STRETCH ’06

In the Field

The Earth Science off-campus program kicked off its tour of the Western United States on September 5th, when students met Professor Brian Dade in the Bighorn Basin of Wyoming. Twenty students join the STRETCH this year, along with six professors, six graduate students in the field, and notable others helping along the way. The Stretch is an ideal opportunity for students to hone their skills in the field, and apply their classroom learning to novel situations and problems. Blair Burgreen ('07), an EARS senior and Stretch alumna, explains: “Stretch was an invaluable experience because we were taught a variety of field techniques and every lesson was completely hands on. It was also a great way to meet a lot of the professors and graduate students. Afterwards, I really felt like a part of the department.” Not only undergraduate students benefit from the trip; graduate students look forward to opportunities for outdoor work, teaching, driving long distances, grocery shopping and packing trailers (in that order). Miriam Borosund, a second year Master’s student and Stretch TA confessed, “I’m super psyched to get out in the field; I’ve been confined to the lab all summer.”

Earth Sciences Department Welcomes New Faces

Dr. James Henry Scott joins Faculty

Dr. James Scott starts this fall as a new professor of GeoBiology in EARS. Previously at the Carnegie Institution of Washington and the NASA Astrobiology Institute, his research focuses on microbial communities and the links between biology and geology. The unifying theme of his work is how life interacts with its environment, and how this interaction has impacted the evolution, adaptation and survival of life. One portion of Dr. Scott’s work focuses on microbial adaptations at extreme temperatures and pressures. This fall he teaches a course in Molecular Paleontology and Archaeology.

Hello, José and Arthur; Au Revoir, Angela!

José Fenollar joined us this summer from the National Meteorological Institute in Madrid. At Dartmouth, he is working with Dr. Eric Posmentier on meteorological postgraduate research. Dartmouth also welcomes Arthur Baker, the new laboratory assistant to the Trace Element Analysis Core Facility headed by Dr. Brian Jackson. Arnold will fill Angie Lacroix-Fralish’s position in October when she moves to Montreal, Quebec. Bid her adieu and wish her the best!

Five Entering Graduate Students

Not quite “new,” Master Nathan Hamm (having earned an M.S. this spring) continues his time at Dartmouth working towards a PhD with Dr. Brian Dade. Four Master’s students join us from across the country. Erin Black just completed her Bachelor’s from Skidmore College this past spring, majoring in Geologic Sciences. Katherine Curtis hails from Colby College where she completed her BA in Geology in May 2006. Elizabeth Johnson survived the cold Minnesota winters, earning a
Q&A with Dr. Brian Dade

The Man behind the Spectacles

ROX takes a little time to acquaint you with one person in the Department each issue. Here we have the pleasure introducing you to Dr. Brian Dade. He has likely peered over his glasses intimidatingly silent in your direction at least once; now you can meet the man behind the spectacles. Unless you are in one of his classes, this might be the most you hear him say all year.

R: Brian, you came to Dartmouth three and a half years ago from Cambridge University; how different are these two experiences?

BD: On some days, simply as different as aluminium and aluminum, on other days, perhaps as different as sillimanite and sanidine.

R: What is one thing you hope to pass on to your students?

BD: One thing!? Jean, you need to sign up for more classes. In addition to the obvious aims of bestowing senses of wonder, fun, and intellectual reward in finding rational order in a chaotic natural world, I hope my students sooner or later come to appreciate that I am grateful to have learned from them.

R: You’ve blown my cover. Not cool.

R: Would you rather be an intrusive or extrusive body?

BD: I would rather be an explosive ash cloud (exhilarating!), but some days I feel like heavily-weathered Archean granite with many faults. I have been told by family and students that occasionally I am a vein.


BD: Hmm…difficult questions…I really do not have favorites. To me this is like asking one to name a favorite parent or eccentric aunt—all are equally worthy of wonder and affection. If FORCED to choose, I suppose it would come down to ties among…


Mineral: Any mineral discovered and named by Professor R. Stoiber, because, well, this is Dartmouth and it is an honor for me to sit in his former office. In addition, I suppose I have always appreciated garnet for its ubiquity and near perfection in structure, shape and color.

Fossil: Stromatolites, for their curious structures, geologic significance for life’s origin and longevity, and artful

See DADE on page 4

NEW FACES continued:

Bachelor’s degree in Mathematics and Chemistry from St. Olaf. Nicole Buck joins us from across the river; she has recently been working for Bruno Associates in Woodstock, VT and previously at the Resource Systems Group in White River Junction. She received her undergraduate degree from Bucknell University.

In the Department

Baby Fever

In the midst of the department welcoming new faculty and students to the community, some smaller persons are also infiltrating our ranks. Congratulations to Jodie Davi on her new little boy Joseph. She can be seen around the department with him in tow (he is big for his age). PhD student Drew Quicksall and his wife Amanda also welcomed their new baby boy Parker. PhD student Jeonghoon Lee and his wife are expecting a little one this Christmas.

Professor Arjun Heimsath Celebrates Wedding to Hanna Breetz

This past August, Arjun and Hanna wed in the wooded grove behind their house in Fairlee, VT. Surrounded by family, friends and forest creatures, the happy couple exchanged vows. Pass along your congrats when you see him in the hall.

In Moo-morium

With sad hearts, we report the passing of Misha, Jodie Davi’s long-lived canine friend and fond fixture in more than one department.

New NASA Space Grant Specialist

Heather Carlos has moved up in the ranks in the Earth Sciences Department, from Graduate Student to “Spatial Data Specialist.” In this new position, funded by the NASA Space Grant, Heather will lead outreach and GIS support to NASA fellows, visiting scientists, and the Mascoma School District.

Stretch Boards

Stretch boards as far back as 1966 are retouched and digitized. You can now access the posters online at http://www.dartmouth.edu/~earthsci/Stretch/

See DEPARTMENT on page 4
Where have all the geologists gone,  
And who is going to take their place?  

AGI Report finds new crop of students in Geosciences may be missing job opportunities.

A recent report by the American Geological Institute examines career decisions of students and advisors in Geosciences. US colleges and universities produce approximately 1,200 geoscience graduates with Master’s and Doctorates each year. Although a large portion of the workforce is nearing retirement age in the science, engineering and technology sector, the study found US students graduating at nearly all degree levels have limited interest in non-environmental private sector jobs. Academic and government career paths will be dependent on limited retiree replacement. In the next ten years, the petroleum industry alone will need to replace over 50% of their geoscience workers; that represents over 40,000 jobs. Industries experiencing pronounced growth as demands increase for raw materials and energy may also be expanding their workforces. Some worry that limited interest from geoscientists within the US for these jobs will lead industries to look towards engineers and foreign trained scientists.

Table 2: Attitude of Students Graduating within One Year

<table>
<thead>
<tr>
<th></th>
<th>BA/BS</th>
<th>MA/MS</th>
<th>PhD</th>
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<tbody>
<tr>
<td></td>
<td>1 yr</td>
<td>&gt;1 yr</td>
<td>1 yr</td>
</tr>
<tr>
<td>State/Local Government</td>
<td>67%</td>
<td>66%</td>
<td>70%</td>
</tr>
<tr>
<td>Federal Government</td>
<td>64%</td>
<td>63%</td>
<td>60%</td>
</tr>
<tr>
<td>Environmental Industry</td>
<td>71%</td>
<td>68%</td>
<td>60%</td>
</tr>
<tr>
<td>Mining Industry</td>
<td>31%</td>
<td>29%</td>
<td>19%</td>
</tr>
<tr>
<td>Petroleum Industry</td>
<td>33%</td>
<td>34%</td>
<td>49%</td>
</tr>
<tr>
<td>Academia</td>
<td>36%</td>
<td>38%</td>
<td>42%</td>
</tr>
<tr>
<td>K-12 Education</td>
<td>28%</td>
<td>29%</td>
<td>24%</td>
</tr>
<tr>
<td>High Technology/Communications</td>
<td>7%</td>
<td>9%</td>
<td>7%</td>
</tr>
<tr>
<td>Finance</td>
<td>3%</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>General Business</td>
<td>10%</td>
<td>11%</td>
<td>7%</td>
</tr>
<tr>
<td>Continue Education/PostDoc</td>
<td>41%</td>
<td>44%</td>
<td>32%</td>
</tr>
<tr>
<td>Other</td>
<td>14%</td>
<td>15%</td>
<td>11%</td>
</tr>
<tr>
<td>Look Outside of Geosciences</td>
<td>21%</td>
<td>13%</td>
<td>23%</td>
</tr>
</tbody>
</table>

Table of jobs considered by geoscience students within 1 or >1 year of graduating. See report for details.

Not surprisingly, Dartmouth Earth Science students have been directing their eyes to this new crop of jobs. A course taught by Dr. Brian Dade in 2006 on petroleum systems brought invited speakers in petroleum related fields to a weekly dinner and seminar series. Edward Meyer, a current PhD student, commented, “The class definitely opened my eyes to the field. After taking the class I’d consider a job in industry. It’s one of the few non-academic fields where you can use traditional geology skills.” The next few years will see whether graduating students miss the opening job opportunities. Ben Burke (PhD ‘06), a graduate student alumn who now works for Exxon in Houston, Texas, agreed with the assessment of the opening workforce in industry. “There are definitely a bunch of experienced people nearing retirement [at Exxon], and then just young new hires.” He added, “I love my job doing geology every day.”

Read the report at the link below.
Student and Faculty Employment Attitudes in the Geosciences, 2006

Science News

Recent science-related news in non-science press. All articles can be accessed at: Geo\Files\Public Folders\Shared Files\!ROX Articles

Mississippi Moving
New York Times (Sep 19)  
Time to Move the Mississippi  
Invited panel of researchers unanimously proposes a major diversion of the lower Mississippi River in Louisiana.

Unworthy Pluto
BBC News (Aug 24)  
Pluto loses status as a planet
BBC News (Aug 25)  
Pluto vote ‘hijacked’ in revolt
It’s official, the underdog has been demoted. Pluto is now only a dwarf planet, and some are not happy. Dr. Alan Stern comments in a BBC report, “It’s an awful definition; it’s sloppy science and it would never pass peer review...It’s as if we declared people not people for some arbitrary reason, like ‘they tend to live in groups.’”

Poincaré Quoi?
New York Times (Aug 15)  
Elusive proof, elusive prover
Math mystery solved. Slate.com explained it best: “The Poincaré Conjecture says, Hey, you’ve got this alien blob that can ooze its way out of the hold of any lasso you tie around it? Then that blob is just an out-of-shape ball.”

Women in Science
New York Times (Sep 18)  
Institutions hinder female academics, panel says
New York Times (Sep 19)  
Bias is hurting women in science, panel reports
A panel, convened by the NAS, reports disparity between the number of women doctorates and woman professors due to a “pattern of unconscious but pervasive bias.”

See SCIENCE NEWS on page 4
DADE Q&A continued:

synergy arising from organic and inorganic worlds; and fenestrate bryozoans—in terms of structural elegance, it has been downhill ever since. Formation: Gile Mountain Fm (on which I currently live and which I inspect daily during dog walks); the Chugwater Fm (for the memorable name and color); and a couple of Paleogene, coal-bearing formations of the Powder River Basin, WY (in which I have invested in coal bed methane and, happily, from which I have earned something to help defray my children’s college tuition).

R: Do you have a favorite equation?
BD: Again, all are worthy of wonder and affection, BUT, if forced to name one, for shear cheekiness: \( e \approx \pi \)

R: Your humor is a bit highbrow. Do you like ‘madlibs’?
BD: I have been known to indulge with family on transoceanic flights and on rainy days...

R: Can you give me an 1) adj, 2) noun, 3) feeling, 4) verb, 5) adj.
BD: 1) geologic, 2) understanding, 3) doubt, 4) search, 5) approximate

R: I can’t help but think you missed the boat on this one, but here goes. Brian was considered by most to be a geologic and rare understanding. He often expressed doubt when he would search his approximate flume.

R: What is the story on this “flume” thing?
BD: You are referring to Dartmouth’s latest facility for research in geo-environmental fluid dynamics. Let me elaborate—the EARS Department now has a laboratory, ‘The Water Shed,’ dedicated to the study of environmentally and geologically important flows in rivers, the sea, and even the atmosphere. Housed in ‘The Shed’ are a recirculating flume driven by belt-mounted paddles, a lock-release tank, and state-of-the-art equipment to measure, among other things, sediment concentration and size and flow speed in situ and with great precision. My research interests include the study of environmentally- and geologically-important flows in laboratory and field. The flume thing is an important tool in this line of inquiry. The flume thing laboratory has been working for a little over a year and already is the intellectual home of two graduate students (with at least one more arriving autumn ‘06), two senior thesis students, and a first-year intern from the ‘Women in Science Program’ (WISP). My research interests also lead me to work with students examining processes in the field which shape different landscapes, ranging from soil-mantled hillslopes, to alluvial fans, to eroding bedrock rivers. All good fun!

R: Can we do a rubber ducky race in it?
BD: No, Jean—that would be an unprofessional and inappropriate use of a sophisticated scientific facility made possible with generous Dartmouth support. Besides, a race has already been run—My duck came in last and I don’t want to talk about it.

R: Thanks Brian. In closing, what is the annealing temp of unobtanium?
BD: The annealing temperature \( t_A \) of any imaginary material relative to its melting temperature \( t_M \) is given by the expression

\[
T_A = \int_0^\infty e^{-t} dT,
\]

where dimensionless \( T = t/t_M \) is the homologous temperature and \( T_A = t_A/t_M \).

R: I do need to take more classes, don’t I?

SCIENCE NEWS continued:

Victory in Kansas
New York Times (Aug 15)
How to Make Sure Children Are Scientifically Illiterate
New York Times (Aug 3)
Fight over evolution shifts in Kansas school board vote

Voters elected moderates to the state school board, ousting the conservative majority and preventing new standards in the classroom that would undermine science literacy.

Little Lucy
New York Times (Sep 21)
Little Girl, 3 million years old, offers new hints on evolution

Lucy’s baby found in Ethiopia
BBC News (Sep 20)
A 3.3 million year old A. afarensis child fossil provides new insight on human evolution. The juvenile find supports afarensis bipedal locomotion and includes the first preserved hyoid bone in the larynx.

DEPARTMENT continued:

EARS Copier

Some professors and students have had difficulty scanning images on the new EARS Copier. Instructions are now posted above the unit. Go to earthsciences-copier.dartmouth.edu to access files and set up a personal user box.

2008 students declare majors

Thirteen sophomores declared majors in Earth Sciences and Environmental Sciences last spring. The incoming junior class is small compared to years prior, with 23 majors in the current senior class and 2006 graduates numbering 21. Although major numbers fluctuate each year, the switch to flavored decaf coffee may explain the decline.