After some 18 months of work by the UNH marine faculty steering committee, I'm delighted to report that a revised proposal outlining the purpose and structure for a School of Marine Science & Ocean Engineering will be submitted to the UNH Faculty Senate this month for feedback and consultation.

This interdisciplinary school is intended to unite our marine-related research, graduate education, and facilities to create a coherent, well-organized entity that will boost the visibility of UNH's marine initiatives. It also will enhance our ability to attract top students, offer outstanding undergraduate and graduate programs, conduct groundbreaking research, and engage policymakers and the public. In addition to a range of master's programs, it will offer doctoral programs in ocean engineering, oceanography, and marine biology. The School will engage faculty and students from CEPS, COLSA, EOS, COLA, and Cooperative Extension and will incorporate the existing UNH Marine Program. We are aiming for a Fall 2013 implementation.

At the state level, we are looking at ways to strengthen our longstanding relationships and develop new ones. To that end, I met late last year with New Hampshire commissioners Clement (Transportation), Burak (Environmental Services), Toumpas (Health & Human Services), and Barthelmes (Safety). We discussed working together to address challenges such as an aging state workforce, data management effectiveness, and technology. I anticipate closer collaboration, for example, between the Dept. of Environmental Services and UNH faculty, with data sharing that would advance sustainability efforts statewide. Other partnerships may bring state recruiters to campus career fairs, open some online courses to state employees, and encourage State and UNH employees to co-submit grants.

On November 7, the National Science Foundation's NH EPSCoR (Experimental Program to Stimulate Competitive Research) held its first state conference since launching a new statewide research and education project. The conference brought together 58 people from... (cont. on page 6)

Each Insider to Feature a Research Office Unit

Starting with this one, each issue of the Insider will focus on an individual unit of the Research Office. Articles will be contributed by the featured unit to provide the rest of the Research Office with a glimpse of what’s going on in the unit — day-to-day activities as well as special activities and achievements.

Thanks to all for their articles…and for their interesting work!
It’s official: UNH’s new supercomputer will be from Cray Inc., an industry leader with a storied history. The computer, supported by a $535,000 National Science Foundation Major Research Instrumentation (MRI) grant, will benefit research in multiple disciplines, including engineering, physics and math. It will be located in UNH’s Research Computing and Instrumentation Center, replacing the 8-year-old computer cluster known as Zaphod.

First, however, the Morse Hall Data Center will require infrastructure improvements to supply adequate power and cooling for the new computer. Additional work will be done to provide redundant cooling and a new clean-agent fire suppression system. RCI staff members Marc Maciolek and Thomas Baker will assist with the installation and system administration of the Cray.

Cray, Inc. was selected as the vendor after a formal bidding process. It has played a pioneering role in supercomputing since Seymour Cray, known as the father of supercomputing, founded Cray Research in 1972. The first Cray system, delivered to Los Alamos National Laboratory in 1976, was then the fastest computer in the world.

In the years since, the company has become known for producing powerful and innovative machines for Oak Ridge National Laboratory, Sandia National Laboratories, the National Center for Atmospheric Research, the Defense Advanced Research Projects Agency, and the National Science Foundation, among other clients in government, industry and academia.

At UNH, researchers will use the Cray supercomputer to better understand turbulence, fluid flows, magnetic reconnection (the process by which magnetic energy is converted into heat and magnetic energy), and space weather. They expect the machine’s computational abilities to lead to advances with practical implications, such as more accurate predication of damaging solar storms.

About a dozen faculty members will use the computer cluster at any given time, along with 20-30 graduate students, post-doctoral fellows, and other researchers. Although the grant will finance only the purchase of the new Cray (not the research it is intended to enable), “The availability of the machine will enhance the likelihood of successful proposals,” says UNH physics professor Joachim (Jimmy) Raeder, the principal investigator for the project.
RCI Develops Technology to Securely Erase Computer Hard Drives

In a recent New York Times article, two industry experts estimated that more than 1.8 trillion gigabytes of digital information were created globally last year. At the same time, government, corporate and public awareness is rising as to the privacy risk associated with this data as the hardware it resides on is recycled, reused or repurposed. Deleting the data, even by reforming the hard drives themselves, cannot safeguard against the ability to reconstruct the original data.

The need for secure data destruction continues to grow as new policies mandate that appropriate measures are in place to insure that digital storage devices are cleared of all data beyond forensic recovery. Secure data destruction is achieved by applying Department of Defense (DOD) specified algorithms to write random data to the device repeatedly over multiple passes – a process that can take hours to complete on an average sized home computer hard drive.

RCI created a novel solution to address the data destruction problem – the secure erasure of information stored on computer hard drives. RCI’s innovative approach targets and overcomes two major challenges facing the industry: 1) the time intensive process to securely remove the data, and 2) support for the ever increasing “makes & models” of hard drives. Following extensive testing and auditing, the software is ready to be put into production to address the growing security needs for data stored on computers that are being recycled or repurposed.

Obliterase, Inc., a recent start-up company, has licensed the core erasure technology from UNH. Although the core erasure technology has been deployed in production at several locations, additional research and development will simplify the client experience and address challenges arising from recent advantages in solid-state storage technology. These steps are essential for the consumer product to be competitive in the marketplace.

Prior to any data destruction, the application creates an entire hardware inventory of the computer system itself as well as its internal and external components. Such information (serial numbers, vendor, model, part number, etc.) is used to determine which devices are available for data destruction. The subsequent data destruction, or “sanitizations,” are performed to the DOD specifications and utilize a customizable, variable pass writing method to ensure data is overwritten completely. This writing pattern can be modified to insert additional random character write passes to satisfy site-specific requirements.

Media that successfully complete all sanitization and verification passes will have an Intel/PC boot fingerprint installed. This fingerprint contains a unique serial number and sanitation date which can be viewed simply by booting a PC with that media. Media that fail to be sanitized will not be bootable and will become candidates for physical destruction. The application also supports the use of a database to store results, providing the greatest flexibility for querying hardware or determining where a sanitized device came from as well as its status. The technology can be utilized in many configurations depending on the need.

The developed software allows the ability for large installations to run concurrent erasures, which in turn massively scales what otherwise is a time intensive effort. The technology was designed to be flexible regarding deployment, data collection, and maintainability. It is built on the Linux platform, but it can be re-targeted to run on a multitude of platforms. Data collection and reporting are also flexible – using available networks when possible but supporting local removable media, such as thumb drives. The technology offers a number of predefined configurations to accommodate most situations and also can be tailored to new and unique environments as needed.

RCI staff are working with a Portsmouth business to bring to market disk erasure technology.

Developed at UNH by software engineer/operations manager Tucker Hurton, the technology was designed to completely erase any data on storage devices connected to computers. Its purpose is to minimize the security risk of losing data in the process of redeploying, recycling, reselling or retiring information-technology assets from organizations where the risk of data loss is high.

RCI and Obliterase, a startup company located at the New Hampshire Innovation Commercialization Center at Pease, were awarded a grant for the venture last fall from the New Hampshire Innovation Research Center. (The NHIRC is based at UNH and administered by ORPC.)

Other RCI staff involved are Thomas Baker and Christine Jamioł. The project is expected to take six months.

RCI also is working with ORPC staff and small business partners to prepare a grant proposal to the National Collegiate Inventors and Innovations Alliance’s E-Team Program.

The proposed project will use Obliterase’s technology to repurpose unwanted computers, ultimately developing a system for individual consumers and industry alike to donate their unused computers to developing countries for a nominal fee.

The team anticipates that this grassroots program will have the capability of delivering massive long-term positive effects on the environment, worldwide education, and energy consumption.
Research Computing & Instrumentation Center:  
Advanced Data Processing and Statistical Analysis

Overview  Research Computing and Instrumentation (RCI) offers advanced data processing consultations and statistical analysis services to the UNH research community.

Profile  For over 35 years, Dr. Robert (Spider) Carrier has worked with Research Computing to provide researchers with high-level scientific and mathematic solutions to a variety of complex problems. Dr. Carrier has contributed his rare talents to research projects spanning a variety of disciplines, some of which are described below.

• The Sea Bottom Layered Half-Space: In conjunction with Musa Yildiz, Keifer Newman, and Al Magnuson, Dr. Carrier determined the intensity of reflected sound from the ocean bottom. This computation relied on contour integration in the complex plane and the eigen-solutions of a determinantal equation.

• The Shell Model Code: Developed with Jochen Heisenberg, this program calculates the nuclear energy transition energies of various heavy elements such as thallium and yttrium.

• The Wave Channel: Dr. Carrier worked with John McHugh to solve the Navier-Stokes equations for the fluid flow directions and surface height of a trough structure whose bottom and sides experience non-slip velocity conditions and whose exposed top’s behavior is governed by pressure and surface tension. Solution by spectral method was appropriate. The field was approximated in the long direction by trigonometric functions and by Chebyshev polynomials in the lateral directions.

• Project 54: A segment of Project 54, conducted with Kent Chamberlin, involved estimating the strength of signals emanating from FM transmission and transmitted over hilly terrain. The rough-cut estimate of this coverage was obtained through geometric optics.

• Chaotic Oscillator: Dr. Carrier collaborated with Professor Kevin Short to analyze speech and music via investigation of the trajectories generated by certain nonlinear differential equations (e.g., Grebogi). Professor Short shared in a GRAMMY Award for work in restoring an historic recording of a Woody Guthrie concert using these techniques.

• Analysis of Ultra-Centrifuge Data: In support of research done by Tom Laue and Richard Toth, Dr. Carrier devised a rational fraction approximation to data obtained through the transmission of light in a centrifuged sample cell in order to estimate the molecular weight of the quick-spun stuff.

The Latex Paint Visualization was developed to aid researchers in understanding the behavior of latex paint particles and how they bind during the drying process. A greater understanding of the behavior of the particles allows researchers to experiment with manipulating the particles to create different varieties of latex paint.

Eqmorph and Kmorph (Don Sundberg, Yvon Durant, Ola Carlson, Jeff Stubbs, John Tsavalas)

Eqmorph computes the equilibrium morphology of a two stage particle created by an emulsion polymerization. It relies on simple algebra and root finding techniques.

Kmorph attempts to model the formation of a two stage particle over time. Early versions relied on large systems of coupled nonlinear ordinary differential equations. The modern version employs stochastic Monte-Carlo techniques. The graphic interface is heavily invested in the motif UID library.
Outstanding Staff for 2012 Recognized

Environmental Health and Safety: Andy Glode

As the laboratory safety officer for UNH, Andy manages the campus laboratory safety program, the hazardous materials shipping program, and the Toxic Substances Control Act program. At the request of the State Fire Marshal and Durham Fire Department, he worked with Phil Collins in RCI to institute a notification system in the UNHCEMS® chemical inventory system that would automatically send alert emails when flammable liquid inventories are approached or exceeded in a laboratory. Since joining OEHS in 2001, he has demonstrated his ability to work with all members of the UNH community as well as outside consultants. He balances many programs and commitments effectively and approaches UNH employee requests for assistance with respect and professionalism. Within the office, he is a valued team member who never hesitates to assist in other program areas when asked. In support of the OEHS mission, Andy ensures that the UNH community gets to enjoy working in a safe and healthful environment.

Research Computing and Instrumentation: Philip Collins and Robert St. Lawrence

Phil and Bob constitute the UNH team responsible for the development of much of the ERMA® software deployed to help manage the Deepwater Horizon spill. They have remained fully engaged in the project through ongoing enhancements, technical support, new design considerations, and new ERMA® deployments. They are committed to its success, responding immediately to urgent matters day or night. In addition, Phil continues to develop and improve the UNHCEMS® software, providing regular support for our subscribing members. This year, he released a major update that adds new and creative functionality as well as support for mobile devices. He also has been engaged in the recent effort to proactively market UNHCEMS®. Bob, the resident database administrator, is consulted on a regular basis by his colleagues. An expert on Geographic Information Systems, he provides support for a variety of faculty and staff projects. He is quiet, efficient and precise in every aspect of his work.

Research Integrity Services: Kathleen Stilwell

Kathleen provides the principal administrative support for RIS. She has performed exceptionally in two key areas by delivering extremely high-quality customer service to RIS clients and by demonstrating excellent mentoring and supervisory skills in her work with the office’s work-study students. Always eager to help clients, she goes above and beyond to fulfill their needs. In addition, she hires and supervises the work-study students who are vital to the functioning of the RIS office. She is very patient when training them, encourages them to develop and learn new skills, and is a supportive and understanding supervisor. Students typically work in the office until graduation, and Kathleen frequently stays in contact with them afterward, providing letters of reference and other help in their professional lives.

Research Partnerships and Commercialization: Paige Smith

Although UNH calls Paige a “senior program support assistant,” within the office she is simply called indispensable. Since arriving in mid-2011, she has helped streamline ORPC’s internal policies and processes, oversee its financial management, and create order out of a seemingly limitless number of inquiries. She especially deserves recognition for her help with the monthly Innovation Catalyst Seminar Series and the annual Inventors’ Dinner, which regularly get rave reviews from attendees. But what is most exceptional about Paige is that she comes to work every day in good spirits and ready to take on whatever comes her way. It is a pleasure to work with her and publicly acknowledge her excellence.
Outstanding Staff for 2012 Recognized (continued from page 5)

Sponsored Programs Administration: Erin Jenkins

SPA’s Management Team wants to recognize the work that all of the staff did this past year to improve quality, professionalism, and customer satisfaction. Besides handling ever increasing sponsor requirements, last-minute faculty emergencies, and the necessity of “doing more with less,” the staff engaged in a year-long process of professional development that included self-examination and assessment, and field trips to complementary units. As the year ends, SPA staff are at the center of a re-engineering effort that promises to touch on every aspect of how sponsored programs are managed at UNH.

Into this swirl of activity came Erin Jenkins, who joined the SPA Financial Management Group in 2012. Her experience supporting research projects in the Research Business Service Center, and before that, in the Family Research Lab, has helped her colleagues (and customers) gain perspectives on what collaborative work between a research center and central administration can look like. Erin is driven to learn and pursue new skills; she participates actively in her own professional development and uses it as a means of contributing to the betterment of the organization. She represents what the organization is striving to become.

T-Hall: Tammy Goldberg

Tammy Goldberg has worked with four senior vice provosts for research. She never loses her temper, always responds to requests for information with a smile, and delivers a high-quality product. She is in the office early and is often the last to leave. Her quiet demeanor should not be misinterpreted: She is fierce in her support of the research mission, understanding the policies and administrative hurdles that often exist at a large university that is part of a larger university system. She has successfully guided, advised, and helped the members of the OSVPR, enabling them to better support faculty, staff and students. In addition to serving as the director of finance and administration, she is taking classes toward her MBA. That says a lot.

SVPR Corner (continued from page 1)

academic institutions, State government, and non-profit organizations across New Hampshire, as well as staff from the NSF. It focused on promoting successful grant writing and developing research opportunities at undergraduate institutions.

As NH EPSCoR State Director, I welcomed attendees to the gathering at the Waterville Valley Resort Conference Center. NH EPSCoR Associate Director Kevin Gardner spoke about the program’s Ecosystems and Society project, a five-year initiative financed by a $20 million NSF grant and involving nearly 100 faculty, staff, and students from eight colleges and universities across New Hampshire. NSF program directors participated in panels and made themselves available for networking and consultation. Kathy Cataneo participated in a panel on “Tips & Tricks of Grantwriting.”

In late January, NH EPSCoR and Maine EPSCoR submitted a joint Track II proposal to NSF (for $3M each) to examine systems interactions between watershed processes and human activities that contribute to high populations of pathogenic bacteria in coastal waters, which in turn trigger decisions to close economically important beaches and shell fisheries on our shared coastline.

As 2013 unfolds, the UNH Research Office is focused on using technology to improve research support for faculty and students. This includes developing databases to track instrumentation, producing training platforms, and routing grant proposals and contracts electronically. I thank you for your contributions to these efforts, and hope the outcomes will be models for the community we serve.
Comings, Goings, & Goings-on

Michele Gregg, CPA, has joined SPA as a senior financial research administrator. She is responsible for financial compliance monitoring, effort certification, and grant closeouts. She returned to New England from New Mexico, where she worked as a fiscal monitor in the Contract and Grant Accounting Department at the University of New Mexico.

Dana Buckley, EHS’s biological safety and security officer, left UNH at the end of January. While part of the OEHS, she completed a thorough gap analysis of the campus biosafety program that identified successful components of the program and areas that need improvement. Dana’s new position is as the safety, health and environmental manager for Environmental and Biosafety programs at AstraZeneca Pharmaceuticals in Waltham, MA.

Bill Armstrong, an almost 20-year employee in RCI, has moved on to a new job in Portsmouth.

ORPC staff were busy this fall sharing their insights and experience with a variety of audiences.

Marc Sedam made presentations about intellectual property issues at several events, including the Global Consortium of Entrepreneurship Centers Conference, the Licensing Executives Society Annual Meeting, the American Societies of Mechanical Engineers’ Northern New England Meeting, and the National Collegiate Inventors and Innovations Alliance’s Innovation Programs Summit.

Maria Emanuel discussed the topic of intellectual assets with grad students in GRAD 930: Ethics in Research and Scholarship. She and Tristan Carrier spoke on the same topic with mechanical engineering undergrads in ME 7: Senior Design Project I.

Michelle Gregoire, Susan Higgins, and Evelyn Jones organized the November, 2012 NSF NH EPSCoR state conference at Waterville Valley and ensured its smooth operation.