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Measuring the industry’s impact on the economy of Delaware

Research at the Lewes wind turbine  Studying the region’s wild game  A day in the life of R.V. Hugh R. Sharp

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ON THE COVER
Dale Blessing, fourth generation farmer from Harrington, Delaware, keeps a close eye on the progress of his corn fields near Milford. Dale farms with his mother, Melissa Blessing, and grandfather Clifford Blessing (both of Harrington). Photos by Danielle Quigley
In terms of strengthening a young nation’s democracy and prosperity, the Morrill Act remains one of the most important pieces of legislation ever passed.

And it was with the Morrill Act that the University of Delaware, then “Dela-ware College,” became one of the country’s first land-grant institutions. The land-grant mission is alive and well at UD. And nowhere is the mission more evident than in our College of Agriculture and Natural Resources (CANR). In this issue, you’ll find a few of the projects connecting CANR with the people and needs of Southern Delaware:

• Protecting Delaware’s $68-million-a-year lima bean crop from “downy mildew,” a disease that caused $3 million in damage in 2000;
• Managing the populations of two of Delaware’s most important game species: wild turkeys and white-tailed deer;
• Planting trees in Milford Neck to sequester carbon, increase biodiversity and improve the region’s water quality.

CANR’s work is absolutely vital—not just to Southern Delaware, but to the entire First State. A UD report released this spring shows that agriculture—on-farm production, processing and manufacturing, inter-industry linkages—adds $8 billion to the state’s economy, supports 100,000 jobs and accounts for 40 percent of total land use. In recent years, the agricultural industry has seen dramatic changes in farming science and technology and, therefore, in productivity and yield. It’s also had to meet changing and challenging consumer demand.

In this dynamic environment, CANR is making a difference. CANR’s work is absolutely vital—not just to Southern Delaware, but to the entire First State. A UD report released this spring shows that agriculture—on-farm production, processing and manufacturing, inter-industry linkages—adds $8 billion to the state’s economy, supports 100,000 jobs and accounts for 40 percent of total land use. In recent years, the agricultural industry has seen dramatic changes in farming science and technology and, therefore, in productivity and yield. It’s also had to meet changing and challenging consumer demand.

In this dynamic environment, CANR is making a difference.
The University of Delaware Associate in Arts Program offers students in Southern Delaware a unique opportunity to jump-start their college degrees. With UD Academic Centers on the Delaware Technical and Community College campuses in Georgetown and Dover, students can choose to enroll in UD courses while staying close to home.

The Associate in Arts Program is designed to give students the chance to prepare and acclimate themselves to the rigorous demands of a UD bachelor’s degree. Students complete work in small classes and are taught by experienced UD faculty. The students receive academic advising and support throughout their time in the program.

Sharon Tucker, director of the program in Dover, said the Associate in Arts Program “is a great first step toward one’s college career—sort of getting your feet wet in college-level academics.”

She said students typically spend two years working toward the completion of 60 credits and at the same time fulfill core requirements for the bachelor’s degree in many majors offered by the College of Arts and Sciences, which allows them “to smoothly transition their education to the Newark campus at the start of their junior year.”

Students from the Associate in Arts program go on to enroll in degree programs in all of the seven colleges at UD.

The program is appealing in many ways. Tuition prices are much lower, possibly even free if students qualify for a SEED (Student Excellence Equals Degree) scholarship. Students can also save on the costs of housing by staying at home and working a part-time job if necessary.

During the fall 2010 semester, the Dover Associate in Arts Program had 148 students and the Georgetown campus had nearly 200 students.

While the program as a whole works to prepare students for their upcoming academic life on the Newark campus, additional programs have been implemented to help students adjust to everyday campus life.

Majors and Minors on Main is a spring semester event for sophomores to meet with different department, major and program advisers, to connect with their department or departments and to explore the options for an educational path for their junior and senior years.

Transitions Day is another event held annually during the summer. Students and parents are invited to come out for the day to learn about what life is really like on the Newark campus.

Richard Bacon, Georgetown campus director, said the University “takes great care in making the transitions as smooth as possible. Each year we have students come back to talk to current students about life in Newark, because to many Newark can seem like a world away.”

Alexis Short, a graduate from the Georgetown campus, said Transitions Day provided helpful information. “One part of Transitions Day that was helpful was to hear the previous students’ comments on their different campus experiences. The comments they made I later found very relevant to situations that my friends and I were going through,” she said.

Starting a new education at any level is oftentimes challenging, however Short said she has made the adjustment. “Now that I’m on my second semester I do enjoy this campus and different clubs that I participate in. I have also enjoyed making new friendships.”

For more information about UD’s Associate in Arts Program, visit www.udel.edu/associateinarts/index.html

Associate in Arts Program offers jump-start to UD degrees

BY GRETAC GIBBONEY

UD student Alexis Short completed the Georgetown Associate in Arts program. Photo by Evan Krape
Blue Hens unite through the Kent & Sussex Counties Alumni Club

BY KATIE MCMULLEN

Whether they are old or young, married or single, employed or still searching, they have one thing in common—the University of Delaware.

Since 2007, University of Delaware alumni in Southern Delaware have been working hard to bring former Blue Hens back together through the Kent & Sussex Counties Alumni Club.

The club’s president, Shanté Hastings, a 2000 graduate and former president of the UD Alumni Association, said, “Whenever I’m out and about and meet alumni I feel an instant connection with them. Maybe we had a professor in common, or lived in the same dorm, or ate meals in the same dining hall, or were involved in the same student organization . . . All alumni are connected to each other through UD in one way or another.”

The primary purpose of the organization is to plan events to bring alumni together while also recruiting board members and volunteers. Today’s board consists of Hastings, president, and Paige Doeberl, a 2007 graduate and special events chair. Vacant positions include vice president, young alumni chair and communications chair.

The board hosts round-table meetings to find out the types of events and activities in which alumni are interested in participating. Their expectations for the club’s future, as well as the University of Delaware, are discussed.

One of the club’s most notable accomplishments from the last three years has been the adoption of part of Delaware Seashore Park. Club members clean the area twice a year in the spring and fall by picking up debris and inventorying it for the Delaware Department of Natural Resources and Environmental Control (DNREC). Once the cleanup concludes, volunteers head to a restaurant for refreshments.

Last fall, the group was educated after the cleanup by a representative of the Center for Inland Bays about the region’s precious water resources. “It’s a wonderful commitment we’ve made to keep our beaches clean so that residents and visitors can continue to enjoy them,” Hastings said. This year, the cleanup was to be held Saturday, May 14.

The organization’s most significant event of the year, however, is UD Day in Dewey. The event is co-sponsored by the Kent & Sussex and New Castle County alumni clubs, and it gives UD alumni and their families a chance to spend a day together in beautiful Dewey Beach. The event kicks off at the Northbeach Restaurant with appetizers and drinks. From there, Blue Hens have the opportunity to take a trolley ride to the Bottle & Cork to enjoy the well-known Jam Session. From there, attenders can also go to the Rusty Rudder for dinner and entertainment. This year’s UD Day in Dewey is scheduled for July 16.

Additional events throughout the year include happy hour gatherings, pizza night and special events, such as a tour of the Dogfish Head Craft Brewery in the fall.

While the club’s board members work hard to expand their reach, one thing is certain—they have developed a greatly cohesive environment for UD alumni to come together and share wonderful experiences. “I believe having an organization that can connect alumni to each other helps them network, make new friends and still feel connected to the University,” Hastings said.

To learn more about the Kent & Sussex Counties Alumni Club, visit www.uDconnection.com.

To home, for me, will always be Felton,” says Peter Burnham, a senior at the University of Delaware and member of the nationally ranked UD cheerleading team.

While at the University of Delaware, Burnham majored in health and physical education, earning a bachelor of science degree and participating in Commencement in May.

During his time at UD, Burnham has dabbled in rugby, become a member of Delaware Christian Athletes, played a significant role with the UD cheerleading team and pursued academic success earning an overall grade point average that earns Dean’s List honors.

Peter Burnham gives a lift to a fellow cheerleader.

Photo by Ambre Alexander

Photo by Duane Perry

Photo by Kayla Codina

Photo by Audry Alexander

Photo by Dan Long

Photo by Karen Garbacz

Photo by Karen Garbacz

Photo by Karen Garbacz

Photo by Karen Garbacz

Photo by Karen Garbacz

Photo by Karen Garbacz

Photo by Karen Garbacz

Photo by Karen Garbacz

Photo by Kayla Codina

Photo by Duane Perry

Photo by Duane Perry

Photo by Duane Perry

Photo by Duane Perry

Photo by Duane Perry
I think being raised in Felton has prepared me in certain ways,” he said. “The list of things to do in a small town is not long and encouraged me to stay open and always try new things. The limited entertainment helps open one’s eyes to what is really important: people, who have molded and shaped me into who I am today.”

Burnham describes himself as, “passionately curious, confident, comfortable and accountable.” Each characteristic serves a part of the infrastructure for his success personally, professionally, academically and athletically.

“I have strived to be a positive influence during my time at UD,” he said. “Overall, I have tried to balance my responsibilities with my interests. I have learned so much at UD while in the classroom, but I may have learned even more outside, around campus.”

Burnham competed and performed with the UD cheerleading team for three seasons. “As a male team member, I am expected to perform a number of stunts and with stunts, the male members of the team throw bas- ket, tumble and base pyramids.”

“Along with stunts, the male members of the team throw baskets, tumble and base pyramids.”

Burnham also explained the importance of the team to the crowd itself. “Throughout the school year we appear at many events, developing positive relationships with people in the community,” he said. “We do our best to make sure that we leave everyone we come in contact with in a better mood than we found them.”

The University of Delaware cheerleading team has won national titles and recognition for its achievements. However, when asked what his biggest accomplishment was as a member, Burnham simply replied, “continuing tradition.”

On the verge of starting the next step in life after college, Burnham reflected on his time at UD. “I feel confident that the University has prepared me as best as possible to become a successful educator,” he said. “As I am from Delaware, I expect to meet fellow alumni for the rest of my life. It’s great to have a common ground when meeting new people.

“Delaware will always be where I call home—the people from both Felton and UD are truly what make each place special to me.”

UD volunteers demonstrate environmental commitment

The Delaware Department of Transportation says its Adopt-A-Highway program is about people caring enough to make a difference.” Volunteers from the University of Delaware’s Hugh R. Sharp Campus demonstrated their commitment to the environment March 22 when they held their first Adopt-A-Highway cleanup of Pilottown Road in Lewes. UD volunteers have adopted a two-mile stretch of the road near the campus, which sits near the mouth of Delaware Bay. As part of the project, they will take part in at least three cleanups a year in which they collect litter and debris from the road.

“A number of us walking or biking that road noticed a general accumulation of trash so we asked about adopting the highway,” said Joe Farrell, a resource management specialist with Delaware Sea Grant who organized the effort.

For members of the Lewes campus, environmental stewardship is all in a day’s work. Research taking place at the complex benefits everything from water quality to fish populations. Their efforts have also made the campus itself more environmentally friendly. It is powered by the clean energy of a wind turbine and landscaping includes a native plant garden and recently installed demonstration rain garden. Keeping a nearby road clean was an obvious next step, Farrell said.

“The road is adjacent to marshes,” he said. “Those marshes flood over and the trash gets washed directly into Caney Creek or Delaware Bay. We think this will make the area cleaner and nicer for the people and the environment, including the wildlife that live here.” — By Elizabeth Boyle

UD receives $2 million gift for Osher Lifelong Learning Institute

♦ ♦ ♦ The University of Delaware has received a $2 million gift from The Bernard Osher Foundation to support statewide lifelong learning programs at UD.

“I thank the Osher Foundation for helping UD expand its lifelong learning programs and connect in a meaningful way with Delaware’s citizens,” said UD President Patrick Harker. “Strong engagement with Delawares statewide is one of the University’s principal goals, and the Osher Lifelong Learning Institutes at UD are critical to cultivating this engagement, and serving the communities we’re so proud to be a part of.”

Founded as the Academies of Lifelong Learning, UD’s lifelong learning programs have been renamed the Osher Lifelong Learning Institute at the University of Delaware to reflect their affiliation with the national network of Osher lifelong learning organizations. UD’s lifelong learning program on the Wilmington Campus was founded in 1980. The Southern Delaware program was established in Lewes in 1989. The Dover program began offering courses in fall of 2010.

UD’s Osher Lifelong Learning Institute is offered through the Division of Professional and Continuing Studies.

“With the $2 million endowment gift from the Osher Foundation, the Osher Lifelong Learning Institute at the University of Delaware can enhance and expand its programs for adults age 50 and above,” said Jim Broomall, assistant provost for professional and continuing studies.

“With the gift from the Osher Foundation and our membership in the Osher Lifelong Learning network,” added Broomall, “we strengthen our commitment as a ‘citizen university’ serving all three Delaware counties.”

“The trustees of The Bernard Osher Foundation are delighted to welcome officially the former Academies of Lifelong Learning at the University of Delaware to the network of Osher Lifelong Learning Institutes,” said Mary Bitterman, president of the foundation.

“Given its exceptional performance over 30 years, UD’s Osher Institute will undoubtedly serve as a model of best practices for the large and diverse group of Osher institutes across the nation. We are grateful to President Harker, Assistant Provost Jim Broomall, and Ruth Flexman, statewide Osher program coordinator, for their cooperation throughout the grant-making process.”

Affiliation with the Osher Foundation provides UD’s lifelong learning programs additional financial resources, and identity as a member of a national network promoting lifelong learning. With UD, Osher has 118 member organizations, at least one in every state, each with its own unique identity that reflects its community.

Founded by noted businessman and philanthropist Bernard Osher, the Osher Foundation supports lifelong learning programs as part of its mission to improve the quality of life through higher education and the arts. ♦
Lifelong Learning class explores *Our Town* and beyond

BY TARA WHITE KEE

A class at the University of Delaware’s Osher Lifelong Learning Institute in Lewes this fall got up close and personal with the plays of Thornton Wilder—in a rich variety of ways.

The class, entitled “Our Thornton Wilder: Novels, Plays and Writings,” set out to discuss the three-time Pulitzer Prize-winning author’s life and writings. Serendipitously, the University of Delaware Resident Ensemble Players (REP) were also in the process of producing *Our Town*, Wilder’s best-known play. The REP, which consists of professional and experienced actors, performs as well as works with students in the theatre graduate training program.

Osher Lifelong Learning course instructors Gary and Margo Ramage contacted Sanford Robbins, UD Department of Theatre chair, and the result was a vastly enriched class. Robbins arranged for theatre professor Jewel Walker to come to Lewes as a guest lecturer for one of the classes. Walker, though he recently retired from the University, returned to direct *Our Town* and also played the part of the Stage Manager in the play. Walker is a nationally renowned movement and acting teacher and was an instructor in the University of Delaware’s Professional Theatre Training Program (PTTP) for more than 25 years. He was named UD’s Edward E. and Elizabeth Goodman Rosenberg Professor of Theatre.

In addition, the Lewes class traveled to Newark to see the play where they were treated to a prologue by REP dramaturge Richard Davison. The Ramages got the REP involved in their classes last year as well, beginning a win-win relationship, according to Gary Ramage. “We had two sets of actors come down and participate in previous classes,” he said. “The first was so well received that for the second visit, we moved the class to a large auditorium and opened it up to everyone in the Osher Lifelong Learning program.”

The actors’ visits to the class enriched the learning experience, and the REP gained many enthusiastic new audience members. Of Jewel Walker’s visit, Ramage said, “Jewel was simultaneously directing the play and performing the part of the Stage Manager. As a director, he had a broader and more comprehensive view of the play than he might have had if he had only been acting in it. He also gave samples of dialog and examples of the flow of the play by ingeniously slipping in and out of his Stage Manager character.”

The Thornton Wilder experience was enriched even more for the Osher class. In doing their research for the class, the Ramages discovered the Thornton Wilder Society, and through them made contact with Thornton Wilder’s nephew, Tappan Wilder. Gary Ramage said, “Tappan was very agreeable to setting up a Skype session with the class, a first for us.”

“Jewel Walker’s visit, our trip to the theatre and our Skype session with Tappan Wilder all really enriched the class’s appreciation for Thornton Wilder as a playwright and an author,” Ramage said.

Program matches students with Southern Delaware’s Guatemalan residents

BY ARTIKA RANGAN

In a unique new program that builds on the University of Delaware’s storied history of study abroad and its growing presence as a Citizen University, a small cohort of students immersed themselves in the Latin American culture without ever having to leave the state. Through “Global at Home: An Alternative Semester Abroad,” 10 students from across the University were enrolled in anthropology, political science and Latin American studies courses taught entirely in Spanish by bilingual professors, as well as a geography course, taught in English, that took them to Southern Delaware six times over the course of a semester to get a firsthand account of the social, economic and political issues faced by the many Guatemalan residents of Georgetown. A lot of schools have service learning and almost every school has study abroad, but ‘Global at Home’ is about showing the true international character of Delaware,” said UD Latin American Studies Program director Persephone Braham, who helped establish the inaugural program. “Families who have been here many years, often doing the ‘invisible work,’ are opening their homes to our students.”

SUSSSE COUNTY ‘STUDY ABROAD’

The Latino population of Sussex County has grown rapidly over the past 20 years, from a few thousand to tens of thousands. Though these migrants come from many different countries, the largest percentage are from Guatemala. Fleeing the violence of civil war there, and attracted to jobs opening up in the poultry industry in Southern Delaware, the first wave of Guatemalan immigrants arrived in Georgetown in the late 1980s, many as political refugees. Since the latter 1990s, however, most of the Guatemalan immigrants coming to Delaware have been escaping desperate poverty and seeking opportunities for themselves and their families.

Working alongside April Venes, an associate professor of geography whose ethnographic research centers on
how the Guatemalan immigrant community of Southern Delaware is defining and creating home, the “Global at Home” students participated in service-learning projects and homestay weekends to learn about the concerns and experiences of Latino residents and the impact of “Latinization” on the small towns here. Their service-learning projects were sponsored by a variety of community partners, and the students were placed in one of three agencies, where their duties included: creating multimedia “Stories of Home” with the Latino children from North Georgetown Elementary School who attended an afterschool program at La Casa/First State Community Action Agency, collecting and translating information for clients at the Murphy Immigration Law firm, and working with adult Latino students from La Casa Esperanza who are practicing their English language and computer skills with resources made available to them at the Georgetown Public Library.

Through “Global at Home,” the students also spent three weekends with the families. UD reciprocated the hospitality, inviting the families to spend a day in May on the main campus in Newark.

The students noted recurring themes amongst their host families—language barriers for the parents, Americanization in the children and a persistent sense of living out of two worlds. This was clearly illustrated for senior Katie LaFleur, an international relations major from Cherry Hill, N.J., when the family dined at Dominos in Newark.

“The enthusiasm was apparent in the faculty, as well. For example, Guzmán Montero designed an on-campus service project in which her 20 anthropology students prepared a radio program on one of five topics—migration, gender, race, politics or human rights—to air on the Spanish program, “Latinoism,” on UD radio station WVUD-FM. The assignment required students to write the script, select the music and run the program in Spanish. In addition to their coursework, all “Global at Home” students participated in excursions, such as a day trip to New York, where they visited the Museo del Barrio and watched the Spanish play La vida en los Eealos Unidos (Life in the United States). They also attended a conference on Latino issues.

“EXPANDING GLOBAL AT HOME”

Marion Bernard-Amos, former assistant director of the Department of Foreign Languages and Literatures’ study abroad program and current program coordinator for the Confucius Institute, developed the idea for “Global at Home,” as a way to build a learning community in the state. And that, said Venes, is the hope for the students, “to actively contribute to these households through friendship.”

“The classroom component”

In addition to their experiences in Southern Delaware, the “Global at Home” students were enrolled in three courses on the main campus, taught entirely in Spanish:

- Grupos y Culturas de América Latina, taught by anthropology professor Carla Guzmán Montero. Problems of Politics of América Latina, taught by political science and international relations professor Julio Carrión; and Culturas y Civilizaciones Latinoamericanas, taught by Braham.

The courses, open to the larger University community, were filled to capacity with students on the wait list before the semester even began.

“Here we are in this quintessentially American pizza place, huddled together deciding what to eat, and after we picked our toppings, the mother, who speaks no English, hands her son the money to order it all instead of doing it herself,” she recalled. “It was a bite of a culture shock for me,” added LaFleur, who studied abroad in Spain but herself, “It was a bit of a culture shock.”

“A lot of schools have service learning and almost every school has study abroad, but ‘Global at Home’ is about showing the true international character of Delaware.”

— Persephone Braham, UD Latin American Studies Program director
Agriculture is an $8 billion industry in Delaware, according to a recent study published by the Department of Food and Resource Economics in the University of Delaware's College of Agriculture and Natural Resources.

The study—conducted by UD faculty members Titus Awokuse and Tom Ilvento, with help from graduate student Zachary Johnston—used input-output analysis, taking into account the market value of products sold from on-farm production, revenue from processing and manufacturing of agricultural products, and inter-industry linkages to determine the value added to the economy. A study of this magnitude had not been conducted since the early 1980s. According to the authors, this new report is much more accurate in its calculations for the true impact of agriculture in Delaware.

Historically, $1.1 billion has been the most commonly cited number for the impact of agriculture in Delaware. "But this is the total market value of agricultural products sold at the farm level, just a small piece of the picture," according to Awokuse, associate professor and director of graduate studies for food and resource economics.

The new report shows that the processing of farm products adds a previously unaccounted for $3.8 billion. Forestry production and processing add an additional $831 million, with agriculture-related services (i.e., crop dusting, ditch digging) adding $28 million.

The research project was commissioned by Robin Morgan, dean of the college. "This study was needed because the impact of agriculture in Delaware is much larger than farm receipts and (the impact) should account for processing of agricultural products. Agriculture is a large and vital part of Delaware's economy, and our understanding of its impact needs to be as accurate as possible," said Morgan.

In addition to the total industry impact, the report provides separate results by county and for several key agricultural commodities: poultry, dairy, fruits and vegetables, corn, soybeans, wheat, greenhouse, nursery and horticultural products.

"Agriculture plays a major role in Delaware's economy," said Danielle Quigley.

With Delaware's long history of poultry production, it was no surprise to the authors that the majority of the economic value of agriculture comes from the production and processing of poultry products, with an industry output of $3.2 billion and over 13,000 jobs.

The report also provides a summary of statistics relative to the changing face of agriculture in Delaware, noting there are fewer farms in Delaware, but the size and productivity of farming operations has increased over time.

Awokuse noted that this trend is in large part because "both technological and biological innovations within agriculture now allow a single operator to be more productive and maintain a larger operation, hence the consolidation of farms across the state."

And, according to the authors, the state of Delaware agriculture will continue to change.

"Farmers are being asked to produce more on less and less acreage and they turn to science and technology to make that happen. Agriculture is a modern, efficient, technologically advanced industry, even if the image is still rooted in a 19th century image of farming," said Ilvento, professor and chair of the Department of Food and Resource Economics. "Changing that image, assisting farmers to find modern solutions and promoting the importance of agriculture—that's what our college is all about."

The report was presented to Gov. Jack Markell and Delaware Secretary of Agriculture Ed Kee by UD President Patrick Harker and Morgan during a ceremony March 23 on the Newark campus. "Farming and related agri-business generate tens of thousands of jobs and my job is to help keep our agriculture industry strong and growing," said Markell, with Kee noting that the study is important not only because it provides new data and information, but also because "behind every statistic, behind every piece of data, is a person." He thanked those involved in the study for capturing that human story by capturing the value of the industry.

The report can be viewed online at ag.udel.edu/deagimpact/index.html.
A diverse team of plant scientists in the University of Delaware’s College of Agriculture and Natural Resources is working together to battle downy mildew, a potentially devastating disease that strikes lima beans, one of Delaware’s most important vegetable crops.

Tom Evans, professor of plant pathology in the Department of Plant and Soil Sciences, and many graduate students have studied downy mildew over the past 15 years. Evans said lima beans are vital to agriculture in Delaware and are “the cornerstone of the state’s processing vegetable industry.”

Approximately 6,000 hectares of baby lima beans are grown annually, with a farm value of over $6 million. Downy mildew, caused by the fungus-like organism Phytophthora phaseoli, is prevalent in Delaware because it thrives in humid conditions, and lima beans are grown on small, dense acreage.

Evans said that most lima bean growers are concentrated in close proximity from Dover to Georgetown and from the Delaware Bay west into Maryland, so wind-driven rain makes it easier for the pathogen’s sporangia to move from one lima bean field to another. That was the case in 2000, when downy mildew caused $3 million damage in what Evans called “the largest downy mildew of lima bean epidemic ever recorded.”

Two factors contributing to this epidemic were the emergence of a new race of the pathogen, Race F, which overcame the genetic resistance of lima cultivars being grown, and frequent wind-driven rain that spread the pathogen’s sporangia.

With the emergence of Race F, growers could no longer rely on downy mildew resistant lima bean cultivars to prevent the disease, as they had in the past. New cultivars with resistance to Race F need to be developed and in the meantime growers have relied upon fungicides to manage the disease.

Bob Mulrooney, UD Cooperative Extension specialist in plant pathology, has tested fungicides for effectiveness against downy mildew for a number of years and has identified new more environmentally friendly fungicides to manage the disease.
benefiting beans

Kunjeti, Nancy Gregory, From left, Sridhara Gupta lines with resistance to both races this summer.

field screening, Evans and Ernest plan to test lima bean between resistant parents followed by several years of
the resistance genes are inherited. After making crosses
ware farmers. Ernest and Evans work together screen-
Research and Education Center in Georgetown, breeds
pathogen in culture for field and greenhouse experi-
search results are the basis for growers' current downy mildew management practices.

Evans and his group have been responsible for studying the biology of the pathogen, monitoring the evolu-
tion of new races of the pathogen and the epidemiology of the disease.

Extension associate Nancy Gregory diagnoses the disease on samples sent in by growers, maintains the

“In order to fight the disease, you have to know your enemy, and the more you know your enemy, the more equipped you are to tackle it when things like a new race emerge.” — Nicole Donofrio, assistant professor of plant and soil sciences

pathogen in culture for field and greenhouse experi-
ments, and determines their races.

Emmalea Ernest, an extension associate at the Carvel Research and Education Center in Georgetown, breeds lima bean for desirable traits, such as disease and drought resistance, and is developing cultivars for Dela-
ware farmers. Ernest and Evans work together screening lima bean germplasm from around the world for resistance to races I and F of P. phaseoli.

Ernest has conducted experiments to determine how the resistance genes are inherited. After making crosses between resistant parents followed by several years of field screening, Evans and Ernest plan to test lima bean lines with resistance to both races this summer.

Nicole Donofrio, assistant professor of plant and soil sciences, is responsible for the pathogen side of the study trying to understand the pathogen’s virulence mechanisms, and how it evolves to attack certain aspects of the plant. Donofrio said, “In order to fight the disease, you have to know your enemy, and the more you know your enemy, the more equipped you are to tackle it when things like a new race emerge.”

Knowing exactly how to fight against the disease from a pathogen standpoint is difficult. Donofrio points out chemicals which offer good control. Mulrooney’s re-

UD students plant trees to sequester carbon

University of Delaware Professor Kent Messer and his students have started a project that aims to plant more than 55,000 trees over a 60-acre plot of land in Milford Neck—work that will result in the sequestration of an estimated 17,500 tons of carbon.

The team planted 5,000 trees during the initial week-
end in mid-April and, in addition to carbon sequestra-
tion, Messer said the trees will provide direct benefits for biodiversity and water quality in the region.

Messer, assistant professor of food and resource econo-

mics in UD’s College of Agriculture and Natural
Resources, jumped at the opportunity to have his stu-
dents gain valuable hands-on sustainable development experience while also providing a beneficial service to the environment.

“I want my students to not only learn in the class-
room, but also to get involved with environmental projects in the local community and region,” he said.

The Nature Conservancy, a conservation organiza-
tion aimed at protecting ecologically important lands and waters for nature and people, is leading the proj-
ect, with Astra Zeneca partnering. Additional funds are coming from the Regional Greenhouse Gas Initiative (RGGI), the first market-based regulatory program in the United States to reduce greenhouse gas emissions.

Knowledge Hackert, executive director of Delaware Wild Lands who was formerly with the Nature Conservancy, wrote the grant proposal for the project and said that because Delaware is part of RGGI, and because the Nature Conservancy is generally interested in reforest-
ing properties, it made sense to combine the two goals.

“The state has a grant program to reduce carbon, the Nature Conservancy wanted to grow trees to improve ecosystem health, so it was a wonderful, natural marriage,” she said.

As far as carbon sequestration goes, Hackert ex-
plained that trees are well equipped for the job.

“When a tree grows, it sequesters carbon,” she said. “The carbon comes out of the atmosphere and is used by the tree to generate fiber. As it grows, the tree is sucking out carbon from the air and soil, so it’s sequest-
ering carbon and removing it from the environment.”

The group will plant the trees in traditional rows, as well as in what they refer to as “habitat islands.”

Hackert explained that the trees’ vulnerability played a big role in the decision to use habitat islands, as did the fact that the group can plant fewer trees but still expect quicker and more effective reforestation.

“Little trees are vulnerable. They are susceptible to drought and flooding, deer over-browsing, so the Na-	ure Conservancy will use some of the typical planting of a row of trees, but will continue with some pioneering replanting methods called habitat islands,” she said.

The idea behind habitat islands is that instead of plant-
ing lots of small trees in rows, larger trees are purchased and those trees are planted in clumps around the property.

Messer said the Nature Conservancy and other groups have already had a great amount of success with habitat islands.

“I am impressed by the results of the Nature Conserv-
ancy’s habitat islands for restoring the health of forests and carbon sequestration,” he said. “By planting more mature trees in clusters, the result is faster reforestation overall.”

Messer said he is thrilled with the many beneficial as-
pects of the project, including the environmental ben-
efit for the public, the learning aspect for the UD stu-
dents and the fact that it will help offset climate change for future generations.

UD students plant trees to sequester carbon

BY ADAM THOMAS

University of Delaware

Dr. Jennifer Mulrooney, Nicole Donofrio, assistant professor of plant and soil sciences and downy mildew.
Last year, Norma Jean Fowler, then president of the Laurel Historical Society, inventoried 259 items in the society’s collection, labeling each and recording its description and the history of how it came to the society—a process museum professionals call accessioning.

This year, during eight days in January, a group of graduate students from the University of Delaware’s Museum Studies program accessioned more than 400 items in the same collection. Working under a grant from the Institute of Museum and Library Services awarded to the Delaware Division of Libraries, ten students, a professor and an independent consultant not only gave the small historical society a big head start on better organizing and preserving its collections, but they also set the stage for similar efforts at other such organizations.

In Laurel, the goal is to create a complete electronic inventory of the collection, so that researchers and the community can use that database to find what they need.

“We’ve been trying to improve our record-keeping, and we were making progress slowly but surely, but these students have given us a real jump start, and we couldn’t be more grateful for the help,” Fowler said on the final day of the project. “They’ve given us a great foundation to build on, and they’ve even found things that we didn’t know we had. This will enable us to capture and document the stories behind the objects.”

Established 30 years ago, the historical society didn’t have a home for the first 20 of those years, instead moving its collection from one storage space to another. Now located in the historic Cook House on Market Street in the town’s historic district, it relies on dedicated volunteers and is open to the public only...
on a limited basis in the summer months, although Fowler said she’d love to see expanded hours in the future.

The society’s collections are extensive and varied, from hand-made flapper-era dresses to old balance sheets from the town’s bank to peach baskets used by the local fruit-packing plant. All the objects reflect the history of a town that was once the third-largest municipality in the state and today boasts 800 homes on the National Historic Register.

“We found that the collection gave a real sense of what life was like in Laurel in the past,” said Katherine C. Grier, professor of history and director of the Museum Studies program, who oversaw the students’ work. “The thing that was so great about this inventory demonstration project is that it was a ‘blitz.’ We called ourselves the ‘Inventory SWAT team’ because of how much we did in just eight days.”

The students, all pursuing master’s or doctoral degrees in history, performed a variety of tasks. Those included sorting the items in the museum’s clothing collection, making cloth labels for the pieces that were able to be preserved and hand-sewing the labels onto an unobtrusive spot on each garment.

“We worked with more than 100 pieces of clothing and accessories that we determined could be displayed,” student Retz Monroe said. “Most were from the late 1800s or early 1900s, and all of them were local—either homemade by Laurel residents or sold in Laurel stores. There were party dresses, a two-piece men’s bathing suit, lots of hats … just so much variety.”

Members of the “SWAT team” who worked with wrote on the blog for the project. “There is no substitute for handling collections and for making decisions in a setting where the constraints are real: limited time, funds and space.”

The grant that funded the project came about after a national study found that 80 percent of small museums lack systematic records of their collections, which are in danger of falling into disrepair. The Laurel project, which will enable the historical society to enter its inventory into a database called PastPerfect, can serve as a demonstration of one way in which other small organizations could begin to better organize and preserve their holdings, Grier said.

Kevin Impellizeri said. “But it was a great experience. I didn’t know what to expect, but I probably never would have expected to be vacuuming mold,” student Kevin Impellizeri said. “But it was a great experience. It’s good to really understand the nuts and bolts of the process.”

Grier said the jobs were organized to give each student as much variety as possible. “It can be difficult to get hands-on experiences in collections, and this project is providing a lot of them!” she said, explaining that his sights are now set on graduate school. “Now I understand what research really is.”

Murray was one of 26 participants in the four-week summer program on the UD campus, which is in its second year and is aimed at giving students from Historically Black Colleges and Universities (HBCUs) and other institutions the tools they need to apply for and be successful in graduate school.

The program is funded by a $213,000 grant from the National Nuclear Security Administration and the Educational Advancement Alliance (EAA). EAA is a nonprofit organization that provides programs to supplement and enrich the educational environment and experiences of students in the School District of Philadelphia and beyond.

The organization’s focus areas are science, technology, engineering and mathematics (STEM). “The program design focuses on creating an immersion situation that is similar to the experiences that a first-year master’s student might have—both with class structure and outside class activities—so that when participants get to grad school they know more of what to expect,” said Michael Murray, attending graduate school was nothing more than a faint idea. Applying for a provisional patent on an invention he helped create was even further from his mind. That all changed after the computer science major participated in the 2010 Educational Advancement Alliance/University of Delaware Graduate Preparatory Program.

“I have never really discovered the desire that I have for research until I went through this program,” he said, explaining that his sights are now set on graduate school. “Now I understand what research really is.”

During spring semester, another group of museum studies students, working under the same grant, helped organize the archives at Auburn Heights Preserve, a new state park in Yorklyn, Del.
“I really appreciate having this opportunity because it made me think of other things to do than just med school and dental school.” — Breaunnah Bloomer

Vaughn, senior assistant dean in UD’s College of Engineering and program principal investigator.

Organized by the College of Engineering, the program puts students through a rigorous schedule. They took courses in calculus and chemistry and biochemistry, as well as modules in graduate prep, technical writing, professional etiquette and career exploration. They also participated in STEM research team projects, which culminated in their producing PowerPoint presentations and writing research proposals articulating what they had learned.

A DEEP-SEA INVENTION

It was through the team project that Murray and his collaborators, biology majors Brianna Hayes, a rising junior at Lincoln University in Missouri, and Danielle Johnson, a rising sophomore at Howard University, found their names on a provisional patent.

The group’s topic was hydrothermal vents, and it ignited their imaginations. They realized that the chemical energy of the deep-sea geysers’ super hot, mineral-rich water could be harnessed to power research on the gushers.

At the urging of Karl Booksh, professor in UD’s Department of Chemistry and Biochemistry who taught the chemistry and biochemistry course module, the group determined a way to use the vents’ chemical reactions much like a battery by placing electrodes inside and near the fissures.

“There’s so much interest in understanding these vents, and my experience with them is that they’re definitely has its perks. Fishing, beaches and cool bay breezes can make for an idyllic way of life. But members of the Kent County community can tell you that living by the water is not always a carefree existence.

On Mother’s Day in 2008, the Delaware Bay coast of Kent County suffered a serious coastal flooding event. One person died and at least 150 residents were evacuated from their homes. Cost estimates of the damage ranged from $1–2 million. Not only were community members unprepared for the event, but emergency management officials had no accurate gauge as to how serious the flooding would be, and thus their response was delayed.

The aftereffects of the Mother’s Day flood left citizens and emergency management officials alike wondering if there was a better way to plan for these types of events. Two state agencies, the Delaware Emergency Management Agency (DEMA) and the Delaware Department of Natural Resources and Environmental Control (DNREC), collaborated with the University of Delaware and the Delaware Geological Survey (DGS) and found an answer in the Delaware Environmental Observing Systems (DEOS).

UD, state work together to mitigate coastal flooding

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UD, state work together to mitigate coastal flooding
able to validate the information, as well as the outreach connections to ensure that critical users are familiar with the system and know how to access it," he says.

The coastal flood monitoring system was established primarily for emergency personnel in Kent County as an early warning system for coastal flooding events. John A. Callahan, a research associate for DGS, and Kevin Brinson, a researcher for DEOS, launched a prototype forecast notification system and website displaying pertinent information regarding local water levels. DNREC and the Delaware EPSCoR program provided funding for the project.

According to Brinson, "The system obtains information from the National Oceanic and Atmospheric Administration’s (NOAA) National Weather Service and then applies that information in a graphical format to estimate or predict when flooding can potentially occur in Kent County communities.”

The website allows users to choose from six different locations in Kent County: Leipsic, Little Creek, Pickering Beach, Kitts Hummock, Bowers Beach and Slaughter Beach. Emergency management officials or private land owners are able to view the website and get specific information about current and forecasted water levels in their area.

"Something that is also nice about the site is you can change the transparency of the flood data overlay to give you a better look of where those potential flood issues are on the street map or satellite view," says Callahan.

Also available on the site is a graph of forecasted water levels up to four days in advance, including the maximum forecasted water level in that time period. This can be helpful to emergency management officials if they know that certain communities will be flooded at a particular water level.

In connection with the tide graph and inundation maps are road elevation profiles. These profiles allow users to view potential flooding points along the main roads or evacuation routes of their communities.

Perhaps one of the most important and useful features of the system is its ability to send emergency management personnel an email or text message warning them of a potential flood in their community.

“That email will tell them that at sometime in the next four days the water levels at this location will reach or exceed a certain level,” explains Callahan. “In that email or text message, it will state the forecasted water level and time it might occur. It will also direct them to this website and encourage them to start preparations for a potential flooding situation. The website is meant only for guidance, not to remove emergency managers from the equation.”

This feature, in particular, may help emergency management officials and community members alike be more prepared for coastal flooding events, giving people a chance to protect their property and possibly saving lives.

The future looks bright for the coastal flood monitoring system, as Kent County emergency officials will soon undergo more detailed, formal training regarding the system. Although it’s still in the beginning stages, DGS and DEOS have received further funding from DNREC to expand the system along the coast north to the city of New Castle and south to the city of Lewes.

DNREC believes that the newest phase of this project will be just as successful as the initial, due to similar coastal geography. According to Scarborough, future plans also include further expansion into the Inland Bays area of Sussex County and into the northeastern Piedmont area of New Castle County. Though the hilly topography of northern Delaware will create a whole new set of complications and necessitate upgrades to the system, the state and the University have proven that together they can come up with innovative solutions.
70 YEARS OF Service

CARVEL RESEARCH AND EDUCATION CENTER: By Michele Walfred

In the lobby of the University of Delaware’s Elbert N. and Ann V. Carvel Research and Education Center in Georgetown, the warm and welcoming smiles of Delaware’s former Governor and Mrs. Carvel have been greeting visitors since 2006. The Carvels’ life-sized portrait serves as a public reminder of the Carvel family’s generosity, affection and commitment to Delaware citizens and agriculture. That tradition of service remains a constant with the 52 full-time employees of the center who carry out the center’s mission to make a difference in the lives of Delawareans.

The Carvel facility’s 26,000 square feet of office, labs and classroom space, is surrounded by 344 acres of agricultural research land, and the adjacent Lasher Laboratory, a world-class poultry diagnostic lab. In addition, the Carvel Research and Education Center (REC) is home to Sussex County Cooperative Extension, whose agents and volunteers deliver university-based knowledge to a diverse group of people. Cooperative Extension, whose agents and volunteers deliver university-based knowledge to a diverse group of people.

In addition to these well-known Delaware crops, new trials are underway to expand market opportunities with seed onion, blueberries, blackberries and wine and table grapes. Johnson is keen to explore the potential of new varieties and cultural practices that could help farmers extend beyond Delaware’s summer range and produce fruits and vegetables that can grow from spring until fall, and successfully overwinter.

How we use water matters,” said Adkins. “We are looking to improve irrigation efficiency.” Adkins says that too much irrigation can adversely influence crop yields and waste water. Likewise, too little irrigation reduces yields and can concentrate nutrients in the soil that may affect watershed quality. In workshops, growers learn their local soil characteristics and the most effective way that plants can maximize the utilization of the applied water and improve nutrient use efficiencies.
A blizzard or two blows in

Water quality was one of many issues that Bill Brown had placed on his agenda when he accepted the position of poultry extension agent in February 2010. Brown had spent most of his life as a poultry grower and 21 years with Perdue Farms, where he served as flock supervisor, ventilation specialist, hatchery manager, poultry housing specialist, area supervisor and grow-out manager. Armed with enthusiasm and a lifetime of knowledge to share, Brown was ready to hit the ground running. But he had not exactly planned on wearing snow boots!

With barely enough time to unpack in his new office and remember his new email password, Brown and the Delmarva poultry industry were hit with back-to-back historic winter storms. Immediately, the integrity of poultry-house construction was pushed to the top of his agenda, as several structures fell to the weight of the record snowfall. Since then, Brown has traveled the region providing valuable construction advice to growers.

As state Extension agent, Brown serves a large constituency of individual poultry growers and businesses who have a stake in what is the largest economic driver in the region. Although poultry is the mainstay of Delaware industry, contributing $3.2 billion dollars to Delaware economy, the industry faces many challenges in public perception. Brown provides assistance for growers to navigate through proposed and pending legislation regarding nutrient management and environmental issues, controlling energy costs, and maintaining Delaware’s lead in bio-security diligence.

“I am eager to let the people know what this industry has done to contribute to the general welfare of the people in the Delmarva region,” said Brown. As Brown looks to the future, he is eager to encourage 4-H and FFA youth to consider a career in an industry that contributes so much to the area.

In March 2011, UD presented a comprehensive study, Impact of Agriculture on Delaware’s Economy, to Delaware Gov. Jack Markell. The report determined that agriculture and related industries generate $7.5 billion for Delaware. “Agriculture is important to our economy and important to our future,” said Markell, upon receiving the study.

Many decades ago, Governor Carvel anticipated Delaware agriculture’s prosperous future and invested in it. The Carvel family’s vision continues to significantly contribute to its success story. The Elbert N. and Ann V. Carvel Research and Education Center, its dedicated staff, cutting-edge research and outreach mission ensure that the beneficiaries of Delaware agriculture are fully realized.

Free marine research tours offered through the summer

For anyone intrigued by the ocean or interested in a marine science career, a free tour of the University of Delaware College of Earth, Ocean, and Environment’s (CEOE) research complex in Lewes is the perfect summer activity.

Tour topics at the Hugh R. Sharp Campus include a broad variety of issues and solutions in marine and coastal environments.

Tours begin with a 15-minute video showcasing ways in which CEOE and Delaware Sea Grant researchers explore the coastal environment in Delaware and throughout the world. Next, guides lead a walking tour of the research buildings, often including stops at the greenhouse, local fish and tropical reef tanks, as well as multiple posters and exhibits.

In the two-hour tour, led by UD’s docent guides, the discussion is tailored to the interests of each visiting group, which may include kids ages 10 and up.

Tours take place from June until early September —at 10 a.m. on Fridays in June and on Tuesdays and Fridays in July and August. To reserve a place, call 302-645-4346, no later than noon the day before.

A healthier place

Delaware Estuary sees dramatic water quality improvements

The Delaware Estuary was so unhealthy in the 1940s that in some areas it completely lacked oxygen and was largely void of aquatic life in the summer. Its low oxygen levels and the production of hydrogen sulfide turned white ships grey, and its severe rotten egg odor even threatened its use as a port.

The estuary today, by comparison, is a much healthier place. In fact, research published by Jonathan Sharp, University of Delaware professor of oceanography in UD’s College of Earth, Ocean, and Environment, in the March 2010 issue of the journal Limnology and Oceanography documents that the Delaware Estuary has seen one of the most dramatic improvements of water quality of any river worldwide.

The research, based on about 100 years of data on oxygen levels, also paints one of the most complete pictures of an estuary’s demise and recovery available. Not only did Sharp analyze data from his own research sampling, which he’s done multiple times each year since 1978, he also looked at Delaware River Basin Commission’s water monitoring stations going back to 1967. Less consistent data from other sources such as the Philadelphia Water Department and anecdotal sources such as newspaper articles provided perspective on the earlier years.

Together this information shows an estuary that for decades was pumped with municipal and industrial wastes, including raw sewage put directly into the river. The sewage caused outbreaks of disease such as...
Rain garden features native plants, removes pollutants

The latest landscaping effort at the University of Delaware’s Hugh R. Sharp Campus in Lewes isn’t just easy on the eyes. It’s a demonstration rain garden—a shallow depression in the landscape designed to collect and clean stormwater runoff.

“It’s a way of us, either a homeowner or a business or a university, taking responsibility,” said one of the garden’s creators, Joe Farrell, resources management specialist with the Delaware Sea Grant College Program.

The rain garden, which contains plants native to Southern Delaware, helps to remove pollutants from stormwater as it drains off of a large parking lot on the campus. By filtering the runoff, the garden keeps contaminants out of nearby streams, bays and the Atlantic Ocean, ultimately providing healthier waterways for wildlife and people.

In addition to helping the environment, the project will serve as a demonstration site for anyone wanting to learn more about rain gardens.

—By Elizabeth Boyle

Professor wins Lifetime Achievement Award

Jonathan Sharp, professor of oceanography in the College of Earth, Ocean, and Environment at the University of Delaware, has received a Lifetime Achievement Award from the Partnership for the Delaware Estuary.

The award was presented during the organization’s Fourth Delaware Estuary Science and Environmental Summit held Jan. 30–Feb. 2 in Cape May, N.J.

The award, the first of its kind given by the partnership, honored Sharp for dedicating his career to the health of the estuary.

In presenting the award, Jennifer Adkins, executive director of the partnership, said that Sharp is “without a doubt one of the top scientists in the Delaware Estuary.”

She cited his more than 30 publications specifically about the Delaware River and Bay system, which have appeared in the pages of numerous journals, including Estuarine and Coastal and Oceanography.

In the past few years, Sharp has completed two large overview papers based on his long-term research in the Delaware Estuary, she added.

While his research has played a critical role in water quality regulation in Delaware, his work has had broad influence as well. He has developed international standards for dissolved organic carbon to better and more accurately determine global and long-term levels of the water quality indicator. Sharp also has been involved with international efforts to re-evaluate the phenomenon of eutrophication, in which a glut of nutrients leads to excess plant growth.

Meanwhile, across his career Sharp has mentored at least 22 advisees who have gone on to academic research institutions across the country as well as federal agencies such as the Naval Research Lab, state-agencies and private industry. Many of these students did their master’s or doctoral research on the Delaware Estuary.

“The work for which we are most appreciative at the partnership is, of course, his unwavering devotion to efforts to expand knowledge, understanding, protection, and restoration of the Delaware Estuary,” Adkins said.

“Dr. Sharp’s interest in the Delaware Estuary is not just about the science—it is about turning science into passion and action.”

He was a founding member of the partnership’s board of directors and its first chair and he continues to serve on its advisory committee today. He was also the founding chair of the group’s Science and Technical Advisory Committee and was instrumental in creating its guiding document, the “Comprehensive Conservation Management Plan for the Delaware Estuary.”

On receiving the award, Sharp said he was surprised and delighted with the great honor.

“I’ve continued along the interface between science and management on the Delaware Estuary because of the interested and dedicated group of individuals who are working in this area,” he said. “A diverse group from academia, local governments, state agencies, regional agencies, local federal offices, industry and the general public have been able to overcome different backgrounds and agendas to cooperatively develop plans and then start implementing them for an improved future for the Delaware Estuary. These plans have been based on local application of solid science with recognition of the multiple uses and values of the estuary. It has been a very rewarding activity.”


Jonathan Sharp accepts a Lifetime Achievement Award for dedicating his career to the health of the Delaware Estuary.

♦

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Jonathan Sharp accepts a Lifetime Achievement Award for dedicating his career to the health of the Delaware Estuary.

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Wild turkeys, once extinct in Delaware, have made a major comeback in the state after 34 wild birds were reintroduced in Southern Delaware in 1984. Wild turkeys, along with white-tailed deer, are revered as two major game species here in the First State.

Jacob Bowman, associate professor in the Department of Entomology and Wildlife Ecology in the University of Delaware’s College of Agriculture and Natural Resources, along with UD undergraduate and graduate students, are in the midst of conducting a three-year study funded by the Delaware Division of Fish and Wildlife on wild turkey and white-tailed deer populations in Southern Delaware.

The goal of the study is to be able to make sound recommendations to the state agencies, backed up by thoroughly researched science, on how to better manage deer populations in Southern Delaware.

The study involves a three-year phase, during which the group is studying wild turkeys and white-tailed deer. The group is currently in the second year of the study, which involves the monitoring of wild turkeys and white-tailed deer populations in the region.

Reproductive Ecology and Survival of Wild Turkeys

Bowman explained that the group studies wild turkeys in Sussex County, primarily in the field area surrounding Redden Forest in Georgetown, which provides ideal habitat for the animals. Most of the work is being conducted on private land and Bowman said “cooperation with landowners has been key to the success of this project. Nearly all of our captures, if not all of our captures, have occurred on private land. We’ve had overwhelming support for the project from landowners and everyone’s been very, very helpful in working with us.”

In order to obtain wild turkeys for the study, Bowman’s group uses a rocket net that carries over a flock. Once the turkeys are in the net, the group runs out to restrain the birds, put each one into an individual box that’s provided by the National Wild Turkey Federation, and then each bird is dealt with individually.

Bowman said, “Each bird is taken out of a box, certain measurements are taken, each receives two leg bands, and then if it’s an adult hen, we put a radio transmitter on it, a backpack transmitter that sits in the middle of the back and emits a signal that allows us to determine the location of that bird at pretty much any time.”

With the wild turkeys, Bowman’s group is looking at reproductive ecology and survival rates. Said Bowman, “In wild turkeys, hen survival comes out to be the most important factor in population dynamics, so whether the population is increasing, decreasing or staying in place depends a lot upon adult survival.”

Bowman pointed out that only male wild turkeys are hunted in Delaware, and they are only hunted in the spring, so hunting should have little to no impact on the survival rates in the study.

The first year of the study involved getting the group equipment and landowner access. The second year, the group started capturing and monitoring wild turkeys, so they’ve had a full year of monitoring nests and tracking adult hens through the year. They’ve also looked at young turkey survival, following them all the way from hatching.

This year, the group finished up the trapping phase on March 15, and Bowman said they “hope to be able to make recommendations to the state to better manage turkeys and to increase turkey numbers. In the area we’re studying, turkeys are doing fairly well, but there are some areas of Delaware that turkeys aren’t doing as well so we look at this as kind of a first step to understanding turkeys in Delaware.”

Movement and Survival of White-Tailed Deer

The white-tailed deer project is a little bit bigger than the turkey project, but it also focuses on the female population of the herd, since that can be used to better manage deer populations.

“‘With white-tailed deer, as opposed to turkeys, we’re more interested in reducing population levels instead of increasing population levels. So we’re trying to understand how they’re using different areas of public versus private land,’” Bowman said. “One of the concerns that people have expressed is that as soon as hunting season opens, the deer will either move onto private land or public land and somehow that provides a refuge from harvest.”

The problem when deer move on to private or public land is that they destroy local crops and can be detrimental to local ecology. Bowman said that for the best ecological results, it is important to maintain a balanced deer herd in Southern Delaware.

Bowman’s group tracks the animals very intensively from May until the end of January, so they can “really get an idea of how these animals are moving, how big their home range is and what areas they are using.”

To catch the deer, a member of Bowman’s team sits in a deer blind, mainly at night, and waits for deer to arrive in an area where the team has rigged drop nets. Corn is placed in the center of the area to entice the deer into the location and once the deer are in position, a member of the team releases the net. The group’s biggest nets are 60 feet by 60 feet.

Once the deer are caught, the group administers a sedative, and each animal is removed from the net. The group takes various body measurements before giving the deer a chance to awaken from the sedative and releasing it back into the wild.
If they trap an adult doe, it receives a radio collar, which allows them to determine the location of the deer. Occasionally, the team will use a dart gun, but Bowman said this is rare because it is less cost effective than the drop nets, which can catch multiple deer at a time as opposed to the one shot of the dart gun.

Because hunting season runs from Sept. 1 until the end of January, Bowman explained that “being able to better understand how deer are changing their use of habitats during the hunting season will help us better inform people on how to improve harvest rates, if that’s what we want to do. The opposite could happen down the road where we decide that we need to back off of harvest, and this same information will help us understand how we can best do that.”

With regards to hunting, Bowman said the area’s hunters have played an extremely helpful role in the study.

“Landowner interactions have been very important for us, and the agriculture community in Sussex County around where we have been working has been amazingly supportive, allowing us access to their land. We couldn’t do what we do without them.”

Bowman also stressed that for the study of deer, just as for the study of wild turkeys, landowner cooperation has been huge. “Landowner interactions have been very important for us, and the agriculture community in Sussex County around where we have been working has been amazingly supportive, allowing us access to their land. We couldn’t do what we do without them.”

Students involved in the deer study include Melissa Miller, a master’s student; David Kalb, a doctoral student; Caroline Jane Corday; Nicole Hengst and Holly Kline, all Science and Engineering Scholars in the College of Agriculture and Natural Resources, and Amanda Dunbar, a senior thesis student who worked on the project in the summer. There are also two full-time technicians working on the project. Students involved in the deer study include Melissa Miller, a master’s student, David Kalb, a doctoral student; Caroline Jane Corday; Nicole Hengst and Holly Kline, all Science and Engineering Scholars in the College of Agriculture and Natural Resources.

“All of these students live in Southern Delaware while conducting their extensive, hands-on field research. Those involved gain a great real-world research experience, while providing Delaware with much needed data to help better manage white-tailed deer populations.”

In fall of 2010, the University of Delaware expanded its age 50-plus lifelong learning program to Dover. Now in its second session, Osher Lifelong Learning Institute at the University of Delaware in Dover has more than 130 members and is offering 22 courses at the Modern Maturity Center.

“The Osher Lifelong Learning program has been a wonderful experience,” said Pat Hughes, who joined the program in the fall. “Besides the benefits of keeping the mind active, you meet some of the nicest people and have a great time, too,” continued Hughes. “And unlike undergraduate studies, you don’t have to worry about a final exam. It’s learning for learning’s sake.”

Carrie Townsend, the University program coordinator, echoed Hughes’ thoughts. “Learning for its own sake is at the core of this program,” she said. “Instructors volunteer to teach subjects that they are passionate about, and the students are there because they want to be—for pure enjoyment and enrichment.”

Designed as an educational cooperative, the program receives logistical and program support from the University of Delaware, but it’s the individual members who develop and implement the program locally, including the design and teaching of the courses and activities.

Don Blakey, retired from a career as a school administrator and educator at Delaware State University, is teaching “Swahili: The Language, People and Culture” this spring. He has designed the class so that the students get involved in actual activities they would experience in Africa, to both give them a flavor of the culture and to reinforce learning.

For a recent class, Blakey transcribed four songs in...
Golden Opportunity

Dover classes are held at the Modern Maturity Center, with a wealth of learning opportunities available.

Swahili, and found a recording of the songs for the students to hear. “We have taken photo tours, tasted African food and drink, all while using the proper Swahili words for the experiences,” he said. “I incorporate as many senses as possible. If you can feel it, taste it, smell it, you are more likely to learn it.”

Blakey was drawn to Osher Lifelong Learning by the concept of a fun, relaxed situation where people can experience a variety of subjects, “under no pressure.” Blakey emphasized, “The learning is genuine. Here the students are after the knowledge rather than the reward of grades. I don’t have to ask them to study.”

Blakey said that he values the opportunity the Osher Lifelong Learning Institute gives people who are out of the workforce and are now free to explore things they didn’t have time or opportunity for because of work or family.

Osher Lifelong Learning members who wish to do more than take classes may volunteer as instructors, or assist with membership outreach, special events or public relations. The program is self-supporting through a membership fee which covers the space rental and operating costs. Mickey McKay has taught at Osher Lifelong Learning in Dover both sessions and also is retired from a career as a university educator. About her class at Osher Lifelong Learning, “Political Landscape of the 21st Century,” she said, “I enjoy the students’ vast and varied experiences all coming together under the general outline I’ve set out. The people here have a broader view of the world and they have so much to add to the class.”

McKay is currently taking “Memoir Writing—Remembering Our Past.” She is conducting genealogical research on her family and wants to put the results down in a narrative format for her children.

Ila Beebe, another Osher student, is taking “Digital Photography and the Art of Seeing,” “Spanish for Beginners,” and “Time Out for Poetry” this session. “I do like to learn,” she commented. “I did the fall semester and liked it so I’m back for the spring. Now I’ve volunteered to do some public speaking to help spread the word about the program. It broadens your horizons and hopefully it keeps your mind a little sharper.”

Beebe mentioned that one of her favorite parts of the program is meeting a lot of new people in class. Many members of her “Memoir Writing” class from the fall semester found the experience so compelling that they continue to meet and read their writings to each other, even though the class is finished.

Classes at Osher Lifelong Learning take place Tuesdays, Wednesdays, and Thursdays. Each 10-week class meets once a week for an hour and 15 minutes, at Modern Maturity Center, 1121 Forrest Avenue, Dover. The modest membership fee (for 2010–11, $130 per semester, $210 for fall and spring semesters combined) includes three courses, other activities and benefits, and additional courses based on available space.

For more information about the Dover program, visit www.lifelonglearning.udel.edu/dover or contact Carrie Townsend at 302-734-1200, ext. 168.

Lewes declares Osher Lifelong Learning Day

BY NORA RIEHL ZELLUK

+++ The mayor and council of the city of Lewes proclaimed the date Dec. 13, 2010, as “Osher Lifelong Learning Institute at the University of Delaware in Lewes Day.”

Mayor James L. Ford III read a proclamation into the record, recognizing the program for its 20 years of growth in membership and volunteerism in Lewes, and the program’s contributions to the quality of life in the greater Lewes community.

The Osher Lifelong Learning Institute at the University of Delaware in Lewes is a membership organization open to those 50 years of age or older who are interested in joining a unique continuing education experience. Classes are held at the Lewes School and other locations in Lewes and Rehoboth Beach. There are no academic requirements for enrollment.

Bob Comeau, council chair of the Lewes Osher Lifelong Learning program, accepted the proclamation on behalf of the Osher program. “Like many other members, my wife and I joined the programs soon after we retired,” he said. “We wanted to continue learning and to make friends with others similarly inclined, and the program has more than met our wishes and expectations.”

Comeau added, “We enthusiastically ‘advertise’ the many volunteer opportunities in the community, and see familiar faces from Lifelong Learning in several of the other associations and grass-roots organizations to which we belong. It is an active community of individuals that regularly makes a positive impact on our community—and I think the community leaders agree, as the Lewes Mayor and City Council have demonstrated.”

Jim Brosnall, assistant provost for UD’s professional and continuing studies, attended the Lewes City Council meeting. “The University of Delaware and the town of Lewes enjoy a long-standing positive relationship,” he said. “This proclamation from the Lewes City Council exemplifies the spirit of respect and affection between UD and Lewes. It is greatly appreciated, as the Osher program in Lewes seeks to continue providing learning opportunities for the community.”

The Osher Lifelong Learning program was originally established in 1989 as the Southern Delaware Academy of Lifelong Learning, as part of the University’s Division of Continuing Education—now the Division of Professional and Continuing Studies. The program opened with 58 members; currently there are almost 500 members, with an average offering of about 50 courses per semester.

Anna Moshier is UD’s program coordinator for the Osher Lifelong Learning program in Lewes, and also attended the event.

“I am so proud to be a part of an organization which boasts such an enthusiastic and dedicated group of community members,” she said. “The lifelong learning program is very member-driven, so the proclamation is truly a recognition of their individual contributions.”

Members offer new course ideas, design and teach courses in their areas of interest, and serve as committee members. Instructors include both active and retired professionals in their fields, and expert hobbyists. Individual members can also just enroll for the semester, taking as many courses as they wish.

In 2010, the program’s name was changed to Osher Lifelong Learning Institute at University of Delaware in Lewes, to reflect affiliation with the network of Osher Lifelong Learning Institutes. Similar UD-Osher programs are located in Wilmington and Dover.
The University of Delaware Research Vessel Hugh R. Sharp is a handsome ship, and one specially designed to carry a wide range of scientific expeditions. Much like a modern freighter, the Sharp carries containers, these containing not consumer goods but interchangeable laboratories.

For this 24-hour journey, the Sharp carries a UD research team headed by Arthur Trembanis, assistant professor of geological sciences, and Douglas Miller, associate professor of oceanography, that plans to scan the seafloor and take bottom samples at several locations off the Delaware coast.

As the guests and scientific team come aboard, they are met by Bill Byam, director of marine operations in the University’s College of Earth, Ocean, and Environment, who is handling the Sharp on this voyage in relief of Capt. Jimmy Warrington.

Byam describes the Sharp, which is part of the University-National Oceanographic Laboratory System (UNOLS) and spends 180–200 days per year on the water with different science teams, as a “charter boat for science.” The crew had just returned from New York Harbor before setting out.

Docked at UD’s Hugh R. Sharp Campus in Lewes, the ship draws about 10 feet and must sail through Roosevelt Inlet on the high tide, thus the unusual—but spectacular—hour of embarkation. To the west, the summer sun is setting in shades of golden orange and a sea of cell phones are held aloft, clicking photographs of the coastline as the crew prepares to cast off.

8:15 pm As the Sharp pulls away from dock and gets under way, the science team and journalists meet in the dry lab for a safety briefing by Byam, who goes over the rules of the vessel and directs a hands-on lesson on the proper use of life preservers. He also takes note of the long period swells being kicked up by the remnants of Tropical Depression Colin and, for those who might get seasick, notes that Dramamine is available. And he insists that anyone spending time on deck—the work area is at the stern—don a fluorescent work vest.

8:45 pm Still in the wet lab, surrounded by a National Oceanic and Atmospheric Administration (NOAA) chart, cables and a computer screen, Trembanis and Miller discuss the work ahead. And it is mentioned that team members will be working through the night—not just into the night, but all night. Plans call for studies of the Pimple, a natural site about 16 miles offshore on the bottom of the Atlantic, a natural fishing area, and Artificial Reef Sites 9 and 11, the latter to check on the condition of subway cars and military vehicles sent to the sea floor to form a manmade reef.

“We will be using 18th, 19th, 20th and 21st century technology on this trip,” Trembanis says, adding that the simple dredge such as that which will be dragged behind the Sharp later tonight might have been used as early as the 4th century.

In addition to the dredge, which features metal teeth and a basket and is dragged on the bottom, the team will use a sampler that looks something like a lunar lander, and a bright yellow, black finned side-scan sonar tow device.

“The tow device is a 20th century technology,” Trembanis says. “It was developed around World War II and makes use of sonar (sound navigation and ranging) to scan the seafloor.”

Also deployed on the expedition will be an autonomous...
Monday, August 9

1:00 am Fatigue begins to set in—for some of us—with the rocking of the boat kind of like the rocking of a cradle. Below decks are comfortable berths for the science team, complete with pillows, sheets and a privacy curtain. Sleep comes in fits and starts, with the motion of the boat and the sound of the engine, which never really gets time to rest. The crew of the Sharp sleeps in shifts on a deck above.

Midnight For the moment, the researchers are getting images they can use, with the side scan sonar towed on its own cord. Miller describes the working of the side scan sonar device, saying it “acts like a flashlight going back and forth. If you are using a flashlight and then throw a handful of dust, you can’t see beyond the dust”—in this case, the propeller bubbles were the “dust.”

3:30 am With Miller overseeing the operation, the metal dredge is prepared to be sent overboard to drag the bottom and bring specimens to the deck of the boat for study.

4:15 am The seafloor proved nearly barren and little is collected—a small crab, a fish and a shell. Miller studies the material with Shayna Sura, a student at the University of Notre Dame, and Pat McLaughlin, a student at Villanova University. Both students are part of the UD College of Earth, Ocean, and Environment National Science Foundation Research Experience for Undergraduates (NSF REU) summer intern program.

5:30 am The side-scan sonar team continues to monitor the images sent from below.

6:35 am The yellow fish is pulled back on board. It is a gray and foggy morning off the Delaware coast.

7:00 am Now the fog is carrying with it a fine mist. Trembanis, along with doctoral student Nicole Raineault and master’s student Jonathan Gutsche, begin preparations to begin using the 21st century technology—the autonomous underwater vehicle. It bears a blue and gold sticker noting: “Harmless oceanographic instrument, property of the University of Delaware.”
7:05 am The computer makes contact with the shipboard AUV. Trembanis says the AUV has a sophisticated inertial navigation system (INS) such as that used on aircraft, submarines and spacecraft. Asked how the AUV will find its way back to the ship once its mission is complete, Trembanis jokes, “A trail of bread crumbs.” Above water, it communicates to the ship through wireless and satellite transmission. Underwater, data is transmitted wirelessly through an acoustic modem set over the side of the Sharp.

7:46 am The AUV is in the water, and begins a descent off the stern of the ship. It is off on a two-hour mission, after which a second mission will be uploaded.

8:50 am The sun begins to break through the fog. While the AUV is off studying the ocean floor, the science team begins taking samples from the bottom, about 28 meters below, using a grab sampler, which looks like a miniature Apollo lunar lander. It brings up rich, dark material filled with mudworms. Using a sifting pan as if panning for gold, Miller also finds a bamboo worm—so named because its segments have the appearance of the plant. Trembanis says the ocean floor here would have been dry land centuries ago, before the glaciers receded and melted, and the sea level rose. “This would have been like Cape May.”

10:00 am Standing in the relative cool of an air conditioned laboratory container, Trembanis explains that the team is using a variety of ways to look at and sample the sea floor to get a multidimensional view of what is down there. On deck, the team begins looking for the AUV, which has surfaced but in a slight fog. Soon it is spotted, the tiny conning tower in sight. A half hour later the Sharp has maneuvered into position to bring the AUV on board, to Miller’s applause. It will take about an hour to transmit data from the AUV to a computer, and to change its batteries.

12:52 pm After another round of preparations, Trembanis declares the AUV fit for a second mission. Graduate student Hilary Stevens says “drive little fish” as it submerges, and the sparkling gold fuselage goes shimmering green as it slips into the crystal blue waters, surprisingly clear given the proximity to the Delaware River and Bay. Trembanis says the research group is involved with applied technology—the actual use of the AUV in missions—and technology development—finding ways to advance the AUV.

3:10 pm As the biologists look at another sampling from the ocean floor, it is approaching time for the return of the AUV and off the port side, a distinct greenish glow can be seen from below and the AUV appears directly next to the ship. The recovery team has this down to a science—the AUV is back on deck in no time.

4:10 pm A toothed metal dredge is sent overboard to drag the bottom. After a 10-minute run, it is brought back on board.

5:00 pm It has been a long, hot day in the sun. Byam lets us know that it is a two-hour run from here to home, and we’re heading in on the tide. The cook prepares one last meal and about 6:30 it is “land ho” for the team. For the AUV, which has surfaced but in a slight fog.

8:00 pm The research team looks over the items brought up on the late afternoon dragging of the sea floor.

The research team looks over the items brought up on the late afternoon dragging of the sea floor.
school and lead of the Coastal Processes Research Group at University of Plymouth, called the upcoming study a “highly significant and timely” opportunity that will produce “novel science, first-class publications and improved modeling capabilities for predicting shoreline change.”

While in England, Puleo also plans to teach a short course for coastal science and engineering students on efficient use of MatLab, a common software package often used for analyzing coastal data sets.

**IN THE ‘SWASH ZONE’**

Most of Puleo’s research takes place right at the water’s edge—where kids skim board in the summer.

Scientifically, this is called the “swash zone,” the area where waves wash up and down the beach face. Understanding how sand moves here is pivotal to predicting swash zone sediment fluxes and ensuing beach erosion and accretion.

“The concentration of sand in the bedload layer varies constantly,” Puleo explained. Part of the problem is that current prediction models are only validated against sand activity higher in the water column rather than near the sea bed on beaches. There have been essentially no field studies on the quantity or mechanisms of sand movement in this thin layer.

Puleo’s sensors (only a few millimeters wide and about one millimeter thick) are mounted just above the surface of sand movement in this thin layer.

Puleo’s sensors (only a few millimeters wide and about one millimeter thick) are mounted just above the surface of sand movement in this thin layer. They measure the concentration profiles of sand directly in the pounding surf—and how the concentration varies as a function of elevation. Measurements in the study will be taken in millimeter increments, 24-hours per day over a seven-day period, while current sensors mounted on pipes record other important factors such as velocity and sea surface elevation.

These measurements, combined with the suspended sediment measurements of his colleagues from University of Plymouth and University of New South Wales in Australia, will provide a “grand master data set” of sand activity in the swash zone where coastal erosion processes are manifested.

“If we can collect better data sets, we can develop more robust parameterizations on sand movement and use numerical modeling to impact future coastal erosion prediction,” Puleo said.

“It is a real opportunity to record total sediment fluxes in the swash zone and relate these to measurements of the swash flow dynamics,” added Masselink.

Puleo is an associate professor in civil and environmental engineering at the Center for Applied Coastal Research at UD. He holds a joint appointment in the College of Earth, Ocean, and Environment in physical ocean science and engineering. Puleo joined UD in 2004 after earning his doctorate at the University of Florida. He previously was an oceanographer with the Naval Research Laboratory.
Junior Rockfish Cooking Contest
Winning Recipes

Amelia’s Devil Made Me Do It Stuffed Rockfish Fillets
By Amelia DiPietro, Timonium, Md.
7–12 Age Group

Rockfish Ravioli with Pesto Sauce
By Julie Ansorge, Olney, Md.
13–17 Age Group

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Winning Recipes

Junior Rockfish Cooking Contest

Rockfish Cook-Off
2011 Junior Chefs

Watch a video from the 2011 Junior Chef Rockfish Cook-Off

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Delaware Sea Grant water monitoring program celebrates 20 years

They converge off Florida’s Gulf Coast, filling the water with ghostly rouge-colored clouds, causing human respiratory irritation, and forcing the state to close shellfish beds. When the tiny, toxic plants associated with red tide showed up in Delaware’s Indian River Inlet in 2007—the first time they’d appeared north of Cape Henlras, N.C.—John Schneider knew the possible consequences.

“It’s nothing to mess with, that’s for sure,” said Schneider, who oversees the state of Delaware’s water resources management section and has faced red tide before in both Florida and North Carolina.

Thankfully, a ready team of staff and trained volunteers from the University of Delaware Citizen Monitoring Program took more than 100 water samples and supplied daily reports for two weeks after they initially identified the problem. That steady stream of information allowed the Delaware Department of Natural Resources and Environmental Control (DNREC) to provide the public with appropriate health advisories and to keep a close eye on the situation at little cost.

Though testing detected no toxin from the red tide phytoplankton, the event underscored the value of a stalwart group of staff and volunteers dedicated to watching our waters. For 20 years now, water quality monitoring volunteers trained through the UD- and Delaware Sea Grant-led program have fanned out across southern Delaware’s coastal region to visit assigned monitoring sites and collect data such as clarity and dissolved oxygen, harmful algae and bacteria levels.

In other words, they’re helping track what’s in the water to ensure safe swimming water, clean shellfish to eat and a healthy ecosystem.

Since the program’s inception, nearly 300 volunteers have contributed 25,000 service hours, an estimated $550,000 of donated time.

Delaware Sea Grant’s Joe Farrell, who helped start the program, and Ed Whereat, who currently runs it, have contributed 25,000 service hours, an estimated $550,000 of donated time.

“Water quality is a big concern of citizens here,” Wilson said. “They have these canals in their backyards, and the last thing they want is water that won’t support life.”

As Wilson suggests, being involved with the program also is about preserving quality of life. The volunteers live on the coast because they want to drink their morning coffee while watching an egret patrol the marsh or teach their visiting grandkids how to cast a fishing line, just like their dad did.

Degrade water quality, and so goes a piece of their happiness.

The retired engineer said it’s given him an appreciation of the things that affect water quality.

“It’s nice to make a difference, too. Monitoring in South Bethany recently helped trigger efforts to filter 65 acres that border Route 1 and drain directly into one of the area’s canals. The contaminated runoff contributes to low oxygen levels that can kill fish and other wildlife.

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Degrade water quality, and so goes a piece of their happiness.
The ocean’s powerful winds make the coast an ideal location for a wind turbine. Ironically, it’s that ocean air that presents a challenge to any turbine on or near the sea. The moist, salty air combined with a turbine’s metallic materials can result in corrosion, a destructive process able to bring any power-generating source to a halt.

Stephen Dexter, professor of marine biosciences in the College of Earth, Ocean, and Environment (CEOE), is working to address this threat to renewable energy production. He is overseeing a two-year, Department of Energy-supported corrosivity study at the site of UD’s wind turbine.

“One of the primary reasons UD constructed the 2-megawatt wind turbine in 2010 was to facilitate scientific study of specific issues with this renewable energy source,” CEOE Dean Nancy Targett said. “This is one of multiple projects fulfilling that purpose and one that could benefit Delaware’s pursuits in wind energy as well as those around the country and the globe.”

Studying corrosion has been a priority since the turbine’s inception. Dexter is an expert on the topic—he has extensively studied microbiologically influenced marine corrosion and is a well-known researcher in the field—and corrosivity is a critical concern for the wind industry. Understanding its impacts will lead to continuing enhancements to turbine reliability and to decreased costs.

“One of the major issues is the cost per kilowatt-hour,” Dexter explained. “The reliability of the turbine and how long it lasts depend on the corrosivity of the site and the corrosion susceptibility of the materials used in construction. Corrosion itself is not the only thing that goes into reliability, but it is a big factor, and it has a direct bearing on your overall cost per kilowatt-hour for power generated.”

The first phase of the project began in September, 2010, when Dexter placed steel samples at three locations around the Lewes campus. Two sets are right near Roosevelt Inlet, one at ground level and one higher up. Another is at the base of the turbine, about 1,150 feet farther back from the water. This spring, Dexter plans to place samples at a fourth location, the top of the turbine. Those samples will be deployed when two graduate students earn final certification required to ascend to the top of the 255-foot tower.

Each site has 12 samples of ordinary steel often used to study atmospheric corrosion. Dexter will pull three samples from each site every six months. The process will allow him to compare the levels of corrosion over time, at the various heights, and at different distances from the water. More importantly, it will allow comparison between the Lewes site and locations up and down the East Coast where similar research has taken place. This ability will benefit those looking to establish their own wind turbines elsewhere by helping them predict the corrosivity of their own location.

“The idea is to calibrate corrosivity and link it to factors that are common to the coastal environment,” Dexter said. “This way, all somebody would have to do is measure the air quality parameters of a given site anywhere in the world and make a pretty good guess as to whether their site is more or less corrosive than ours and what they need to do about it, if anything.”

A second phase of the project will look at the susceptibility to corrosion of the Lewes turbine itself and the electronic control systems inside of it.

For this phase, Dexter will use specially designed probes that will tell him in real-time when corrosion begins to damage critical working parts throughout the turbine. Each probe will simulate a particular turbine component. It will be made of the same material, and it will be placed right next to the turbine part of interest. The probe will work by monitoring the electrical current going through it over time—if the current for a certain voltage lessen, it tells Dexter corrosion has occurred on the probe and probably on the turbine component as well.
"The current just stays the same all the time you know it's OK, but if it starts to decrease then you know that that type of material in the turbine environment is getting some damage," he said, explaining that then turbine operators can either schedule maintenance or that component again when it needs it, or redesign it to be more durable.

That’s what this project is all about, Dexter said, taking steps to try and make a turbine more durable by dealing with corrosion.

“One of the primary reasons UD constructed the 2-megawatt wind turbine in 2010 was to facilitate scientific study of specific issues with this renewable energy source.” — Nancy Targett, CEOE Dean

The UD project began March 1, 2011, with spring and fall sampling periods focusing on birds and bats migrating through the area and summer and winter periods on resident bird and bat flight activity.

During each of the four seasons, the researchers will use a variety of techniques to collect data. Acoustic monitoring, visual surveys, radar and thermal imaging will provide information on bird and bat traffic and flight patterns. Spring and fall carcass searches around the turbine will help determine the fatality rate.

Local and regional weather data, which will help researchers understand bird and bat movement, will be provided by a nearby meteorological tower and the National Weather Service.

“We want to monitor how much bird and bat activity there is in the vicinity of the turbine so we have a context for how much risk there may be for them to collide with the turbine," said Buler, who specializes in using radar to track bird migration.

The scientists also want to know which birds and bats are moving through the area. Although the main focus is on migrating land birds and bats, other types of birds also inhabit the area near the turbine throughout the year. These include raptors, waders, marbled and shorebirds.

The team expects to have a final report of data and analysis completed by December 2013. They will present findings at technical meetings and publish them in scientific journals. The researchers also will share their bat data with Delaware State’s Kevina Vulinec, an expert on bat ecology.

For additional information on the wind turbine and other research projects in the works, see www.ceoe.udel.edu/lewesturbine.

“Ongoing CORROSION research at the University of Delaware's 2-megawatt wind turbine,” illustrated by Blaise Sheridan.

"I'm not really afraid of heights," Sheridan said. "But you certainly found that out when you were sitting on top of the nacelle.”

The trip to the top is to be the first of many for the students who are to facilitate turbine research by placing instrumentation used to gather data. During the recent accent they took measurements for steel samples to be measured for corrosion research and diagnosed a malfunction with a microphone being used in a bird and bat study.

The graduate students, who both have undergraduate engineering degrees, said being able to climb the turbine will benefit their future careers. Sewell, of Hobe Sound, Fla., is a master's student in the Physical Ocean Science and Engineering Program who is developing computer models of underwater forces on offshore turbine foundations. Sheridan, a native of Tucson, Ariz., is earning his master's degree in the Marine Policy Program and studying the environmental and social costs and benefits of wind energy. Sheridan is a College of Earth, Ocean, and Environment Magers Fellow this semester. “This will make them extremely well qualified to work in the wind power field, as engineers regulating the wind industry, or as engineers in the wind industry,” said Willett Kempton, professor of marine policy, who advises both students. “Not only are they learning the theory and basic principles, but also the very practical experience.”

Kempton reviews research on the turbine as research director of the UD Center for Carbon-free Power Integration.

UD Facilities technicians Rodney McGee and Don Smith also were certified to climb safely, and have additional training for assisting with maintenance operations.

While having trained UD climbers will benefit both students and the UD turbine research program, Kempton said the university plans to tap only a select number of students for the privilege due to cost and time involved with the training. The students and staff took three online training courses that covered first aid and safety regulations. Then they attended a two-day fall protection course where they learned additional safety measures and emergency procedures, and practiced using the turbine’s ladder, which is divided by several platforms so climbers can take breaks. Per regulations, at least two certified climbers must be on site for any access, but only one can use the ladder at a time.

By the day of their first climb, which the health and safety officer from the turbine’s manufacturer supervised, the students were equipped with the proper safety equipment (items such as a full body harness, hard hat, gloves and fire-rated clothing) and ready to go. “I don’t think you would get this anywhere else as part of a master’s degree, and let alone have a turbine on your campus,” Sheridan reflected. “This is quite incredible.”
Crab Cake Cook-Off Winning Recipes

**First Place**
Pan Seared Blue Crab Cakes with Pepper and Onion Jam

*Steven M. Ruiz, Wilmington, Del.*

**Crab Cakes**
- 2 pounds lump crab meat
- 1/2 cups mayonnaise
- 2 tablespoons Old Bay
- 1 tablespoon dry mustard
- 2 eggs
- 1/4 cup lemon juice
- 1 teaspoon Worcestershire sauce
- 1 teaspoon Old Bay hot sauce
- 1 cup Panko bread crumbs

**Pepper and Onion Jam**
- 1 teaspoon salt and pepper
- 1 cup olive oil
- 1 cup flour
- 2 red peppers
- 1 jalapeño
- 1 small white onion
- 1 jar of red currant jam
- 1 cup Panko bread crumbs
- 4 tablespoons red-wine vinegar

**Preparation Instructions:**
In bowl, place mayonnaise, eggs, Old Bay, dry mustard, lemon juice, Worcestershire sauce and Serracha hot sauce. Mix well.

In a separate bowl, take 2 pounds of crab meat, slowly add wet mix and 1/2 cup of the Panko bread crumbs. Fold together lightly then put out 4-ounce cakes. Place crab cakes on plate to coat with crumbs on plate. Gently.

**Second Place**
Sussex County Low Country Crab Cakes with Crabanero Remoulade Sauce

*Charles Parkhill, Millsboro, Del.*

**Crab Cakes**
- 2 pounds lump crab meat
- 1/4 cup mayonnaise
- 1 egg plus 1 yolk
- 1 tablespoon butter
- 1/4 cup fine-dined cayenne
- 1/4 cup fine-dined red and yellow bell pepper
- 1/4 cup shredded scallion
- 2 tablespoons minced parsley
- 1 tablespoon Worcestershire sauce
- 2 tablespoons course mustard
- 1 tablespoon Crabanero sauce
- 1/2 cup Matzo meal

**Pepper and Onion Jam**
- 1 tablespoon Crabanero brand
- 2 tablespoons course mustard
- 1 tablespoon Crabanero brand hot sauce
- 1 tablespoon minced capers

**Preparation Instructions:**
Saute peppers, celery and scallions in the butter until wilted. Turn off heat and add Worcestershire sauce and course mustard; toss, and allow to cool before proceeding with remainder of recipe.

Blend pepper mixture with mayonnaise, 1 egg plus yolk, Crabanero, mustard, and 1/2 zing. Pick the crab meat for shell or course mustard; toss, set aside and allow to cool before proceeding with remainder of recipe.

Drizzle mixture Gently. Allow to stand in cooler before you put out the crab cakes. Portion crab cakes out, form into 3-4 ounce cylinders.

Toss Panko crumbs with remaining scallions, scatter on plate or sheet pan, and place cylindrical crab cakes on plate to coat with crumbs on plate. GENTLY press remainder of scallion crumbs into flat top of crab cakes. Add remaining butter to a medium high heat skillet (do not overcrowd). Brown one side then the next.

**Remoulade Sauce**
Combine all ingredients well, set aside (best if chilled for 15-20 minutes). Garnish plate with lemon, 1 crab cake and remoulade sauce.

*Crabanero is the original bay seasoned habanero sauce located in Millsboro, Del.*

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**Crab cake WARS**

One of the highlights of the annual Coast Day is the gathering of the chefs, who compete for titles in the Crab Cake Cook-Off and the Chowder Challenge. So coveted is the Crab Cake Cook-Off prize that the 2010 winner, Steven Ruiz, was in his third competition and came back after finishing second in 2009.

The panel of three judges unanimously chose Ruiz’s “Pan Seared Blue Crab Cakes with Pepper and Onion Jam” as the winning entry. They raved about the recipe, saying it was a classic cake with spices that amplified the taste of the crab.

“It was beautifully balanced,” said judge Peter Mandelstam, president of Bluewater Wind. “The reason it won was the balance of the spices and the crab.”

Ruiz, chef de cuisine at Mari Grove, a retirement community in Glen Mills, Pa., chalked his win up to determination. “I use the same base for the crab cake and change the accompaniment,” he said. “Last year I did somthing a little more mild, and this year I went for something with a little more zing.”

Ruiz squared off against seven other finalists in the 21st edition of the contest. He received a $200 cash prize and a sterling silver serving plate.

Second place and $150 prize went to Charles Parkhill of Millsboro for his “Sussex County Low Country Crab Cakes with Crabanero Remoulade Sauce.”

Keith Starkey and Joe Joyce, both of Wilmington, took third place and $100 for their “Chesapeake Crab Cake.”

Other finalists in the competition included Carl Zampini of Newark, Pam Field of Rehoboth Beach, Crystal Macciari of Elkton, Md., Terri Carr of Lewes, and Jack Bartley of Lincoln University, Pa.

Judging the friendly competition along with Mandelstam were last year’s winner and Celebrity Kitchen chef Raymond Williams of Bear and Karen Falk of Coastal Cakes in Rehoboth Beach.

Coast Day guests also got a chance to try the winning soup in the Chowder Challenge. Prior to the event, members of the ACF First State Chefs Association held a competition among 10 of its members to determine which recipe they would serve.

The winning entry was created by William Stanton, president of the Delaware Technical and Community College Culinary Student Club. Stanton combined crabs donated by SeaWatch International, of Milford, with Red Bliss potatoes, butter, onions, celery, cream, Worcestershire sauce, parsley and garlic with one other very special ingredient—bacon—to produce a winner.

Coast Day is organized by UD’s College of Earth, Ocean, and Environment (CEEo) and the Delaware Sea Grant College Program.
Not even a rainy, gusty day could keep crowds from celebrating the University of Delaware’s 34th annual Coast Day last fall.

The event, sponsored by UD’s College of Earth, Ocean, and Environment (CEOE) and the Delaware Sea Grant College Program, was held Sunday, Oct. 3, 2010, at the Hugh R. Sharp Campus in Lewes.

“This is our opportunity to share what we do with you in a way that brings everything together in a single day,” Nancy Targett, CEOE dean and Delaware Sea Grant director, told visitors during the event’s opening ceremony.

The kickoff ceremony, like the rest of the day, was packed with activity. The Sierra Club presented CEOE with a check to support educational signs about UD’s new 2-megawatt wind turbine at the Hugh R. Sharp Campus, the City of Lewes celebrated its involvement in the Sierra Club’s Cool Cities initiative, and Targett honored the winners of the Coast Day video and essay contests for school kids.

Fitting with this year’s theme “Making the Most of Our Coast,” guests also had several opportunities—from lectures to interactive displays—to learn all about the new wind turbine, which operated at maximum power in the day’s strong winds and supplied all the energy for the event.

Throughout the day, hungry visitors stopped by the Chowder Challenge and Crab Cake Cook-Off competitions for a chance to taste contestants’ creations. Seafood lovers attended cooking demonstrations that taught them delicious recipes for fish, shrimp and sea scallops. They also had the opportunity to see two ice sculpture demonstrations of marine animal figures provided by the First State Chefs Association.

For more information about Coast Day 2011, taking place on Sunday, Oct. 2, visit the website www.decoastday.org or call 302-831-8083.

The marine critter touch tanks attract kids of all ages. Photo by Margaret Tossey
SOUTHERN DELAWARE RESOURCES

A guide to University of Delaware programs and services

UNIVERSITY PROGRAMS

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Academic advising, career counseling and student services for adult students through the University’s Division of Professional and Continuing Studies.
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www.pcs.udel.edu/access

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Phone: (302) 831-2508
E-mail: yackoski@udel.edu
Web page: http://ag.udel.edu

Contact: Richard Bacon
Phone: (302) 855-1657
E-mail: jrbacon@udel.edu
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Georgetown: Mary C. Miller
Phone: (302) 831-6077
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CULTURAL AND COMMUNITY EVENTS

Other Lifelong Learning Institute at the University of Delaware, Lewes
Contact: Anna Moshier
Phone: (302) 645-4111
E-mail: aamoshier@udel.edu
www.lifelonglearning.udel.edu/lewes

Other Lifelong Learning Institute at the University of Delaware, Rehoboth
Contact: Sharon Tucker
Phone: (302) 645-9492
E-mail: atownsend@udel.edu
www.lifelonglearning.udel.edu/rehoboth

Other Lifelong Learning Institute at the University of Delaware, Dover
Contact: Carrie Townsend
Phone: 302-734-1200 ext. 168
E-mail: ctownsen@udel.edu
www.lifelonglearning.udel.edu/dover

Other Lifelong Learning Institute at the University of Delaware, Lewes
Contact: Tracy Owens Hudson
Phone: (302) 855-1634
E-mail: tohudson@udel.edu
www.udel.edu/udpdc/

Cultural Programs in Southern Delaware
Contact: F. Gary Simpson
Phone: (302) 855-1620
E-mail: gsimpson@udel.edu

UNIVERSITY LOCATIONS

Southern Delaware Professional Development Center, Carvel Education Building, Georgetown
Contact: Tracy Owens Hudson
Phone: (302) 855-1634
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