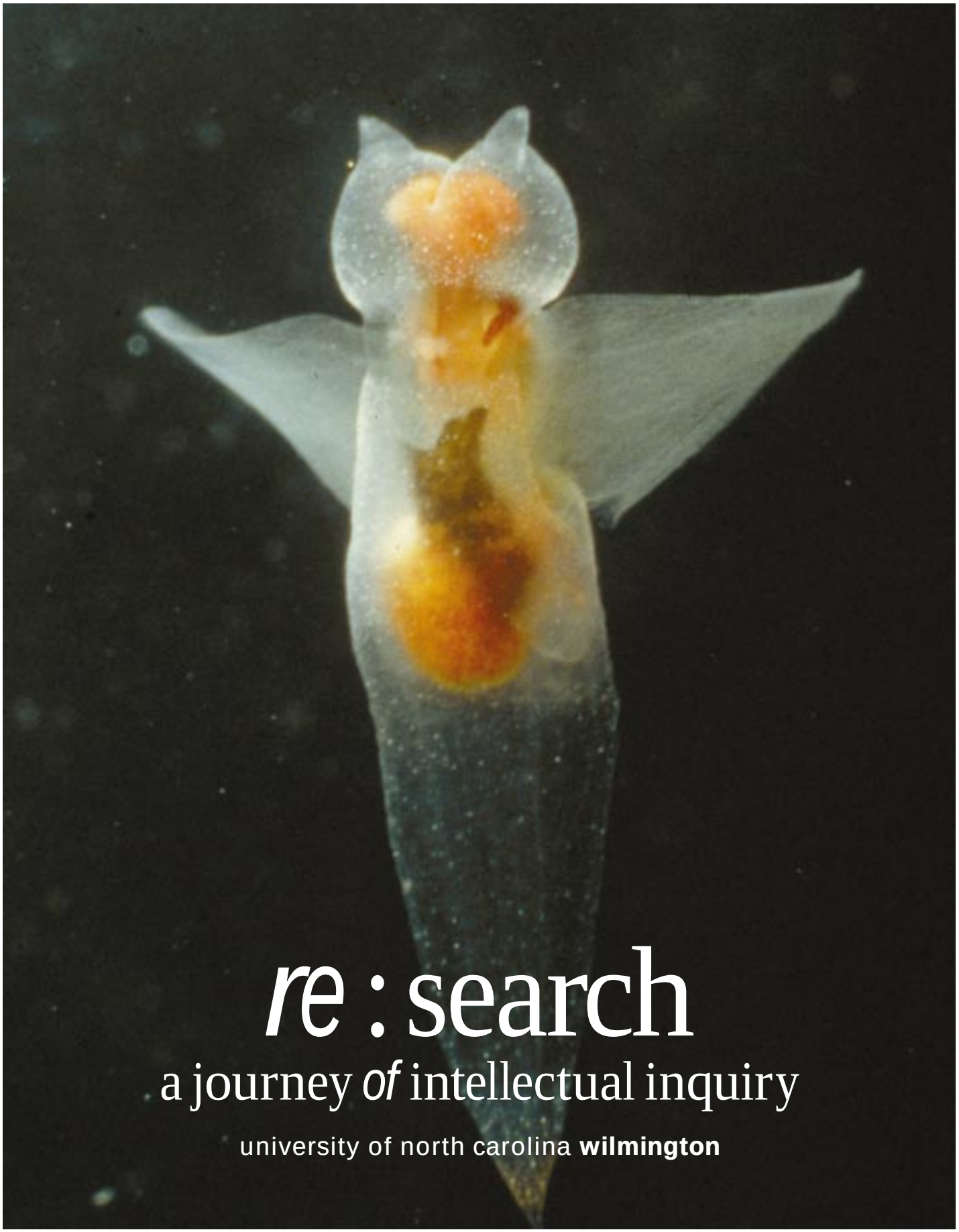

re : search

a journey *of* intellectual inquiry

university of north carolina **wilmington**

Throughout our college and professional schools, UNCW's faculty and students actively engage in a journey of intellectual inquiry that leads to the creation of new knowledge. Whether discovering the properties of newly synthesized molecules, solving problems and exploring the relationships amongst various artistic media, or assessing the value of a new learning method for middle school children, our faculty introduce students to the intellectual life of the mind. Engaging in research projects in any field sparks students' intellectual curiosity, immerses students in the intellectual life, increases self-confidence, and exposes students to new career options.

Faculty and student research and scholarship not only enhance the intellectual life of the university, but also contribute to the economic growth and development of the region and, indeed, all of North Carolina. UNCW has witnessed unprecedented growth in grant and contract awards during the past decade, and this has served as the engine for the accelerated creation of knowledge by university faculty and students.

The university considers scholarly practice, research, and creative activities essential for effective learning. We are pleased to share with you a sample of the exciting and forward-thinking contributions of our faculty, graduate students, and especially our undergraduate students. Our commitment to "re:search" reinforces this belief and expands the role of faculty and student beyond the confines of the university to the community we serve.

— Paul E. Hosier
Provost University of North Carolina Wilmington

Dobo Hall

University of North Carolina Wilmington is a public comprehensive university dedicated to excellence in teaching, scholarship and artistic achievement, and service. The university seeks to stimulate intellectual curiosity, imagination, rational thinking, and thoughtful expression in a broad range of disciplines and professional fields.


Center for Marine Science Research

re:search a journey of intellectual inquiry university of north carolina wilmington

UNCW

re:search a journey of intellectual inquiry

to explore or examine in order to discover

April 2005

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contents:

Coastal Ocean Research & Monitoring Program

Sustaining research that protects coastal Carolina waters and ecosystems

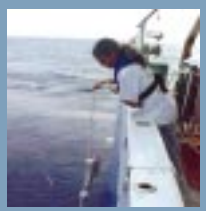
Since 1999 UNCW has conducted a sustained, long-term program of coastal ocean observations and research off North Carolina shores. The Coastal Ocean Research and Monitoring Program (CORMP) is located at the UNCW Center for Marine Science (CMS) and is an interdisciplinary program that includes specialists in areas such as physical oceanography, geology, biology and marine biology, environmental science, and chemical oceanography. CORMP, whose research is supported by the National Oceanic and Atmospheric Administration (NOAA), collaborates with both NC State University and the University of South Carolina to study and monitor the dynamic environment of the coastal Carolina ocean and the Cape Fear River Plume. The mission of the program is to promote sound public policy, supported by research, which leads to wise coastal use, sustainable fisheries and improved health of the ecosystem.

Students from the *Cruise or Field Sampling* course work together to remove water samples taken via a carousel water sampler that is used by researchers to help determine the health of the coastal ocean ecosystem. The students enrolled in this course participate in the planning and sampling phases of major marine or environmental research programs.

Presently eleven faculty researchers from four academic departments and CMS work with nine full-time researchers on projects associated with water quality, nutrient pollution and ecosystem health, ocean optics and remote sensing, physical oceanography, fisheries, and sediment transport. UNCW students directly benefit from first-hand experience in this research. Since the program began, CORMP has supported over 40 undergraduate and graduate student researchers, nine masters' theses and one Ph.D. dissertation.

CORMP serves not only the regional scientific research community but also a growing network of public service and local citizen groups dedicated to the management of coastal resources and marine ecology.

Current outreach endeavors include a year-long professional development pilot program for middle and high school educators and expanding partnerships with state and federal agencies and local citizens dedicated to preservation and wise coastal management.



UNCW offers students unique opportunities: Andrea Quattrini monitors coastal ecosystem health under the direction of UNCW professor Thomas Lankford Jr., biological sciences. As part of its interdisciplinary research endeavors, CORMP creates opportunities for students to work with professors on cutting-edge research. "Distribution of larval fishes in shelf and gulf stream waters in Onslow Bay, North Carolina" was the title of Andrea's master's thesis.

Lynn A. Leonard, Ph.D., professor, earth sciences
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Research for Cures:

Chemistry students are working with UNCW professor Sridhar Varadarajan to find better drugs for the treatment of cancer, diabetes and more.

Sridhar Varadarajan, assistant professor of chemistry and biochemistry, conducts research in the area of DNA damage and DNA damaging drugs. His research in the design and synthesis of novel DNA damaging molecules able to modify DNA at specific sites in particular cells without mutational side-effects has potential applications in the treatment of diseases such as cancer and diabetes. Andrew McIver, first-year master's student who started working with Varadarajan as an undergraduate honors student, is making DNA-damaging compounds that will target insulin-producing pancreatic beta-cells. Andreas Linke, who finished his honors research working on the same project will graduate in May and plans to continue his research at medical school. Tera Lynch, a second-year master's student, and Heather Lewis, an undergraduate senior, are both working on molecules targeting breast cancer cells. Heather received the UNCW undergraduate research fellowship for her directed-independent-study research with Varadarajan and will continue working in his laboratory this summer. Tera plans to work in the pharmaceutical industry as a medicinal chemist when she graduates. Shannon Cook developed HPLC analytical methods for quantifying DNA damage while an undergraduate and is now pursuing plans for graduate research in the field of forensics. Also currently working in the UNCW chemistry lab with Varadarajan are students Heather Hill, who is using computational methods to identify best candidate molecules, and honors student Lacie Smith, who is synthesizing molecules that can target bacterial cells. Research in Varadarajan's lab is partially funded by the Research Corporation.

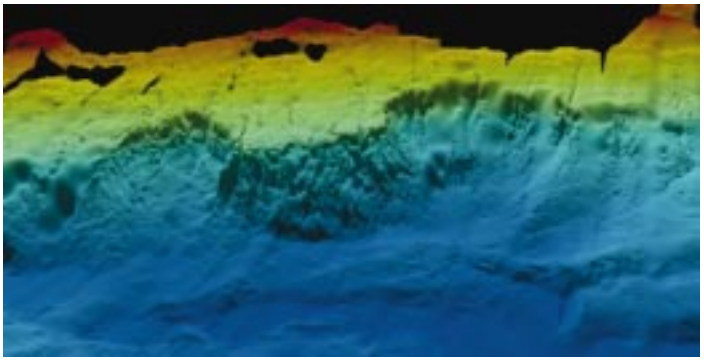
Undergraduate and graduate chemistry students, Heather Lewis, Tera Lynch and Andrew McIver have the privilege of hands-on research experience under the direction of professor Sridhar Varadarajan. Together they are searching for better drugs to treat the most threatening diseases.

Sridhar Varadarajan, P.h.D., assistant professor, chemistry and biochemistry
varadarajans@uncw.edu

Submarine Landslides and the Potential for Tsunami Generation: Puerto Rico Trench

Using multi-beam bathymetry, sidescan sonar and seismic data of the Puerto Rico Trench, which marks the boundary between the North American and Caribbean tectonic plates, UNCW earth sciences professor Nancy Grindlay, UNCW graduate student Meghan Hearne and Paul Mann of the University of Texas Austin, have determined a potential for tsunami generation. According to their article, published in *Eos, Transactions, American Geophysical Union* on March 22, all ten significant tsunamis documented in the northern Caribbean since 1492 were triggered by movement along this active plate boundary. Grindlay, Hearne and Mann warn that the potential is high for more tsunami events. Ever-increasing population of coastal areas, movements along the fault boundary, and submarine landslides could produce potential tsunamis endangering a coastal population that now exceeds 35 million people. Grindlay's research is presently funded by the National Science Foundation and the University of Puerto Rico Sea Grant Program.

March 2005, water sampling cruise offshore northern Puerto Rico aboard the R/V *Pelican*. Left to right: Brant Anderson, an undergraduate student at the University of South Carolina; UNCW professor, Dr. Nancy Grindlay; Kelly Robertson, an honors undergraduate student from UNCW; and Jennie Mancinone, a graduate student at UNCW.



A three-dimensional image of the bathymetry of the Puerto Rico Trench and northern margin of Puerto Rico. Perspective view is north looking south. Note the large (up to 55 km across) amphitheater-shaped scarps on the margin less than 40 km from the north coast of Puerto Rico. These are probable sites where submarine landslides have occurred.

Nancy R. Grindlay, Ph.D., professor, earth sciences
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music

Thinking in Music

A graduate of the University of Arizona, the New England Conservatory of Music and Emory University, Daniel C. Johnson has researched music cognition, critical thinking and music listening. In his published dissertation, he investigated the effect of critical thinking instruction on students' written responses to music listening examples. He has since presented sessions at state, regional, national and international conferences hosted by the Music Educators National Conference, the International Society for Music Education, the College Music Society, the American Orff-Schulwerk Association and the National Collegiate Honors Council. His publications include articles in *The Bulletin of the Council for Research in Music Education, Contributions to Music Education* and *The International Journal of the Humanities.*

He is currently collaborating with area music educators in two research partnership studies to replicate his research. Johnson regularly presents in-service workshops to K-12 educators to share his findings and recommendations for improving pedagogical practices. In undergraduate education, he has used his research to develop innovative approaches to music education in the form of new basic studies courses, Web CT course sections, courses and seminars in the Honors Scholars Program, and a new textbook, *Musical Explorations: Fundamentals Through Experience.*

To support his work, Johnson has received nearly $40,000 in grant funds from the National Endowment for the Arts, the American Orff-Schulwerk Association, a UNCW Innovative Technology Grant, the UNCW Center for Teaching Excellence, the UNCW Office of International Programs and the Schechter Foundation. He has also applied for an additional $10,000 in grant funds from the North Carolina Arts Council to support professional development courses for area elementary educators. Johnson is currently collaborating with the New Hanover County Schools to provide music education through a Twenty-First Century Learning Grant.

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johnsond@uncw.edu

Johnson directs participants in the Level I Orff-Schulwerk teacher-training course, including several UNCW alumni.

history

Republic of Egos: a Social History of the Spanish Civil War

The Spanish Civil War (1936-39) excites ongoing interest because of its ideological scope and its supposed anticipation of World War II. The understandable fascination provoked by the struggles between democracy and dictatorship, Communism and fascism, anarchism and authoritarianism, Catholicism and anti-clericalism have marked the literature with an ideological/theological stamp.

Most recently, the many forms of the collective have mesmerized historians whose investigations have centered on social groups, such as classes or genders.

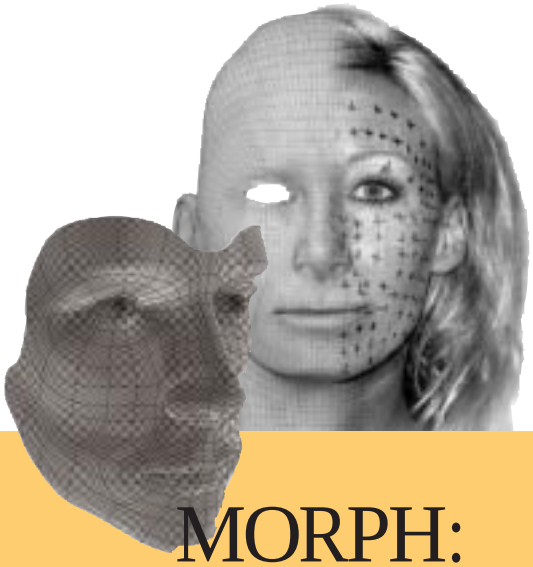
This new emphasis was a healthy reaction to the previous stress on great men who supposedly made history by themselves. Yet the obsession with group identity has left much unexamined.

Michael Seidman's *Republic of Egos: A Social History of the Spanish Civil War* (University of Wisconsin Press, 2002) offers a different vision of the war and revolution. While not neglecting the collective identities of political/religious affiliation, class and gender, it examines the anonymous individuals, families and small groups who struggled for their own interests and survival, not for an abstract political or revolutionary cause. *Republic of Egos* analyzes the political economy of the war. It shows how price controls and inflation in the Republican zone encouraged peasant hoarding and black marketeering. The consequent lack of food in the cities promoted workers' indifference, absenteeism and pilfering. Soldiers responded to material shortages by looting, deserting and fraternizing with the enemy.

This book offers a new explanation for the failure of the Republic and the success of Franco's Nationalists. It breaks methodological ground by focusing on the personal and individual realms.

Michael Seidman is also the author of *Workers against Work: Labor in Paris and Barcelona during the Popular Fronts* and *The Imaginary Revolution: Parisian Students and Workers in 1968.*

Michael M. Seidman, Ph.D., professor, history
seidmanm@uncw.edu



MORPH: Craniofacial Morphological Database

Facing the Future for Better Security

As if we need evidence that we're getting older, researchers from UNCW seem determined to prove it.

With a growing database of thousands of photos, they're tracking facial laugh lines around the mouth, crow's feet around the eyes and all other age-related texture changes on the human face.

By studying these images, a team of UNCW researchers is advancing the field of face-recognition technologies. Once only science-fiction fare, face-recognition devices now have a limited ability to "read" the dimensions of a face in order to establish a person's identity. In the future, it's likely that sophisticated scanning devices will have broad application for airport security, company ID systems, movie and game animation, and product design. (Imagine keyless entry to your house and computers that boot up upon "seeing" you.)

Though the technology is advancing, it still has a glaring limitation: even sophisticated programs cannot properly account for aging. It seems those wrinkles associated with passing years can compromise the accuracy of facial recognition. What's needed are math-based models that "map" the aging process in computer bits and pixels. The achievement would usher in the next generation of face-recognition technologies and give us machines that recognize a face ten years or more after an initial image is taken.

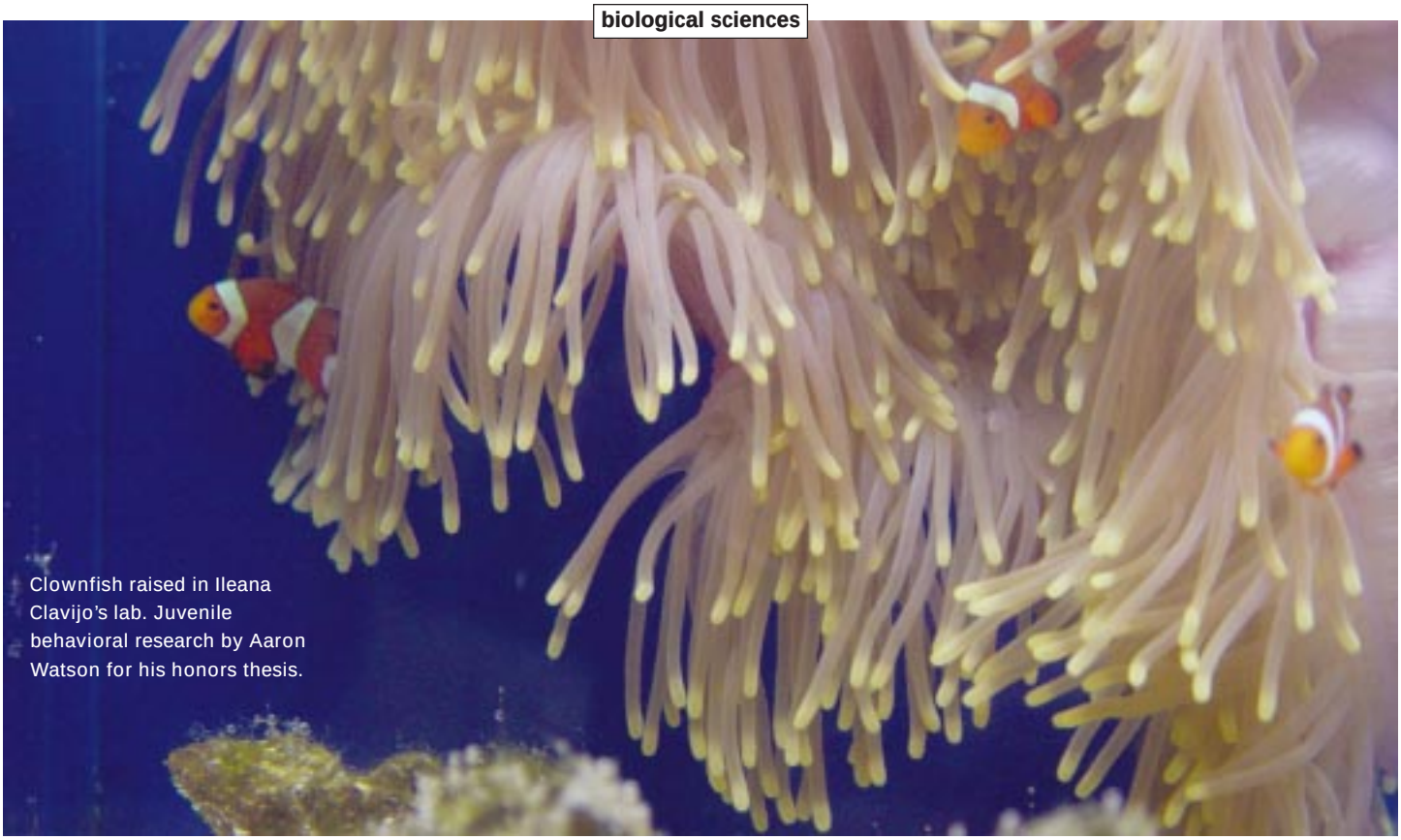
So, with advanced algorithms that run on high-powered computers, UNCW researchers are developing a database to make it happen. Their work—the Craniofacial Morphological Database or MORPH—is becoming one of the world's most extensive longitudinal "libraries" of facial images. For test subjects, they're starting with public record mug shots. From there, they're taking three-dimensional scans of UNCW students, who will be encouraged to return to their alma mater every year so researchers can track the path from ruddy youth to the care-worn countenances of later adulthood.

The federal government, with an eye on improving homeland security, is funding the UNCW research under a three-year contract. That's nearly $1 million toward making accurate facial recognition technology as inevitable as the lines on our face.

Karl Ricanek, Ph.D., assistant professor, computer science
http://fire.bear.uncw.edu/IRL • ricanekk@uncw.edu

below Eric Patterson, computer science.

right Midori Albert, anthropology, standing left Edward Boone, mathematics and statistics, and standing right Karl Ricanek, Jr., computer science.



Clownfish raised in Ileana Clavijo's lab. Juvenile behavioral research by Aaron Watson for his honors thesis.

On Being the Most Popular Fish in the Tank

The ornamental trade industry is a growing industry handling over $900 million annually in the sale and transport of hundreds of species of fish and marine invertebrates for aquariums, hobbyists and enthusiasts. The majority of the animals that enter the trade are collected directly from the wild, which is putting a higher and higher price tag on the hobby and is beginning to have vastly negative effects on coral reefs. Growing concern for the environment has propelled a new side of the industry: aquaculture of desired species. Culture of these animals can greatly reduce the cost to the consumer and curb some of the destruction and degradation to one of the world's most popular and fragile ecosystems.

Determining the optimal density for growing fish to marketable size is valuable information for the ornamental trade industry. Juvenile (30-71 days-old) *Amphiprion ocellaris*, known as the *ocellaris* clownfish, were stocked at three different densities. Tanks containing six, 12 and 24 fish were monitored for growth and agonistic behavioral differences to identify an optimal stocking density for growing fish to market size.

Growth rates were not significantly different for this age group based on total length as measured at the beginning and end of each trial. The overall frequency of agonistic behaviors was found to be significantly higher at the lowest density. Mean frequencies of approaches, nips and face-offs were significantly higher at the lowest density while there was no significant difference among the frequencies of chases or circling behaviors. A previously undescribed behavior involving two individuals vibrating along their lengths while parallel was observed during this study and called "parallel vibration." This behavior exhibited no significant difference in frequency among the densities.

Optimal density for this age group could not be determined from this study, although these results show that agonistic behaviors are minimized at higher densities and growth rates are not affected at these densities.

Aaron Watson, undergraduate honors student, biological sciences
http://www.uncw.edu/honors

computer science
chemistry & biochemistry
mathematics & statistics

Project Numina

Interactive Classrooms for Better Teaching

We survey for consumer preferences, poll for presidential candidates and cast real-time votes on the Internet about likely Super Bowl winners.

So what's to stop a college professor from using instant polling during a lecture about molecular shape and structure? Thanks to the leadership of UNCW professors, an interactive wireless classroom is not only possible, it's now a teaching model that's winning over students and professors around the country.

Ron Vetter, a UNCW computer science professor, has been part of the pioneering Project Numina team since it was formed in the early-1990s. Project participants investigate how handheld computers and wireless Internet connections improve classroom instruction.

"Any professor who's taught in a room with 100 students knows why this works," Vetter said. In larger lecture halls, student response rates can be as low as three percent. And comprehension rates are usually impossible to determine. But in classrooms equipped with interactive equipment, student response rates have soared to 99 percent. "Even students sleeping in the back row have to give an answer," Vetter said.

Similarities to the audience survey segment of a popular game show are all too real. "Our students treat it like 'Who Wants to Be a Millionaire'," Vetter admits.

At the heart of Project Numina is UNCW-developed Student Response System (SRS) software. In class, students access the software on handheld computers or "Pocket PCs." Then anonymous student responses to professor-supplied queries are instantly tallied and displayed on an overhead screen. So if 80 percent of the class doesn't know a proton from a neutron, a professor can immediately address the situation.

Since the introduction of SKS in 2001, schools like Emory, UC Berkeley and the University of Iowa have signed up. More than 50 colleges have SRS accounts, and the list is sure to grow with this year's introduction of SRS III.

Thanks to UNCW, there's a lot more participation in classrooms and a lot less sleeping in the back row.

This project is a multidisciplinary effort between:
Charles R. Ward, Ph.D., chair/professor, chemistry and biochemistry, ward@uncw.edu;
Ronald J. Vetter, Ph.D., chair/professor, computer science, vetterr@uncw.edu;
James H. Reeves, Ph.D., assoc. professor, chemistry and biochemistry, reeves@uncw.edu;
Gabriel G. Lugo, Ph.D., assoc. professor, mathematics and statistics, lugo@uncw.edu;
Russell L. Herman, Ph.D., assoc. professor, mathematics and statistics, hermanr@uncw.edu

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Learning to Function

Computer screen of CBVI to teach grocery shopping.

Identification of effective strategies for teaching persons with moderate to severe intellectual disabilities has long been a challenge in the field of Special Education. Linda Mechling, Watson School of Education, understands this challenge and has been involved in a series of investigations evaluating use of interactive computer-based video instruction (CBVI) to teach functional skills to this population of students.

Research in the field of special education supports instruction of skills to persons with disabilities within natural environments in which skills will be used, yet many school-based programs experience resource constraints which limit opportunities for community-based instruction. Simulated instruction has been recommended as an alternative means of instruction when care is taken to closely replicate the natural environment. The focus of Mechling's research (CBVI) incorporates two technologies, video technology and computer-based instruction, with software programs such as Hyperstudio 4.5 or

Linda C. Mechling, Ph.D., assistant professor, curricular studies
mechlingl@uncw.edu

in the Real World

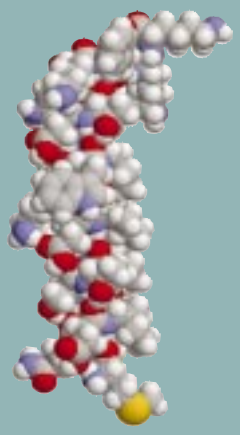
PowerPoint accessing video images. This technology is creating a promising means for providing simulated instruction within an interactive, realistic environment incorporating the multimedia effects of photographs and video captions, meaningful to the learner.

Collaborations with David Gast, University of Georgia, UNCW graduate assistants, and teachers and students with disabilities in the New Hanover County School System, have resulted in six single-subject research investigations over the past four years. Research results support the use of this medium of instruction to teach skills such as grocery shopping, debit card use, ordering at fast-food restaurants, augmentative communication and on-task behavior. Students benefiting from the research have included those with mental retardation, cerebral palsy, multiple disabilities and Autism Spectrum Disorder.

Efforts do not stop here. With the assistance of graduate student Fanny Ortega-Hurndon, Mechling is developing a program to evaluate the promising potential of this technology to teach job skills to adults with disabilities.

Graduate student Beth Cronin and Mechling developing computer-based video instructional program.

Membrane Penetrating Peptides as Antibiotics



The research conducted by Paulo Almeida, assistant professor of chemistry and biochemistry, is investigating the mechanism of action of antimicrobial and cargo-delivery peptides. The long-term objective of this research is the development of rational methods for the design and improvement of membrane-penetrating amphipathic peptides that are antibiotic or cytolytic, or that can carry other toxic molecules as cargo into cells. Critical knowledge in reaching this objective is the determination of the mechanism(s) of membrane penetration by these peptides. An important step in obtaining this information is an experimental kinetic study, combined with a global theoretical analysis, of membrane penetration by a set of known cytotoxic or antibacterial amphipathic peptides. The mechanism of this widespread biological defense system is presently not understood. To the several models currently discussed for the mechanism of function of these peptides, Almeida's team has recently added a new model (sinking raft model) in which the peptides insert parallel to the membrane and translocate across it, also creating a transient pore. Funding for Almeida's work is provided by the Research Corporation and the National Institutes of Health.

Paulo F. Almeida, Ph.D., assistant professor, chemistry and biochemistry
almeidap@uncw.edu

Illustration **above** shows the molecular structure of a membrane-penetrating peptide.

left Allison Cavenaugh in the lab.
below Paulo Almeida and students Jenny Wright, Kristina Knoelke and Allison Cavenaugh.

Promoting Clinical Reasoning Abilities of Baccalaureate Nursing Students Using the Human Simulator

In a collaborative project with nurse education graduate students from Duke University, the UNCW School of Nursing faculty directed a project that tested the clinical reasoning abilities of undergraduate nursing students using the Human Patient Simulator. Infusing this technology as a teaching/learning strategy in nursing education has the advantages of interactive learning, repeated skill practice while reducing patient risk, immediate feedback from faculty, critique in a safe environment, enhancement of assessment skills and practice with decision-making situations. The equipment includes a laptop computer with manikin and compressor interface, a monitor screen capable of projecting typical vital sign trends, speakers to amplify faculty-directed voice sounds during clinical scenarios, and supportive manikin equipment such as a running intravenous line, a draining urinary catheter, wound/incision manikin inserts, and life-like lung, heart and bowel sounds. During a 14-week adult health course, faculty assisted two graduate nurse educator students to develop scenarios for 44 undergraduate nursing students to treat and respond to human simulator functions as if they were caring for a real patient. When the clinical reasoning abilities during the human simulator experiences were compared to authentic clinical experiences, there was no significant difference for the two types of experiences. The implications of these findings suggest that human simulator activities could be beneficial at all levels of the nursing curriculum, the scenarios could be used in planning student remediation for clinical decision making and faculty could use the human simulator for scholarship activities that would support professional development.

Students Erin Bruchanski, Venessa Mattson and Keri Lloyd correcting respiratory complications of shock.

This project was a collaborative effort between UNCW School of Nursing faculty members, **RuthAnne Kuiper, Ph.D.,** assistant professor, nursing and **Lorna Bell-Kotwall, Ph.D.,** assistant professor, nursing and Duke University graduate students, **April Matthias, MSN, RN** and **Meki Jacobs Graham, MSN, RN.**
kuiperr@uncw.edu

left to right: **Len B. Lecci, Ph.D.,** **Julian R. Keith, Ph.D.** and **Dale J. Cohen, Ph.D.**

MARS: Memory Assessment & Research Services

Memory Upgrade for Better Health

Forget something today? (Let's face it—your memory may not be what it once was.) That's why adding one step to your annual checkup can offer more than peace of mind. It just might save your mind.

If three UNCW psychology professors are successful, no checkup will be complete until everyone over the age of 55 undergoes an annual "memory test." Their advocacy for the test is part of an initiative that could put UNCW on the map as a memory research center. This initiative took form with the recent opening of Memory Assessment Research Services (MARS) in Wilmington.

UNCW psychology professors Julian Keith, Len Lecci and Dale Cohen are experts on memory, brain functioning and cognitive assessment. Their advocacy for memory tests is driven by a sobering fact: disease-related memory loss, or dementia, is often overlooked. If fewer than three percent of patients with mild to moderate dementia are being diagnosed, it's clear the problem is going undetected—and untreated.

While gradual lapses in memory are a natural part of the aging process, disease-related dementia is an altogether different adversary. Since dementia attacks the brain lobes where memory is stored, the condition is marked by rapid physical and mental decline.

There is cause for hope, though. A new generation of drugs can now stave off the conditions that lead to diseases like dementia and Alzheimer's Disease (a type of dementia). The key is catching the first signs of trouble, years before dementia's onset. An annual memory test remains the best diagnostic approach.

"We get our whole bodies checked out, then forget the part from the neck up," said Keith, MARS neuroscience director. "But without a functioning brain, life and retirement are not going to be fulfilling."

During an annual test, general cognitive health can be measured, tracked and projected. When disease-related problems are detected, a physician-administered plan for life-saving medications can begin.

A primary MARS objective is the development of a memory research center where UNCW psychology students and faculty can study memory disorders and treatments. Once the clinic and "memory think tank" are established, planners envision the model being followed at colleges nationwide.

Of course, you still have to remember to schedule your annual memory check. Three UNCW professors say it's something you can't afford to forget.

Dale J. Cohen, Ph.D., professor, psychology, cohend@uncw.edu; **Julian R. Keith, Ph.D.**, professor, psychology, keithj@uncw.edu;
Len B. Lecci, Ph.D., associate professor, psychology, leccil@uncw.edu
www.memoryassessment.com

earth sciences

Chris Wood (left) and Lewis Abrams (right) next to JASON, a remotely operated vehicle, on board the *Research Vessel T. Thompson*, 250 miles south of Easter Island (February 2004).

Extraordinary Opportunities

for Student Research in Earth Science

Chris Wood, UNCW honors graduate '04, participated on a 32-day research cruise to investigate the Endeavor Deep, an active rift in the southeastern Pacific Ocean. The Endeavor Deep, deeper and wider than the Grand Canyon, has never been surveyed for hydrothermal activity. The scientific team that Chris joined included researchers from the University of Rhode Island, the University of Miami and Dartmouth College and took place aboard the *R/V T. Thompson* from the University of Washington. Based on the data he collected during this expedition, Chris completed his honors thesis, *Detection of hydrothermal plumes at the Endeavor Deep along the Juan Fernandez microplate, southeast Pacific Ocean*, providing direct evidence for recent hydrothermal activity by identifying hydrothermal staining as well as carcasses of recently deceased tubeworms that thrive in environments where hydrothermal activity occurs. This unique research opportunity was facilitated by Lewis Abrams, earth science and Center for Marine Science. Abrams is also part of an international team investigating global environmental consequences of the formation of the Ontong-Java plateau in the western Pacific which resulted in the largest outpouring of magma on earth in the last 200 million years. Recently, Abrams with Haraldur Sigurdsson, University of Rhode Island, also mapped volcanic deposits and searched for villages buried during the 1815 Tambora eruption in Indonesia, the largest volcanic eruption in historical time. Portions of that six-week expedition were filmed for a Discovery Channel documentary entitled *Pompeii of the East*.

Lewis J. Abrams, Ph.D., associate professor, earth sciences
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creative writing

ecotone \e'k -ton'\ n:

a transitional zone between two communities, containing the characteristic of each.
a place of danger or opportunity;
a testing.

eco Greek oik-os, house, dwelling +
tone tonos, tension.

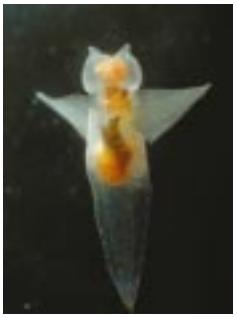
This past February the Creative Writing Department at UNCW began putting out the national literary journal, *Ecotone*. *Ecotone*, conceived of by UNCW professor of creative writing David Gessner, emphasizes the deep importance of place in contemporary writing. The first issue featured the work of such nationally prominent writers as Mark Doty, Wendell Berry and Phillip Levine. The launch for this issue was celebrated locally at the Simmons-Wright Gallery and at the Associated Writing Program Conference in Vancouver, where it drew wide praise.

Ecotone operates from the belief that much of our best writing grows out of the land. More specifically, it grows from rich, overlapping areas, those unstable, uncategorizable places that aren't one thing or another. Biological ecotones are areas of great species diversity and biological density, of intense life and death; literary ecotones are the places where words come most alive. These edges between genres, between science and literature, between land and sea, between urban and rural, between the personal and biological, between the animal and spiritual are not only more alive, but more interesting and worthy of exploration.

The writing breaks across genres and across disciplines, to discover writing that is new, dangerous and refuses to stay safely in a single place. The goal is an ambitious one: to reclaim landscapes, to remap and reimagine place in writing that is vital, thorny, and alive.

Ecotone is currently accepting submissions for its second issue, due out at the end of 2005.

David Gessner, M.A., assistant professor, creative writing
http://www.uncw.edu/ecotone



The Pteropod Mollusk *Clione limacina*, called the sea butterfly, is an inhabitant of the colder oceans of the northern hemisphere. About an inch long, it spends its entire life in the water column, living at about 100 meters during the day and migrating upward, near the surface at night.

When Mollusks Fly

What can a lowly marine mollusk tell us about how our nervous system controls our legs during walking and how it controls the switch from walking to running? This problem is difficult to address in humans or even in other vertebrates. We know from the post-chopping block chicken that the circuitry controlling alternate movements of the two legs is located in the spinal cord, not the brain, but beyond that, not much is known about the connections between neurons that produce the rhythmic activation of muscles that we know as walking or running.

Our immediate vision of a marine mollusk takes one of two forms: a slow-moving creature cruising on the ocean bottom or a sleek squid or octopus jetting through the water. Neither has much in common with our bipedal locomotion. We have to go to the mid-water depths to find a specialized mollusk whose locomotory system shares features with ours. The pteropod mollusk, *Clione limacina*, never goes near the ocean bottom, but rather flies through the water by flapping a pair of wings, hence its common name, the sea butterfly. *Clione* not only shares neuromuscular features with higher animals, it can change swimming speed in a way that is similar to the way we change gait, from walking to jogging and jogging to running. Best of all, *Clione* has a relatively simple, accessible nervous system with neurons large enough in which to insert tiny microelectrodes so their electrical activities can be measured.

Richard Satterlie, UNCW's Frank Hawkins Kenan Distinguished Professor of Marine Biology, has been working on the neural circuitry underlying locomotory speed changes in *Clione* since the mid-1980s, and the emerging picture is going beyond the simple control of limb movements. The little animal, only about an inch long, is providing insights into the neural substrates of those "mysterious" behavioral states called arousal and motivation—what we refer to when we say that we are in the mood, or not in the mood, to do something.

Can the sea butterfly help paraplegics walk? Not directly. But the neurobiological rules discovered in the locomotory system of *Clione* have been found to apply to higher animals, whose complex circuits use the same basic circuitry found in this marine mollusk. Furthermore, knowledge of adaptable rhythmic circuits is essential for the design of devices used for electrical stimulation of muscles in spinal injury patients, with similar applications to the field of robotics.

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Chris Dumas illustrates that good economists must have first-hand experience with their research subjects.

Making an Impact on the Environment

Chris Dumas is a Wilmington native who attended Laney High School, NC State University and the University of California Berkeley. Dumas returned to his hometown in 1997, when he joined the economics department in UNCW's Cameron School of Business. Dumas' research concentrates on issues related to the economics of natural resources and the environment. In recent years, he has looked into the economic benefits of maintaining water quality in the Cape Fear River, the economic impacts of regulating vehicle access on area beaches and the economic benefits of improvements in coastal ocean information systems (such as buoys and tide gauges). In the area of commercial fisheries, Dumas has investigated regional flounder markets, U.S. trawl fisheries (including the shrimp fishery), and in collaboration with colleagues at UNCW and Duke University, the economics of the commercial swordfish and tuna fisheries (as in the movie *The Perfect Storm*) in a million dollar research project funded by the Pew Charitable Trusts.

In other "fishy" work, Dumas has teamed with fellow UNCW researchers on developing ways to farm summer flounder and black sea bass. In work related to the economic impacts of hurricanes, Dumas has examined the cost-effectiveness of hurricane damage-reduction activities, the business interruption impacts of low-intensity hurricanes and ways of measuring homeowners' risk tolerance with respect to hurricane damage.

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