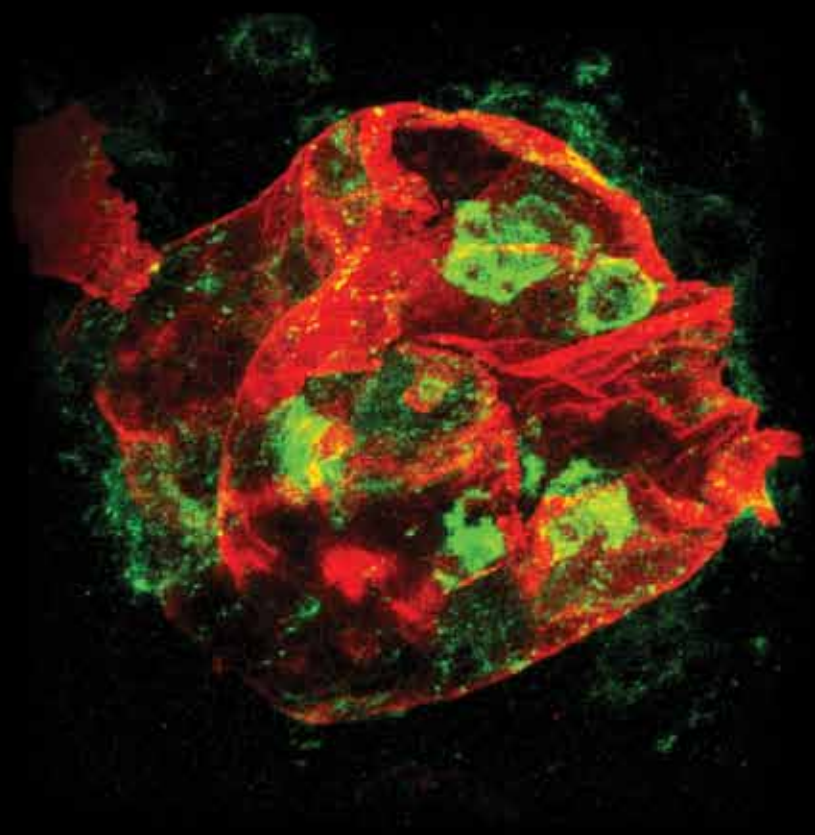
RISING TIDE

SCHOLARSHIP AND RESEARCH AT THE UNIVERSITY OF NEW ENGLAND · 2011/2012



RESEARCH IN THIS ISSUE:

welcome

It is my pleasure to introduce the second edition of *Rising Tide: Research and scholarship at UNE*. Much has happened in the short time since we published the first edition. We have made some terrific new hires in a number of disciplines that will help continue to drive the culture of research at UNE. Grants awarded in this past fiscal year exceeded $12 million, which demonstrates impressive growth in competitive applications over the last three to four years (2007 totals were less than $3 million). Although we are a small university, I see this trend continuing to grow as we make strategic investments in research active faculty and develop new colleges and new research directions. Our scholarship never ceases to impress me. From the fine arts to scholarly books, our faculty are leaders in their respective disciplines. The same is true for the areas of science in which we excel. During this uneasy funding climate, we seem to have become increasingly competitive for state and federal grants. I cannot speak highly enough of the researchers at UNE who persevere and are increasingly successful in their efforts to garner funding for their research.

Rising Tide presents a snapshot of research and scholarly activity at UNE, but at every level I think you will see that students play an integral part. Although it sounds like a cliché, it is certainly true that at UNE our students make us who we are. My office is dedicated to developing graduate level research programs — initially in marine sciences, public health and biomedical sciences – but we will never lose the mission of engaging undergraduates in research, nor fail to recognize the critical role they have played at UNE in building the culture of research. Today, I believe that more undergraduates receive a research or scholarship opportunity in a faculty mentor's lab than ever before.

As we have grown, so has our need for policies, procedures and unwavering compliance to state and federal standards. I am delighted to say that we have an incredible team in my office that is truly dedicated to ensuring full compliance for all research-related functions.

We look forward to the continuing growth at UNE and take pride in the research and scholarship showcased in *Rising Tide*.

Tim Ford
Vice President for Research
and Dean of Graduate Studies

ON THE COVER:
Big Eaters: Macrophages (green), the "big eaters" of the brain, escape from blood vessels (red) and invade the brain in response to injury.

Research and photo by Assistant Professor Colin Willis, Ph.D.
UNE Department of Biomedical Sciences

contents

RISING TIDE
SCHOLARSHIP AND RESEARCH
AT THE UNIVERSITY OF NEW ENGLAND

2011 / 2012

UNIVERSITY MISSION

The University of New England provides students with a highly integrated learning experience that promotes excellence through interdisciplinary collaboration and innovation in education, research, and service.

OFFICE OF RESEARCH MISSION

The Office of Research provides leadership to the University of New England community in building research and scholarly activities by:

providing support for faculty and staff to identify and pursue funding opportunities

ensuring that faculty and staff have all the tools necessary to be competitive

encouraging student participation in research

ensuring compliance in all research functions

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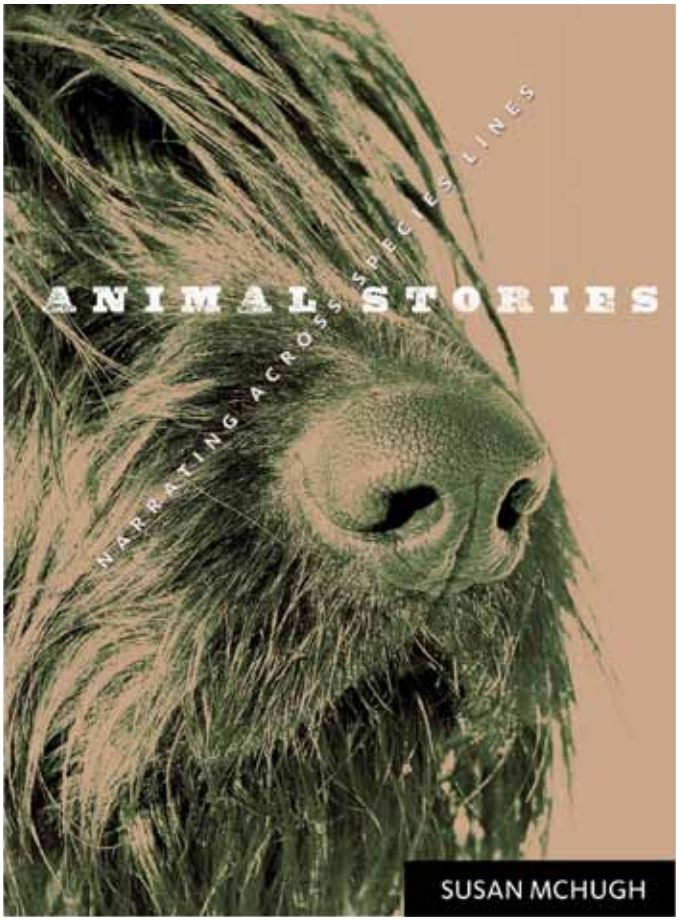
On Animal Stories

My investigation of animal stories started when the question of animal agency arose in a survey-course discussion of a short, forgettable William Wordsworth poem titled "Nutting." Then a shy undergraduate, I hesitantly volunteered an interpretation of the text as reflecting the squirrel's thoughts on the subject of seasonal change. "That's insane," said the truly venerable professor, as the class fell silent. "Animals don't think, and they certainly don't write poetry."

Twenty years or so later, I credit this stunning moment of classroom candor as inspirational for my new book *Animal Stories: Narrating across Species Lines*, published in 2011 by the University of Minnesota Press. Admittedly, my naive interpretation reflected sensibilities peculiar to late twentieth-century America, where (unlike in Wordsworth's England) squirrels abounded. But my subsequent research nonetheless illuminates how my professor's rebuke says so much more about changing ideas of humans, animals, and literature in the twentieth century.

Creatures like Wordsworth's squirrel locate a peculiar paradox in the history of literary criticism: although animals abound in literature across all ages and cultures, only ever as metaphors have they been the focal point of systematic literary study. Consequently, challenging this tradition of reading animals in literature only ever as humans-in-animal-suits involves coming to terms with a discipline that appears organized by the studied avoidance of just such questioning. In my book, I illustrate the problem through my experiences with researching and teaching George Orwell's *Animal Farm* to today's college students, who are more likely to see the characters as animals than as symbols of Soviet oppression. Old-timers dismiss the students as simply wrong, but they do so only by conveniently ignoring Orwell's own explanation that his ideas about human as well as animal politics are at the heart of the novel.

With *Animal Stories*, I outline a more constructive approach by pursuing the question: what changed so that people became able to read animals as having their own stories, as having history, in the broadest sense? Looking at the ways in which fictions of companion species—including guide dogs, racehorses, pets, and farm animals—mutate across time, the book tracks the intersections of such stories with quintessentially modern developments, notably the rise of disability-activist movements, the enclosure of animal slaughter from public view, and the establishment of the field study as a method of biological science.



As the latest volume in the critically acclaimed *Posthumanities* series, *Animal Stories* also contributes to an emergent discussion among scholars of how this kind of work overall might help to reinvigorate the humanities from within the interdisciplinary matrix of animal studies, if not lead to a more comprehensive reconfiguration of knowledge structures beyond the disciplines. By focusing my research on an era that many see as distinguished by the disappearance of animals amid seemingly endless proliferations of mass killings, I have concluded that the scale and immediacy of the problems of representing species require a variety of different archives of texts, methodological tools for interpreting them, and theories to make better ways of reading, writing, and living within our own as much as alongside other species.

Susan McHugh
Associate Professor
Department of English and Language Studies
Lukde Chair of Arts and Sciences (2011-2012)

The Impact of a Summer Literacy Program on Children's Perceptions of Scientist

As teachers how can we ensure our students will not limit themselves due to hidden stereotypes? How can we ensure that our students will not dismiss opportunities due to misconceptions of an occupation? As teachers how do we encourage students to pursue hidden potential they may not realize they hold?

Science, in particular, has been a field where substantial documentation has been made of the many misconceptions prevalent in children in terms of scientific concepts and the lack of basic science literacy (Keely, Eberle, & Farrin, 2005; Smith & Abel, 2008, Springer, 1991). Moreover, research that began over 25 years ago has shown that children can hold particular stereotypes of scientists (Chambers, 1983). Given these concerns, a study was developed to explore (1) whether stereotypes of who is a scientist continue to be present today in children, and, if yes, (2) whether these stereotypical perceptions can be broadened by using children's literature and the library as a venue from which to actualize change.

This project operated in collaboration with a local library in southern Maine. Upon signing up for the six-week summer reading program, parents and children, five or older, were given the option to participate in the research study. If the child and parent/guardian both consented, the child was provided a quiet space and asked to draw a scientist and write what a scientist does using the Draw-a-Scientist Test (DAST) (Chambers, 1983; Finson, Beaver, & Cramond, 1995; Mason, Kahle, & Gardner, 1991). No additional prompts were given. If they could not write, they dictated to the librarian or to the primary researcher. Crayons including a range of special flesh-colored crayons and pencils were available.

Nineteen children participated in this pre-test, completing a drawing and writing or dictating to a prompt asking what a scientist does. Six weeks of inquiry-based science activities were offered. Each activity involved a scientist when feasible and began with an introduction of what science is, what scientists do, or where they work. Furthermore, emphasis was placed on how the children were acting like scientists. Finally, children were encouraged to read two non-fiction and two fiction science trade books throughout the summer reading program. As part of a grant to augment this summer research project, the University of New England donated 30 new science trade books to the library.

Attendance was voluntary and ranged from 12 to 16 children each week. Of those weekly numbers, one to five were participants in the study. A special evening activity in which local scientists displayed and carried out experiments with the children drew 35 participants, five of whom were participants in the study. Following the six-week program, children who completed the pre-test were asked to return to the library to submit a second drawing of what a scientist looks like and a description of what scientists do using the DAST.

Most perceptions of the nine children did not change. For instance, if the participants drew scientists with lab coats in the pre-test, they did so in the post-test. Of particular interest, though, is the fact that boys drew male scientists and the girls drew female scientists in both pre- and post-tests.

A few shifts in perceptions were noted in the drawings or the descriptions, including all three who drew scientists with eyeglasses in the pre-test did not draw scientists with eyeglasses in the post-test. Four out of nine who did not draw test tubes in the pre-test added a test tube to their post-drawing. Race was difficult to distinguish even with the flesh colored crayons that were available. It appears that a darker shade of skin is present in two post-tests when none were present in the pre-test.

A discussion of results must be limited to trends due to the low sample size and the lack of control in applying the treatment. In general, the nine-matched subjects showed stability in their perceptions. Some shifts were found in having more detail in their drawings, such as test tubes, and a slight increase in non-traditional settings or roles being reflected. Whether the summer reading program influenced these changes cannot be determined.

When examining all pre- and post-test sample results beyond the nine-matched participants, significant findings were found by age with lab coats being present in the pre-test and by gender in males and females depicting scientists as having the same gender as they in both the pre-test and post-test. It is difficult to conclude whether this last result is developmental in that children are drawing their own gender as an egocentric response or if they truly believe scientists can be and are of their gender. More research is needed especially in surveying whether older children continue this pattern or if at some point there is a shift.

Celina McMichael '10
Elementary Education

Susan Hillman (left)
Professor, Research Adviser
Department of Education

Trends were found in showing that as age increases, the depiction of traditional roles increase and non-traditional roles decrease. This pattern is of concern since encouraging students to enter the science field could be limited by their perceptions of what scientists do. It is curious that the view becomes narrow versus more encompassing. Furthermore, it appears females are less likely to view scientists in non-traditional roles. More research is needed particularly in identifying the influences that may be causing this narrowing perception.

Trends including all participants in the study: 19 pre-test and 11 post-test by age. Examining the pre-test data by age (see Table 1), the presence or absence of lab coats emerges as the only significant difference (p=0.036 level). In the post-test data, a trend in having lab coats drawn is present as age increases, but there were no significant differences (p=0.118) based on this small sample size.

When coding for traditional and non-traditional roles, a drawing along with the description could be coded as having both roles present. For example, one child drew multiple male scientists in labs but then described a scientist as "Explore [sic] the earth, time, and space studying reptiles, insects, mammals, fish, amphibians, plants and fossils. Some scientists work in a lab." In examining the traditional perceptions by age, essentially there is no change, but a trend can be seen in that as age increases the occurrence of traditional roles increases (see Table 2).

No significant differences were found by age when examining non-traditional perceptions (see Table 3). Although it appears that the percentages shift, the children in the 8–10 age bracket who included non-traditional characteristics were not present in the post-test. Hence, a mirror occurrence can be viewed when examining the data on non-traditional roles. A trend can be noted that as age increases the percentage of children who will include non-traditional roles decrease.

In studying the 19 pre-test drawings and explanations of scientists, two differences emerge between how the male and female children initially perceive scientists (see Table 4). Males tend to draw male scientists and females tend to draw female scientists. Eight out of nine males drew male scientists, and six out of ten females drew female scientists (p=0.033 level).

With the post-test data, 100% of males drew male scientists and 100% of females drew female scientists in the post drawing (p=0.001). Although it appears there is a shift of change from the pre-test data, in examining these nine participants' pre-test data (two did not participate in the pre-test), no actual change of gender drawings occurred. Consequently, there appears to be clear differences in the gender of the scientist drawn dependent on the child's gender.

The only other significant characteristic to note when looking at how the different genders perceive a scientist is evidence of non-traditional characteristics or settings. While four of the nine males perceived a scientist with non-traditional characteristics in the pre-test, 0 out of 10 females did (see Table 5). Similar percentages are present with males in the post-test, reflecting non-traditional characteristics while one of the six females did draw a scientist with non-traditional characteristics, indicating a small change from the initial drawings since she had participated in the pre-test.

Table 1. Presence of lab coat by participant's age

Pre-test, n of 19	**Present**	**Not present**
5 and 6 year olds	0	100% (7)
7 year olds	33% (2)	67 % (4)
8 to 10 year olds	67% (4)	33 % (2)
Post-test, n of 11		
5 and 6 year olds	0	100% (4)
7 year olds	0	100% (3)
8 to 10 year olds	50%(2)	50%(2)

Table 2. Traditional perceptions by participant's age

Pre-test, n of 19	**Present**	**Not present**
5 and 6 year olds	86% (6)	14% (1)
7 year olds	67% (4)	33% (2)
8 to 10 year olds	100% (6)	0
Post-test, n of 11		
5 and 6 year olds	75% (3)	25% (1)
7 year olds	67% (2)	33% (1)
8 to 10 year olds	100%(4)	0

Table 3. Non-traditional perceptions by participant's age

Pre-test, n of 19	**Present**	**Not present**
5 and 6 year olds	14% (1)	86% (6)
7 year olds	17% (1)	83% (5)
8 to 10 year olds	33% (2)	67% (4)
Post-test, n of 11		
5 and 6 year olds	50% (2)	50% (2)
7 year olds	33% (1)	67% (2)
8 to 10 year olds	0	100% (4)

Table 4. "Gender of scientist drawn" by gender

Pre-test, n of 19	**Male**	**Femaie**	**Undetectable**
Male children	89% (8)	11% (1)	0
Female children	30% (3)	60% (6)	10% (1)
Post-test, n of 11			
Male children	100% (5)	0	0
Female children	0	100% (6)	0

Table 5. Non-traditional characteristics identified by gender

Pre-test, n of 19	**Present**	**Not present**
Male children	44% (4)	56% (5)
Female children	0	100% (10)
Post-test, n of 11		
Male children	40% (2)	60% (3)
Female children	20% (1)	80% (5)

The Effect of Art Making on Anxiety Level

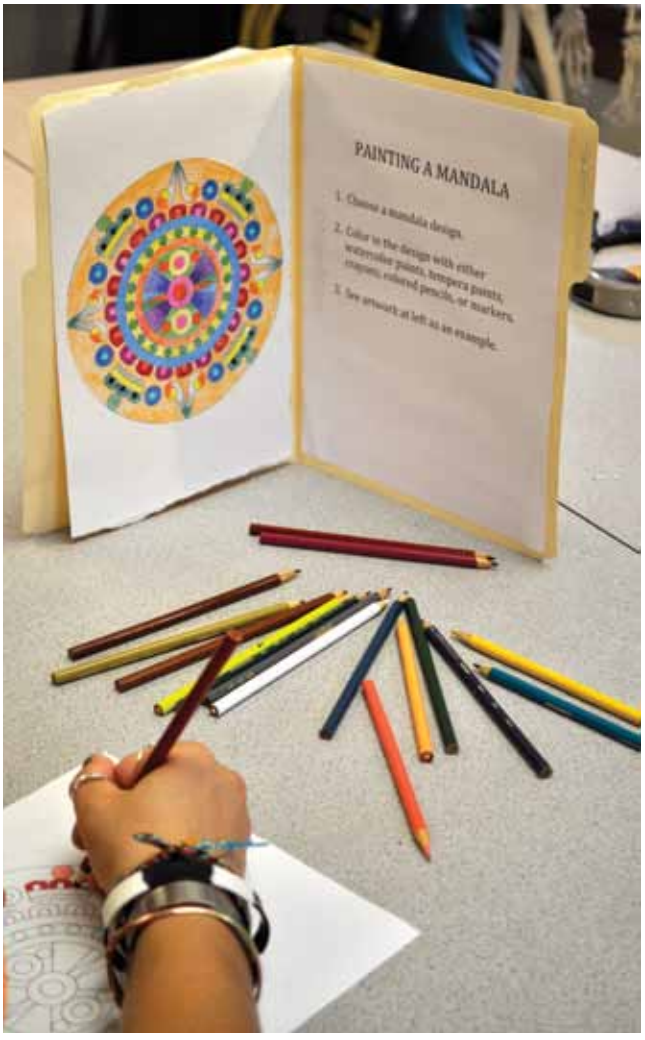
David Sandmire | Biological Sciences

The research team completed the first phase of its study in 2010, finding that a mere 30 minutes of time spent creating a work of art significantly reduced one's "state" and "trait" anxiety scores

Sarah Gorham, David Grimm and Nancy Rankin, investigators from UNE's Departments of Creative and Fine Arts, Biology, and Psychology are collaborating on a study of the effect of art making on anxiety level. The potential for art making to calm one's nerves may be especially relevant for the high-stress lifestyle of the typical college student, who is juggling competing demands from coursework, extracurricular activities and internships while at the same time adjusting to the new psychosocial milieu that comes with moving away from home.

The research team completed the first phase of its study in 2010, finding that a mere 30 minutes of time spent creating a work of art significantly reduced one's "state" and "trait" anxiety scores, as measured by the State-Trait Anxiety Inventory, when compared to a control group that did not participate in art making.

The group is currently preparing the next phase of its program, which will extend the study to include physiological indicators of anxiety, such as beat-to-beat heart rate variability and galvanic skin response (a measure of the electrical conductivity of the skin as a result of sweating). One local benefit, the research team hopes, will be the anxiety-reducing effect that may be afforded students by the establishment of an on-campus, walk-in art studio at the University of New England.



Creating Safe School Climates

Heather Dwyer Sadlier | Education

Rather than harmonious melting pots, today's multicultural schools can be fiery cauldrons, where misperceptions about differences boil over between individuals and groups, leading to harassment and bullying, with or without accompanying physical violence. Without targeted educative efforts to build understanding and connections among students, problems associated with perceived differences will result in bias, harassment, and hate aimed at the "others." Principals make choices that ensure the creation of school climates where difficult conversations can occur—or not; where biases and stereotypes are dealt with—or not; and where tolerance and inclusion are promoted—or not.

The emotional, psychological, physical and learning lives of students are improved or imperiled by the respective health or toxicity of the prevailing interpersonal and cultural norms, the climate, within a school. The "tone" that the principal sets and models makes a significant difference in determining the inclusiveness or exclusiveness of a school's climate. As schools' educational leaders, principals must choose to confront and resolve these serious school climate issues. Avoiding or ignoring bias and prejudice imperils students, schools, communities, and, ultimately, nations. Sadlier focuses her researcher's lens on the words and actions of educational leaders who are successfully confronting these critical school climate issues and uses her scholarship to amplify leaders' various working solutions to these challenges.

Artwork by Stephen Burt. Clockwise from top: Dusk Manuel Antonio, Fighting Crocodiles, Detail of "We'll Meet Again..."

I have always found it more compelling to re-imagine rather than replicate, perhaps in part because a precise photographic rendition can record only part of what is physically there.

Recent research in the studio and abroad

Stephen Burt | Creative and Fine Arts

The drawings here are a result of recent research in Costa Rica and Maine in 2010/11. I have always found it more compelling to re-imagine rather than replicate, perhaps in part because a precise photographic rendition can record only part of what is physically there. A photo does not (for me) record wind, temperature, sound, or an emotional response to a place. I want to portray my experience of landscape and the forces inherent in it. In order to do so, I have taken aspects of place and structure and accented, memorialized, and memorized them. While the environments I have "recorded" were not untouched, I have taken out all vestiges of human "interference" and created a kind of primal stage for the imagination to evoke my sense of wonder in the face of nature.

Stephen Burt
Associate Professor and Chair
Department of Creative and Fine Arts

An Innate Process

Sarah Gorham | Creative and Fine Arts

Water is both beautiful and enigmatic. In this duality, one struggles to find a still point, both intoxicated by the quest for stillness yet lured by the dynamic quality of the ever-changing surface patterns.

As an innate process of application, the painting evolves out of instinct, out of necessity, out of habit. Through a deliberate yet haphazard cycle of collection and distribution, the pigment moves from tube to palette to tool to painted surface. From start to finish, the painting evolves a process of layering, with each successive layer hiding the previous. This painted water refection is not only one, but a virtual retrospective of a lifetime's investigation. The layers unseen mark growth and evolution. A sweeping gesture of cerulean blue, although applied in recent months, may have taken 15 years to show up from soul to palette knife to surface.

The struggle to find stillness is apparent and the relinquishing to the process is perfect. It becomes more satisfactory to allow the image to breathe and find a life of its own. Not directed or fought against, but accepted for its own beauty. With a final array of colorful splatters, smudges and one final scrape, my painting is accepted just as it is.

Water is both beautiful and enigmatic. In this duality, one struggles to find a still point, both intoxicated by the quest for stillness yet lured by the dynamic quality of the ever-changing surface patterns.

Artwork by Sarah Gorham.
At left: Ebb at Mother's Beach; Above, clockwise from top: Vista's of Calm, Art House Pond, Losing Patience

Sarah Gorham
Associate Professor and Vice Chair
Department of Creative and Fine Arts

Voyages and the Great Age of Sail

The 18 undergraduate students enrolled in HIS 290, History Hands On, had a dual challenge: learn about maritime history, and learn how to create a professional museum exhibit that would open to the public in just 15 weeks. This hands-on course was a collaborative effort between the UNE Department of History and the Saco (Maine) Museum. Supported by a grant from the Maine Humanities Council, team-teachers Dr. Elizabeth De Wolfe (professor and chair, Department of History) and Camille Smalley (education director, Saco Museum) guided students—who represented majors including history, English, art education, political science, medical biology, business, communications, and psychology— toward these goals.

The course began with an in-depth study of the life of Saco sea captain Tristram Jordan, his wife Catherine, and his Biddeford-built ship the Pepperell by reading surviving letters, diary entries, ship's logs, and period newspapers. Research in maritime history helped students understand nineteenth-century shipbuilding, what life was like for sailors and sea captains, the experience of wives and children left behind on land, and the tremendous dangers one faced at sea. Students, organized into four museum exhibit design teams, developed an exhibit story line focused on the tension, and tragedy, of Captain Jordan's life. Tristram's conflict between the draw of making a living at sea while simultaneously pulled to a life of farming and family in Saco was a source of tension throughout his life. The Jordan family's sorrow at the loss of Tristram, swept overboard during an 1856 hurricane, and the death of the Jordans' only son Frederic, who died at sea of fever in 1855, illustrated the tragedy many seafaring families endured.

Museum professionals shared with the class insights on exhibition design, artifact care, and writing evocative museum text panels. As the semester moved along, the exhibit took shape. Students developed an exhibit floor plan, designed interactive features, determined graphics, selected artifacts, and wrote informative text panels.

Group photo in front of museum

Students spent hours at the Saco Museum bringing their designs and models to life. Students constructed temporary walls, carefully installed artifacts, and hung text panels. Fifteen weeks from the first day of classes, the exhibition opened with over 200 guests viewing the students' hard work.

This is the second collaboration between Professor De Wolfe and the Saco Museum. In 2007-2008 a UNE student design team created an exhibit based on the death of a nineteenth-century Saco factory girl. One member of that museum exhibit class was Camille Smalley UNE '08, then an undergraduate English major and Women's Studies minor. That experience provided Smalley with a career direction and real-world skills that led to a Master's degree, her current position at the Saco Museum, and her return to UNE—this time, teaching the exhibit course.

Elizabeth DeWolfe
Chair and Professor
Department of History

Graduate student Bianca Prohaska weighing a spiny dogfish

Sharks, skates and rays

James Sulikowski
Professor
Marine Sciences

Sharks, skates and rays are exploited worldwide by commercial and recreational fisheries, and as a result, accurate life history and ecological data is imperative to establish effective conservation and management practices. A portion of Dr. Sulikowski's research focuses on the collection of this data to help ensure a sustainable balance is maintained between the ecosystem and the economic demands of the fishing industry. This research includes developing non-invasive techniques to assess reproductive status in elasmobranchs, assessing movement patterns and habitat utilization in sharks (such as the spiny dogfish), and quantifying by-catch mortality and stress responses in skates (such as the little skate).

Currently, hormones extracted from blood are used as a non-lethal method to determine the reproductive biology of elasmobranchs; however, this method can be unfeasible on larger or endangered species. In collaboration with scientists in Mississippi, as well as the University of New Hampshire, Dr. Sulikowski and graduate student Bianca Prohaska will be testing the validity of extracting hormones from muscle samples, as this collection is minimally invasive and can be conducted without removing the animal from the water. If this method proves effective, it may be utilized to study the reproductive biology of ultimately allowing for improved management and conservation strategies for this group of fish.

Determining the detailed movements and habitat use patterns of highly migratory fish is critical for not only understanding their ecology but also for the proper assessment and management of their stocks. However, this information is among the most difficult and expensive to obtain largely due to the low densities of these species, highly migratory behavior and the vast, dynamic nature of the environment they inhabit. However, the recent development of the popup satellite archival transmitting tag (PAT or PSAT) is helping to reveal aspects of movement and behavior of pelagic and/or migratory fish never realized before.

Dr. Sulikowski holding a gravid dogfish caught off the coast of Rhode Island

Determining the detailed movements and habitat use patterns of highly migratory fish is critical for not only understanding their ecology but also for the proper assessment and ultimately management of their stocks.

These include information on horizontal and vertical movements of fishes in relation to conditions and/or features of their biophysical environment by recording depth (pressure), temperature, and geolocation (light intensity) with relatively high levels of precision. Dr. Sulikowski and graduate student Amy Carlson are using this technology to better understand the vertical and horizontal movements of spiny dogfish, *Sqaulus acanthias*, in U.S. waters. With the use of PSATS, Dr. Sulikowski hopes to offer new management strategies that will benefit both commercial fishermen as well as the ecosystem.

Within the northwest Atlantic, skates are routinely captured and thrown back during commercial fishing operations. Unfortunately, no studies have attempted to quantify discard mortality, or the underlying physiological alterations, which may compromise survival in skates after a capture event. In collaboration with the New England Aquarium and local commercial fishermen, Dr. Sulikowski and graduate student Angela Cicia will address this gap in knowledge by investigating discard mortality rates and the physiological response to capture stress in four skate species (little, winter, thorny and smooth) in the Gulf of Maine. If this method proves effective, it may be utilized to study the reproductive biology of endangered species and ultimately allowing for improved management and conservation strategies for these fish."

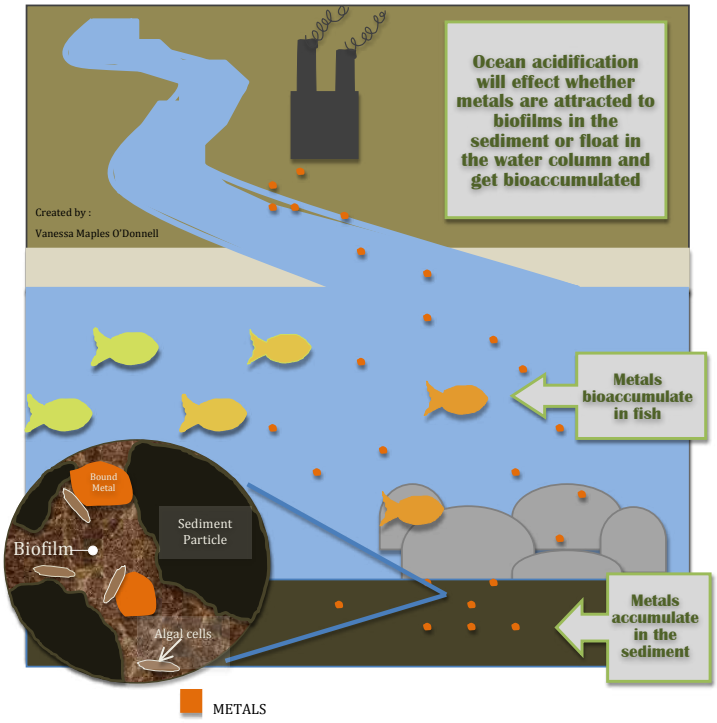
Marine Science Grad Student Receives NSF Funding

Vanessa Maples O'Donnell | Graduate Student

Marine microalgae are unicellular organisms that are responsible for the majority of the oxygen we breathe and largely for sequestering certain greenhouse gasses out of the atmosphere.

UNE graduate student Vanessa Maples O'Donnell is working on her thesis, which researches how ocean acidification will affect biofilms' binding capabilities with metals. She has been awarded a fellowship from the National Science Foundation through its GK-12 program, which aims to connect universities with local grade schools.

Intertidal benthic communities of diatoms produce biofilms that have absorptive and adhesive qualities. The biofilms have charged functional groups that bind with metals. Metals can be introduced into the intertidal zone from terrestrial/freshwater inputs. As ocean acidification occurs, it has far-reaching effects on the function of biofilms. Determining effects of metals binding with EPS in benthic systems can aid in learning more about where metals end up (i.e., bioaccumulation or metal burial through sedimentation).



It is a highly invasive species that has been recently spotted in Delaware Bay and could displace the more commercially valuable Blue Crab, which supports a $7 million fishing industry in the bay.

Invasion of Delaware Bay by the Chinese Mitten Crab

Charles Tilburg | Marine Science

Jacqueline Boudreau, a junior marine biology major, and Dr. Charles Tilburg are studying the life cycle of the Chinese Mitten crab, *Eriocheir sinensis*, known for its hairy mitten-like claws and extensive migration range. It is a highly invasive species that has been recently spotted in Delaware Bay and could displace the more commercially valuable Blue Crab, which supports a $7 million fishing industry in the bay.

Boudreau and Dr. Tilburg are using numerical models and observations of temperature, wind and salinity to track the possible migration patterns of the crab to determine likely settlement locations and possible population increases. This research was recently presented at the Council of Undergraduate Research Posters on the Hill presentation in Washington, D.C to state congressmen of New Jersey, Delaware and Maine. It was the only research project from the state of Maine and was chosen along with 70 other undergraduate research projects from nearly 900 applicants throughout the United States.

Factors Affecting Bacterial Concentrations in the Saco River

Stephan Zeeman | Marine Sciences
Tyler Spillane | Undergraduate Student

The purpose of this study is to determine the quantity of E. coli in the water and sediment of the Saco River, and on nearby beaches along the coast, in order to evaluate the risk to humans.

The 134-mile-long Saco River flows through multiple towns, farms, wetlands and forests in New Hampshire and Maine. Pathogens from fecal waste derived from animals or humans can enter into the river by a variety of means and eventually travel downstream to the Atlantic Ocean. Land-use and land-cover may be related to the distribution and entry of pathogens into the river.

Figure 1 shows the land-cover patterns of the Saco River drainage basin. Pathogens are very difficult to detect and identify, so scientists use Fecal Indicator Bacteria (FIB) to determine their possible presence. Escherichia coli (E. coli) bacteria are an example of an FIB that are good tracers of pathogens because they are tied to fecal waste of warm-blooded organisms, including wildlife and humans. The purpose of this study is to determine the quantity of E. coli in the water and sediment of the Saco River, and on nearby beaches along the coast, in order to evaluate the risk to humans.

Sediment and water samples are collected at 17 sampling sites along the Saco River starting from the source of the river in Crawford Notch, NH and ending at Biddeford Beach in Maine (Figure 2). Monthly sampling started in December 2010 and continued through the winter. Unexpectedly high results were seen around the town of Conway, NH, and just above the cities of Biddeford and Saco during the December sampling. These results may be related to manure spreading on farm land.

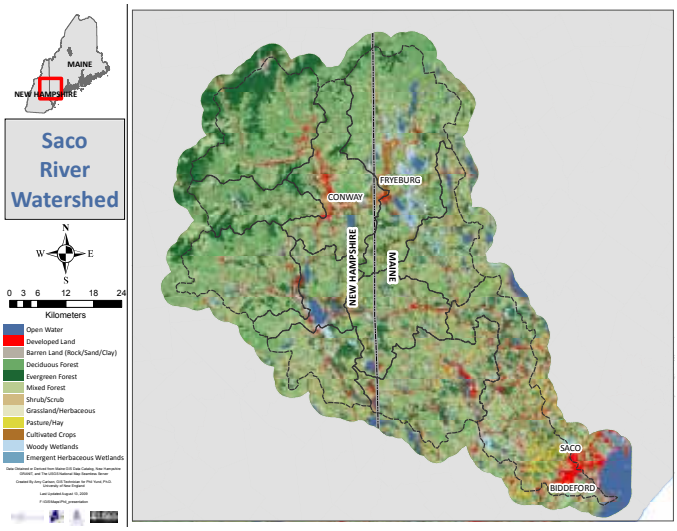


Figure 1

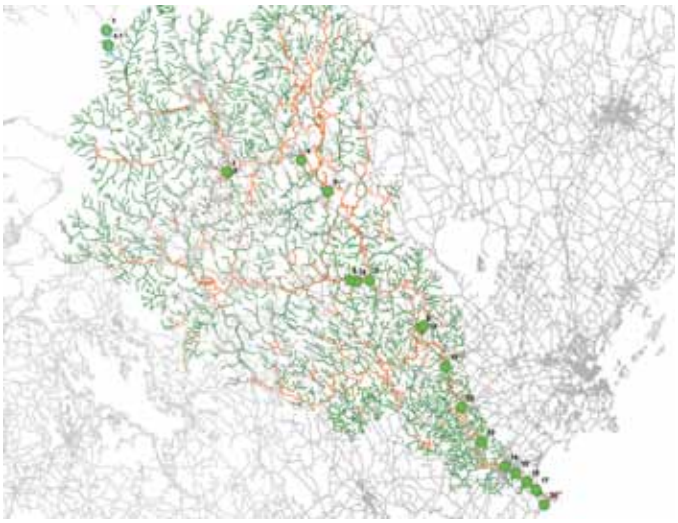


Figure 2

Sustaining the Saco

During the first field season, researchers and their students began to learn about the ecology of the estuary by spending time studying the marshes that line the edges of the river and by surveying the fish that use the river channel.

"What do you value about the Saco River?" was the question that started off the evening. A room full of people had just had dinner, and now they were sharing their thoughts about the river and what it means to them. Bob Barris, member of the Saco Planning Board, lives on the river. He spoke about how much he appreciates the beauty of the river, and the fact that the view out his window is never the same, as the seasons change and the tides come and go. Jeremy Miller, research scientist at the nearby Wells Estuarine Research Reserve and UNE alumnus, talked about the river as an important nursery ground for fish. He caught his first striper in the Saco as a UNE student, and now he fishes as part of his research on the river. Several current UNE students explained the value the Saco has to them as a place to swim, canoe and take a break from studying.

The scientists, students, coastal managers and community members in the room that night had all come together to share information and ideas about the Saco River estuary, the lower part of the river that is influenced by the tides and is bordered by the communities of Saco and Biddeford. UNE students and their professor Dr. Christine Feurt developed the workshop, Sustaining the Saco, as a way to help develop solutions to problems that threaten the values of the estuary.

The Saco River Estuary Project started just over a year ago, and is part of the Maine Sustainability Solutions Partnership, an initiative that is funded by the National Science Foundation. The long-term goal of the project is to protect the health of the Saco River estuary, so that it will continue to provide services and values to the surrounding communities.

During the first field season, researchers and their students began to learn about the ecology of the estuary by spending time studying the marshes that line the edges of the river and by surveying the fish that use the river channel. At the workshop, Dr. Noah Perlut reported that he was surprised to find almost 100 species of birds using the estuary during the summer months. This is nearly one third of all of the species of birds known to occur in the state of Maine. Jeremy Miller shared his results about the fish foraging on the marsh surface at high tide. Dr. Pam Morgan explained that the marshes contain a wide variety of plant species, including some that are listed as threatened and of special concern. Dr. Stephan Zeeman reported on the water quality research he is overseeing, including an assessment of bacterial counts in the river.

The project has provided many opportunities for undergraduates to gain valuable research experience. In addition to the students who have worked on the project in Dr. Feurt's classes, more than 10 other students have worked one-on-one with faculty on the research team. Last spring, several of these students presented their findings at the Undergraduate Research Symposium in the College of Arts and Sciences. Kayla Smith gave a presentation summarizing the fish data she and other students have collected in the river under the supervision of Dr. James Sulikowski. She concluded that the estuary is, in fact, a nursery ground for many fish species. As she reported, "Almost all the 28 fish species and three crustacean species collected by beach seines conducted biweekly since the summer of 2008 were observed as juveniles and increased in size over consecutive months."

Pamela Morgan
Associate Professor
Department of Environmental Studies

Christine Feurt
Director
Center for Sustainable Communities

Student researchers gather research in the Saco River estuary. From left to right are Rachel Tamulonis '12, Will Almeida '11, and Cory French '12.

Amy Carlson's poster presentation showed her work using GIS modeling to predict where the Saco's shoreline could be in the future, given current predictions of sea level rise. Another student, Chloe Crettien, did a photography project in the estuary during the summer of 2010. She displayed some of her work in her presentation, "Seeing the Saco: Photographic Documentation of the Saco Estuary Project," and was awarded first prize for best artistic exhibit at the symposium.

This past summer during the project's second field season, another group of students worked in the estuary itself and in the Biddeford and Saco communities, gathering data and communicating with stakeholders. They surveyed the water for bacteria, mapped the extent of invasive plant species in the marshes, and continued to gather data about the fish and birds using the estuary. Dr. Perlut spotted peregrine falcons and bald eagles during his first bird survey.

In addition, another group of UNE students worked with Dr. Michael Daley over the summer to research the livelihoods supported by the estuary. Their work will be used to develop a visual model that can be used to communicate the economic value of the Saco River estuary. In April 2011, Dr. Daley and other members of the research team met with the town planners of Biddeford and Saco to develop ideas for this work to ensure that the end product would be useful to their communities.

The team also intends to issue a "report card" that will summarize how the estuary is doing. Other estuaries along the East Coast report water quality, tidal marsh health, fish populations and land use, and some of these indicators will be included on the Saco River estuary list.

Conducting research that is both useful to local communities and can result in positive change for people and the environment is known as "Knowledge to Action" research. The Saco River estuary project has enabled UNE researchers to interact with a diversity of stakeholders, including nonprofit organizations such as the Saco River Salmon Club and the Saco Valley Land Trust, as well as resource managers and government officials, to design and carry out studies that will have a positive effect on the future of the estuary and the communities that border it.

Pathogen Transmission Between Land and Sea

While we have some understanding of how fertilizer and excessive nutrients impact aquatic systems, we know less about how pathogens from terrestrial organisms affect the marine organisms downstream

Pathogen research in the Center for Land-Sea Interactions focuses on assessing possible transmission pathways among terrestrial, freshwater and marine organisms. Both human and natural activities in river watersheds affect downstream freshwater and marine areas. Fertilizer and silt runoffs are common, as are wastewater overflows. While we have some understanding of how fertilizer and excessive nutrients impact aquatic systems, we know less about how pathogens from terrestrial organisms affect the marine organisms downstream, not to mention possible connections from marine organisms back to humans. Human health is increasingly viewed as inextricably tied to the health of the oceans, and our proxies for ocean health tend to be organisms that share a similar physiology to us, such as marine mammals. Other important indicators of ocean health include organisms that we use as food sources, such as fish and bivalves (clams and mussels).

Our initial research has focused on identifying the presence of two genera of parasites, *Giardia* (Figure 1) and *Cryptosporidium*, which cause the diseases giardiasis and cryptosporidiosis, respectively. Symptoms of giardiasis or "beaver fever" can be quite severe, including diarrhea, while at the other extreme, infected individuals may be asymptomatic. Other symptoms such as abdominal pain are similar to bacterial infections of the stomach and intestines. Fortunately, this protozoan responds to treatment with a common antibiotic. On the other hand, cryptosporidiosis is a more dangerous disease that typically targets individuals with poor immune systems. Clinical symptoms include watery and frequent diarrhea that may be accompanied by fever, nausea and vomiting. Both of these parasites are generally considered to be fecal-oral or waterborne pathogens, particularly impacting humans in locations where drinking water facilities and sewage treatment plants are not well developed. Although most prevalent in developing countries, these intestinal parasites also impact humans in rural states like Maine. They are problematic not only for humans, livestock and pets, but also for marine mammals such as seals and porpoises.

The Maine Center for Disease Control ranks giardiasis as the most commonly reported infectious disease in humans at approximately 200 annual cases in the state. On a national scale, Maine is one of eight states with the highest incidence (> 12.6 cases per 100,000 people) of giardiasis. Still, giardiasis is thought to be severely under-reported in humans (especially mild cases). Cryptosporidiosis infections in Maine are considered moderate in terms of the number of annual cases. On a national scale, Maine is in the top half of states with an incidence rate of 3.5 per 100,000 persons in 2008. As with giardiasis, this disease is probably under-reported.

Giardia and Cryptosporidium species readily survive in seawater, and preliminary work in our lab and others has indicated the widespread occurrence of Giardia intestinalis in marine animals in the Gulf of Maine (including seals, mussels, fish and sea birds) and other regions. Of the eight assemblages of *G. intestinalis* recognized from genetic signatures, two are known to be zoonotic (meaning they occur in both humans

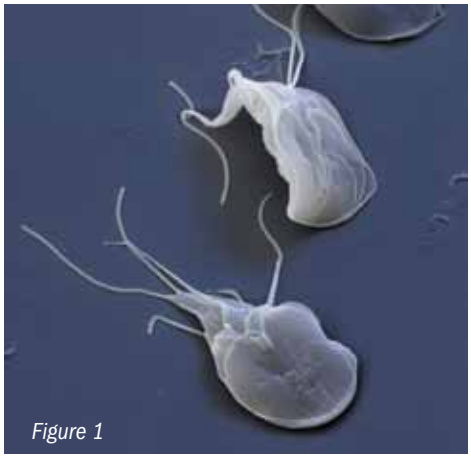


Figure 1

Anna Bass (top photo, center) leads the pathogen research in the Center for Land-Sea Interactions. In addition to Anna, associated with this project are Courtney Wallace, Phil Yund, Marion Reagan and Tim Ford.

(Figure 1) Color-enhanced scanning electron microscope (SEM) image of Giardia intestinalis. The organism is water borne and usually transmitted via contaminated surface water. Trophozoites, the active, reproductive form of the protozoan, are found in the intestine of their hosts. The parasites have an oval, long-stretched form and possess four flagella. The length is about the 10-15 microns and 7-10 microns at the widest point. A ventral adhesive disk is used to attach to the intestinal walls. Magnification: 4900x.

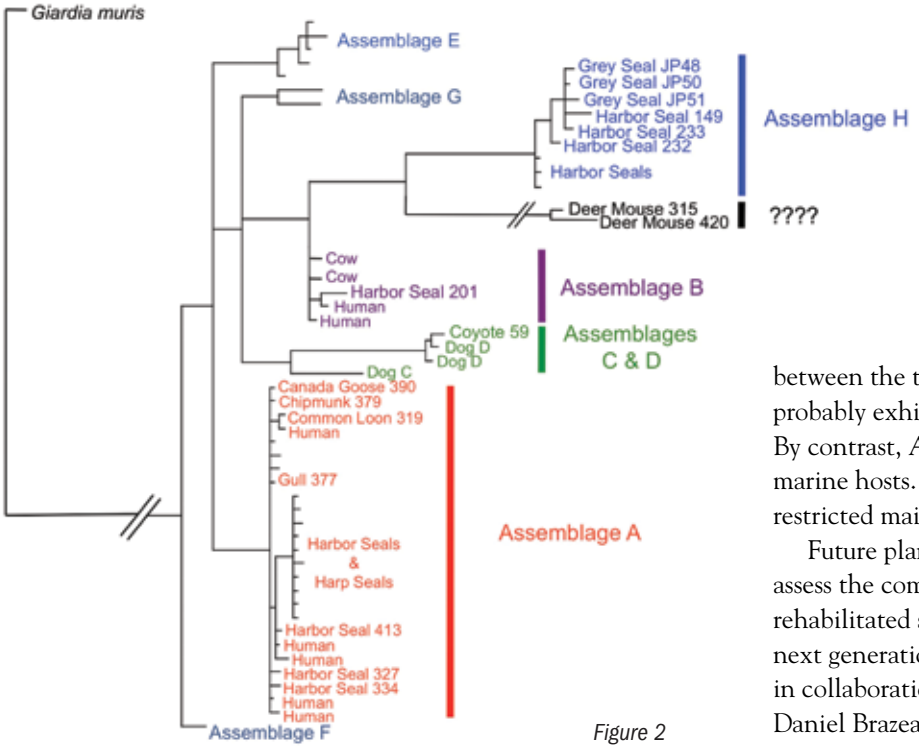


Figure 2

(Figure 2) Result of a clustering analysis of the DNA sequences collected from Giardia positive animals in Maine and Giardia DNA reference sequences. Giardia sequences that we have identified are indicated by the common name of the organism and a number. Sequences from other organisms were used to assess overall relationships and are either not shown or indicated by the assemblage type or common name.

and wildlife), while the remaining six are thought to be fairly host-specific. Hence, assessing human health risk from *G. intestinalis* in the marine environment requires not only detecting the presence of this pathogen, but also identifying the genetic assemblage present. We are currently using DNA sequences from multiple genes for genetic assemblage identification. Although *Cryptosporidium* species are less studied in the marine environment, there is evidence that this parasite co-occurs with *Giardia*, and *Cryptosporidium* has been identified in marine organisms such as fish.

We have tested over 300 scat/fecal samples from various types of terrestrial, aerial, and aquatic organisms for the presence of *Giardia* and *Cryptosporidium*. None of the terrestrial animals or birds tested positive for Cryptosporidium; however, multiple individuals of harbor, hooded and harp seals did test positive. We were able to match this "type" of *Cryptosporidium* to an undescribed species previously identified only from ringed seals in northern Canada. Thus, our research provides strong support for a seal associated type of *Cryptosporidium* infecting multiple seal species and ranging further southward than previously believed. However, transmission of this pathogen seems to be limited to exchanges within the marine environment.

Giardia testing indicated a higher proportion of positive animals in both the terrestrial and aquatic environments. In addition, we detected the protozoan in several birds, including a common loon, gull, Canada goose, and turkey. *Giardia* genotypes belonging to Assemblage A are widespread in multiple terrestrial and marine hosts in the Gulf of Maine and surrounding watersheds (Figure 2). This pattern suggests that Assemblage A is transmitted both within and between the terrestrial and marine environments, and thus probably exhibits the most complex transmission dynamics. By contrast, Assemblage B appears to be more restricted to marine hosts. An additional assemblage, H, appears to be restricted mainly to seals.

Future plans involve the expansion of our research to assess the composition of gut fauna in both free-ranging and rehabilitated seals using state of the art techniques such as next generation sequencing. This research will be conducted in collaboration with the new genomic lab headed by Dr. Daniel Brazeau in the College of Graduate Studies. The gut composition work will allow us to test for differences between "healthy" and sick seals, but also to compare gut fauna of marine organisms to that of terrestrial mammals. To assess the distribution of *Giardia* within the Saco River outflow regions and near seal haul out sites, we will take an experimental approach using a high-throughput assay for pathogen presence coupled with the deployment of mussels (used as bioaccumulators). This approach will allow us not only to assess the human health risk, but understand the ecology of *Giardia* in the marine environment. We will also conduct environmental sampling around the mouth of the Saco River to assess the presence of other pathogens in the water, including the popular tourist beaches of Saco Bay. This approach will allow us to evaluate the overall microbial community and detect other potential pathogens that may pose a mammalian health risk.

Our research highlights the importance of collaboration at the local and regional levels. Collecting scat samples from terrestrial and marine mammals and birds is not an easy process; therefore, we have been lucky to forge relationships with numerous "helpers" during the past year. Volunteers and staff of the Marine Animal Rehabilitation Center have taken time to collect scat while taking care of very sick seals, porpoises and marine turtles. They have also provided significant information regarding behavior and biology of marine mammals. UNE faculty, staff, graduates and undergraduates have also been tremendously helpful in assisting us in our collections. Outside assistance has been provided by the Biodiversity Research Institute (Maine) and we greatly appreciate their scientists allowing us access to bird scat. Scientists at Tufts University and Woods Hole Marine Biological Laboratory (Massachusetts) have also been instrumental in moving this project forward.

UNE Squirrel Project Success Continues

The diverse results were surprising, as some squirrels showed very large home ranges, while others remained in a very small area.

Noah Perlut
Assistant Professor
Department of
Environmental Studies

In the Fall 2009 semester, Dr. Noah Perlut initiated the UNE Squirrel Project on the Biddeford Campus to accomplish three basic goals. First, he wanted to engage students with a professional-level, applied field ecology experience that would contribute to a long-term project. Second, he wanted to collect rigorous data on the home range and survival of a visible species found on campus. Third, he wanted to build a model demonstration on how little is known about some of the most common species, with the long-term goal of keeping these common species common.

The project expanded significantly during its second year. In addition to involving his Conservation and Preservation, Introduction to Environmental Issues, and Terrestrial Wildlife Ecology and Conservation classes in field work trapping squirrels, a field crew of 11 student research assistants collected thorough field data and maintained the new website (www.une.edu/squirrel).

During the Fall 2010 semester, these UNE "squirrelologists" deployed six radio transmitters on individual squirrels and followed their movements across campus The diverse results were surprising, as some squirrels showed very large home ranges, while others remained in a very small area. During the Spring 2011 semester, the researchers deployed five additional collars, and will deploy another three in the coming months, with data analysis to begin soon thereafter. They will explore how gender and body size influence habitat selection, activity patterns, winter survival and home range size.

When Perlut introduces this project to his students, he asks them—though it may be strange to consider—to imagine what life would be like if they never saw another squirrel again. With this question, and after time spent in the field, Perlut's students realize just how complicated a squirrel's life may be!

CEN Faculty and Students Host Biddeford High School Students for Hands-on Science Activities

Ed Bilsky | Neuroscience

Two science classes from Biddeford High School (BHS) recently took a field trip to the University of New England to participate in some hands-on science activities and get a taste of college life.

The program, funded through the National Science Foundation SPARTACUS project, serves as an educational outreach program to participating K-12 grade Maine classrooms.

Jay Williams, a graduate student in the UNE marine science program, organized the event that included a lecture by Helida Oyieke, Ph.D., a visiting scientist from Kenya, along with laboratory activities in the Marine Science Center and the UNE College of Osteopathic Medicine (UNECOM).

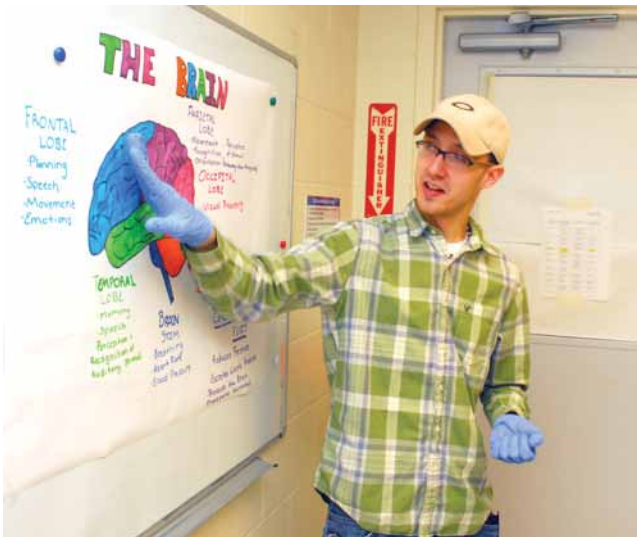
Members from Dr. Edward Bilsky's laboratory and the Center for Excellence in the Neurosciences (CEN) conducted an exercise with each class on the mammalian brain. The exercise had students learn about the different lobes of the brain with Jim Cormier, a graduate of the College of Arts and Sciences. They discussed how these different brain regions communicate to perform various functions including control of movement, interpretation of external stimuli, and learning and memory.

Undergraduate neuroscience majors Jordan Faloon and Aaron Fullerton led the dissection of sheep brains with the students to reveal deeper brain structures. Matt Jackson, a junior in UNE's athletic training program, described the cranial nerves and discussed how mental function is assessed following a sports injury.

John Lowery, D.O., Ph.D., a graduate of UNECOM, added clinical relevance to the activities by showing the students a dissected human brain and leading discussions on the consequences of brain injury. Upon completion of the brain exercise, the BHS students joined their UNE mentors for lunch, and had an opportunity to ask questions about science, higher education and career paths.

John Lowery, D.O., Ph.D., a graduate of UNECOM, added clinical relevance to the activities by showing the students a dissected human brain and leading discussions on the consequences of brain injury.

Dr. John Lowery relating the human neuroanatomy to clinical neurology.



Jim Cormier describes the different lobes of the brain.

The Relationship Between Metallole Research and Ionic Liquid Properties

Photoluminescence behavior of metalloles ranging from least polar solvent (left, unaggregated state) to most polar solvent (right, aggregated state).

Drs. Amy Keirstead and Jerome Mullin have embarked on a new collaboration that combines their research interests and expertise with exciting advances in nanotechnology, and have recently received funding for their work from NASA through the Maine Space Grant Consortium. UNE undergraduate chemistry majors Regina Scalise and Abby Jones are also assisting with this exciting study.

Dr. Mullin is an analytical chemist, and has been working with a team from the University of Southern Maine on the synthesis and properties of metalloles, with a focus on their photoluminescence (fluorescence) behavior. Metalloles are different from most molecules because their light-emitting properties are enhanced when they are in an aggregated state, a trait that can be modified with solvent polarity and viscosity, and has been exploited for applications such as molecular sensors, organic light emitting diodes (OLEDs) and other optoelectronic devices.

Dr. Keirstead is a physical organic chemist whose research program focuses on using organic photochemistry to characterize the properties of ionic liquids, a fairly new class of materials that have become popular media for solar cells, synthetic chemistry, and molecular electronic devices. Ionic liquids are non-volatile, recyclable, and stable under extreme conditions, making them ideal "green" alternatives to traditional solvents for these applications.

The relationship between metallole research and ionic liquid properties, and thus the collaboration between Drs. Mullin and Keirstead, is symbiotic in nature. Since ionic liquids are quite viscous and consist of charged species, they should provide an environment that promotes metallole photoluminescence. Likewise, because the photoluminescent properties of metalloles are known to be influenced by their environment, the yield of metallole luminescence will in turn inform about the polarity of ionic liquids, a property that is difficult to measure by conventional techniques. A further advantage of studying metalloles in ionic liquids is that they could provide an ideal host-guest system for molecular electronic devices, particularly in aerospace technology, since the robustness of ionic liquids could protect siloles from degradation in the extreme conditions of space.

Jerome Mullin
Professor, Department of Chemistry and Physics

Amy Keirstead
Assistant Professor
Department of Chemistry and Physics

Activities in the Burman Lab

Michael Burman | Psychology

The Burman lab is generally interested in limbic system function and development. Recent publications demonstrate the early functional development of the hippocampus relative to hippocampus-amygdala interactions. The lab is currently involved in four ongoing projects.

Undergraduate students Stephanie Shiers, Rose Ashner and Miles Hughes are investigating the ontogeny of fear conditioning. Following a series of behavioral experiments, they are using immunohistochemistry to examine the expression of activity-related genes. This will enable them to determine when various relevant brain structures come "online." Ashner and Bolduc are looking at early hippocampus function for contextual learning using a series of sophisticated behavioral experiments. Ashnere is leading a new collaboration with Dr. Lei Lei transitioning some behavioral procedures to mice and looking at the effects of targeted genetic deletions. UNE student Aaron Fullerton initiated a collaboration between Burman's lab and Dr. Ed Bilsky investigating the effects of analgesics that work via the endocannabiniod system on memory. Together they are making progress on unpacking the complex interactions between the hippocampus and amygdala throughout development.

Prenatal Protein Malnutrition and the Brain

Current research by Mokler and colleagues suggests that PPM causes a permanent rewiring of the brain. Studies to date have shown changes throughout the brain. Unlike other developmental disorders, PPM produces subtle changes to the structure and function of the brain.

Prenatal protein malnutrition, (PPM), also known as kwashiorkor, is the most prevalent form of malnutrition in the world. This form of malnutrition occurs when the mother is able to obtain enough calories for herself and the fetus but is unable to obtain adequate protein.

The late Peter J. Morgane, Ph.D., and David J. Mokler, Ph.D. of the Department of Pharmacology in the College of Osteopathic Medicine are part of an international team investigating the effects of PPM on the brain. Dr. Morgane began his research on PPM in 1976 at the Worcester Foundation in Worcester, Mass. The project moved to Boston University School of Medicine in 1987 with Janina R. Galler, M.D. as the principal investigator (P.I.). Dr. Galler then assembled a multidisciplinary team of scientists who spent the next 20 years determining how PPM affects the developing brain.

When Dr. Galler moved to Judge Baker Children's Center at Harvard Medical School, the research arm of the project moved to the University of New England in 2007 with Dr. Mokler serving as the PI at UNE. Dr. Morgane worked on the project for 34 years until his passing in 2010. The current team consists of neuroscientists from Harvard University School of Medicine, Boston University School of Medicine and the University of New Hampshire in addition to the University of New England College of Osteopathic Medicine. The project has received continuous funding from the National Institute of Child Health and Human Development and the National Institute of Mental Health.

Current research by Mokler and colleagues suggests that PPM causes a permanent rewiring of the brain. Studies to date have shown changes throughout the brain. Unlike other developmental disorders, PPM produces subtle changes to the structure and function of the brain. Research by the team has shown there are changes in the serotonergic, dopaminergic and noradrenergic neurons in the brain of animals exposed to PPM. These changes lead to changes in behavior such as difficulties in sustaining attention. These changes also may reflect a tendency toward impulsivity as well as depression. One of the strengths of the research team conducting this research at UNE is that Dr. Galler is also investigating the effects of PPM on the brains of men and women in Barbados. She has been working for 30 years with a group of patients in Barbados who were exposed to PPM. She has found that they have an increased incidence of behavioral and attention problems as well as an increased risk of depression. These changes last well into adulthood and severely affect the patient's ability to function. These findings in humans correlate well with the animal research conducted by Drs. Morgane and Mokler and colleagues at UNE.

Further research by these neuroscientists will determine how these changes occur in the brain following exposure to prenatal protein malnutrition and how we might be able to treat humans who have been exposed to PPM to rehabilitate the brain.

David J. Mokler
Professor
Biomedical Sciences

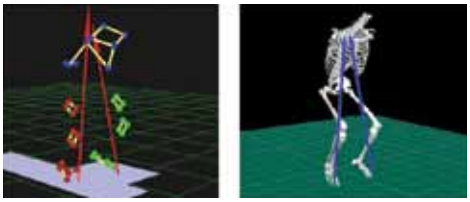
Examining the Effects of "Indoor Pollutants" on Metabolism and Bone Health

Dr. Deena Small is studying the effects that Polybrominated Diphenyl Ether (PBDE) flame retardants have on fat and bone tissue growth and function. PBDEs have been used extensively over the last several decades as flame retardants in electronics and household goods. While initially seen as a benefit for human safety due to the ability of these chemicals to suppress the spread of fire in our homes and offices, it is now known that PBDEs are released continually into the atmosphere from the products in which they are found. Once in the environment, PBDEs find their way into the human body through inhalation or ingestion of contaminated foods. As they are lipophilic molecules, they tend to accumulate in tissues high in fats including adipose. Although production and use of a variety of PBDE chemicals have been banned in the United States since 2008, PBDEs can be expected to leach into the environment for decades to come. Since the chemicals are primarily used in household products, they are considered "indoor pollutants" and it is estimated that 4100 kg/year of PBDE congeners are released from houses per year. It is likely that humans will continue to accumulate these contaminants in their bodies throughout their lifespan.

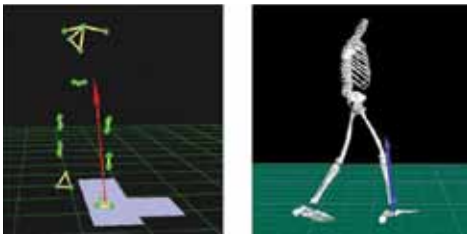
PBDEs are thought to act as "endocrine disrupting" chemicals that interfere with normal thyroid hormone activity. However, the effects on metabolism and other thyroid-hormone regulated processes like bone growth are largely unknown. Dr. Small, her laboratory personnel (including several UNE undergraduates) and toxicologist Dr. Vincent Markowski (SUNY Geneseo) are using a variety of biochemical and molecular techniques to study the effects that chronic PBDE exposure has on the ability of cells to form either adipose (fat) tissue or bone. Since thyroid hormone regulates these processes, disruptions in normal thyroid hormone receptor function by PBDEs in fat tissue and bone marrow may result in an inability of the body to produce adequate numbers of healthy fat and bone cells. Furthermore, disruption of thyroid hormone responses may also cause fat and bone cells that are present to function abnormally, eventually contributing to the development of medical conditions such as obesity, Type II Diabetes and osteoporosis. Dr. Small's unique research is currently funded by the National Institutes of Health. She and her colleagues are hopeful that this research may lead to a greater understanding of the endocrine-disrupting effects that exposure to these prevalent environmental contaminants has on human health in children and adult populations.

Although PBDE chemicals have been banned in the U.S. since 2008, PBDEs can be expected to leach into the environment for decades to come.

Deena Small
Associate Professor
Department of
Chemistry and Physics



Bob Cochrane performing a drop jump landing during pilot testing before analysis (left) and post analysis (right)



You can't see the strain on his face, but Stephen Marcil is dragging a sled with 20% of his body weight, how a person appears during collections (left), after several hours of analysis (right)

Graduate Students Begin Research Projects at UNE Human Performance Lab

Michael Lawrence | Biomechanics

Two groups of Doctor of Physical Therapy students are taking the plunge into biomechanical research at UNE's Human Performance Laboratory. The procedure involves working with researchers Dr. Erin Hartigan and staff biomechanist Michael Lawrence. Steps include: writing a proposal; pilot testing on the students themselves; and data interpretation and analysis, all with the intent of publishing in a scholarly journal.

DPT students Bob Cochrane and Brian McNeany are investigating the differences of impact loading rates (how hard or soft a landing is) between barefoot and shod drop jump landings. The study will help to determine how the body reacts to sudden large forces without shoes. This comes at a pivotal time as performing physical activities barefoot is becoming more popular. Forty subjects will be recruited from the local community for the study.

DPT students Samantha Ellis, Allyson Harvey and Stephen Marcil are determining the effects of weighted sled dragging on athletes who have recently undergone ACL reconstruction surgery. The hope is that this study will lead to alternative strengthening methods for athletes just coming out of physical therapy. Twenty-five subjects will be recruited from Orthopedic Associates for the study. Special thanks to Dr. Thomas Murray and his physician's assistant Bernadette Shaw, PAC.

UNE Biomechanics Lab: First Year of Operation

Erin Hartigan | Physical Therapy

The end of the spring semester officially marked the first academic year of operation of the Biomechanics Lab at UNE. It was an extremely busy year with five ongoing studies (three faculty and staff projects and two graduate student projects) and collaborative efforts with Orthopedic Associates and the local Parisi Speed School to develop research and fee-for-service projects.

Dr. Erin Hartigan's first study collaborated with Parisi Speed School's manager Stan Skolfield and trainers Greg Hatheway and Kelsey Pettengill to determine the effects of the speed school's training regimen on UNE's softball and women's lacrosse teams. The success of this study acted as a springboard for Dr. Hartigan, who then received a divisional grant to investigate how the foot moves in a shoe during athletic movements. She has been invited to submit a full grant application to the National Athletic Trainers Association to determine the effects of the Parisi training on athletes who have undergone ACL reconstructive surgery.

Michael Lawrence, the lab's staff biomechanist, has supported Dr. Hartigan's research and recently concluded his own research project to determine the effect of various methods of sled dragging on gait mechanics. The results of the study have been submitted to the American Society of Biomechanics for presentation at the society's annual conference. Lawrence is also working with Orthopedic Associates to begin developing a fee-for-service model for the biomechanical analysis of the golf swing and competitive cyclists.

Heidi Jones, a UNE undergraduate student, has been instrumental in the lab's success and assisted Dr. Hartigan and Lawrence with the majority of their projects.

Finished data showing a UNE athlete performing a change of direction maneuver during Dr. Hartigan's study

Local golfer at mid-swing during a golf analysis piloting program

Building a Program of Research: New Psychology Faculty Incorporate Undergraduates into Their Research

Undergraduates in the department of psychology have opportunities to work with faculty members in a variety of research areas, such as animal behavior, neuroscience, general psychology, and applied psychology.

As the second largest department in the College of Arts and Sciences, the Department of Psychology has seen a growing interest in research among its undergraduate majors and minors. Importantly, student enthusiasm has been matched by psychology faculty dedicated to both scholarship and mentoring. Undergraduates in the department of psychology have opportunities to work with faculty members in a variety of research areas, such as animal behavior, neuroscience, general psychology, and applied psychology. Therefore, students are motivated to gain research experience in subjects that truly interest them.

Such an atmosphere has proved ideal for Drs' Peterson, Hare, and Stiegler-Balfour, three new faculty members in the department, to develop their research programs. Together, they are mentoring 11 undergraduate students, ranging from second-semester freshmen to graduating seniors. A primary mission of each of their research labs is to provide undergraduates with a quality research experience. As these faculty members establish themselves both at UNE and in their respective fields, they are exposing students to the unique and varied experience of helping a junior faculty member build a productive program of research.

Julie Peterson
Assistant Professor
Department of
Psychology

Peterson's Self and Close Relationships Lab

Julie Longua Peterson, Ph.D., assistant professor of Psychology, joined the University of New England in Fall 2010. As a social psychologist, Peterson's research focuses broadly on the ways people regulate the self in close relationships (e.g., romantic relationships, family relationships and friendships). Importantly, one of the greatest potential benefits of close relationships is that they can help people satisfy a fundamental human motivation: the need to belong and feel accepted. Unfortunately, not all people are equally skilled at reaping the benefits of close relationships. But what if we could change this? Peterson, along with her team of undergraduate research assistants, is pursuing the intriguing possibility that, under the right conditions, even insecure individuals can use their close relationships as a resource for self-enhancement.

As part of Peterson's Self and Close Relationships Lab, Lyle Vintinner (class of 2012), Bethany Kay (class of 2012), Heather Tatsak (class of 2013) and Shelby Peterson (class of 2014) have become involved in all aspects of the research process, including participant recruitment, data collection, data analysis and the presentation of research results. At weekly lab meetings the team not only discusses current research projects, but also receives professional development advice from Peterson, such as how to give a good presentation, build a strong curriculum vita, and apply to graduate school.

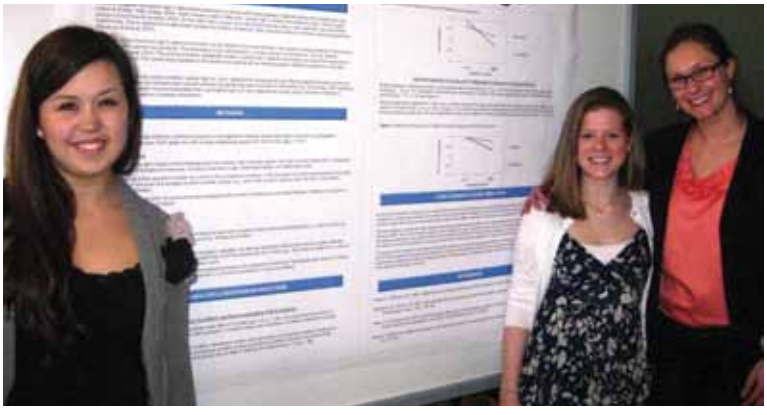
Their hard work over the 2010-2011 school year culminated in two presentations at the 2011 Undergraduate College of Arts and Sciences Research Symposium. Kay and Peterson presented data on priming security in insecurely attached individuals, while Vintinner and Tatsak presented data on self-definitions, acceptance in close relationships and feelings of optimism.

Peterson continued investigating self-regulation in close relationships over the summer with the help of Kay, who was awarded a College of Arts and Sciences Undergraduate Summer Research stipend to pursue her interests in attachment and positive relationship experiences. Together, they designed and piloted a couples-interaction study that will be carried out with the rest of the lab team in the Fall 2011 semester.

For Peterson, a successful research program is about not only research productivity, but also educational achievements for her students. According to her research assistants, working in Peterson's Self and Close Relationships Lab is a challenging yet rewarding experience – and one they will carry with them after their time here at UNE.

"Exploring the vast field of social psychology by conducting research has provided me with some deep insight into what it means to be human, and how our unique social interactions help form the social world that we thrive in every single day."

Lyle Vintinner | Class of 2012
Research Assistant



Shelby Peterson, Bethany Kay and Dr. Julie Longua Peterson at the 2011 Undergraduate Research Symposium

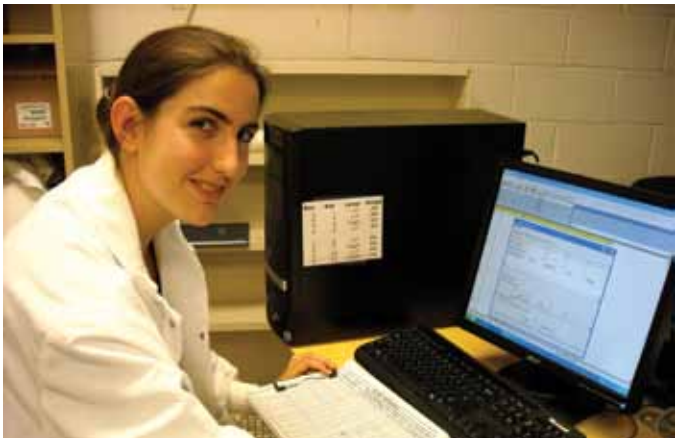
The primary mission of the Stevenson Lab is the training of UNE undergraduate students. The lab currently is composed of UNE undergrads majoring in medical biology, neuroscience and psychology.

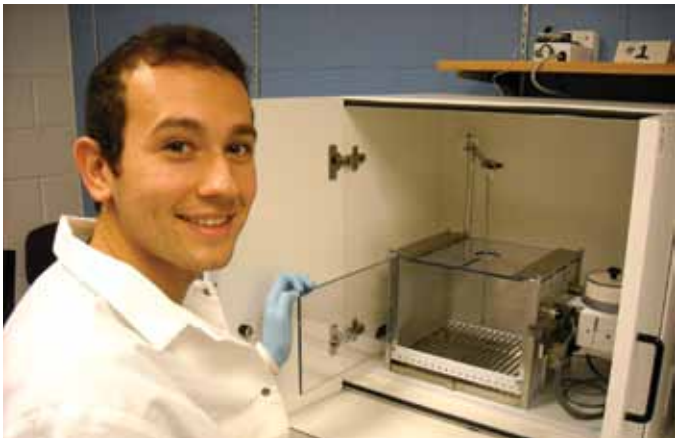
Stevenson Lab Activities

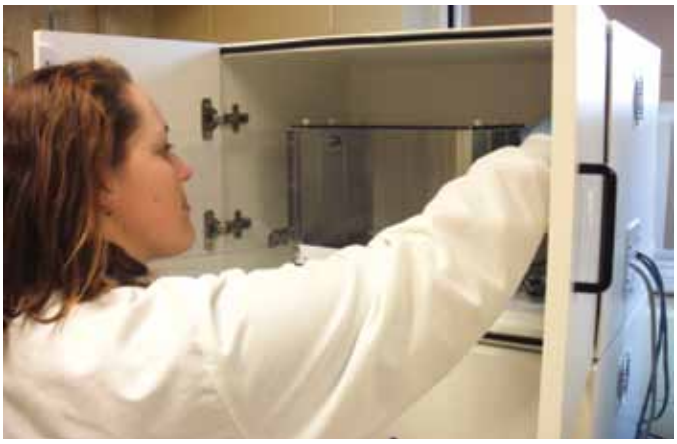
Glenn Stevenson | Psychology

The Stevenson Psychopharmacology Lab is directed by Glenn W. Stevenson, Ph.D., assistant professor of Psychology. The laboratory focuses on two research platforms: (1) development of novel and relevant preclinical methods to quantify pain and pain relief. These studies are aimed at enhancing the ability to screen for effective and safer drugs to treat chronic pain conditions in veterinary and human populations; (2) characterization of the addiction liability of new experimental mixed-action opioid drugs using preclinical drug self-administration procedures. These studies are aimed at assessing the abuse liability of experimental opioid drugs that are being developed to treat pain. Parallel studies are characterizing the effectiveness of novel compounds to treat drug abuse.

The primary mission of the Stevenson Lab is the training of UNE undergraduate students. The lab currently is composed of UNE undergrads majoring in medical biology, neuroscience and psychology. Students are responsible for running all experiments, data collection, data analysis and interpretation, presentation of results at weekly lab meetings and annual national/international meetings, as well as thoughtful contribution to scientific design of all studies. Research funding to Glenn W. Stevenson is provided by the National Institutes of Health.







Dr. Dzieweczynksi actively involves undergraduate research assistants in all steps of the research process, from experimental design to writing scientific manuscripts.

Sex and Aggression in Two Fish Species

Teresa Dzieweczynski | Psychology

Male Siamese fighting fish interacting in the presence of a male audience

A male Siamese fighting fish demonstrating decision-making behavior

Lindsay Forrette and Jenna Crovo show off a stickleback haul.

Dr. Teresa Dzieweczynski, associate professor in the Department of Psychology, and her undergraduate research assistants are interested in the same things that many people are interested in — sex and aggression— they just happen to use fish as a system in which to explore these questions.

The Dzieweczynski lab uses two fish species, Siamese fighting fish and threespine stickleback, to address two lines of research, exploring how and why males differ from one another in their behavioral responses and examining how social environment influences behavior. Using Siamese fighting fish as a model system, the Dzieweczynski lab investigates personality by placing males in identical situations and observing how their responses differ from one another. Now that these differences have been established, the Dzieweczynski lab has started to explore the causes of these differences – for example, genetic effects and variation in testosterone levels, as well as the consequences of these differences with an ultimate goal of examining the evolution of decision-making behavior. While animal personality has gained a great deal of attention in recent years, the Dzieweczynski lab is one of the few investigators to look at consistent individual differences in terms of a relatively complex behavior, decision-making in the form of choosing to attack or court when presented with a male and female conspecific at the same time.

A second project using Siamese fighting fish strives to understand how communication occurs in groups of multiple individuals, with special attention paid to how familiarity with one another and sex of the interactants affects communication in these settings. The Dzieweczynski lab also works with an underutilized population of threespine stickleback in Maine, investigating both personality in adult males and differences in boldness in juveniles, which provides insight into the evolutionary history of these behaviors between freshwater, anadromous, and marine populations of this species.

Dr. Dzieweczynski actively involves undergraduate research assistants in all steps of the research process, from experimental design to writing scientific manuscripts. These students graduate with a newfound sense of confidence in their abilities as they are often challenged to achieve things they made not have realized or believed they were capable of, all within a supportive research environment.

College Transitions Study

Research team investigates how parent-child relationships affect college students

Kaulback, Peterson, Baker

The combination of increased work load, social temptations, and unstructured time overwhelms many new students, sometimes overshadowing the primary goal of college as an educational experience. In fact, recent estimates from a 25-year study by the Higher Education Research Institute indicate that first-year college students' emotional health is at a record low (Pryor et al., 2010). Not surprisingly, many parents wonder what they can do to help prepare their adolescents for these challenges. During her first year at University of New England, Dr. Amanda Hare, assistant professor of Psychology, set out to answer that question.

Through her College Transitions Study, Dr. Hare and her research team of Katelyn Kaulback (class of 2012), Brett Peterson (class of 2013) and Nicole Baker (class of 2014) investigated how parent-child relationships can make the first year of college easier or more difficult for new students. Dr. Hare's undergraduate research assistants immersed themselves in every step of the research process, from collecting and analyzing first year students' survey responses in the Developmental Psychology Lab to presenting their findings at the 2011 Undergraduate College of Arts and Sciences Research Symposium in May. Together, the team presented data on the precursors of college students' resistance to control, a known risk factor for engagement in problem behaviors such as drug and alcohol use (Block, Block, & Keyes, 1988). Summer was no vacation either, as Dr. Hare and her team kicked off a new longitudinal study with the support of UNE's Office of Student Affairs. Nearly 200 incoming first-year students and their parents volunteered to participate in Dr. Hare's year-long study at orientation in June.

Amanda Hare
Assistant Professor
Department of
Psychology

Dr. Hare supports her research assistants as they pursue their own scholarly interests through the College Transitions Study, as well. For instance, rising fourth-year student Katelyn Kaulback, who has aspirations in counseling psychology, was awarded a College of Arts and Sciences Undergraduate Summer Research Stipend to study parental influences on college students' self-esteem. In the coming year, rising third-year student Brett Peterson, who hopes to work in higher education administration one day, plans to investigate the factors that predict college students' institutional attachment (and in turn may help prevent dropout). Regardless of their individual interests, the combination of hands-on research experience and individual mentoring that Dr. Hare's research assistants receive will put them in an optimal position to one day achieve their goals as UNE alumni.

"Through my experience working on the College Transitions Study, I have been able to experience first-hand what it is like to work in a lab setting. I have learned how to set up data collection programs, successfully run participants, and I have gained further insight to what being a psychologist will actually be like."

Katelyn Kaulback | Class of 2012
Research Assistant

"As a research assistant, I have gained a sense of responsibility that is very hard to gain anywhere else. I have a sense of professionalism that allows me to expand in all other areas of my education. Because of this opportunity, I feel that I am a valuable part of the UNE community and that the things I do are making a difference to others around me."

Julia Rich | Class of 2012
Research Assistant

Exploring the Many Factors That Impact Reading Comprehension

Jennifer Stiegler-Balfour | Psychology

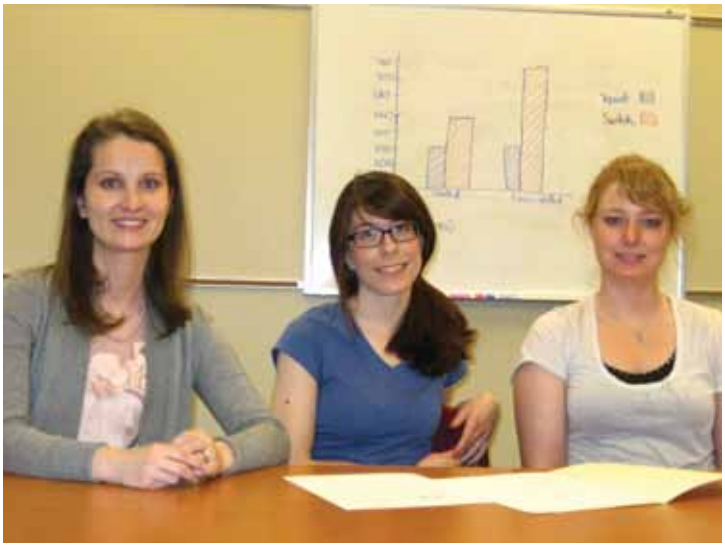
When we consider enhancing and ultimately propelling learning in the classroom, factors such as a comprehensive curriculum, innovative teaching tools and an engaging personality often come to the forefront. And for good reason – stimulating students' desire for knowledge has long been the foundation for success in the classroom. But even the most dedicated student can encounter challenges within the classroom.

As a skill, reading comprehension is no different than the ability to write, paint or even cook. Skill levels inevitably vary from one individual to the next, and while some read and integrate information efficiently, many struggle to understand the most basic written messages. Over the course of the last few years, a deeper study of what differentiates a skilled-reader from a less-skilled reader and what can be done to close this gap has gained significant momentum in the field of cognitive research.

Dr. Stiegler-Balfour is creating an exciting new line of research at the university, exploring the many factors that impact reading comprehension. One of the research initiatives nearing completion in her lab is a project that uses a 'task-switching' paradigm to investigate the relationship between reading skill and the ability to inhibit irrelevant text information while reading. Being able to inhibit irrelevant information, while reading is crucial to ensuring a high level of comprehension and is one of the cognitive factors directly linked to high reading skill.

Assisting Dr. Stiegler-Balfour in her lab are undergraduate research assistants Julia Rich (Psychology/English, 2013), Tiffany Shahin (Psychology/Neuroscience, 2013) and Hadleigh Smith (Education/Psychology, 2013). Undergraduates have long enjoyed a strong presence within the psychology department's research efforts and Dr. Stiegler-Balfour strongly believes in continuing that commitment, actively involving undergraduate researchers in every step of the data collection and analysis process.

The research projects Dr. Stiegler-Balfour conducts in her laboratory often inspire a secondary line of research examining best practices in the classroom. At present, one of her projects in process emphasizes how reading skill levels directly affect students' ability to excel in reading- and writing-intensive courses, while a second assesses whether or not frequent testing in a psychology statistics course increases overall retention of course material. Regardless of where research projects will take her, it is Dr. Stiegler-Balfour's hope that as an instructor, mentor and researcher she can optimize students' learning experiences.



Dr. Stiegler-Balfour with research assistants Tiffany Shahin and Julia Rich

UNE summer intern program mixes medicine, research and entrepreneurship

Kirk and Nancy Pond, longtime residents of Maine, are strong supporters of the Undergraduate Summer Research Program at UNE. Through a donation from the Pond Family Foundation, UNE's program aims to mentor the next generation, preparing them to enter the workforce ready to lead.

UNE's Undergraduate Summer Research Program provides opportunities for students to work with faculty across UNE's full spectrum of curriculum and discipline offerings. Each summer more than 60 students are on campus and engage in faculty mentored research matched to their discipline and career interests.

A new program launched this summer introduced a select group of Maine students to the connection between medicine, research and entrepreneurship. Donors Dave and Melinda Anderson, Ed and Jill Bilsky, and Brian and Deborah Dallaire, saw a need and took the initiative to support a program that incorporates all aspects of turning biological discoveries into drug treatments for patients. This summer, seven eager Maine students worked alongside UNE undergraduate mentors and faculty in the Center for Excellence in the Neurosciences (CEN). The select group of two high school and five college students learned how discoveries in UNE research laboratories are being developed as potential treatments for neurological and psychiatric disorders.

During the 11-week program, students studied the principles of neuroscience and pharmacology, translational biomedical research and entrepreneurship.

The active seminar program also included internationally known scientists as well as business leaders in the state of Maine. Speakers included Skip Irving, partner and managing director of Health Advances Biotechnology, and Jacquelyn B. Cawley, D.O., senior medical director of Maine Health, among others.

Students read academic papers written by the speakers and participated in interactive group discussions with the speakers following the lectures. The program's capstone event featured a keynote address by noted Maine neurosurgeon and entrepreneur Lee Thibodeau, M.D.

From left to right: Taylor Piers, Hannah Clarke, Hannah Doss, Danielle Rafferty, Allison Saunders, Evan Shuris. Missing from photo is Mark St. John.

The interns partnered with UNE undergraduate student mentors who are involved with research activities in Ed Bilsky, Ph.D.'s lab. Bilsky is the director of the Center for Excellence in the Neurosciences and a professor of pharmacology in the UNE College of Osteopathic Medicine. The interns conducted literature and patent searches and also prepared and presented a capstone project at the end of the program.

"Mentorship plays a very important role in the lives of young people" said Nancy Pond, an elementary school teacher and principal in Cape Elizabeth, Maine, for 30 years. Her husband, Kirk, served as president and chief executive officer of Fairchild Semiconductor International, Inc. Together they have supported many students like 2011 summer intern Hannah Clarke, who plans to become a doctor and said, "I love the entrepreneurial aspect of UNE's internship program and the wide range of research opportunities. UNE is a step ahead of a lot of other schools with this approach. It allows me to stretch my mind and apply what I'm learning to the business and creative sides of research."

For more information on how to support students in the undergraduate summer research program, please contact Bill Chance, Associate Vice President for Institutional Advancement at (207) 221-4372 or at wchance@une.edu.

UNE Center for Community and Public Health (CCPH) Conducts a "Churning" Policy Study for the State of Vermont

The study included a multi-year analysis of churning in Vermont's Medicaid and Catamount Health insurance programs to specifically examine enrollment, disenrollment, and re-enrollment patterns within Catamount as well transitions made by Catamount enrollees to other public or private health insurance plans.

CCPH conducted a policy study on ways to reduce "churning" in the state of Vermont's Health Insurance Exchange. This study was part of a larger project led by Bailit Health Purchasing, LLC, to assist Vermont in the design and implementation of its Health Insurance Exchange, pursuant to the federal Patient Protection and Affordable Care Act of 2010 (PPACA). Churning involves participant enrollment and subsequent disenrollment in private or public insurance plans, primarily due to changes in family income or other personal circumstance. Churning adds significant burdens to insurance programs as it adds unnecessary administrative costs and reduces coverage. It may also cause enrollees to forego needed care once they become uninsured.

The CCPH churning study led by principal investigator Dr. Ron Deprez was national in scope and resulted in several policy recommendations. The study included a multi-year analysis of churning in Vermont's Medicaid and Catamount Health insurance programs to specifically examine enrollment, disenrollment, and re-enrollment patterns within Catamount as well transitions made by Catamount enrollees to other public or private health insurance plans.

In addition, CCPH conducted a comprehensive literature review on the causes of churning and a multi-state analysis of policies implemented by other states to improve enrollment, re-enrollment and reduce churning. CCPH also conducted targeted interviews with Vermont stakeholders and national experts on churning policy options. Based on the information gathered in the study, CCPH presented recommendations to Vermont that included policies designed to:

- Streamline the enrollment and re-enrollment processes by adopting policies that reduce the administrative burden on enrollees, such as paperless renewal procedures, and using available data to re-enroll recipients automatically.
- Enroll new recipients in public insurance programs continuously for 12 months, regardless of changes in their income; and
- Standardize operations, provider networks, administrative systems, and benefit packages in private and public insurance plans operating on the Exchange.

Ron Deprez
Director
Center for Community
and Public Health

UNE Center for Community and Public Health (CCPH) Continues High Level of Research and Evaluation Studies in Public Health

In addition to assisting in redesigning health services in St Louis County, the assessment will assist the health department in attaining accreditation with the state health department.

Over the course of the 2011 fiscal year, CCPH won several new research and evaluation studies and training projects. Overall income to UNE amounted to just over $2 million. Three examples of new or expanded CCPH studies are:

Project Launch Evaluation
Maine's Project LAUNCH (Linking Actions for Unmet Needs in Children's Health) program is located in Washington County under the oversight of the Community Caring Collaborative (CCC). Evaluation of Project LAUNCH is housed at CCPH and consists of tracking, analyzing and reporting on process, impact, outcome, and fiscal factors that affect Project LAUNCH implementation. The evaluation team led by principal investigator Dr. Ruth Anne Spence coordinates Maine's data within the national cross-site evaluation of all LAUNCH projects (there are 18 across the US), and also coordinates state and community data to assess project implementation, program service delivery impacts, and family outcomes.

Healthy Maine Partnership Evaluation Project
CCPH won a five-year $3 million-plus contract from the Maine Department of Human Services to evaluate the Healthy Maine Partnership Initiative (HMP), Partnership for a Tobacco Free Maine (PTM), Maine Cardiovascular Health Program, Maine Diabetes Prevention & Control Program, and the Maine Physical Activity and Nutrition Program. The core evaluation team comprising the program manager, lead evaluators, data experts and technical experts (as needed) guides the overall evaluation. The evaluation will benefit program management while also providing evaluations that are explicit, formal, and justifiable to improve initiative effectiveness and demonstrate success. The evaluation captures the unique contribution of the HMP Initiative as a nationally recognized prevention model.

St. Louis County Community Health Needs Assessment
CCPH continues its community assessment work with a study for the St. Louis (MO) County Health Department. In addition to assisting in redesigning health services in St Louis County, the assessment will assist the health department in attaining accreditation with the state health department. The assessment identifies the health status of the population and subgroups, assesses health needs, and identifies public health priorities for St. Louis County. The final report will include service delivery recommendations to improve the health status of the population.

Some members of the CCPH research team, from left to right: Praphul Joshi, Michele Polacsek, Ron Deprez, Karen O'Rourke and Kira Rodriguez.

In Memoriam:

Peter J. Morgane, Ph.D.

Professor of Pharmacology
Neuroscientist, benefactor and friend

The late Peter J. Morgane, Ph.D., at left with David Mokler, Ph.D.

Peter J. Morgane, Ph.D., Professor of Pharmacology in the College of Osteopathic Medicine, died on September 27, 2010 following a brief illness. Dr. Morgane was a great benefactor to the University of New England. He was also one of the world's most preeminent neuroscientists.

Dr. Morgane was a resident of Kennebunkport, Maine since 1980. He was predeceased by his wife Cécile Murette Morgane, who died in 2001. He was born in Atlanta, Georgia and spent numerous early years in New Orleans. Dr. Morgane served as a page in the United States Senate in 1943 and 1944, and served in the U.S army in 1947 and 1948 at Fort Hood and Camp Maxey, Texas.

Dr. Morgane's impressive scientific career spanned five decades. He received his Bachelor's degree from Tulane University in New Orleans, and his M.S. and Ph.D. in neurophysiology from Northwestern University. Dr. Morgane did post-graduate work at the University of Oregon in Portland, Oregon and the Brain Research Institute in Mexico City, working at the latter with the famous sleep researcher Dr. Raul Hernandez-Peon. He then carried out research with Dr. John Lilly on aspects of whale brain anatomy, carrying out most of these studies with Dr. Paul Yakovlev at the Department of Neuropathology, Harvard Medical School in Boston, Mass.

Dr. Morgane moved to Worcester, Mass., in 1968 as head of the sleep research laboratories, Worcester Foundation for Experimental Biology; he became director of the Training Program for Neurobiology from 1970–1975. He also began work on a program project dealing with effects of prenatal protein malnutrition on the developing brain, which he worked on until his death in 2010. That program moved to Boston University Medical School in 1987 and was funded by the National Institute of Child Health, National Institutes of Health. At Boston University, Dr. Morgane was Professor in the Department of Psychiatry.

In 1986, Dr. Morgane joined the University of New England College of Osteopathic Medicine as a Professor of Pharmacology. During his time at UNE, he worked tirelessly to develop research. He felt strongly that research was one of the most important jobs of a university faculty. In addition to his sage advice to faculty on research and his mentoring of many of the faculty at UNE, Dr. Morgane also gave a significant part of his personal wealth to UNE, first with a donation to the Pickus Center for Biomedical Research with the establishment of the Cécile Morgane Research Laboratories in honor of his late wife Cécile, and then with another substantial donation for the building of the Peter and Cécile Morgane Hall, which houses the Departments of Biology, Chemistry and Physics for the College of Arts and Sciences.

In his scientific career, Dr. Morgane published over 230 scientific papers and edited the four volume Handbook of the Hypothalamus, which continues to be a classic work on the structure and function of the hypothalamus of the brain.

He was a member of 16 scientific societies, and served for 11 years on grant reviews at National Science Foundation and at National Institute of Neurological Disease and Stroke. Dr. Morgane received support for his research from the National Science Foundation and the National Institutes of Health for over 35 years.

Dr. Morgane's studies on whale brains were published in several monographs and some 40 scientific papers. These studies form the definitive works on whale brain, both large whales and small whales (dolphins and porpoises).

At UNE Dr. Morgane worked with David Mokler, Ph.D., on the emotional brain (limbic system), and they edited an entire volume of the journal Neuroscience and Biobehavioral Reviews. They also worked together for 15 years on the program project on prenatal protein malnutrition at Boston University and UNE. In the last few years, Drs. Morgane and Mokler worked with principal investigator Janina Galler, M.D. at Judge Baker Children's Center at Harvard Medical School, Jill McGaughy, Ph.D. at the University of New England, and Douglas Rosene, Ph.D. and Jarrett Rushmore, Ph.D. at Boston University School of Medicine.

Dr. Morgane's principal endeavors outside of science included book collecting, antique gathering, champagne tasting and worldwide travel to over 45 countries, including Japan, India, Australia, East Africa and all the countries of Europe. He and his wife Cécile, who was born in Paris, France, particularly loved going to France, sampling the great beauties of the country as well as the wine and food.

Dr. Morgane had no surviving family, but is survived by many friends and his cat Monet. UNE President Danielle Ripich says, "Dr. Morgane was a man of great vision and generosity. He dedicated his entire career to advancing the body of biomedical research knowledge and sharing his research passion with others. We mourn the loss of our dear friend, but know that Peter's legacy of scientific discovery will live on at the University of New England."

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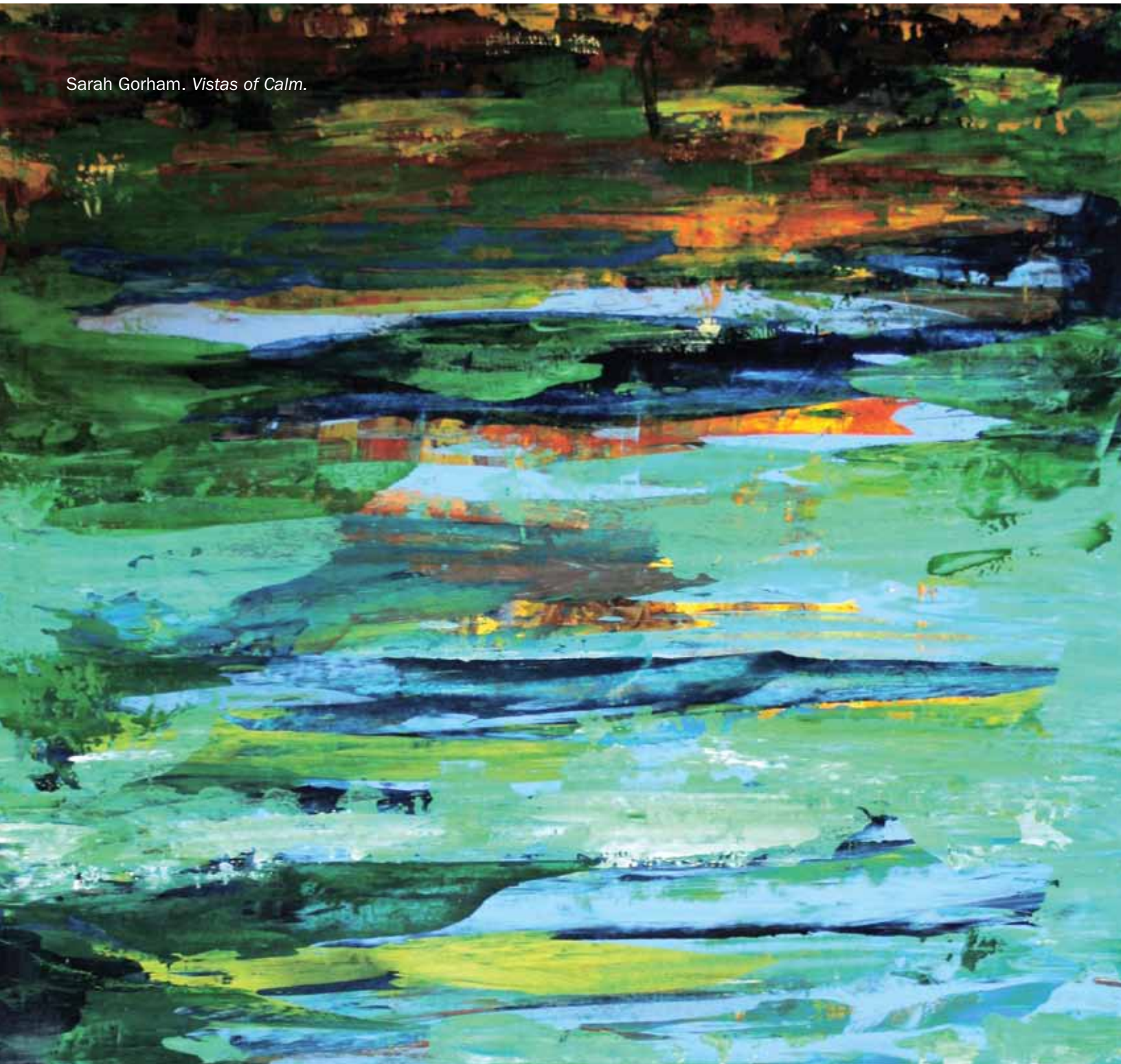

Sarah Gorham. *Vistas of Calm.*