



# SEAHORSE SURF and HAMMER SURF



Fall 2015

Department of Geological, Environmental, and Marine Sciences (GEMS) at Rider University  
<http://www.rider.edu/gems>

## IN MEMORIAM: DR. JOSEPH NADEAU

Dr. Joseph E. Nadeau, Dean Emeritus of the College of Liberal Arts, Education, and Sciences (CLAES), and former GEMS faculty and chair, passed away on June 26, 2015. Rider faculty, staff, and particularly students knew Dr. Nadeau for his easygoing and accessible manner, as well as his deep passion for education and science.



Dr. Nadeau came to Rider in 1971 as an Assistant Professor of Geology. He later became GEMS Chair and then the Assistant Dean for Science, before becoming CLAES Dean in 1998, a position he held until his retirement in 2008. While a member of the GEMS faculty, he taught a wide variety of courses, including physical geology, geochemistry, economic geology, structural geology, and at the Princeton-Penn-YBRA geology field camp.

Dr. Nadeau earned his bachelor's degree from the University of Illinois, his master's degree from the University of Tennessee, and his doctorate from Washington State University, all in geology. A geochemist, he authored or co-authored more than 100 publications and papers in his areas of research, as well as serving on many committees at Rider.

Joe is survived by his wife, Rosemary; daughter Jan and her husband, Volker Kern; daughter Denise and her husband, Stoffel Probasco; sisters Julie LeBlanc and Jeanne Stovall; grandchildren Leila and Lucas Probasco; and sister-in-law Sharon Hunt. All of us at GEMS send his family our deepest condolences; he will be missed.

## SWIMMING AGAIN IN ROATAN, HONDURAS!

Once again, the GEMS marine science field course (MAR-229) was held on Roatan Island, off the coast of Honduras. This summer, 12 Rider students successfully completed the two-week field course based at Anthony's Key Resort and at the Roatan Institute for Marine Science (RIMS). The course was team-taught by **Dr. Reed Schwimmer** and **Danielle Schmitt**, instructor at Princeton University and adjunct instructor for GEMS.

With more than 30 miles of fringing and barrier reefs, seagrass beds, mangroves, and rocky limestone shorelines, RIMS offers students the ideal venue for research and for gaining valuable field experience. GEMS has cultivated a relationship with RIMS over the past 16 years and is the only college or

university in New Jersey to participate in RIMS's educational programs.

The GEMS majors who had to "suffer" through this stay in a tropical paradise were: **Pilar Ferdinando '15, Julia Galayda '16, Lisa Gottel '16, Dan Guarino '15 Yunjung Hong '16, Tyler Houck '15, Maddie Hummel '16, Andrew Kelly '15, Alyssa Luongo '15, Laura Moritzen '15, Adam Phillips '16, and Fatima Sulaman '16.**

RIMS is a renowned research and teaching institution dedicated to the study of tropical marine ecosystems including behavioral research and training of Atlantic bottlenose dolphins housed at the facility. Students receive four academic credits, learn about the ecology of Caribbean coral reefs, and develop a deeper understanding of how physical factors influence biology in various ecosystems.



*View to Anthony's Key Resort from RIMS.*

Research activities during the course include coral mapping; sea fan orientation; and study of the abundance and distribution of organisms in turtle grass, mangrove, and rocky intertidal ecosystems. Students also spend a day working and swimming with the dolphins to learn about dolphin behavior. The course culminates with students designing, implementing, and presenting their own research projects.

Each day at RIMS involves a full day of instruction, field work, and lab work. The experience is one of constant exploration and

discovery in which the students engage in hands-on research. The classroom is connected to a fully equipped dry lab and wet lab, which students can use to collect and analyze data. They also are able to avail themselves of a 42-foot dive boat that transports students to different locations around the island.



*Yunjung, Pilar, and Lisa taking a break from counting fish species!*

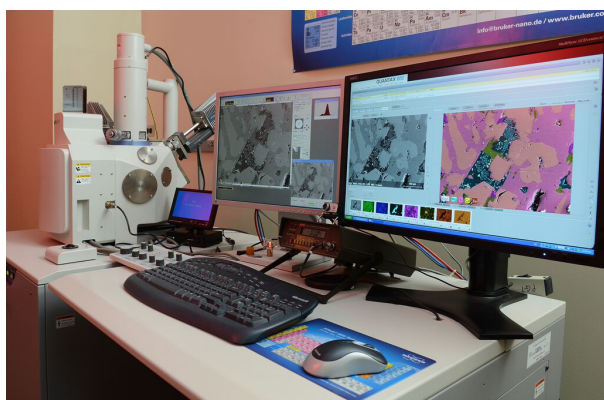
This immersion experience truly develops the students' skill set beyond what a semester-based course could provide. GEMS students hone their scientific writing skills and sharpen their analytical and research skills. By visiting a different country and experiencing a different culture, some of the students might initially feel out of their comfort zone, but this allows them to gain a more global view of human issues, thereby broadening their own perspectives on academic subjects. This trip offers valuable real-world experiences that add depth to graduate school applications and to job interviews.

### **MAGNIFYING OUR VIEW: SCANNING ELECTRON MICROSCOPE (SEM) ARRIVES AT RIDER**

After years of trying to bring a scanning electron microscope (SEM) to campus, students at Rider now will have access to an on-campus SEM, an instrument worth nearly \$500,000, along with an expert operator who can train faculty and students on how to maximize its scientific and educational return.

Developed in 1963, the SEM can magnify objects up to 300,000 times. And, unlike a standard optical microscope, the SEM's high magnification produces an almost 3-D image, as well as providing detailed information about a sample's elemental composition and internal structure.

The Hitachi 3400N SEM, along with its attached microanalytical detectors, arrived on campus this past fall, and how the instrument came to be at Rider can be characterized as a combination of serendipity and the quick reactions of the College of Liberal Arts, Education, and Sciences faculty, as well as many other members of the Rider University staff and administration.

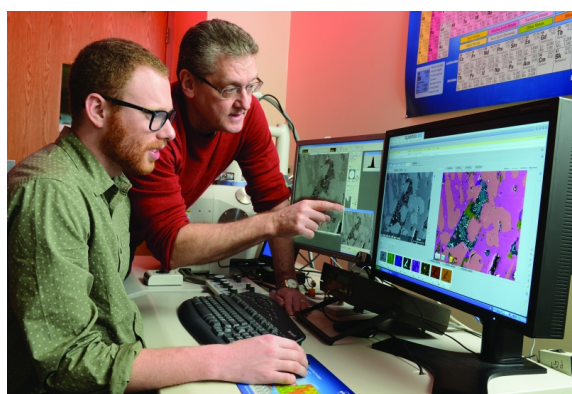


*The Hitachi 3400N SEM with attached Bruker, Inc. microanalytical detectors*

During summer 2014, Dean Patricia Mosto received an email about the availability of the SEM from Bruker Inc., a leading international manufacturer of high-end SEM microanalytical detectors. Bruker was closing its Ewing, NJ sales and support office, although it still wanted to have the Hitachi SEM available to Ted Juswak, the instrument's operator, for training and demonstration purposes. Therefore, in exchange for housing the instrument in a suitable location, Bruker was offering a local college full access to the SEM, as well as Ted's extensive expertise, all at no cost! It was an offer too attractive to pass up.

"We had to act very, very quickly; otherwise the SEM would have gone to another

university," says **Dr. Jonathan Husch**, professor and chair of the Department of Geological, Environmental, and Marine Sciences (GEMS). As a geologist for over 40 years, Dr. Husch immediately understood the immense value of having access to an SEM for both educational and research purposes. Dr. Husch, who has been at Rider since 1980, also remembered the early 1990s when Rider had a mini-SEM, a low-end instrument that wasn't nearly as capable. "This new SEM is many things. It has the ability to magnify an object far beyond most other microscopes. It can tell you about the internal structure of the



*Dr. Husch and Steve Schwartz '15 learn how to operate the SEM*

object, how the atoms are arranged, and what elements are in the material. It also can map the elemental concentrations over a relatively large area. So, for example, if there is a contaminant, such as arsenic, in a sample, the SEM can tell you not only that it's there, but where exactly it's located and how much of it exists."

Dr. Alexander Grushow, professor and chair of the Department of Chemistry, Biochemistry, and Physics, also was a key player in getting the SEM to Rider. He sees it as an invaluable opportunity for all students and, in particular, for students of material sciences. "The microelectronics industry, for example, requires an in-depth knowledge of materials, and having the SEM gives us an additional, more powerful tool for characterizing various materials down to the atomic level."

“For all involved, it’s a win-win situation. Bruker gets the space it needs to continue its work, and Rider receives access to a state-of-the-art instrument and a 30-year expert in the field who can show us how to use it,” explains Dr. Husch. “It will give our students better hands-on training and opportunities for cutting-edge research along with excellent preparation for graduate school or careers.”

So, the next time you stop by campus, check out the Hitachi SEM in room 252 of the Science and Technology Center. And, if he has some time, ask Ted to give you a personal demonstration of just what this amazing instrument can do.

### **GEMS NEWS, HONORS, AND AWARDS**

It’s been another exciting and satisfying year for GEMS with an abundant amount of faculty and student activity. As of May 1, 2015, total GEMS enrollments, including ISM majors, stood at approximately 125 majors and minors. It’s nice to be popular!

As far as GEMS faculty are concerned, **Dr. Kathleen Browne** enjoyed a very productive second year back in GEMS after ten years as Assistant Provost and Director of the Bristol Meyers-Squibb Teaching and Learning Center. In addition to her many and varied campus committee activities, Kathy continued to participate in a number of external grant activities, including creating a new online graduate course on the Teaching and Learning of Earth and Space Sciences, as part of a Martinson Family Foundation grant to the School of Education. Furthermore, Kathy authored a talk presented at the Earth Educators Rendezvous 2015 meeting and chaired a session at the meeting as well. Kathy also mentored two freshmen students from her Discovery Program science class on their fish population studies in Centennial Lake.

**Dr. Daniel Druckenbrod** continued as Sustainability Studies Program Director, while also continuing his research program on forest

ecology and the analysis of tree rings from North American forests. In support of this work, Dan received two external grants, the first from the Corporation for Jefferson’s Poplar Forest, and the second from the Appalachian Stewardship Council. He also was awarded a Rider University Paid Research Leave for fall 2015 to study long-term climate change records in the deciduous forests of the eastern United States.

**Dr. Druckenbrod** also was the author or co-author of four conference papers and invited presentations related to his research, including papers presented at the 2014 Annual Meeting of the American Geophysical Union and the 2015 Annual Meeting of the European Geophysical Union. In addition, Dan mentored a number of GEMS students who participated in his forestry research program, including **Imani Guest ’18**, **Jessica Munyan ’16**, and **Craig Sinkler ’15**.

**Dr. William Gallagher** remained a visible and consistent contributor to GEMS. In addition to giving a number of dinosaur talks to local organizations, Bill was the author of a published manuscript on late-Cretaceous fossil assemblages in Monmouth County, NJ, as well as the co-author of a published manuscript on the geology, geochemistry, and taphonomy of a famous fossil-bearing quarry in Garfield County, Montana. Bill also served as Editor Emeritus of the *The Mosasaur* journal.

**Dr. Jonathan Husch** completed his ninth year as GEMS Chair. Jon also was part of a group of Rider faculty, staff, and administrators that helped bring a state-of-the-art Scanning Electron Microscope (SEM) to campus for faculty and student use (see separate SEM story). Finally, **Dr. Husch** was selected as the 2015 honorary faculty inductee into the Rider University School of Liberal Arts and Sciences Honor Society in recognition of his many years of outstanding teaching and dedication to the principles and values of a Liberal Arts and Sciences education.

**Dr. Reed Schwimmer** continues to serve as the Head Senior Judge for the Mercer County Science and Engineering Fair, as well as continuing to write and review questions for the PRAXIS teacher certification exams and to lead the department's assessment activities. In addition, he mentored an Integrated Sciences and Math (ISM) student, **Amanda Breeden '15** and an Environmental Sciences major, **Kaitlyn Weindorfer '15**, on their senior independent research projects.

**Dr. Gabi Smalley** continues to serve on the Rider International Education Council, as well continuing to serve as the Rider Liaison to the New Jersey Sea Grant Consortium and act as the GEMS Study Abroad Advisor. She also was the Chair of Rider's Undergraduate Research and Scholarship Awards (URSA) Committee, and was responsible for organizing the ISCAP Day program. In addition, Gabi mentored **Laura Moritzen '15** on her senior thesis research project and co-authored a paper with Laura that was presented at the 2015 Annual Benthic Ecology Meeting. Gabi also was awarded a Rider University Paid Research Leave for fall 2015 to study the feeding rates of microzooplankton. Her research will be conducted at the University of Maryland's Horn Point Laboratory.

**Dr. Hongbing Sun** continued his ongoing research into the fate of sodium and other ions in watersheds impacted by the repeated application of winter deicing salt. He also helped numerous students successfully conduct ICP or x-ray diffraction analyses. In addition, Hongbing was the co-author of two published manuscripts, one with GEMS student co-authors **John Alexander '14** and **Brita Gove '13**, and three conference papers, two of which were presented at the 2015 Annual Meeting of the Northeastern Section of the Geological Society of America with student co-authors **Amber Barton '14**, **Elaine Panuccio '15**, **Muhammad Sarwar '15**, and/or **Steven Schwartz '15**. Hongbing also mentored Elaine and Muhammad on their senior thesis research projects.

**Pilar Ferdinando '15** and **Laura Moritzen '15** will be starting graduate studies this fall, both pursuing Master's degrees in Marine Biology. Pilar will be attending Nova Southeastern University and Laura will be attending the University of Massachusetts-Dartmouth with a tuition waiver and a stipend. Congratulations to both of them.

**Survana Murali '16** interned this summer at ALK Technologies, Inc. where she worked on GIS-related projects as a Quality Assurance Analyst. **Aleesha Rouse '18** interned at the Connecticut Department of Public Health where she worked with the impact of domestic (home) water wells on adjacent groundwater and surface water sources.

A large number of GEMS students received various honors, awards, and recognition for their many academic achievements. **Laura Moritzen '15** graduated with honors in Marine Sciences, **Elaine Panuccio '15** graduated with honors in Environmental Sciences, **Nicole Ruggiero '15** graduated with honors in Integrated Sciences and Math, and **Muhammad Sarwar '15** graduated with honors in Geosciences. **Nicole Ruggiero '15** also received Baccalaureate Honors and was selected as Rider's recipient of the New Jersey Distinguished Student Teacher Award. **Laura Moritzen '15** also was inducted into the School of Liberal Arts and Sciences Honor Society and the Tri-Beta Honor Society. **Craig Sinkler '15** was inducted into the Tri-Beta Honor Society as well. **Stephanie Barron '15**, **Nick Centurione '15**, **Melissa D'Ascoli '15**, **Amy Hunt '15**, **Kaitlyn Resavy '15**, and **Nicole Ruggiero '15** were inducted into Kappa Delta Pi, and **Kaitlyn Weindorfer '15** was inducted into the Admissions Honor Society. **Sandra Amato '15** received a Certificate for Excellence in Middle School Education and **Yulieth Le '15** received a Certificate for Excellence in Science Education. **Muhammad Sarwar '15** received a Center for the Development of Leadership Skills Leadership Certification and was selected for inclusion in the 2014 edition of

Who's Who Among Students in American Universities and Colleges.

And, as if all these awards and honors were not enough, 61 GEMS students in the fall 2014 semester and 63 students (the most ever!) in the spring 2015 semester earned Dean's List recognition. Congratulations to all GEMS students for all their hard work and their accomplishments! We could not be more proud.

### **GEMS STUDENT RESEARCH 2014-2015**

Once again, a major strength of the GEMS program is the ability for our students, even freshmen, to become actively involved in independent research, usually under the mentorship and guidance of one of the GEMS faculty. The following is a listing of all student research, independent study, and senior thesis topics for the 2014-2015 academic year, including three research projects that resulted in papers being presented at professional meetings. It's quite an impressive list.

**John Alexander '14 and Brita Gove '13:** *Mobilization of arsenic, lead, and mercury under conditions of sea water intrusion and road deicing salt application* (student co-authors of a manuscript published in the *Journal of Contaminant Hydrology*).

**Amber Barton '14, Muhammad Sarwar '15, and Elaine Panuccio '15:** *Role of phosphate in the mobilization of arsenic from soil and aquifer* (student co-authors of a paper presented at the 2015 Annual Meeting of the Northeast Section of the Geological Society of America).

**Allysen Breeden '15:** *To what degree do human activities contribute to the increase in the concentration of atmospheric carbon dioxide?*

**Pilar Ferdinando '15:** *The role of pheromones in urine affecting reproductive behavior in Blue Crabs, Callinectes Sapidus.*

**Imani Guest '18:** *Tree-ring research on Jefferson's Poplar Forest.*

**Andrew Kelly '15:** *Effects of limb loss on the Serpent Sea Star (Ophioderma brevispinum).*

**Laura Moritzen '15:** *Habitat preference and tidal variation in native and invasive shrimp along the Long Island coast following the invasion of Palaemon macrodactylus* (student co-author of a paper presented at the 2015 Annual Benthic Ecology Meeting).

**Jessica Munyan '16:** *The effect of molecular structure on the phase transitions of atmospheric aerosol particles.*

**Elaine Panuccio '15 and Muhammad Sarwar '15:** *Hysteresis of aqueous geochemistry of stream water in the Centennial Lake watershed, New Jersey.*

**Rachel Pereira '18 and Kristina Frattaroli '18:** *Centennial Lake fish population study.*

**Nicole Ruggiero '15:** *Pedagogy of symmetry in the elementary mathematics classroom.*

**Alexandra Santora '18:** *Egg viability in Blue Crabs.*

**Muhammad Sarwar '15, Elaine Panuccio '15, and Steve Schwartz '15:** *Lead concentrations in soil profiles from a transect near an interstate highway in New Jersey* (student co-authors of a paper presented at the 2015 Annual Meeting of the Northeast Section of the Geological Society of America).

**Steve Schwartz '15:** *Honey Bee philosophy: The ethics of sustaining bees.*

**Craig Sinkler '15:** *Creating high-resolution maps of leaf water isotopes using IM-CRDS, IRIS and IRMS techniques.*

**Kaitlyn Weindorfer '15:** *Google Earth or My Maps: Which is better for disseminating geologic information?*

## **GEMS SUPPORT REACHES A NEW HIGH FOR THE THIRD STRAIGHT YEAR!**

Nearly \$10,400 was donated to GEMS this past year by alumni, friends, and corporate matching gifts, once again the largest total amount in any 12-month period in the department's history! Everyone at GEMS thanks all who donated for their ongoing generosity and support. Without their assistance, we would not be able to purchase the necessary equipment that allows us to continue to provide a modern, state-of-the-art education to all our students.

As many of you know, the "*Friends of GEMS*" alumni group is committed to increasing the number of active members and donations to the department. If you would like to join "*Friends of GEMS*", and help make the GEMS experience even better for our current and future students, please contact **Randy Kertes '84**, GEMS Adjunct Instructor and Vice President of Science and Land Use, Sadat Associates (Trenton, NJ), at 609-826-9600, ext. 149, or at [rkertes@sadat.com](mailto:rkertes@sadat.com). You'll be glad you did!

## **GEMS ALUMNI UPDATE**

As usual, a number of GEMS alumni either stopped by the department for a visit or contacted us with their latest news. If you haven't done so recently, please bring us up to date with what is going on in your life. You can find additional alumni news, including specific contact information, on the GEMS alumni web page, located at <http://bit.ly/NTJeO2>. As always, we look forward to hearing from you.

**Jacki Frizano Beck '93**, her husband, Robert Beck, and stepson, Bobby (14), are still living in Allentown, PA. She stopped by Lawrenceville recently and says they play a lot of golf in the summer and bowl in the winter. She also said something about enjoying lots of leisure time and desserts. Some things never

change! Jackie not only has her doctorate in environmental geology from the University of Pennsylvania, but also her Professional Geologist certification for the State of Pennsylvania. Dr. Frizano now is working as a project geologist for an environmental consulting firm, AECOM, located in Conshohocken, PA.

**Jenn Sliko '00** received her Ph.D. in geology (with a heavy focus in paleoclimatology) in 2010 from the University of South Florida. She is a Lecturer of Earth and Geosciences at Penn State-Harrisburg in the Civil Engineering program. Prior to that, she was an Adjunct Professor in the Geosciences Department at Virginia Tech University. Jenn's present research focuses on paleoenvironmental reconstructions (see photo of Jenn in the field) and Geoscience education. Current projects include finding more effective ways to teach non-majors about the "Grand Challenges" in the earth sciences, as well as testing the effectiveness of non-traditional course delivery methods, such as online and "flipped classes."



*Jenn Sliko '00 checking out the rocks*

On a more personal note, Jenn married Mike Meyer (also a geologist) in June 2012. Congratulations and smart move Mike! Jenn and Mike live about 10 minutes from Hershey Park with two cats and spend their free time hiking and eating way too much chocolate!

**Mark Manning '01** is a chemistry teacher at Hopewell Valley Central High School in Hopewell, NJ and lives in Hamilton, NJ with his wife and two children. Prior to his current position, he was an Analytical Chemist for

Envirogen, Inc., and then a science teacher at Nottingham High School in Hamilton.

**Ken Kacperowski '06** received his M.S. in Geosciences at Montclair State University where he worked on deciphering the geologic history and geomagnetics recorded in a deep marine sediment core from eastern Antarctica. Ken was married in September 2010 and also bought a house. Congratulations! Ken is working for AMEC Environment and Infrastructure in their Hamilton, NJ office along with two other GEMS alumni, **John Alexander '14** and **Frank Petrino '09**.

**Carey Sliko '08** (Jenn's sister) is working for Cargill Inc. at their Wilbur Chocolate Company plant in Lititz, Pennsylvania, her hometown. She is the Microbiology Program Supervisor for Wilbur, where she is in charge of all their microbiology testing, Carey also works on Wilbur's environmental monitoring program, which ensures their three plants remain clean for food production. As her group's motto says, "We are making chocolate safe for the world." Well, someone has to! Carey also is involved in a number of community service projects, including the Cargill Cares Council, as well as being on the Board of Directors of VisionCorp of Lancaster County, an organization that helps the blind and visually impaired. And, if that wasn't enough, Carey is engaged to a very lucky guy she met through work. Congratulations from GEMS on all your accomplishments!

**Elissa Connolly-Randazzo '11** is still living in the Florida Keys (well someone has to!) where she has worked as a science instructor and naturalist. Initially, Elissa educated young minds and adults about the organisms and processes of the ocean at John Pennekamp State Park. She also assisted with several organizations in shark tagging, fish census, and coral restoration, as well as working on her SCUBA diving skills and certification. This past spring, Elissa completed a six-month internship with the Student Conservation Association and National Park Service where

she spent almost all of her time in the remote Dry Tortugas National Park studying and counting endangered and threatened sea turtles. Her work was the object of an article in the *Florida Key News*, which can be viewed at <http://keysnews.com/node/65187>.

**Kate Krsnak '13** has been teaching since graduation at the Alexandria Middle School in Pittstown, NJ. She is the school's sixth grade science teacher, as well as the coach of the school's Solar Cars and Science Olympiad teams. Sounds like she's keeping very busy.

**John Alexander '14** now is working for AMEC Environment and Infrastructure in the Hamilton, NJ office. In addition, he completed the 40-hour OSHA HAZWOPER course and has begun working on soil and groundwater samples in order to evaluate metal contamination.

**Kelly Krolik '14** is working towards her Masters degree in marine biology at Montclair University. She's also hoping to intern at the Stony Brook-Millstone Watershed Association

**Taylor Krolik '14** is working on her Masters degree in geoscience, also at Montclair, and most likely specializing in sedimentology.

**Norbert Iari '15** is now working as a Geologist/Field Technician at Earth Engineering, Inc, a geotechnical and environmental consulting firm located in eastern Pennsylvania and southern New Jersey. He started about a month after finishing his geology field camp requirement for graduation. Not bad, not bad at all!

**Craig Sinkler '15** has taken a position as a staff scientist with EarthRes Inc., an environmental consulting company located in Pipersville, PA (central Bucks County). He will be traveling around the region taking water and soil samples from various sites, mostly involving mining and solid waste. Congratulations on the new job, and only a month after graduating!