops are planned for 2014. Dove is running the 2014 meeting on the theme topic of ‘Big Data’ and has set up a steering committee with VT faculty at the National Capital Campus.

Martin Chapman was awarded funding from the NSF via a RAPID proposal for a “Study of Soil-Structure Interaction Effects on Behavior and Damage to Structures in Washington D.C., during the August 23, 2011 Earthquake, March 1, 2012 - February 28, 2013,

John Hole was also awarded funding from the NSF for AIDA(Aftershock Imaging with Dense Arrays) data from the the 2011 M5.8 Virginia earthquake, July 15, 2012 - July 14, 2013.

Examples of partnerships with external collaborators which have enabled VT to compete more effectively for external funding:

- The Center for the Environmental Implications of NanoTechnology (CEINT) is exploring the relationship between a vast array of nanomaterials— from natural, to manufactured, to those produced incidentally by human activities— and their potential environmental exposure, biological effects, and ecological impacts. Headquartered at Duke University, CEINT is a collaborative effort bringing together researchers from Duke, Carnegie Mellon University, Howard University, Virginia Tech, University of Kentucky, Stanford University, and Baylor. CEINT academic collaborations include on-going activities coordinated with faculty at Clemson, North Carolina State, and North Carolina Central universities, with researchers at NIST and EPA government labs, and with key international partners.

  Created in 2008 with funding from the National Science Foundation and the US Environmental Protection Agency, CEINT performs fundamental research on the behavior of nano-scale materials in laboratory and complex ecosystems. Research includes all aspects of nanomaterial transport, fate and exposure, as well as ecotoxicological and ecosystem impacts. Additionally, CEINT is developing risk assessment tools to provide guidance in assessing existing and future concerns surrounding the environmental implications of nanomaterials. The VT team has been awarded $1.75M in funding thus far.

- Interdisciplinary Coastal Hazards Research Team was initiated on a small scale with the help of a NSF-RAPID grant for Hurricane Sandy awarded to Robert Weiss and Jennifer Irish. The team includes Dr. Yang and Dr. Buckvic from the Department of Urban Affairs and Planning and Dr. Dixit from Political Sciences who conducted interviews in the Sandy-affected region to study the economic impacts and long-term impact on environmental and security policy. Dr. Irish, Dr. Lynett (University of Southern California) and Dr. Weiss collected quantitative data on residential and infrastructure damage, coastal change and sedimentological effects of Hurricane Sandy in November 2012. They conducted a series of workshops in 2013 that attracted interested people from the campus community.
II. The Life of the Mind

The department had 120 UG majors in the 2013-14 AY in one of our 4 options: Geology, Geochemistry, Geophysics, Earth Science Education. 31 students graduated in 2013 (16 male, 15 female). Geoscience faculty taught over 14,000 WSCH in 2013-14 for lower-level and upper-level UG courses. Faculty also taught over 4,600 WSCH in graduate courses.

The Department of Geosciences also continues to maintain a strong graduate program with an enrollment of 64 students (22 MSc, 42PhD) in 2012-13. 10 MSc and 12 PhDs were awarded in Spring 2013.

Faculty and departmental teaching awards:

Madeline Schreiber received a Carroll B. Shannon Teaching Certificate of Excellence from the College of Science.

Undergraduate student achievements and awards:

**College of Science Dean’s Freshman Scholarship:** Christopher Melsen

**Endowed Scholarships:** Hannah Brooks, Russell Wheeler (Edith L. and Lawrence E. Meade Endowed Scholarship Fund); Morgan Distad (Charles J. Gose, Jr. Scholarship for Geological Sciences); Grant Euen, Ali Rabaan, Obai Shaikh, John Smith (Thomas Jeffries Geosciences Scholarship); Jordan Elmiger, Jennifer Groce, Lisa Whalen (William C. “Bill” and Francia J. Presley Endowed Scholarship Fund); Maxwell Griffiths, Alexa Mulin, Zachary Printz, Emily Slaughter, William Whalen (Leo and Melva Harris Geosciences Scholarship); Nathan Brown, Christopher Matthews, Kyle Overby (Wallace D. Lowry Scholarship); Ali Alsaad (Geosciences Faculty Endowed Fund)

**Outstanding Service Recognition Award:** Rachel Corrigan

**Outstanding Senior Award:** Aaron Prunty

Graduate student achievements and awards:

**College of Science Outstanding Doctoral Student Award:** Matthew Joseph Steele-MacInnis

**College of Science Roundtable “Make A Difference” Scholarship Finalist:** Aida Farough

**ICTAS Fellowships:** Kyle Ashley, James Dale, Sebastian Mergelsberg

**Industry Sponsored Scholarships:** Jacalyn Wittmer (Conoco Phillips Graduate Fellowship); Ryan Brandon, Andrew Hawkins, Andrew Muscente, Maria del Pilar Madrigal Quesada (Petroleum Industry-Geosciences Scholarship)
Endowed Scholarships: Ty Buller, Natalia Bykova, Cody Mason (Charles E. & Frances P. Sears Endowed Scholarship Fund); David Mercier (Matthew J. Mikulich Geophysics Scholarship); Kyle Ashley, Theodore Them (Wallace D. Lowry Geosciences Endowed Graduate Scholarship Fund); Neil Auchter, Kai Deng, Aida Farough, Kui Lui, Pavithra Sekhar, Qimin Wu, Jing Xue (John K. Costain Graduate Geophysics Scholarship); Natalia Bykova (Charles J. Gose, Jr. Scholarship for Geological Sciences); Lindsay Funkhouser, Donald Stahr (Leo and Melva Harris Geosciences Scholarship); Kyle Ashley, Lowell Moore (David R. Wones Geological Sciences Scholarship Fund); Kathleen Craft, Aida Farough, Maria del Pilar Madrigal Quesada (Aubrey E. and Eula H. Orange Award in Geosciences)

Tillman Awards for Teaching Excellence: Ty Buller and Sarah Ulrich (Introductory Laboratories); Ryan Brandon (Advanced Laboratories); Nicholas Heaverlo (Combined Introductory and Advanced Laboratories)

Geosciences Outstanding Service Recognition Awards: Pilar Lecumberri-Sanchez, Jorge Daniel Moncada de la Rosa, Matthew Joseph Steele-MacInnis

Who’s Who among Students in American Universities: Carol Johnson

Sigma Gamma Epsilon W. A. Tarr Award: Kyle Ashley

Grants in undergraduate teaching and learning:

- Water E3G (Engineering, Ecology, Environment, Geosciences) (STEM)
  
  John Chermak and Madeline Schreiber were PIs in a RET Virginia Tech Site Proposal submitted to NSF with, Vinod Lohani (Engineering Education), Randy Diamond (Civil and Environmental Engineering), Fred Benfield (Biology), Kang Xia (Crop and Soil and Environmental Sciences), which was submitted October 2013.

Grants in graduate education:

Faculty are involved in three Interdisciplinary Graduate Education programs (IGEPs):

- Mike Hochella is a PI in the IGEP: Sustainable Nanotechnology (SuN)
- Robert Weiss is a core member of the IGEP: Disaster Resilience
- Madeleine Schreiber is a PI on the IGEP: Interfaces of Global Change (IGC)
One to two notable events or programs related to undergraduate education:

Barbara Bekken and Madeline Schreiber teach *Geoscience Fundamentals* which is required by all UG majors in Geosciences which was taught in the SCALE-UP classroom and included writing intensive assignments. This course forms a component of the FYE which is being expanded in 2014.

**Chermak: Co-chair of the scientific reasoning committee** for the VT general education revision with Richard Walker, Biology

John also organized and led a panel discussion on April 22, 2013 in Squires Colonial Ballroom about the movie SWITCH which was included in the VT Earth Week 2013. Panel members included Madeline Schreiber, Mike Hochella (both Geosciences) and Michael Ellis (Mechanical Engineering). They discussed Non-renewable and Renewable energy and the environment. Approximately 300 people were in attendance.

Notable events or programs related to graduate recruitment and/or education:

The department held 18th annual Geosciences Research Symposium (GSRS) in March, 2013. GSRS is produced and organized by the graduate students and many faculty invite prospective graduate students to the event. The symposium is designed to allow students the opportunity to prepare and present talks in their current research areas for both professional growth and public awareness. Forty students presented talks. The organizing committee attracted funding from BP, Conoco-Phillips, Consol Energy, and Schnabel Engineering.

Examples of research experiences and experiential learning opportunities for undergraduates:

- More than 50% of our undergraduates participate in undergraduate research projects. John Chermak, for example, worked with 2 undergraduates on undergraduate research projects. Nathan Brown concluded his project on the Mineralogy of Sulfate Salts in an ARD environment and John Henley completed his project on Ground Water Temporal Variation Near the proposed Virginia Uranium Mine, Chatham, Virginia.
• Madeline Schreiber was invited to present at a National Science Foundation REU site: Complex Human and Water Dynamics. She presented her work with UGs about “An Interdisciplinary Research Experience at the Virginia Tech StREAM Lab.”

• Bob Bodnar participated in the Presidential Global Scholars program and taught a two-week module in Riva San Vitale, Switzerland and Naples, Italy in 2013.

Examples of international experiences for graduate students:

Graduate students have opportunities to study and/or perform field research in Chile, China, Costa Rica, England, Germany, India, Italy, Nepal, and the United Kingdom.

• For example, Rick Law’s research programs in the Himalaya (Nepal and India) expose graduate students, through extensive periods of fieldwork, to different cultures and perspectives on global issues.

• Brian Romans and Ph.D. student Neal Auchter spent time in southern Chile doing field work on the Cretaceous Tres Pasos Formation. The photo shown at the right is from Neal’s primary field locale and highlights the stunning exposures of these submarine slope deposits.

Bob Bodnar presented short course entitled “Applications of fluid inclusions in minerals exploration”, to 45 participants at Antalya, Turkey. He also presented the first two days (14 hours of lectures) of a 5-day short course entitled “Fluids in the Earth” at Dipartimento di Scienze della Terra, Università di Napoli Federico II, Naples, Italy, October 14-18, 2013. Thirty-two students from universities in Italy, Switzerland, Russia, Germany, France, Hungary, Canada and the UK participated (see photo below).
Any additional examples that address goals in Virginia Tech’s “Plan for a New Horizon”:

- Professor of Practice John Chermak has taught GEOS 1024 Resources both in large classes (250-300 students) in traditional lecture halls and smaller classes (30-40) in the SCALE-Up class room. He presented his study and comparison at the VT 2013 Pedagogy conference titled “Teaching Science in Large Lecture Classes Compared to the SCALE-Up Class Environment”.

- Robert Weiss participated in the International Faculty Development Program and visited a number of universities in Asia, including Nanyang Technological University, Singapore. This is an initial step in building links with global partners in Singapore.

**The Virginia Tech Experience**

Faculty service (Editorships, NSF/NIH program managers or panel members, leadership positions in professional societies):

- Tom Burbey: Associate Editor, *Hydrogeology Journal* and Board of Directors, *Environmental & Engineering Geoscience*

- Bob Bodnar: Member of Society of Economic Geologists Distinguished Lecturer Committee; Founding Editor-in-Chief of the Central European Journal of Geosciences;
Member of the Scientific Advisory Committee for the European Conference on Research on Fluid Inclusions held in Anatalya, Turkey; Edited a thematic issue of *Geofluids* on Fluid and Melt Inclusions. The issue contains 15 papers and was published as *Geofluids*, volume 13, issue 4

- Mark Caddick: Newly elected member of the Editorial Review Board of the *Journal of Metamorphic Geology*. Guest editor of an issue of the *Elements* magazine of mineralogy, geochemistry and petrology, with E. F. Baxter and J. J. Ague (December 2013)

- Patricia Dove: Principal Editor: *Elements* Associate Editor, *Proceedings of the National Academy of Science* Editorial Advisory Board of the new journal, *Bioinspired Materials*

- Ken Eriksson: Co-chair (with Bob Tracy) of the organizing committee for the sectional GSA meeting to be held in Blacksburg in April, 2014.

- Esteban Gazel; Review panel member of NSF Marine Geology and Geophysics Program
• Ben Gill: Participated in the Earth-Cubed Workshop For Sedimentary Geology (March 25-26, 2013) at the University of Utah.

• Mike Hochella: Invited to National Science Foundation, NG-NNIN Reverse Site Visit, Arlington, VA

• John Hole: Associate Editor for Journal of Geophysical Research member of American Geophysical Union (AGU) - Society of Exploration Geophysics (SEG) Coordination Committee; member of PASSCAL standing committee for Incorporated Research Institutions for Seismology (IRIS); member of the IRIS Nominations Committee; Chair of the IRIS Large N Working Group; member of the EarthScope Steering Committee.

• Rick Law: Editor-in-Chief and Chair of Geological Society of London Books Editorial Committee. Member of Geological Society of London Publication Committee; Member of Geological Society of London Science Committee. Co-convener for Geological Society of America Penrose Conference to be held in Asheville, NC in 2014.

• Robert Lowell: Associate Editor J. Geophysical Research, Solid Earth; Panelist Research Associate Program National Academy of Sciences; NASA Panelist for Planetary Geology and Geophysics, Fall 2013

• Marc Michel: Proposal Review Panel Member: Scattering – Chemistry/Biology/Environmental, Advanced Photon Source, Argonne National Laboratory, Argonne, IL.

• Scott King: NASA Planetary Missions Data Analysis Panelist (PMDAP) (January 2013); NASA Planetary Geology and Geophysics Panelist (PG&G) (September 2013) – declined to serve as group chief; Participated in NSF’s cite review of Computational Infrastructure for Geodynamics (CIG) at Davis, CA.

• Brain Romans: Serving on Editorial Board for the journal Geology. Selected in 2013 to serve three-year term on the Science Evaluation Panel (SEP) for the International Ocean Discovery Program (IODP). Council member for SEPM (Society for Sedimentary Geology).

• Nancy Ross: Served on NSF COMPRES Executive Committee; selected as Chair of COMPRES 2014 Annual Meeting; invited by Doe to review the Lujan Center for the Department of Energy, Basic Energy Sciences, Scientific User Facilities Division.

• Madeline Schreiber: Associate Editor, Groundwater; Vice Chair, Geological Society of America (GSA) Hydrogeology Division; Management Board member, GSA Hydrogeology Division and Committee member, GSA Hydrogeology Division, Kohout (Early Career) Award.

• Jim Spotila: Science Editor for the journal Geology one of the premier interdisciplinary journals of the geosciences.
Bob Tracy: Council Member of the Geological Society of America; Council Member-at-Large and Member of Executive Committee, Geological Society of America. Chair, Geological Society of America Committee on Nominations; Member, Geological Society of America Audit Committee. Member and Chair, Arthur L. Day Medal Selection Committee, Geological Society of America. Co-General Chair, Southeastern Section Meeting, Geological Society of America.


Examples of economic development (e.g., industrial partnerships, patents):

- Bob Bodnar leads a program to develop methods for the quantitative analysis of hydrocarbon fluid inclusions. Chevron Energy Technology Company. 18 month project; $49,260.

- John Hole: The department strengthened links with industrial sponsors. John Hole renewed a 3-year Landmark Graphics Corporation University Grant Program software license, with a commercial value $60,062,866.

- Brian Romans Industry Consortium: ‘Chile Slope Systems: Architectural Analysis and Modeling of Outcropping Slope Deposits, Magallanes Basin, Chile’, a multi-disciplinary and multi-institution research program with University of Calgary and University of Utah; Proposal sent to companies in December 2012; 13 companies have agreed to sponsor for a consortium total of $1,690,000 with $356,000 of that total delivered to Virginia Tech over three years (2013-2016).

- Industrial sponsorship: ConocoPhillips: Graduate fellowship Award for $25,000.
  Northrup Grumman: $5,000 for education using Geosciences Museum.

PK-12 STEM programs:

- John Chermak: Appointed in Fall 2013 by Susan Magliaro, VT STEM coordinator to be the VT representative for the Virginia Mathematics and Science Coalition (VMSC). This group seeks excellence in Mathematics and Science education (www.vamsc.org)

- Esteban Gazel: awarded $5,000, 4VA Grant Laboratory Techniques in Geology: Redesign of a STEM Course to Prepare Students for Graduate School and Employment, in collaboration with James Madison University. This is a course on analytical methods in the geosciences using the new and established instrumentation at VT and JMU. The new course includes team teaching at JMU and VT as well as interactions with graduate students and faculty at VT. A group
of 12 students from JMU will visit VT during Spring 2014 to be trained in sample preparation and data collection under the supervision of Gazel.

Examples of Community and Student Engagement:

Patricia Dove gave the keynote lecture for 220 middle school kids and about 250 adults at Kids Tech University held on Jan 26, 2013.

In the afternoon, over 250 kids and about 320 adults participated in an expo where she and her research group hosted exhibit stations and were joined by others from Geosciences for a total of 10 Geoscience hands-on activity stations led by Mark Caddick, Patricia Dove, Ben Gill, Nizhou Han, Esther Schwartzzenbach, Llyn Sharp; Adam Angel, Christina Blue, Patrick Boyle, Kristie Dorfler, Sarah Eagle, Michelle Fame, Angela Gerhardt, Victor Guevera, Tony Giuffre, Anna Hardy, Nick Heatherlo, Cody Mason, Sarah Mazza, Kristen McCall, Sebastian Mergelsberg, Mego Ohlhaver, Lindsay Sabey; Andy Crane, John Huntley, Rachel Raines, Russell Wheeler

John Chermak helped the Vista Teachers, Kevin Agee and Clair Guzinski with their problem based learning unit at Carvin’s Cove on October 25th, 2013 for 6th and 7th grade science students from Stonewall Jackson Middle School.

Esteban Gazel has engaged the community through the following:
- When was the last time volcanoes erupted on the East Coast? Scientific American: http://www.scientificamerican.com/article.cfm?id=recent---east---coast---volcano
- Studying Virginia’s volcanic activity, A Touch of Tech Podcast from WVTF http://www.podcasts.vt.edu/touchoftech/2013/091313---tot.html

During AY 2013-14 the Museum of Geosciences had 9,600 visitors. Over 1200 were academic, course-related visits, from 10 different VT courses. Outreach programming served 4532 people, including 1408 K-12 youth, and 220 K-12 educators. There were 56 loans of teaching kits and materials.

Geosciences 2013-14
The department sponsored the GeoFair and Mineral Sale, featuring learning stations as well as specimens for sale, attended by over 600 people in 2013.

**International collaborations and programs:**

Almost every faculty member in the Department of Geosciences has international collaborations, many of which have already been noted above.

Among these, Ying Zhou maintains strong collaborations Qingju Wu at Institute of Geophysics, China Earthquake Administration on surface wave inversion using broadband experiment data in northern China. A research associate from his group has been working with Dr. Zhou since 2012.

Any additional examples that address goals in Virginia Tech’s “Plan for a New Horizon”:

Bob Bodnar is developing an outreach and education plan related to energy resources and energy independence (with award from Virginia Uranium, Inc., $156,000).

**Diversity**

Notable activities by students, faculty and/or staff activities promoting diversity:

Esteban Gazel applied to the National Science Council, Ministry of Science and Technology of Costa Rica to obtain funding for Hispanic graduate students from Costa Rica to attend Virginia Tech. He was successful for an award of $89,157 for “Superplumes, Large Igneous Provinces and Oceanic Anoxic Events” to support Pilar Madrigal for her Ph.D. project (Award No. MICITT---274---2013)

Diversity awards and honors (e.g., MAOP scholarships; McNair Scholars):

- Madeline Schreiber served as the AdvanceVT liaison for the College of Science in 2012-13 AY. Maddy is also co-chair of the College of Science (COS) Diversity Committee, faculty member Madeline Schreiber has been involved in developing programs to enhance diversity of undergraduate, graduate and faculty in COS.

- Nancy Ross was a panelist for the Future Faculty Program in Jan. 2013 providing an overview of the academic search process. She was also a panelist in an Advance VT program for graduate students to discuss becoming a Professor and Head of Department.

- Patricia Dove serves as a member of the Advance VT Advisory Committee

- Multicultural Academic Opportunities Program (MAOP) Scholarships: Kathleen Craft, Kristin Dorfler