A message from the Assistant Director:

Dear Readers,

It's a small world after all...
I recently returned from a long planned (dreamed of) vacation to see friends and family in the northwest with the ultimate destination of Glacier Bay, Alaska. I had spent many years living and working in Yosemite National Park, hearing stories about the whales and glaciers in Glacier Bay and had always wanted to see this magical place where John Muir proved his theory that glaciation, not earthquakes, created Yosemite Valley. Shortly before departure, I learned from Laura Conkey, Professor of Geography and current Chair of the WISP Faculty Advisory Committee, that Glacier Bay is where she and her colleague Dan Lawson from CRREL do their tree ring research each summer!

What a coincidence! But that's not all...

On the 8 hour park service boat tour of this spectacular place, our excellent Park Service guide turned out to be Dartmouth alumna Laura Tepper ’02, a former Geography/Art Major, currently spending her summers as a Park Service naturalist in Glacier Bay while attending graduate school in Landscape Design. Shown here with Assistant Director Kathy Weaver.

Laura Tepper ’02, spends her summers as a Park Service Guide at Glacier Bay and the rest of the year in graduate school for Landscape Design. Shown here with Assistant Director Kathy Weaver.

What a small world indeed!

Vacation time was also good for catching up on reading. The 100th birthday of pioneer conservationist Rachel Carson was celebrated in June, so it was timely to read "The Gentle Subversive: Rachel Carson, Silent Spring, and the Rise of the Environmental Movement" by Mark Hamilton Lytle. The compelling book gave me newfound appreciation for this remarkable woman who battled incredible odds, poor
health, and powerful interests to publish her landmark research on the damaging effects of DDT and pesticides. Highly recommended!

Her legacy lives on ... There is inspiring work being done just up the road at the Dartmouth Organic Farm where a handful of students under Farm Manager Scott Stokoe’s able guidance are using sustainable farming practices to nurture the land and grow glorious produce. Come see what it’s all about and join us at our WISP Farm Tour and Picnic on Wednesday, June 25. Please read on in this issue of the newsletter for more information.

Kathy

Kathy Scott Weaver, Assistant Director of WISP

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**YOU'RE INVITED!**

Join WISP at the Dartmouth Organic Farm
Midsummer Farm Tour and Picnic
Wednesday, July 25 from 5 - 7 PM

Farm Tour begins at 5 PM followed by a picnic supper. Arrive early to help gather hand-picked garden greens and veggies for salad!

This is an opportunity to get to know other women in science at Dartmouth and learn more about the Dartmouth Organic Farm. '09's are especially encouraged to attend! The Farm is three miles up the Lyme Road, just north of CRREL, the Cold Regions Research and Engineering Lab. We’ll provide food and transportation (if needed).

To RSVP please blitz WISP by Sunday, July 22.

To learn more about the Dartmouth Organic Farm visit [http://www.dartmouth.edu/~doc/organicfarm](http://www.dartmouth.edu/~doc/organicfarm)

To read about plans for its new greenhouse go to page 7, under On-Campus News.

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Photos by Sarah Hackney ’06.
position: I am a Research Assistant (RA) for Becky Irwin, a Dartmouth Ecology professor, at the Rocky Mountain Biological Laboratory in Gothic, Colorado.

finding and obtaining the job: Susan Dunklee '08 was an RA for Becky and told me about the job; I was astonished that Becky hired me despite my total lack of experience in biology. At that point I hadn't taken any bio classes. It was a good investment on her part though; now I'm an Ecology major and planning on doing my senior thesis research in her lab next summer.

overall goal: Next summer I hope to do my senior thesis research with funding from the National Science Foundation as part of the Research Experience for Undergraduates (REU) program. Hopefully, my project will be about how toxic metals from mine sites impact local pollination webs. Right now I am helping Becky with her work on pollination webs and learning how to do good research.

today's to-dos: Today I worked on diversity plots. These are 2x2m plots, where we identify and quantify all the individuals of every species of plant in 4.25x.25m quadrants, and then identify any species in the plot that didn't make it into the transects. The goal is to see how the presence or absence of the invasive Linaria vulgaris impacts the composition of native wildflower communities. This is one of my favorite tasks among the many we perform each week, because I like learning and identifying all the different plants. When we finished today I learned how to key out grasses with our lab tech.

frustrations: The biting flies are my current frustration: you can't wear gloves while hand-pollinating, so they munch on your hands! But on a more serious note, I know that this experience will be incredibly important to my future goals, so I'm planning to spend every summer here while I'm in college. It's frustrating not to be at home with my family and friends - I was only home for six days in between spring term (I was in Morocco) and coming out here. I have no complaints about the job though!

valuable experiences: I've learned a lot of IDs and organismal type of information that you can't learn in a class at Dartmouth. The whole experience changed my goals at Dartmouth and converted me to a biology major. Working at the research station has allowed me to meet many prominent researchers, some of whom have completely defined their fields. This is going to be an incredible advantage to my career, I think. Plus, I'm in the middle of the Rockies so there's great hiking and outdoor fun!
Get career advice from an engineer or scientist!

Here is an opportunity for ALL Dartmouth students studying science, mathematics or engineering. Women and under-represented minorities are particularly encouraged. Get "real world" information, encouragement, advice, and access to professional networks from professionals in your field.

MentorNet's One-on-One Mentoring Programs pair male and female undergraduate, and graduate students, postdocs and untenured faculty as protégés with female or male professionals from all sectors as mentors for one-on-one, email-based mentoring (e-mentoring) relationships.

Our flagship Industry E-Mentoring Program is for protégés interested in working in industry or at a government laboratory or agency, while our Academic Career E-Mentoring Program is for graduate students, postdocs and untenured faculty pursuing faculty careers.

The program has proven effective by providing "real world" information, encouragement, advice, and access to networks that are otherwise often unavailable to underrepresented groups. This is why more than 90% of participants would recommend MentorNet's e-mentoring programs to a friend or colleague.

How can you find a mentor?

1) Join and sign into the MentorNet Community (http://www.mentornet.net/join).
2) Follow the One-on-One Mentoring Programs links to create a protégé profile.

Since 1998, MentorNet has matched more than 17,000 protégés and mentors with strong results. We hope you will join them!

For more information, please contact Kathy Scott Weaver, MentorNet's campus rep

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Feature Article

Secret Agent Woman: From Computer Science Education to National Security
By Bridget Alex '08, Newsletter Editor

The stereotype of a Computer Scientist is an antisocial, white male who hibernates with code, consumed by a quest to program the ultimate video game. This CS archetype met its antithesis on Friday when Christen (Einsiedler) Shepherd '00, a Computer Scientist at the National Security Agency, coolly and articulately addressed the Dartmouth community.

In a speech sponsored by ISTS, Shepherd reflected on her Dartmouth Computer Science education, her career path, and the scarcity of women in the field.

Shepherd’s high school was small—60 some students per class small. In this personal Maine setting, she realized her penchant for science, but had no exposure

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Alumna Christen Einsiedler Shepherd ’00 Quick Facts
-Computer Science major, Women’s Studies minor

- M.S. in Computer Science from the University of Tulsa (Cyber Corps); grad work focused on Information Assurance
-currently works at the National Security Agency as a Vulnerability Analyst
-originally from Maine; now resides outside D.C.
to Computer Science. Therefore, with loose ambitions of engineering, Shepherd said she evaluated schools on their “climate for women in science,” while college shopping. Dartmouth, then, particularly attracted her because of the Women in Science Project and its first year internships program.

At Dartmouth, Shepherd dove into the Engineering prerequisites and found that she enjoyed the one that introduced computer science the most. Her subconscious petitioned for more; as she tried to focus on other classes, Shepherd recalls, “I couldn’t get the bug of programming out of my head.”

Thus, sophomore spring, her major card read Computer Science.

Although Shepherd loved her education and time here, the CS major forced her over some rocky peaks. She thrived on the Dartmouth experience—active in the Dartmouth Asian Organization, Green Key Society, and Office of Residential Life—but was “not exactly a stand-out Computer Science student,” she said.

One challenge of her education was that the major was quite male-dominated. Now, seven years later, Shepherd is surprised to see that the number of woman CS majors has not risen.

And where are the women? Also a Women’s Studies minor, Shepherd conducted undergraduate research on the topic and found the main causes to be perceptions of subjects as masculine/feminine, learning style differences, and the inability of women in science to reach the critical mass, or the point where they are no longer a minority.

She also found that the College had conducted research (before establishing WISP), which showed that women leaving science majors tended to have higher GPAs than men that remained; the women had a self-perception that they were doing poorly.

During the lecture, Shepherd suggested some practical measures that the College or students could implement to change the status quo. For instance, to provide visual support for women, Sudikoff could erect a display highlighting women in CS. Also, the College could show an institutional commitment by slapping syllabi and walls with a gender equality slogan, as it does with the Honor Code.

“We can all wish [for equality] until we are blue in the face…but it’s really going to take some change,” Shepherd said.

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FASCINATING FACTS ABOUT NSA

The National Security Agency/Central Security Service is America’s cryptologic organization. Its two missions are Signals Intelligence (SIGINT) and Information Assurance (IA). SIGINT’s modern era dates back to World War II, when the U.S. broke the Japanese military code and learned plans to invade Midway Island. IA involves protecting the government’s classified and sensitive information.

In the process of meeting these missions, the NSA managed to…

- Develop the first large-scale computer and first solid-state computer, predecessors to the modern computer
- Pioneer efforts in flexible storage capabilities, which led to the development of the tape cassette
- Hire the most mathematicians in the United States and perhaps the world
- Employ analysts, engineers, physicists, mathematicians, linguists, computer scientists, and researchers.

This information and more from http://www.nsa.gov/about/
The second suggestion included building a stronger CS community. In the Thayer School, Shepherd observed engineers socializing and bonding while they toiled late, long hours. She did not feel this connection with her co-majors, and she urged current CS students and faculty to create togetherness, in order to feel “a part of something” and to help each other through the difficult times that inevitably arise during the CS major. She suggested redesigning Sudikoff, which is “very isolating” with its small windows and snaking hallways.

Besides gender disproportions and a sense of isolation, Shepherd’s major summit as a CS major was when she “emotionally [came] to grips with the process of debugging.”

For most of college, she took it personally when her programs did not compile, or function. Then during her senior year she said, “I had an epiphany of how I interacted with code.”

After much work on a simple assignment for a programming languages class, a particular program continued not to compile, and Shepherd arrived to Sudikoff on the verge of breaking down.

“My head was garbled with all the programming languages that had been swimming around” she said. She sought the guidance of her professor, who told her simply to start over completely, writing code one line or function at a time, and test each function before moving on. Following this advice, she found that she could easily pinpoint the problem where she had gone wrong. This simple advice revolutionized her attack and outlook on programming, and it is an approach she suggests to other programmers today.

Regardless of this epiphany, Shepherd graduated pleased with her degree, but with no desire to continue programming for employment or graduate school. “The highs were high, but the lows were too low,” she said. Resolution established.

The next year Shepherd was working in Boston as a Java Programmer/Project Manager for a medical technology company. Resolution dissolved.

It was during her two-year stint there, that Shepherd first became interested in security; how did the company protect people’s confidential health information? Because the company was a start-up of 45-60 people, it did not have a lot of time or concern for security and the bosses suggested that Shepherd learn about it on her own.

Security, however, is not something easily self-taught; there was no Computer Security for Dummies at her local bookstore.

Instead, Shepherd discovered the Cyber Corps program at the University of Tulsa. Funded by the government, this program offers scholarships in exchange for service afterward: “a pipeline into government security work,” she said.

Designed to develop “an elite squadron of computer security experts,” it exposes students to the gamut of computer security areas. Classes included penetration testing, computer forensics, and secure E-commerce, in which students received points for hacking into their classmates’ mock online businesses.
After focusing on network security, Shepherd’s transition to government work was “seamless,” she said. With many others from the Cyber Corps, she was hired by The National Security Agency (NSA), but admits that, “when I was at Dartmouth I couldn't have told you the difference between NSA and NASA.”

Unaffiliated with astronauts and space ships, NSA is the US government’s cryptologic organization. Its two primary missions are foreign signals intelligence—i.e., deciphering other countries’ communications—and information assurance—i.e., protecting our own.

Shepherd could not divulge any specifics from her work because it is mostly classified. However, she did explain that she works as a Vulnerability Analyst, where her work has included finding bugs in devices and software in order to assess their security implications.

This post has included three years in NSA’s rotational development program, during which time she interned in several offices and then detailed for seven months at the Executive Office of the President (EOP). There, she worked to protect the sensitive networks of the White House.

This experience proved valuable in that Shepherd “saw real world pressures of trying to secure a network.” She had to solve problems in real time and deal with people who view security as an expensive hindrance. “This is a customer that doesn't like to hear the word ‘No,’ even when policies are created for their security,” she said.

Although Shepherd originally had reservations, if not objections, to a career in programming, she now loves her job and considers it the “coolest in the world.”

“I feel very fortunate that I found my way back to the field, that I can call myself a Computer Scientist.”

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**News & Events of Interest**

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**On-Campus**

**Organic Farm Plans for Greener Greenhouse**
From Dartmouth News

When it comes to energy use, conventional greenhouses aren't all that "green." For example, it takes hundreds of gallons of propane each year to heat the 816-square-foot greenhouse at the Dartmouth Organic Farm.

Not so for the farm's second greenhouse, being built new this summer on the farm's site on Route 10, three miles north of campus: thanks to passive-solar and energy-conserving features, this one won't need fossil fuel to provide a reasonable growing environment…

The design was the work of two students at Dartmouth's Thayer School of Engineering… Chris Polashenski and Luke Wachter,

A team of Dartmouth students has won Google's Build Your Campus in 3D Competition. Google asked "how would your campus look in 3D" and challenged students to use Google SketchUp and Google Earth software to find out. The Dartmouth group was one of seven winning teams chosen from more than 350 entries. The winners will enjoy a trip to Google's headquarters in Mountain View, Calif., to meet and work with professional 3D modelers.

**Former WISP intern, Jessica Glago ’08** led the team of students in digitizing and virtually reconstructing more than 130 buildings that make up the Dartmouth campus. Lorie Loeb, research assistant professor of computer science, served as faculty advisor. Congratulations to all!


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**Become Search360 Savvy:**

**Drop-In Sessions Available Now!**

Learn how to use Search360, a one-step search across multiple scholarly sources including journals, datasets, image databases and more. It is available at from the library home page at: [http://library.dartmouth.edu/](http://library.dartmouth.edu/)

**drop in sessions:** this week 1:30-2 pm in Novack

**workshop:** Thursday August 2nd, 4-5 pm

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Don’t forget to monitor the WISP bulletin for up-to-date information on events and opportunities of interest to women in science.
Vermont Company Researches Strain in Everything from Trucks to Knees
From Sloan Career Cornerstone

Powered by mere vibrations or the movement of magnets, novel sensors and transmitters developed by a small company in Vermont are changing the way engineers are looking at fatigue. Communicating wirelessly via the Internet to engineers halfway across the world, the embedded sensors developed by MicroStrain—a small business based in Williston, VT and supported by the National Science Foundation (NSF)—are revealing how objects as diverse as enormous mining trucks and human knees respond to daily use. By monitoring strain levels and tracking the cumulative effects of fatigue, the researchers' ultimate goal is to supplant the nearly universal system of "replace by this date" with a smarter approach of replacing components based upon the actual operating loads components experience.

Find out more at: http://www.careercornerstone.org/scccnews/issues/2007/scccnews0707.htm#scccnews5

FEATURE WEBSITE: Resource for Gay and Lesbian Scientists

NOGLSTP is a national organization of gay, lesbian, bisexual, and transgender people (and their advocates) employed or interested in scientific or high technology fields. NOGLSTP's goals include educating the scientific and general communities about LGBT issues in science and the technical workplace; educating the queer community about relevant topics in science; dialogue with professional societies and associations; improving our members employment and professional environment; opposing queer phobia and stereotypes by providing role models of successful LGBT scientific and technical professionals; and fostering networking and mentoring among our members. NOGLSTP is a non-profit educational organization… an affiliate of the American Association for the Advancement of Science, a participating professional society in the MentorNet Affiliated Partners Plus program, a sustaining member of the National Postdoctoral Association, and an endorsing society of National Engineers Week.

This text and more from http://www.noglstp.org/
Jobs & Grants

It is important to note that the jobs and internships listed below are only a sample of the opportunities available. Please monitor department Blitz bulletins as well as Career Services, Engineering Career Services, Computer Science Jobs & Internships, and check out WISP's 2006 Summer Opportunities Bulletin posted on the WISP website. Good luck!

Part-time ENGS Summer Research Position

who: undergraduate engineering students

time commitment: 10-15 hrs/wk

compensation: $9/hour

contact: Robyn Millan, Dept. of Physics and Astronomy
Robyn.Millan@dartmouth.edu

Project description: Help design a high altitude balloon experiment for studying Earth's Van Allen radiation belts. The Dartmouth Balloon group is currently doing a concept study for an experiment (BARREL) that will support NASA's Radiation Belt Storm Probes (RBSP) mission. We are looking for 1-2 engineering students to help design a modular, easily assembled payload structure. The candidate will also help put a model of the payloads into AutoCAD, and may assist with thermal modeling of the payloads (using the CAD model). Prior experience with AutoCAD is desired but not necessary (this will be an opportunity to learn it). For more information about the project or our group, see our website: http://www.dartmouth.edu/~rmillan/barrel.html.

Health Policy Internship

For those interested in fusing “hard science” with social science…

Employer: Senator Kennedy's Health Policy Office for the Health, Education, Labor and Pensions Committee

Description: Senator Kennedy's Health Policy Office for the Health, Education, Labor and Pensions Committee seeks unpaid full or part-time interns to start in late August or September. Responsibilities include a range of administrative and legislative work such as letter writing, administrative duties, attending hearings and briefings, and assisting with writing and research for staff members, as well as special projects. Applicants should have strong written and verbal skills, and be able to multi-task in a fast-paced environment.

To apply: send cover letter and resume to fallhealthintern@gmail.com

Don’t forget, this isn’t all that’s out there. Remember to monitor department bulletins for additional internship, scholarship, and grant opportunities!!
Symposia & Seminars

A great way to learn about new areas of science or more about your own field of interest is to attend a seminar in one of the many departments on campus that host a seminar series.

We encourage you to check department bulletins for weekly seminars and symposia.

WOMEN IN SCIENCE PROJECT
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Visit the WISP Homepage:
http://www.dartmouth.edu/~wisp