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In this issue

6 Osher programs.
The Osher Lifelong Learning Institute at the University of Delaware in Lewes has expanded its reach, now offering programs in Bethany Beach.

7 Cape stars.
Rebecca Pepper and Jacki Coveleski have taken their love for field hockey to the next level as members of the Fightin’ Blue Hens varsity.

12 Coast economics.
A report commissioned by the Delaware Sea Grant College Program shows that economic activity along the Delaware coast generates $6.9 billion annually.

14 Hazard preparedness.
With storms a coastal threat, a new 116-page homeowners handbook offers information on how to prepare for natural hazards.

16 Sandy’s sandscapes.
UD researchers used a variety of technologies to study the seafloor for changes in the wake of Hurricane Sandy.

17 School director.
Mark Moline has been named director of UD’s School of Marine Science and Policy.

18 Counting crabs.
A rite of spring is the annual Delaware Bay Horseshoe Crab Spawning Survey.

20 Shark studies.
Using an underwater robot, UD and DSU researchers are working to better understand the migration patterns of sharks.

22 Shipwreck found.
Remains of a long-lost vessel, the W.R. Grace, have been found near the coast of Cape Henlopen by a UD research team.

23 Farm irrigation.
Southern Delaware farmers are getting an assist from a new irrigation management system.

24 Assistive technology.
Support for people with disabilities and medical conditions is being provided in Southern Delaware through the Delaware Assistive Technology Initiative.

25 Rehoboth lectures.
The Osher Lifelong Learning Institute at the University of Delaware offers a winter lecture series in Rehoboth Beach.

26 New CANR dean.
Mark Rieger is the new dean of UD’s College of Agriculture and Natural Resources.

27 AAP success.
UD’s Associate in Arts Program, serving students at sites in Georgetown and Dover, has a proud record of success.

28 Lima bean research.
Delaware is the number two producer of lima beans in the U.S., and a research project could put the top spot within reach.

29 Hopkins family farm.
The Hopkins family, with a dairy farm and creamery near Lewes, has a legacy of service to agriculture.

34 UD support.
The Newton family of Bridgeville has long supported the University of Delaware.

42 Tidal wetlands.
UD scientists are studying tidal flow and sediment movement in a Kent County salt marsh.

46 Supporting young scientists.
Mollee Crampton’s story illustrates how Delaware EPSCoR supports developing scientists.

50 Going global.
Kindergarten students are part of a Chinese immersion program.

56 Coast Day.
Coast Day is a Delaware tradition, drawing thousands to UD’s Hugh R. Sharp Campus in Lewes.

Points of interest

5 A Letter from the President
6 Osher Lifelong Learning Institute
7 Diamond State of Mind
54 Office of Economic Innovation and Partnerships
56 Coast Day
61 University of Delaware Resources

ON THE COVER: The cover features UD’s Research Vessel Hugh R. Sharp, which will be open for tours as part of Coast Day. (Photo by Evan Krape)
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POSTMASTER: Send address changes to University of Delaware Messenger, Academy Building, 105 East Main St., Newark, DE 19716.
Lifelong Learning expands to include Bethany Beach

BY CARRIE TOWNSEND

With growing numbers of people retiring to Sussex County, outpacing the state and national average, expanding the Osher Lifelong Learning Institute at the University of Delaware in Lewes to a south coastal location was a natural.

An exploratory meeting with community members and a lecture series in Bethany Beach in January 2012 reinforced the idea, and classes in the oceanfront town were launched in September 2012. Classes were held Monday and Wednesday mornings through the generosity of the town at the Municipal Building and Community Center, and subjects offered included Irish history and culture, introduction to Spanish, how to look at and understand great art, plumbing and heating, and little known proverbs.

The Osher program in Lewes, established in 1989, is a membership organization that provides opportunities for adults 50 and over to learn, teach and travel with their peers. There are no grades or tests, just learning for the fun of it. The only requirements for admission are interest in a continuing educational experience, support of the programs through participation and a modest membership fee, which entitles members to take classes in both Lewes and Bethany.

Response to the first semester in Bethany was positive with people attending from all over eastern Sussex County. “It has enabled people to attend a wide range of courses at both locations by participating in the Bethany program on days that it is offered and coming to Lewes on other days,” said Bob Comeau, council president at Osher Lewes. “We have more interchange between ‘north and south of the bridge.”

Bethany Beach has been pleased with the classes, too. “The town of Bethany Beach is very pleased to be working with the Osher Lifelong Learning Institute at the University of Delaware in providing its programs to residents of our community through use of its town hall facilities,” said Jack Gordon, vice mayor and program member.

Gordon and his wife, Joan, have participated in both semesters and took several classes this spring including Spanish, art appreciation and discovering the Delaware inland bays. “With inland bays, we live on a wetland and it has been very educational and inspired us to volunteer. Art is filling a gap in our education and Spanish has been so much fun,” said Joan Gordon.

The Bethany courses are taught by a seasoned group of Lewes instructors, as well as new talent from the south coastal area. The Delaware Center for the Inland Bays offered a class during the spring semester. Class facilitor Jenn Jones didn’t know

Lifelong learning participants chat between classes in Bethany Beach

what to anticipate from the program and her students going into the experience. “They were so open minded and it was such a diverse group. They were very interested in learning anything about the bays,” she said. “It was interesting to me that people came from Lewes and Fenwick. People came from all over and that was exciting for us. Our whole watershed was represented.”

Plans are underway now for the third 10-week fall semester of classes in Bethany. Osher members and the community look forward to the ongoing offerings and the town has agreed to continue hosting classes at the municipal building. “We believe it is another way of adding to the quality of life of residents and others who live in the area. All comments we have received from participants have been highly positive. We look forward to a continuing relationship,” Gordon said.

University of Delaware hosts Osher Lifelong Learning Institutes located in Wilmington, Dover, and Lewes. For information about the programs or classes, or to join the mailing list, visit www.lifelonglearning.udel.edu or call the Lewes office at 302-645-4111.

For information about the programs or to join the mailing list, visit www.lifelonglearning.udel.edu or call the Lewes office at 302-645-4111.

Jack and Joan Gordon participate in the lifelong learning program at Bethany Beach. Jack is also the vice mayor of Bethany.
Cape field hockey stars take their game to next level at UD

by Jerry Rhodes

Having honed their games at Cape Henlopen High School, Southern Delaware scholar-athletes Rebecca Pepper and Jacki Coveleski continue to strike for perfection as members of the University of Delaware field hockey team.
Pepper, a senior art history major with a minor in legal studies and studio art, was part of a Cape squad that went 62-4-1, notching back-to-back state semifinal appearances under coach Nicole Hughes.

A defense/midfielder who started the last two seasons at UD, Pepper helped lead the 2011 Blue Hens to a Colonial Athletic Association tournament berth under first-year head coach Rolf Van der Kerkhof.

"Rebecca has been able to assist the Blue Hens with solid defensive involvement," Van der Kerkhof said. "Her speed and fitness have been instrumental in her contributions to both sides of the ball, whether joining the attack or recovering plays on defense."

"Playing midfield requires an extra focus on endurance and the ability to transition between defense and offense and to distribute the ball from one side of the field to the other," Pepper said. "Since you play on the entire area of the field, it is important to know where and when you can take risks or need to be more conservative to protect the ball."

Pepper, who also played for the Jersey Intensity, said that while having a solid high school and club team background builds and instills confidence, the transition to collegiate play requires a tenfold increase in time commitment.

"You go from one practice after high school each day, to as many as two or three daily in preseason, plus lifting a few times each week, having individual sessions with the coaches, watching films and being on the field working on specific skills," Pepper said. "It’s a lot of work, but you adjust quickly, and there is a whole team there to support you."

Despite a family background steeped in track and field and cross-country running, Pepper said she is very much at home in her chosen sport.

"The camaraderie and the friendships that develop are what I enjoy most," Pepper said. "Whether it's sweating together in practice, being in the weight room before the sun comes up, or in study hall, the people that support you at these times are the same ones who support you through everything else."

Coveleski began playing field hockey last fall.

"It’s a lot of work, but you adjust quickly, and there is a whole team there to support you."

With half of the Blue Hen team composed of underclassmen, spring is a great time to become more seasoned as players and as a team, Pepper said.

"Spring is the time to perfect the execution of basic skills and passing patterns which will translate into playing well together this fall," Pepper said. "We have the Colonial Athletic Association championships in our sights, but to get there we have a collection of smaller goals that will allow us to achieve that."

Playing sports makes sense to Pepper, as both parents ran track at UD and continue to be involved in track and cross country at Cape.

"My dad, George Pepper, has been coaching track there for 30 plus years, and my mom helps out," Pepper said. "I’ve been around track and field my whole life."
in the first grade, with the Delaware Shore Field Hockey club team run by Ike Eisenhower.

“My older sisters Sam and Kaci were my influences as to why I started to play the sport,” Coveleski said. “Once I started, I loved it so much I just kept on playing.”

This fondness for the sport continued as a member of the 2011 Cape state championship team that went 18-0 under Hughes.

Notching her first goal of the 2012 season for the Hens against Albany on Aug. 26, Coveleski quickly became impressed at the caliber of play she saw among her teammates and their opponents. “The difference in college play is not only the skill, but the speed, the quickness in every move,” Coveleski said. “It’s more challenging, but that is what makes it fun.”

Also rewarding, Coveleski said, is the camaraderie on the team. “I don’t take the opportunity to be involved in the program for granted,” Coveleski said. “I do like the fact that I’m playing with a group of women that I like as individuals and athletes.”

Van der Kerkhof cited Coveleski as a player who is strong, “likes to put it to goal, has a great shot and is excited about playing in the attacking 25.” Coveleski also enjoys the relationship she has with siblings Kaci, who plays at CAA rival Northeastern, and Samantha, who played for Villanova.

“Having sisters in the sport has helped me develop as a player,” Coveleski said. “I was able to watch them and play alongside or against them. It’s just something we like doing together.”

Goals include being at her best and playing a lot of hockey for UD, Coveleski said.

“I figure that if I get all of the hockey out of my system while I have the chance, good things will come of it. I can’t wait to see what these good things will be.”

“Jacki has done a very nice job for the Blue Hens,” Van der Kerkhof said. “She has a lot of potential and talent and, with the assistance and support from her teammates and coaches, has taken true ownership to further develop her hockey skills.”

Van der Kerkhof also likes the idea of attracting talented athletes coming from across the First State.

“Winners at the high school level are good indicators of potential winners at the next, intercollegiate level,” Van der Kerkhof said. “The University will always recruit the best in-state prospective student-athletes and have them join our Blue Hens field hockey program.”

“Winners at the high school level are good indicators of potential winners at the next, intercollegiate level,” Van der Kerkhof said. “The University will always recruit the best in-state prospective student-athletes and have them join our Blue Hens field hockey program.”
Economic activity along Delaware's coast generates $6.9 billion annually according to a 2012 report commissioned by the Delaware Sea Grant College Program.

Beach communities and surrounding areas support 59,000 jobs and $711 million in tax revenue, ranking the coast-related economy on par with agriculture among the state's top industries.

Coast-related activity provides more than 10 percent of the state's total employment, taxes and business production, the report shows.

Delaware's coast has experienced dynamic changes in response to population growth in the Mid-Atlantic region and a major demographic shift in the population in coastal areas. The population has been shifting toward more retired persons who require different types of economic activities to support them, such as health care.

"Delaware's coastal economy employs thousands of workers and attracts millions of visitors to our Atlantic coast beaches, inland bays, and coastal areas," said Joe Farrell, DESG resource management specialist. "Understanding what drives our coastal economy and maintaining those attributes is vital to ensuring a robust coastal economy and high quality of life for residents."

The coastal economy is defined as economic activity on or near the coast, specifically in ZIP codes that border the ocean, inland bays and lower Delaware Bay. For example, vacationing families that stay at motels, dine at local restaurants, shop on the boardwalk and take fishing excursions are part of this economy. The sector also includes permanent and seasonal residents who use medical facilities, grocery stores, banks, real estate agencies and numerous other services.


The authors used an economic input-output model in their calculations and incorporated "multipliers" that account for ripple effects of spending throughout the rest of the state.

"This report can provide guidance for elected officials and businesses considering infrastructure investments or new market opportunities," Farrell said. "The results can serve as a baseline to monitor coastal development over time as economic conditions change."

A complete copy of the report can be found at the Delaware Sea Grant website, www.udel.edu/001853.
Direct coast-related activity has multiplied effects on the state’s economy.

— for example —

$67 of additional production is added throughout the state for every $100 of coast-related production.

48 additional jobs are added throughout the state for every 100 coast-related jobs.

The total economic contributions of coast-related activity to the state of Delaware are

$6.9 BILLION added to total industry production

$711 MILLION of additional local, state and federal taxes

$2.5 BILLION of additional labor income

59K additional jobs supported

The jobs include full-time, part-time, and seasonal employment, converted to full-time positions.

PHOTOGRAPH BY EVAN KRAPE
More than 80 major storms have threatened Delaware’s coast over the past three decades, putting lives and property at risk. Most recently, Hurricane Sandy’s heavy rainfall, high tides and floodwaters underscored the importance of having emergency plans and resilient buildings in place.

The new Delaware Homeowners Handbook to Prepare for Natural Hazards can help Delawareans get ready. The resource guides residents on practical measures that can keep them safe and minimize damage to homes and property.

“Having a strong community that can withstand a severe storm depends on individuals taking responsibility for their property and taking preparedness actions in advance to reduce vulnerabilities,” said author Wendy Carey, coastal processes specialist with Delaware Sea Grant. “This guide enables homeowners to understand the risks and make smart decisions about how to deal with the next weather hazard — well before it strikes.”

The 116-page book was prepared as a collaborative effort by the Delaware Sea Grant College Program, the Delaware Emergency Management Agency and the Delaware Department of Natural Resources and Environmental Control.

The opening sections dispel common myths about natural disaster preparation and detail how hurricanes, nor’easters, floods and tornadoes have affected Delaware in the past.

The book goes on to explain how residents can protect themselves and their families with emergency supplies, evacuation kits and reliable communication channels. Valuable information about creating wind-, flood- and rain-resistant homes is provided, along with life-saving tips about electrical and power issues.

Protecting homes with insurance is also addressed, followed by discussion of how climate change will likely worsen natural hazards in the future. Numerous useful web links and resources are included throughout.

“This book was in the works long before Hurricane Sandy developed, but that recent storm makes it all the more timely,” Carey said. “When the next hazard hits, we want every Delawarean to be ready and safe.”

More information is available by contacting Carey at 302-645-4258 or wcarey@udel.edu.

Download: www.deseagrant.org/products/2012-homeowners-handbook
COMMON MYTHS AND REASONS TO PREPARE

You may be among the many homeowners in Delaware who have not fully prepared for a natural disaster because of complacency caused by several myths. The most common myths appear as quotes below and are discussed in order to remove some of the major barriers to taking action and to encourage people to prepare.

**MYTH 1:**
"A NATURAL HAZARD WON’T AFFECT ME."

Scientists agree that it is not a matter of if the next major coastal storm will occur, but when. Over the past 30 years, Delaware has experienced approximately 85 meteorologically significant coastal storm events, including nor’easters and tropical systems. As recently as 2008 and 2009, severe nor’easters resulted in property damage and flooding along Delaware’s coastlines. In 2011, Hurricane Irene posed a real and significant threat to all of Delaware — spawning a tornado and resulting in widespread rainfall, flooding, and evacuations. Delaware has been fortunate during the last few decades, but there is a good chance you will experience impacts from a major natural hazard event in your lifetime.

**MYTH 2:**
"I SURVIVED HURRICANES ISABEL AND IRENE, SO I AM SUFFICIENTLY PREPARED."

Many people have the impression that if they survived past hurricanes, they do not need to prepare any more than they did previously. Although previous storms resulted in widespread damage along the East Coast, their three impacts to Delaware could have been much more severe. Had those storms tracked slightly differently or made landfall at different locations along the coastline, significantly greater effects would have been experienced in Delaware, including higher winds and more severe flooding.

**MYTH 3:**
"IF A DISASTER OCCURS, IT WON’T BE THAT BAD."

When a coastal storm or flood event occurs, the damage can be devastating. In 2003 during Tropical Storm Henri, more than 10 inches of rain fell during a five-hour period, resulting in extreme floods and property damage in New Castle County. Although Irene was only a Category 1 hurricane when it made landfall, more than 10 inches of rain fell in Kent and Sussex counties, and most areas in New Castle County received 6 to 7 inches. In 1962, a March nor’easters resulted in seven deaths and cost more than $50 million in public and private property damage.

**MYTH 4:**
"I DON’T LIVE NEAR THE COAST, SO I AM SAFE."

In fact, the vast majority of damage or destruction during recent tropical systems was caused by inland flooding associated with extreme rainfall. Significant inland flooding occurred with hurricanes Donna (1960), Agnes (1972), Gloria (1985), Floyd (1999), and Irene (2011), as well as tropical storms Henri (2003) and Jeanne (2004). Powerful thunderstorm and wind events can cause widespread damage in all areas of Delaware. Therefore, all homeowners should prepare — not just those who live along the coast.

**MYTH 5:**
"EVEN IF I INSTALL HURRICANE CLIPS, MY HOME COULD BE DAMAGED."

Even though someone may wear a seat belt, shoulder belt, and have an airbag, there is no guarantee that person won’t be injured in a major auto accident. Yet most people recognize the importance of these safety devices in reducing risk and use them. Likewise, the measures discussed in this handbook could significantly reduce risk, although there are no guarantees there will be no damage.

**MYTH 6:**
"IF MY HOME OR PROPERTY IS DAMAGED BY A NATURAL HAZARD EVENT, GOVERNMENT PROGRAMS WILL PROVIDE ASSISTANCE."

After major disasters, many homeowners find that the government may not repair their damaged houses or even provide adequate compensation for property damage. Government compensation evaluations are conducted after a disaster strikes and are based on the amount of damage that occurs on a county-wide basis. It is up to you to plan properly, strengthen your house, and have the appropriate financial protections in place such as insurance, if it is available. After a natural disaster occurs, the government may also be overwhelmed by the number of people in need and help may not arrive quickly.
Beneath the 20-foot waves that crested off Delaware’s coast during Hurricane Sandy last fall, thrashing waters reshaped the floor of the ocean, churning up fine sand and digging deep ripples into the seabed. Fish, crustaceans and other marine life were blasted with sand as the storm sculpted new surfaces underwater.

University of Delaware scientists cued up their instruments to document the offshore conditions before, during and after Sandy’s arrival to scrutinize the differences and better predict the environmental impact of future storms.

“Out here, we’re trying to get the fingerprint of the storm,” said Arthur Trembanis, associate professor of geological sciences and oceanography, aboard the research vessel Hugh R. Sharp.

Trembanis and his colleagues focused in on Redbird Reef, an artificial reef about 16 miles off the coast of the Indian River Inlet. The site contains old subway cars, boats and truck tires sunk over the past decade to provide habitat for sea creatures. The scientists have been studying the reef in recent years, among other “hard bottom” sites in this otherwise barren, sandy region, to examine the ecosystem found there and create detailed maps of the seafloor.

Besides improving scientists’ understanding of the natural environment, the work has potential military applications: Shifting underwater sands and sediment can bury — or uncover — dangerous mines used to explode enemy vessels in conflict zones. Understanding how weather conditions can affect such objects on the bottom of the ocean could help the Navy, which funded this scientific cruise, identify and avoid the weapons.

In the peacetime waters off Mid-Atlantic shores, however, the manmade structures at the reef serve as research substitutes for mines. Two days before Hurricane Sandy hit, Trembanis’ group set up a specialized buoy at the reef with three different types of equipment attached that rested on the seafloor to measure waves, currents and sand formations on the seafloor.

The researchers also used a multibeam sonar on the ship to generate images of the seafloor, complemented by side-scan sonar for a finer resolution images taken by an autonomous underwater vehicle (AUV) — an unmanned, torpedo-shaped machine that darts through the ocean to collect data.

“We really can build a pretty complete picture of what happened on site,” said oceanography graduate student Carter DuVal.

The team repeated the sonar runs days after the storm, finding newly formed sand ripples, reshaped surfaces and exposed areas, with significant patches of “scouring” where erosion occurred due to rapidly flowing water. Currents raced at more than 3 knots during Sandy’s peak, capable of moving large stones and rotating the researchers’ underwater equipment almost 50 degrees during the storm.

In analyzing the data collected, the scientists will link the geological markings on the seafloor to wave conditions and currents. Then they can develop models of how sediments move and predict whether areas might experience extensive scouring.

The study is just one of several ways Trembanis tracked Sandy’s geological imprint. He also took photographs and video during an airplane flyover of the coasts of Delaware, New Jersey, Maryland and Virginia just days after the storm, recording what happened right at the land’s edge for the Program for the Study of Developed Shoreline. He and his team also surveyed Broadkill Beach with high-resolution GPS to map its shape after the storm, finding it to be much more flat than usual for this time of year.

Collecting pre- and post-storm metrics through a variety of means creates a valuable dataset, Trembanis said, though it was not easy to compile. Aboard the Sharp, the team was unsure whether the buoy survived the storm, eagerly anticipating its presence as the ship headed to the site.

While it remained in place to clearly indicate where the equipment was, not all data that they hoped to collect was there: a rotary sonar scheduled to record ripples at regular time intervals malfunctioned. That information would have helped separate conditions specific to Sandy from those of the nor’easters that arrived a few days later. Instead, they will have to settle for a composite of the two.

Other signs pointed to how rough the conditions were, though. As the ship’s crew raised the scientific equipment that rested on seafloor during the storm, a large piece of twisted metal arose that had been entangled in the rope — possibly a window frame from a subway car.

Doug Miller, associate professor of oceanography in the College of Earth, Ocean, and Environment on board to collect biological samples, worried that the sharp debris would cut the line and sink the equipment. Thankfully, it did not. “But that was a tense moment,” Miller said.
Collaborative spirit

Moline named new director of School of Marine Science and Policy

BY TERESA MESSMORE

♦ ♦ ♦ When Mark Moline was an undergraduate, the biology major gained hands-on experience in marine science on research expeditions to Bermuda, Australia and Antarctica. Over the course of his career, he continued zigzagging around the globe to use underwater robots and remote sensing to better understand the ecosystems in which whales, penguins, plankton and other aquatic organisms live.

“My whole life is sort of like a pinball going back and forth,” Moline said. “When research opportunities come up, I grab them when I can.”

Moline plans to emphasize such experiential learning among students and faculty in his new role as director of the School of Marine Science and Policy in the University of Delaware’s College of Earth, Ocean, and Environment (CEOE), which he joined last summer. Based in both Newark and Lewes, Moline oversees the school’s four programs in marine biosciences, marine biology, and his enthusiastic leadership will help keep the school’s tradition of excellence moving forward.”

Moline joined UD from California Polytechnic State University (Cal Poly), where he was director of the Center for Coastal Marine Sciences, professor of biological sciences and the UNOCAL Professor of Marine Science. He has received numerous professional honors and published widely in international literature, including a 2010 paper he co-authored in Science on how polar marine ecosystems respond to rapid climate change. He was involved in the early years of autonomous underwater vehicle (AUV) deployment in marine biology applications.

Over the course of his career he has used AUV-attached sensors to validate remote sensing on a wide scale, map distributions of harmful algal blooms in Florida and study whale habitat and food sources at depths twice as deep as could be reached with shipboard equipment. He also studied the impacts of climate change on penguin ecology in the Antarctic and mapped coral in Palau, an island east of Philippines. For the last several years, he has been working in the Arctic to map the sea floor and algae under ice sheets and recently returned from Norway after seven months as the Fulbright Distinguished Arctic Chair.

A common thread in his diverse projects is the application of AUVs to not just measure physical properties of the ocean, like temperature and salinity, but also to make connections to biology on scales that the instruments can measure. His approach is collaborative in nature, often assisting other researchers in accomplishing their experiments by incorporating new technology.

When interviewing for his new position at UD, Moline found the same collaborative spirit among researchers at CEOE. “I am really impressed by the faculty here and the group mentality,” Moline said. “Like me, they seem to enjoy helping other people do their science well.”

His vision for the school includes equipping faculty with the tools they need to do their jobs efficiently and remain excited about their work. He plans to regularly communicate with potential partner agencies and anticipate trends in science that will assist faculty and strengthen the school’s leadership in marine studies.

Moline said he also looks forward to expanding opportunities for students, involving them in research and building on existing offerings such as the Semester-in-Residence program. CEOE was traditionally a graduate college and did not begin offering undergraduate majors until relatively recently.

“The fact that we’re growing an undergraduate program here is really exciting to me,” Moline said. “And so is seeing how we can spark young students’ interest early on.”

“I am really impressed by the faculty here and the group mentality. Like me, they seem to enjoy helping other people do their science well.”
Wearing sneakers and rain boots, University of Delaware freshmen got their feet wet as marine biologists last year while counting horseshoe crabs along the Delaware Bay. The students participated in a monitoring effort to gain firsthand experience in field research with their fellow marine science majors.

“Where else can you go on a Saturday night to count horseshoe crabs?” student Will Goldman said.

After receiving training in April 2012 through the Delaware Bay Horseshoe Crab Spawning Survey, two dozen students gathered in the evening at the St. Jones Reserve in Dover and dispersed to nearby beaches with an experienced volunteer leading each group. Thousands of horseshoe crabs lined the shores at high tide, congregating into clumps and slowly creeping along the sand in search of mates. The females lay small, round green eggs in the sand as males attach themselves to their backs for fertilization.

The students took a one-meter square made of PVC pipe and laid it on the sand at the “crab line” where the animals gathered, counting how many horseshoe crabs of each gender were within the quadrat. They repeated the process every 20 meters until they covered 1,000 meters of shoreline.

By volunteering with the project, students gain valuable field experience. At this early stage of their college careers, many students are enthusiastic about studying the ocean and sea life, but are not sure specifically how they will use their degrees.

Joanna York, undergraduate program coordinator with the University’s School of Marine Science and Policy, said there are many options. Students go on to work at consulting firms and government agencies, attend graduate school, teach secondary education or even enroll in medical school.

“Our goal is to have the degree very well supported by the basic sciences...
because marine science — including marine biology and oceanography — is very interdisciplinary and it’s really hard to do marine science if you haven’t had a broad science background,” York said.

The marine science major was formally approved in February 2011, and the inaugural group of freshmen began studies in 2012. York teaches several colloquia classes on marine science to complement students’ studies in biology, chemistry, math and other requirements.

“My goal is to immediately get students involved in doing things not just in the classroom, not just reading books and sitting in classes, but immediately doing and seeing and experiencing it because that’s what marine science is,” York said. “That’s why most of these students want to be in this major — it’s because they’re excited about those kinds of opportunities.”

For many of the students walking Delaware’s shores for the survey, counting the spawning horseshoe crab population was a first exposure to data collection in the field.

“I’ve never done anything like this before,” student Kayla Krenitsky said. “It’s pretty cool.”

“Where else can you go on a Saturday night to count horseshoe crabs?”
University of Delaware researchers are using an underwater robot to find and follow sand tiger sharks that they previously tagged with transmitters. The innovative project is part of a multi-year partnership with Delaware State University to better understand the behavior and migration patterns of the sharks in real time.

“Our new, specially equipped glider OTIS — which stands for Oceanographic Telemetry Identification Sensor — has detected multiple sand tiger sharks off the coast of Maryland that were tagged over the past several years,” Matthew Oliver, assistant professor of oceanography in UD’s College of Earth, Ocean, and Environment, said following a fall expedition. “This is the first time that a glider has found tagged sharks and reported their location in real time.”

OTIS is a remote-controlled device that looks like a yellow torpedo and normally darts through the ocean to sample water conditions. Oliver outfitted the apparatus with acoustic receivers that can recognize signals given off by the sharks’ transmitters as they travel through coastal waters, rapidly reporting the encounters.

The technology allows the course of OTIS to be changed to follow the sharks and test the water surrounding them. Sharks were initially found on Oct. 10, 2012, and OTIS doubled back to again locate the sharks. The approach will help scientists follow where the sharks are going more quickly than conventional tracking techniques.

Sand tigers are the largest commonly occurring shark in Delaware’s bay and coastal waters, serving as Delaware Bay’s apex predator and playing a key role in the ecological balance of the region.

“Sand tigers have suffered from a number of threats that ultimately led to population declines,” said Delaware State’s Dewayne Fox. “In 1997 sand tigers were listed as a ‘species of concern’ by the National Marine Fisheries Service, although very little is known of their migrations and habitat requirements.”
Matthew Oliver, assistant professor of oceanography, is using an underwater robot to help track sharks along the Delmarva Peninsula.

The research involves three different types of tags. One is an acoustic transmitter that “pings” receivers while passing by a set of 70 devices situated mostly in Delaware Bay, with a few along the Atlantic coast. The receivers are maintained by Fox, who has tagged more than 500 sharks since 2006.

The team is also using 34 pop-off satellite archival tags, which store data on the sharks’ journeys for one year and then automatically release from the animal to dispatch a location signal for retrieval from the water.

The newest type of tag is called a VEMCO mobile transceiver (VMT), a larger tag that both transmits and receives information to communicate its location and listen for the pings of other sharks, fish or marine mammals outfitted with acoustic tags.

“It will tell us not only where it is, but who it’s with,” Oliver said. “It’s like a social network for sharks.”

Together with their students, Oliver and Fox spent the summer of 2012 inserting the transmitters into sand tiger sharks in Delaware Bay. Using bait, hooks and little patience, they caught the sharks — up to nine feet long — and carefully pulled them into a stretcher alongside their boat.

Veterinarians from the Georgia Aquarium trained Oliver’s graduate student, Danielle Haulsee, to insert the small transmitters in a quick surgery.

Scientists suspect that the sharks migrate widely along the Eastern Seaboard, and the Delaware research team plans to use newly collected information to map sand tiger shark habitats. They will cross-reference the sharks’ data with satellite and remotely sensed environmental conditions to create a comprehensive picture of the animals’ habitats.

“The integration of biotelemetry with ocean observations represents a fusion between observing networks on the East Coast,” Oliver said.

Fox is part of the Atlantic Cooperative Telemetry Network (ACT), which tracks thousands of animals as they move up and down the coast, while Oliver participates in the Mid-Atlantic Regional Association Coastal Ocean Observing System (MARACOOS), which uses satellites, underwater robots and models to study the coastal ocean. Their hope is that the combination of various data sets will assist natural resource managers in predicting where sand tiger sharks live — and when — for conservation and recovery efforts.

Using OTIS will help researchers know which water conditions sharks prefer to swim in during their migrations. The glider can travel further out than the static receivers’ locations and also collect information on temperature, water clarity and oxygen levels. If the sharks head to a certain place, scientists may be able to better understand why, Oliver explained.

In October 2012 his team took an educated guess on where to find the sharks, launching the glider off the coast of Delaware’s Indian River Inlet and heading south. After five days, they received transmissions from sharks about 4 to 9 miles off the coast of Assateague Island, Md. Later they tried to direct the glider to stay near the sharks. The machine can stay out on a mission for about four weeks before needing a battery recharge.
Shipwreck discovered

UD research team pinpoints site of sunken three-masted sailing vessel W.R. Grace

BY TERESA MESSMORE

University of Delaware researchers have discovered that a shipwreck near the coast of Cape Henlopen is a 215-foot-long sailing vessel destroyed by a hurricane more than a century ago. Scientific surveys and historical records indicate that the wreck is the W.R. Grace, a three-masted ship that ran aground during a hurricane on Sept. 12, 1889.

“It was not something we expected to be as old as it was,” said Arthur Trembanis, associate professor of oceanography and geological sciences in the College of Earth, Ocean, and Environment. Trembanis’ research group came upon the shipwreck about three years ago while training undergraduates to use remotely operated vehicles (ROVs) and other ocean surveying equipment along the coast of Cape Henlopen State Park near Lewes. They were surprised to find that the wreck was not included in a public federal database of known shipwrecks and other potential navigation hazards.

Delaware’s coast has been the site of hundreds of shipwrecks over nearly four centuries, making identification a challenge — particularly with older wooden ships disintegrating over time. State archaeologists initially suspected that this unknown wreck was made of iron or steel since it was readily picked up on sonar, possibly a military or freight vessel dating to World War I or later.

Trembanis partnered with Jeff Snyder, president of SeaVision Underwater Solutions, a commercial marine surveyor, to revisit the site in June 2012 and obtain better images with side-scan sonar and video technology. They were able to pinpoint the exact location, orientation and size of the wreck, which sits about seven meters below the surface.

Oceanography graduate student Carter DuVal then consulted a book about shipwrecks in the Mid-Atlantic and other sources to begin cross-referencing their field findings with historical clues. Maritime records revealed that the dimensions of the W.R. Grace, built in 1873, matched that of the wreck, and the ship had a metal sheath around the hull to prevent marine growth.

DuVal also researched newspaper accounts about the ship’s fate when a strong hurricane struck the coast in 1889. Apparently the massive ship had difficulty navigating the shallow waters around the cape, and after dropping anchor to ride out the storm, the ship drifted and lodged into the sand below.

The vessel was carrying 7,000 empty petroleum barrels from France to refill in Philadelphia and ship to Japan. With the W.R. Grace a loss, operator Flynn and Company sold the barrels at auction.

“When we found the wreck itself, we noticed that there doesn’t appear to be any cargo in the hold,” DuVal said. “So that is also something that points to our wreck being the W.R. Grace.”

Today the ship is covered in dense clusters of blue mussels and frilled anemones, forming an artificial reef similar to others built around Delaware Bay. The invertebrates need hard surfaces to latch onto and form colonies, which are not easy to find along the sandy coastal zone.

“If they encounter something, they colonize pretty quickly,” Doug Miller, associate professor of oceanography, said, adding that a significant population can manifest in just a few years. “It’s indicative that our coastal shallow waters are very, very productive.”

The sandy coastal features seem to have prevented life from taking hold on the wreck until relatively recently: The ship appears to have been previously buried. Swift currents help move the ocean floor in this area into a series of ripples, with conditions so turbulent that the sandy tip of Cape Henlopen extends about nine meters each year.

A 1995 study of the area did not reveal the wreck, yet the ship’s outline did appear on a 2007 National Ocean and Atmospheric Administration survey (the results were not included in the public database). So either the wreck was uncovered sometime between 1995 and 2007, Trembanis said, or it has undergone periods of burial and exposure.

State archaeologist Craig Lukezic said he has frequently encountered those kinds of changes while studying shipwrecks. He said a scuba dive investigation could reveal more information about the wreck, such as the architecture of the boat, but there are probably no artifacts left on the ship since the contents were salvaged before it submerged.

Such a dive would need to be conducted in cooperation with the state, as the wreck is protected by law under the Abandoned Shipwrecks Act, and the currents make diving in the area treacherous.

“It makes it very difficult and very dangerous,” Lukezic said.

For now, the ROV and sonar findings can be used to better understand the ocean dynamics that impact wrecks, compare the site to other reefs and study how the ocean floor changes over time. “We’re in an exciting time for this kind of exploration,” Trembanis said. “In our own backyard are some exciting new discoveries.”

PHOTOGRAF COURTESY OF THE MAINE MARITIME MUSEUM, BATH, MAINE
Watering corn, cantaloupes and other crops with industrial-sized sprinklers can be costly for farmers, but so can be fields parched by dry, hot weather. University of Delaware researchers are helping growers find the right balance between irrigation and rainfall with new online software that incorporates Delaware-specific environmental data.

“Our goal is to make the best available information that farmers need easily accessible,” said Kevin Brinson of the College of Earth, Ocean, and Environment’s Delaware Environmental Observing System, who developed the tool with assistance from College of Agriculture and Natural Resources Deputy Dean Tom Sims and associate scientist James Adkins.

The recently launched Delaware Irrigation Management System (DIMS) lets farmers enter information about their crops that is then combined with weather station feeds and physical data from the environment, such as soil composition, to calculate how much water is available underground to plant roots. The system is designed for several irrigated crops in Delaware: corn, soybeans, sweet corn, cucumbers, watermelons, cantaloupes, lima beans and peas.

DIMS is the only irrigation scheduling application written specifically for Delaware with automatically updated weather data. The free software provides a straightforward interface that allows users to quickly determine if a field has enough moisture — and make immediate irrigation decisions.

“Results include increased yields, which lead to higher profits; there’s improved water quality resulting from efficient utilization of nutrients; and also water conservation, which reduces water waste and can lower operating costs,” said State Conservationist Russell Morgan of the U.S. Department of Agriculture Natural Resources Conservation Service, which funded the project with additional support from the Delaware Department of Natural Resources and UD’s Delaware Environmental Observing System.

Environmental Control.

DIMS uses the “checkbook” method based on a basic water balance. The amount of water evaporated from the soil surface plus the amount of water used by the crop is calculated and compared to data from rainfall, soil moisture measurements and irrigation to determine the amount of water available in the soil to a particular crop.

With the price of corn varying based on weather conditions in the Midwest, such careful calculations of water use could really pay off for the roughly 25 percent of Delaware’s cropland that is irrigated.

“The impact is real,” Brinson said. “This hits at farmers’ wallets.”

To set up an account to use DIMS or for more information, contact Brinson at 302-831-6906 or via email at kbrinson@udel.edu.
Those who find it difficult to carry out daily activities because of a disability or medical condition can find help through the Delaware Assistive Technology Initiative (DATI), part of the University of Delaware’s Center for Disabilities Studies. DATI serves Southern Delaware residents through Assistive Technology Resource Centers (ATRCs) in Dover and Georgetown.

Jamie Colvett and Kay Oesterling, co-facilitators of the Sussex County MS Shore Group, a support group for people with multiple sclerosis, have gotten to know Sussex County assistive technology specialist Dan Fendler over several years. They have benefited from the services and expertise that DATI brings to people with disabilities.

Milford resident Oesterling said she is grateful for the ramp she recently acquired through DATI’s AT Exchange, which gives people who have items to sell or give away the opportunity to connect with those in need of such items. A ramp might be considered “low-tech” assistive technology but it can erase the barrier that even a few steps present to accessing one’s home.

Fendler and Oesterling shared the story of how she came to own the ramp: Just before the Shore Group was to meet at the Sussex County ATRC in Georgetown in November 2012, Fendler noticed that a ramp had been posted on the AT Exchange website. He mentioned it to the group, and Oesterling, who lives in Milford, didn’t hesitate to express interest. She knew that with the progression of her MS and the difficulty she was having climbing stairs, a ramp would make her life easier. Her husband, Bob, also was at the meeting and he immediately made arrangements with the New Castle County owner to pick up the ramp, at no charge.

“I’m feeling so good about having the ramp for my home,” Oesterling said. “It will increase my ability to continue to be active and to have better access outside. I’m just thrilled.”

The ATRC in each county includes a wide array of devices — from a simple magnifier to sophisticated computers — and a knowledgeable assistive technology specialist who listens to his clients, educates them about AT, helps them find just what they need and lets them borrow the equipment, all at no cost.
Winter lectures warm
Rehoboth Beach
Osher Lifelong Learning Institute at UD offers winter lecture series

By Carrie Townsend

 obra

Cold winter mornings in January and February could not deter people in Sussex County from heading out to learn about oceanography, opera, presidential politics and public radio. A sold out crowd of people 50 and older joined talented speakers at the Osher Lifelong Learning Institute at the University of Delaware’s Winter Lecture Series Friday mornings at the Rehoboth Beach Convention Center.

“With a talented, interesting line up of local speakers addressing such diverse topics, it comes as no surprise that the lecture series was so popular,” said Jim Broomall, associate provost for Professional and Continuing Studies at UD. “Despite the weather, or maybe because of it, people were eager to get out each week and participate in the series.”

Emmy Award-winning former National Public Radio Weekend Edition host Liane Hansen kicked off the series with an insider’s view of public radio. Hansen delighted her audience, and enjoyed herself as well, by sharing her personal insights through historical and never before heard sound bites from NPR. “It was a lot of fun. The people were so attentive and receptive,” she said. Hansen also enjoyed the prep work: “It gave me chance to synthesize what I knew into a presentation. I wanted to convey information, but I also wanted to make people laugh.”

Ralph Begleiter, former CNN correspondent and director of UD’s Center for Political Communications, followed Hansen with a thought-provoking presentation on the candidates, money and media of the 2012 presidential election.

Participants were pleased to meet Mark Moline, UD’s new director of the school of Marine Science and Policy, and hear an enlightening talk about the global challenges and future of marine science.

Opera was the grand finale of the series with Pat Mossel, an Osher Lifelong Learning Institute instructor and former executive director of the Washington National Opera, taking the audience behind the scenes of putting on an opera.

Attendees included Osher Lewes members and some newcomers to the program and the area, as well. For example, Ed and Barbara Wendel live in Washington, D.C., but spend some time at their condo in Bethany Beach. After retiring two years ago, they had been interested in the Lewes lifelong learning program. Ed Wendel said that when he read about the Winter Lecture Series in the local paper, “I thought it sounded really interesting and like a good way to find out what’s going on and we signed up.

“For one thing, I really appreciated the variety. It exposed me to things I was vaguely interested in but not necessarily drawn to. Each lecture was interesting and very competent. It more than met my expectations,” he said.

Edith and Ray Shanahan moved to Lewes from Bedminster, N.J., three years ago. They happily settled into the community, and looking into lifelong learning was on their “to do” list.

The Shanahans were so pleased with the series, they both signed up for several classes as part of the Osher spring semester. He took classes in physics and hand tools, and she took classes on genealogy and plant-based eating; together they took a class on Irish literature and landscape.

The Osher Lifelong Learning Institutes at the University of Delaware are membership organizations that provide opportunities for adults 50 and over to learn, teach, and travel with their peers. The only requirements for admission are interest in a continuing educational experience, support of the programs through participation, and a modest membership fee. UD’s Osher Lifelong Learning Institutes are located in Wilmington, Dover and Lewes. For information about the program, classes or to join the mailing list, visit www.lifelonglearning.udel.edu/lewes or call the Lewes office at 302-645-4111.

(Portfolio) Barbara and Ed Wendel sampled the Lewes lifelong learning program through the Rehoboth lecture series.

(Bottom) Jeanne and Bob Comeau enjoy a presentation at the Rehoboth lecture series.

Photographs by Evan Krape
New leadership
Rieger named dean of UD's College of Agriculture and Natural Resources

BY KATY O’CONNELL

During Decision Days at the University of Delaware in April, Mark Rieger had a lot more in common with prospective undergraduate students than most deans, considering that not too long ago he made the decision to come to the University.

“I came to UD because I could see a genuine commitment to undergraduate education at a strong research university,” said Rieger. “After several months on the job, I see examples of this commitment everywhere, which reaffirms my decision to come here. While other universities are placing greater emphasis on research and graduate education, UD has maintained a nice balance and has not grown in these areas at the expense of its undergraduate students.”

Following a nationwide search, Rieger took office as dean of UD’s College of Agriculture and Natural Resources on Aug. 1, 2012, having previously served as associate dean of the University of Florida’s College of Agricultural and Life Sciences since 2006.

He succeeded Robin Morgan, who served as dean of CANR for a decade. Morgan announced in September 2011 that she planned to step down as dean and return to the CANR faculty at the conclusion of the 2011–12 academic year.

“We’re thrilled to welcome Mark Rieger to the University of Delaware,” UD President Patrick Harker said. “He brings with him the kind of clear vision and commitment to innovation that CANR has enjoyed this last decade under Robin Morgan. Agriculture is such a rich and vital industry in Delaware, and the college has a huge role to play in addressing some of today’s most critical issues: environmental protection, renewable energy, human health, food sustainability, global responsibility. I look forward to our continued leadership and influence in these areas with Mark as CANR dean.”

“Mark was warmly received by all the constituents with whom he met during the interview process. This includes faculty, professionals, administrators, students, and partners throughout the state,” added Nancy Brickhouse, deputy provost. “They were impressed by his knowledge of the agricultural industry as well as his commitment to strong academic values. The role of CANR dean is a complex one and I am convinced we have found the right person to step into this position.”

The search committee was pleased that Mark Rieger was selected the new dean, said Charles G. Riordan, UD vice provost for research and chair of the search committee. “Mark articulated a strong and dynamic vision for a contemporary College of Agriculture and Natural Resources. He brings experience and creative ideas about how to build connections across campus, the state and the entire Delmarva region that will serve the college well.”

College snapshot

CANR is also home to Cooperative Extension, the outreach arm of the college, which extends university knowledge to the constituents of Delaware in the areas of agriculture, natural resources, horticulture, youth development, and family and consumer sciences.

Looking ahead
Throughout the spring of 2013, the college embarked on a master planning process, evaluating its core strengths and looking for ways that the college might have a greater impact on agriculture and natural resource issues that face Delaware and the world. As part of the master plan, CANR intends to grow enrollment to meet the demand for agriculture and natural resource professionals. According to a recent USDA study, there are almost two jobs for every graduate in these sectors of the economy. The college is working to identify areas of selective excellence and focus its efforts on the most relevant issues in our region and working with neighboring institutions to build synergy and avoid redundancy.

About Mark Rieger
Mark Rieger served as associate dean and professor in the University of Florida’s College of Agricultural and Life Sciences since 2006 and was interim dean in 2010–11.

As associate dean, Rieger had major responsibilities in graduate programs, distance education, statewide degree completion programs, the honors program and international education.

Prior to joining the University of Florida faculty, he was a professor in the University of Georgia’s Department of Horticulture from 1999–2006. He joined the University of Georgia faculty as an assistant professor in 1987 and was promoted to associate professor in 1993 and professor in 1999.

Rieger received a bachelor’s degree in horticulture in 1982 from the Pennsylvania State University, a master’s degree in horticulture in 1984 from the University of Georgia and a doctorate in horticultural sciences in 1987 from the University of Florida.
The University of Delaware’s Associate in Arts Program (AAP), which offers classes to Southern Delaware students close to home in Georgetown and Dover, has a proud record of success, according to program director Jack Bartley.

“The design of this program really is unique to UD, and it is dedicated to ensuring the academic success of Delaware students,” Bartley said.

AAP offers small class sizes and personal attention from UD faculty and the academic advisers, helping students achieve success through the associate in arts degree and the opportunity to transition to the University’s main campus in Newark.

Bartley said 92 percent of the students who earn their degree through AAP transition to the Newark campus to continue studies toward the bachelor’s degree.

The program’s semester-to-semester retention rate is consistently over 90 percent, with the number of students enrolled in AAP up 58 percent since its inception.

AAP officials in both Georgetown and Dover — UD classes are housed on the two Delaware Technical Community College campuses through a longstanding partnership — continue to expand course offerings and to increase opportunities for students pursuing various majors in Newark.

As part of the AAP, the University holds an annual spring event called Majors and Minors on Main, providing an opportunity for Southern Delaware students to learn more about the many services and programs available to them on the Newark campus.

This year, Majors and Minors on Main, held in mid-March at the Trabant University Center on Main Street, drew about 200 students. Bartley welcomed them, saying, “This is a real opportunity for you to explore what is available at UD and to open up some windows and doors and some pathways for you to take. This is a great opportunity and a chance to get prepared.”

A panel of representatives from a wide variety of academic disciplines discussed choosing or changing majors and getting academic support from UD professionals when needed.

The discussion also highlighted the broad spectrum of possibilities open to individuals with a liberal arts degree. An information fair afforded visitors the opportunity to meet contacts and talk with representatives from campus majors and departments.

Chadd Duranso, a sophomore at the Dover campus, welcomed the opportunity to talk with people about his criminal justice major. “The best way is to come here and meet people and get to know them,” he said. “I’m also looking forward to being on my own and experiencing college life for what it is.”

Ryan Gross, an information systems major completing his associate in arts course work at Georgetown, said coming to the event gave him a chance to decide what he wants to do when he begins his junior year on the Newark campus. “Coming here today gave me a chance to have some of my questions answered,” he said. “It was especially nice to talk to students and people on the Newark campus.”

For additional information about the AAP, see the website www.udel.edu/associateinarts.
LIMA BEAN GRANT

BY ADAM THOMAS

Delaware is currently the number two producer of lima beans in the United States, second only to California and with the top spot within reach. As a result, it is imperative to study the many aspects of the various diseases affecting the crop in Southern Delaware and throughout the region.

To that end a research team has been assembled through a five-year, $1.5 million U.S. Department of Agriculture (USDA) Specialty Crop Research Initiative grant. The grant includes researchers from the University of Delaware, Delaware State University, the University of Maryland, Ohio State University, Cornell University and the University of California Davis (UC Davis).

The project, which will include studies that are being conducted for the first time, has six components that encompass research on: downy mildew, pod blight, white mold, root knot nematodes and germplasm resources, as well as an economic analysis.

POD BLIGHT

Pod blight is caused by the disease P. capsici. Unlike downy mildew, which generally affects only lima beans, P. capsici has a very wide host range. Once it strikes a particular crop, it is very difficult to get rid of, with pathogen spores lasting up to 10 years in the soil.

Pod blight is increasing as a problem for growers as it occurs in low-lying areas of fields and is more frequent in wet years. This part of the project has three goals: to find a fungicide to deal with the disease, to monitor the disease, and to look for alternative or organic non-pesticide driven strategies. The study is also looking at some risk management strategies, including information for growers in the state about the best time to spray for disease control and consideration of alternative control methods.

DOWNY MILDEW

Downy mildew is a fungal-like disease of lima beans caused by Phytophthora phaseoli and the goal of the research is to improve disease forecasting and look at genetic diversity of the population of the pathogen. That way, researchers will be able to tell farmers the risks to their crops, as well as what strain of downy mildew they have in their fields and the best way to deal with that particular strain.

WHITE MOLD

Research also is being conducted on alternative ways to control white mold, another disease that is difficult to eliminate. With an even broader host range than P. capsici, and an even longer life — persisting in soils for some 20–30 years — finding out as much about the disease as possible, as well as possible ways to control it, is imperative. Researchers will test biological control strategies and alternative control strategies.

ROOT KNOT NEMATODES

The problem of root knot nematodes will be considered, as researchers screen new germplasm for resistance and look at how it impacts root knot in Delaware. Cultivars that are resistant to root knot nematodes in California will be used to evaluate cultivars in this region. If the California cultivars are resistant in Delaware, they can be used to breed nematode resistant lima bean varieties here.

Research also will consider the use of local weather and soil condition data — such as depth and length of freeze, soil temperature ranges and soil moisture — to help determine what types of conditions root knot nematodes thrive in. The researchers will try to tie environmental data with soil types to predict when and where the nematodes are likely to be a problem, and will evaluate alternative control measures.

GERMPLASM RESOURCES

Researchers will characterize available germplasm resources to assist in the breeding of new varieties of lima bean, going beyond disease and looking to create new resources for the future. Using a technique called reduced representation sequencing, they will look at how lima beans differ genetically with the goal to develop improved varieties.

ECONOMIC ANALYSIS

Finally, an economic analysis aimed at determining the benefits of using the alternate methods of pest control developed through the study will be included. Results will help inform farmers of the potential profitability from using the new approaches that will be developed by the study.
Sparkling days on the water. Delicious dinners with good friends. The life you want is right here with plenty of time to stroll the beach or sail the bay. Cadbury at Lewes is where you'll find choices, for how you want to live, in a community that's as unique as you are.

For more information or to schedule a tour, call (302) 645-6400 or (800) 390-8298.
Hopkins family has tradition of service to agriculture

BY MICHELE WALFRED

In the spring of 2013 Walter C. Hopkins Sr. stood in front his 66-year-old dairy barn and reflected on a structure that represents the past and future of his family’s dairy farm. A renovation project completed in June 2013 converted 1,200 square feet of barn space into a new production and storage area for the Hopkins Farm Creamery. It doesn’t take too much cajoling to get Hopkins to climb up the hayloft where he once played as a boy, nor is it difficult to relive memories that are attached to the large barn.
The barn's gambrel roof is significant for the family. Its evolution has marked the third, fourth and fifth generations of Hopkins family arrivals. The barn's renovations mark another chapter in the story of Delaware's largest dairy farm owned and operated by a family able to balance a reverence for tradition with an eagerness for innovation.

"I know exactly how old this barn is," Hopkins reflected. "In 1947, my father was putting on the cedar shake shingles when my mother, Dorothy, went into labor — with me." In 1978 it was Walter up on a ladder, replacing those worn out shakes with new asphalt shingles, when his son, Walter C. Jr., known to all as "Burli," was born. And true to tradition, father-to-be Burli was in the process of installing the current steel roof in 1996, when his son, Michael, arrived to begin the fifth generation of the Hopkins family.

Adjacent to the dairy barn, a silo crested with colorful cones towers in the sky — a landmark that beckons tourists and locals to the creamery established in 2008. The dairy farm’s legacy, however, reaches back to 1942, when William N. Hopkins, son of dairy farmer Alden Hopkins, established Green Acres Farm in its present location on Route 9, west of Lewes. On the site where Hopkins’ boyhood home used to stand, a small gray rancher serves as the farm and creamery offices. Inside, numerous awards, photographs and news clippings document a strong dedication to Delaware agriculture and the Hopkins family’s tradition and visionary leadership.

The Hopkins family cares for 560 Holsteins on their 1,000 acres. Cows are milked three times a day, every single day of the year. There is no such thing as a holiday or day off on a dairy farm. The herds of Holsteins yield approximately 12 million gallons of milk annually.

Walter Hopkins was one of 10 "somewhere in the middle" children born to William and Dorothy Hopkins. His parents met on the University of Delaware campus and sent all of their 10 children through college, nine to UD. Like his father, Hopkins became an "aggie" and enrolled in the agriculture engineering program, Class of 1970. Hopkins recalls attending half of his classes on the central campus with civil and mechanical engineering students, the other half in Townsend Hall.

His hand-crafted and time-worn Alpha Zeta pledge plaque, signifying membership in UD’s agriculture professional society, is a virtual Who’s Who of Delaware agriculture, with signatures that include the college’s dean at the time, William McDaniel, Hopkins’ professor, Donald F. Crossan, and classmates Derby Walker and Frank Webb, who became Sussex County Cooperative Extension agents.

"One summer, dad got a visit from University of Delaware President David Roselle," recalled Hopkins. "The president wanted to meet the

Continued from previous page

“There’s a lot of history to this barn,” Hopkins said, affectionately patting the massive barn door frame and soaking in his last looks of the barn’s vintage interior. By June 8, Hopkins beamed as his son Burli guided a small tour of UD alumni from Kent and Sussex — the first outside guests to take a peek inside the fresh white walls, sparkling stainless, and smiling staff eager to scoop their way into the summer. With the added production, Hopkins Farm Creamery can make 250 gallons of ice cream each day during its peak season.

UDairy Creamery delivers cool treats

BY ADAM THOMAS

Residents of Southern Delaware are getting increased opportunities to enjoy UDairy Creamery treats thanks to a new ice cream truck that hit the road in June.

The truck, which has the look of a large mechanical cow, is the result of a partnership between the University of Delaware’s College of Agriculture and Natural Resources (CANR) and the Alfred Lerner College of Business and Economics.

The ice cream truck is decked out with assorted black and white spots, cow ears that can be placed below the side view mirrors and a speaker to play the UD alma mater and fight song. It is being stocked with a rotating list of between 10-20 flavors carried in freezers that make transporting the ice cream to events that much easier.

Melinda Litvinas, UDairy Creamery
family who sent nine children to UD, so he came to the farm. Wouldn’t you know it, but the hat my father wore that day was from his one child who was attending North Carolina State.” Nothing was said about the absence of blue and gold colors, “but a few days later, Dad got a UD hat in the mail,” Hopkins laughed.

One of the ways Hopkins maintains his ties with UD is through a lasting partnership with Delaware Cooperative Extension and Sussex County 4-H. For the past 27 years, for two days each May, the Hopkins family has opened its farm to area school children. It is an agricultural classroom without exams or textbooks. As many as 1,900 youth annually experience an authentic working dairy farm and a chance to explore the many ways a family farm brings food to the table. Extension staff provides additional interactive displays, helping the young visitors make the agricultural connection to nutrition, safety and fitness. Staff from the farm and creamery join Hopkins, his wife, Jenny, son, Burli, and wife, Allison, and the fifth generation of the family — 4-Hers Michael, Jacob, Luke and Grace — as hosts and ag educators. Students leave with a new awareness and a free cone to complete the farm-to-table experience.

A former Cape Henlopen school board member, Hopkins continues to play an active role in education through the 4-H school tours. “We have a sense of responsibility — we need to get the message out where our food comes from and how it is produced,” said Hopkins. Occasionally, other small tours of the farm, such as that by the Hopkins family’s commitment to agriculture and community education. 

There is no such thing as a holiday or day off on a dairy farm. The herds of Holsteins yield approximately 12 million gallons of milk annually.

manager, said she has dreamed of having an ice cream truck since she arrived at UD in 2010. “It makes everything much more efficient from an operational standpoint because we’re not loading freezers onto a van and worried about electricity, and we’re not limited in the amount of space that we have,” said Litvinas. “This allows us to be out and about longer and with more ice cream and more flavors to serve more people.”

Mark Rieger, CANR dean, said the partnership of the two colleges in bringing the ice cream truck to the University is “yet another way that UD demonstrates its commitment to quality undergraduate education.”

He added the project would bring students from the two colleges together in an atmosphere designed to foster creativity. “CANR students will work side-by-side with Lerner students to find new markets and learn to be entrepreneurial with our UDairy Creamery ice cream. Real-world experience is a value that both colleges strongly support.”

Bruce Weber, Lerner dean, echoed those sentiments, saying, “An essential element of the Lerner College’s strategy is to emphasize experience driven learning more than any other business school, and this is just a perfect fit with that objective.”

The partnership established between the two colleges involves the creamery and the Horn Program in Entrepreneurship, an academic program at the University made possible by alumnus Charles W. Horn and his wife, Patricia, that is centered on entrepreneurial education.

For more information, visit the UDairy Creamery website at ag.udel.edu/creamery.
ROOTED IN PHILANTHROPY:
A FAMILY’S LEGACY

BY SHANNON H. POTE
In 1916, a young man graduated from Delaware College — as the University of Delaware was then known — and returned home to work on his father’s farm in Bridgeville. If Warren C. Newton had been an ordinary young man, that might have been the end of this story. But Newton was far from ordinary, and this story is just beginning.

Ninety-seven years later, Newton’s tale is best told by his own grandson, Robert Rider Jr., who sits at the helm of the thriving business that Newton first established and graciously tells the story of a family that built a successful business while simultaneously investing in their community and their state.

When Newton returned to Bridgeville with his college degree in 1916, he had a lot of ideas, but little else. Newton and his father, Oliver A. Newton, decided to start a poultry business on their farm, aptly naming it O. A. Newton & Son. Unfortunately, their chickens were poor producers and unprofitable. Newton, however, had developed an interest in feed technology while studying agriculture at Delaware College. He bought the best ingredients he could afford and started mixing his own feed formula. The result? Increased egg production and the growing interest of his neighbors, who began buying Newton’s feed for their own chickens. With that, a successful business was born.

While the company’s namesake, O. A. Newton, was more of a politician than a farmer — serving several terms in Delaware’s House of Representatives and Senate — his son was a true agricultural entrepreneur. In addition to the poultry business, Warren Newton added farm equipment maintenance, chemicals, agricultural irrigation and millwright businesses to the portfolio.

“If there was a need, he wanted to fill it,” said Rider of his grandfather. “More importantly, when an industry cycle matured or the company’s business model changed, he wasn’t afraid to sell or exit a business.”

Rider’s father, Robert Rider Sr. (Bob) connected with the Newton family when he met and fell in love with one of Warren Newton’s three daughters, Jane, while the two were undergraduates at Skidmore College in New York. After Bob Rider left the Army in 1952, his father-in-law laid out a detailed case to persuade him to forego the many offers of employment he had received and come to work for him in Bridgeville instead. As many people do when faced with pressure from in-laws, he acquiesced. He would not regret the decision.

In 1969, O. A. Newton & Son sold its poultry business to Armour Swift, who in turn sold the business to Perdue. Around the same time, Newton relinquished the reins of the company to Bob Rider, who ran the company until he retired, at which point his son, Rob, took over as president.

Today, the modern O. A. Newton Company is still rooted in agriculture. Primary businesses include commercial and agricultural irrigation and engineered material handling systems. And the family that runs the business is still committed to UD and the state of Delaware.

Newton was proud to be an alumnus of UD. His pride was evident in the service and support that he gave the University throughout his life, serving as a member of the University’s Board of Trustees from 1922 until his death in 1977. Newton provided for the University in his will, leaving money to establish an endowed fund to support education in the College of Agriculture and Natural Resources. The Warren C. Newton Endowment at UD is still supported by Rob Rider and other family members.

According to Mark Rieger, dean of the College of Agriculture and Natural Resources, the support provided by this endowment helps to advance the college’s mission.

“We are extremely fortunate to have the Warren C. Newton Endowment,
not just for the valuable funding it provides, but because it was designed to recognize that the needs of the college change over time," said Rieger. "For example, we used the fund to provide microscopes and other laboratory upgrades several years ago, and more recently used it for greenhouse operations that serve both research and teaching. Having the flexibility to direct the funds to our most pressing needs is a great advantage, and we thank the Rider family for their thoughtful and generous support."

Neither Rob Rider nor his father graduated from UD; however, their commitment to the University has been as strong as that of any alumnus.

"My father felt that, although he wasn’t a graduate of UD, he was a citizen of this state, and part of being a good citizen was supporting state resources, like UD," said Rider. "That, coupled with the fact that the Newton side of the family felt such affinity for UD, made my father and me want to continue that tradition of support."

Bob Rider became a member of the UD Board of Trustees in the mid-1980s, and remained a trustee or trustee emeritus until his death last June. According to Rob Rider, one of his father’s proudest accomplishments was chairing the Board’s Grounds and Buildings Committee from 1989-2003 during which time a remarkable $706.7 million was expended or committed to building and renovation projects. Under Bob Rider’s leadership, nearly half of the UD campus was built or renovated.

"My father felt that, although he wasn’t a graduate of UD, he was a citizen of this state, and part of being a good citizen was supporting state resources, like UD."

"My dad believed strongly in the University and its mission, and that meant growing and not becoming stagnant," said Rider.

For his part, Rob Rider is happy to be carrying on the family tradition of support and volunteerism at UD and other, mostly conservation-based philanthropies. He recently accepted a position on the Advisory Council for UD’s College of Agriculture specifically for education and agriculture, is important," he said. "We have to feed this world, and the world is growing. To have young people remain interested in agriculture, from research to farming, is vital."

With all its growth and success, one might wonder why O. A. Newton has remained in the small town of Bridgeville all these years. Rider’s answer to that question reveals his admiration for the area.

"There is no better place to base a business, from our perspective, than Southern Delaware," said Rider. "There is a terrific workforce and terrific resources like the University of Delaware, Delaware Tech and the Cooperative Extension Service to help train our workforce. Delaware is simply a unique place. There are not many places where you can pick up the phone and call anyone, including the governor."

He continued, "I travel all over for business, but when I drive back across the Bay Bridge, and I hit the Delaware line and see the agricultural landscape and the scenery, I just take a deep breath and think, 'I'm home.' It is just a wonderful place to live."

Note: Robert Rider, Jr. lives in Sussex County with his wife, Susan. Their blended family includes Susan’s grown son and daughter and Rob’s two grown sons and teenaged daughter.
NEWTON FAMILY TREE

O.A. Newton

Warren Newton

Robert Rider
For Delaware farms near the coast or close to brackish waters, dry seasons can hit hard in two ways. Not only are the farms deprived of fresh rainwater to help boost their crop yields, they also face the threat of farmland salinization.

Farmland salinization is exactly as it sounds: salt water seeps into farmland soils and spoils crops, and with sea levels rising in the First State, the problem doesn’t appear to be going away any time soon.

“There’s probably acres that get flooded every year, so that’s a continual challenge,” said Cory Whaley, a Cooperative Extension agent at the University of Delaware. “The salt levels just get so high that it becomes, in most cases, impossible to grow our normal grain crops, corn and soybeans.”

That’s a big problem for Delaware farmers, as the two most popular crops grown in the state — corn and soybeans — are sensitive to salt, although Whaley does note that corn is slightly more salt tolerant than soybeans.

In 2008, Whaley saw the effects of farmland salinization firsthand in areas around the Delaware Bay. A high tidal surge impacted thousands of acres, resulting in significant crop loss.

Not only did the tidal surge kill the crops for that season, but it also had lingering effects for future yields.

“The frustrating part is that it destroyed the crop that was there, but if you come back and replant, your chances of having salt injury on the replant is there, so it’s almost like you’re leaving it barren,” Whaley said, noting that this problem is largely dependent upon how long the salt water sat on the cropland and how much salt got absorbed into the soil.

When it comes to dry seasons, Whaley said the threat of farmland salinization is especially prevalent because “you’re relying on rainfall or irrigation to leach out the excess salts. So the more precipitation on the ground, the more salt you’re going to leach out.”

When there is big tidal flooding, Whaley said an option farmers have at their disposal to deal with salinization is to moldboard plow. This practice allows for a plow to go 10-12 inches into the earth and turn the soil over, taking the topsoil and putting it on the bottom. This helps the crop get going by having fresh soil on top and allowing the rain to leach out the salt from the bottom of the crop.

Whaley said that when they conducted soil testing for salt concentrations, they found that as the salt water receded, the salt levels were higher the closer they got to where the water initially came up.

For farmers that grow in areas where salt levels are the highest, Whaley recommended crops that can handle higher salt levels such as wheat, barley or certain species of grass for hay.
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Clean bill of health

UD researchers look at ‘structural health’ of Indian River Inlet bridge

BY KAREN B. ROBERTS
In the wake of Hurricane Sandy, University of Delaware researchers intently studied the structural health of the new Charles W. Cullen Bridge at Indian River Inlet, which sustained 56 mile per hour winds during the storm and even greater wind gusts.

According to Michael J. Chajes, professor of civil and environmental engineering, the hurricane was an “unplanned calibration test of a wind event” that allowed sensors embedded in the bridge to capture data 125 times per second over a two-day period before and during the storm.

While they are still analyzing the data, researchers were encouraged by the bridge’s performance and consider it an example of useful data the bridge’s structural health monitoring system can provide.

“Officials faced with inclement weather need to make decisions about whether or not to close a bridge and as we build up our data sets, they may help officials define parameters for what wind speeds are safe for bridge traffic, a major concern on this structure,” Chajes said.

Near midnight on Wednesday, Nov. 28, 2012, six trucks weighing roughly 30 tons each crawled across the bridge, collecting additional data from the nearly 150 sensors embedded in the 1,750-foot cable-stayed structure. The trucks were driven in pre-determined patterns across the bridge. Data samples, collected 125 times per second, measured the strain, vibrational response, movement, temperature, wind speed and pitch of the bridge deck.

It is the second of four calibration tests UD researchers Harry (Tripp) Shenton, Gary Wenczel and Chajes will perform over the next two years, in collaboration with the Delaware Department of Transportation (DelDOT).

“It’s sort of like a physical for the bridge, and will create a baseline for the bridge’s structural health,” explained Chajes. If the bridge endured significant stress, due to, say, an overloaded truck, it can evaluate whether or not any damage may have occurred.

“Fifteen or 20 years down the road, you could perform this test again and compare the results to the initial data set. If the bridge were damaged, we believe analyzing the data would reveal some detail about the cause,” added Shenton, professor and chair of the Department of Civil and Environmental Engineering.

While adding a structural health monitoring system may enable a bridge owner to more effectively manage and maintain the structure, thereby extending the bridge's designed life span, according to Wenczel, the technology has yet to be widely accepted or adopted in the United States because it carries a cost — approximately 1 percent the cost of the bridge.

“Similar monitoring systems are already used in the automobile industry and the petroleum industry where production problems are both costly and environmentally undesirable,” said Wenczel, project manager. “We’re working to prove the system’s effectiveness and value in the bridge industry.”

After a storm, DelDOT engineers typically visit and inspect the bridge for signs of wear or damage. Structural health monitoring systems can capture hourly snapshot data to determine environmental effects, temperature changes and other steady state bridge behaviors that fluctuate over time, as well as event data, such as wind or a large vehicles, where the system triggers itself and records for a pre-determined length of time.

One of the current challenges is incorporating this new data into traditionally accepted bridge assessment methods. The UD research team, which helped design and install the system, is now working to educate DelDOT engineers and the bridge owners about how to understand and make use of the data.

“We are the bridge between the technology and the bridge owners and engineers — no pun intended,” concluded Shenton.
PROTECTING TIDAL WETLANDS
According to a 2007 report by the Intergovernmental Panel on Climate Change, global sea level is expected to increase one half meter or more over the next century. Along the Mid-Atlantic coast of the United States, relative sea-level rise is about two times higher than the global rise.

In Delaware, nearly 371,000 acres of contiguous tidal wetlands surround the Delaware Bay. Studies indicate that the proportion of wetlands that were degraded increased from 25 percent in 1984 to an alarming 54 percent in 1993.

Three University of Delaware scientists are studying tidal water flow and sediment movement in a Kent County salt marsh to better understand changes to the marsh ecosystem due to a rising sea level.

In Delaware, nearly 371,000 acres of contiguous tidal wetlands surround the Delaware Bay. Studies indicate that the proportion of wetlands that were degraded increased from 25 percent in 1984 to an alarming 54 percent in 1993. "Developing new methods to quantify water and sediment movement in these wetlands, on marsh surfaces and in small tidal channels will provide critical information related to marsh stability."

Increasing rates of sea level rise could convert this tidal wetland to an intertidal flat, an environment where muddy sediment can be quickly eroded. This conversion to an intertidal flat has the potential to alter water quality by releasing large quantities of sequestered carbon, nutrients and pollutants, and could affect wildlife such as birds, crabs and fish that live in coastal marshes and waters.

"Developing new methods to quantify water and sediment movement in these wetlands, on marsh surfaces and in small tidal channels will provide critical information related to marsh stability. This information is needed to predict future changes," said Jack Puleo, associate professor of civil and environmental engineering and in the Center for Applied Coastal Research.

Brockonbridge Marsh is a tidal wetland adjacent to Brockonbridge Gut, a small tidal creek located approximately 24 miles upstream from the mouth of the Delaware Bay. It is characterized by daily tidal flooding and extensive cordgrass vegetation.

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Jack Puleo and graduate student Aline Pieterse conduct research in the Brockonbridge Marsh.

PROTECTING TIDAL WETLANDS
UD scientists study tidal flow, sediment movement in Kent County salt marsh

BY KAREN B. ROBERTS

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Jack Puleo and graduate student Aline Pieterse conduct research in the Brockonbridge Marsh.
Puleo is collaborating with Thomas McKenna, a hydrogeologist with the Delaware Geological Survey and associate professor of geological sciences, and Aline Pieterse, a doctoral student studying geological sciences. The team worked in the field for over three weeks in March and April to quantify the hydrologic processes across the intertidal flat, particularly how tidal forces move water and fine-grained sediment in and out of tidal channels cut into the marsh platform during many, but not all, high tides.

“While this study necessarily focuses on a single marsh in Delaware, the data and techniques developed can be applied at other tidal wetlands, both within and beyond Delaware’s borders,” remarked McKenna.

It may also inform ecologists about how tidal dynamics affect the ecosystem, particularly whether it alters the marsh’s biogeochemistry or affects certain plant or animal species currently living there.

To perform the study, the research team developed an innovative imaging system that included thermal infrared sensors. Sensing hydrologic processes in tidal wetlands is difficult with only visible-band imaging, a technique commonly used along sandy coastlines, explained Puleo, because there are no obvious high contrast signatures such as waves.

“Our analysis used heat to track the water’s path,” added Puleo, who, along with McKenna, Pieterse and a rotating team of graduate and undergraduate students, remained on-site around the clock during the experiment.

The research team deployed over 40 sensors on the tidal flat to measure water flow and sediment concentration while the imaging system, mounted on a 17-meter tall retractable mast and operated by remote control, allowed them to capture images from live video feeds of the marsh over time. Reference marks in the imagery, surveyed with a global positioning system, enabled them to analyze the recorded images using real-world coordinates.

According to Puleo, this is the first experiment of its kind to simultaneously record imagery and millimeter-scale velocity profiles in this type of soft, muddy environment.

Access to Brockonbridge Marsh was generously provided by Delaware Wildlands Inc., a non-profit conservation and preservation organization. Accommodations for the research team were graciously supplied by the South Bowers Sportsman’s Club.

“Improved predictive models are needed if scientists and engineers are to understand, and potentially mitigate, the negative effects on marshes exacerbated by rising sea levels,” he said.

The research team’s work is supported in part by Delaware Sea Grant.

Jack Puleo (center) with graduate students Thijs Lanckriet and Aline Pieterse at work in the Brockonbridge Marsh.

“Protecting tidal wetlands” by Evan Krape
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Just as laboratories need pipelines for water and natural gas, they also need a “pipeline” that provides a continuous supply of people able to conduct research there.

Making sure the people pipeline is full of well-trained individuals from its source in the elementary grades to its outlet in the academic and commercial laboratories of the world is one of the most important goals of Delaware’s Experimental Program to Stimulate Competitive Research, or EPSCoR.

“Expanding the pipeline of students pursuing science, technology, engineering and mathematics — or STEM fields — is a matter of national importance,” said Jeanette Miller, director of education, outreach and diversity for Delaware EPSCoR. “The cornerstone of EPSCoR is building research capacity through infrastructure improvements, and that includes developing people as well as building facilities and buying equipment.”

By linking the four institutions of higher education in Delaware that offer science degrees, EPSCoR also provides alternative pathways for nontraditional students and members of underrepresented groups that might not otherwise find their way to a STEM career.

Pursuing a research career can be daunting, but Delaware EPSCoR provides both the financial and personal support that aspiring scientists often need to persevere.

For Mollee Crampton, a master’s student in biological sciences at UD, that support has been a key component to achieving her goals.

Crampton’s journey illustrates how the statewide EPSCoR network links what might otherwise be disjointed steppingstones into a smoothly flowing pipeline of higher education.

A resident of Kent County, Crampton attended Caesar Rodney High School. There she dreamed of pursuing a degree at the University of Delaware, but finances were an obstacle. In Crampton’s case, a combination of state and national funds, including support from the EPSCoR program, has been instrumental in shaping her journey.

Rather than applying to UD initially, Crampton took advantage of a new state scholarship program and a program for STEM students sponsored by the National Science Foundation (NSF). The SEED (Student Excellence Equals Degree) Scholarship program, funded by the state of Delaware, enables students to pursue an associate degree from Delaware Technical Community College for free if they meet certain basic qualifications. The NSF Scholarship in Science, Technology, Engineering and Mathematics (S-STEM) is meant to stimulate undergraduates to pursue degrees in these four critical areas.

When Crampton completed her associate degree in biotechnology in May 2009, her adviser at Delaware Tech, Barbara Wiggins, encouraged her to apply to a Research Experiences for Undergraduates (REU) internship program in molecular genetics and genomics at Delaware State University for the following summer. One of several REUs in Delaware supported by NSF, the program places undergraduates in research laboratories for the summer, allowing them to make real contributions to the investigations under way. Crampton’s internship was hosted by Venu Kalavacharla, associate professor of plant molecular genetics and genomics for the College of Agriculture and Related Sciences and director of the REU program at Delaware State.

Kalavacharla’s lab also receives EPSCoR research funding, which made all the difference to Crampton. After her summer REU, she was hired to continue working in the lab during the academic year.

“They paid me to do research,” she said, “so I spent a lot more time in the lab than if I had also needed to work in a restaurant or something.”

As a student researcher, Crampton worked with the common bean, which includes “most species of bean that are normally eaten, except for soybeans,” she said. Much of her effort focused on discovering genes for disease resistance. She compared genetic variations in the bean genome to the genome of Arabidopsis, a plant commonly used as a model by plant geneticists because its genome has been completely sequenced.

Crampton also played an active role in mentoring other undergraduate students and exciting them about the possibilities of research in biology. The positive experience encouraged Crampton to finish her degree at Delaware State.
In 2010, she attended a regional agricultural conference in Atlanta held by the 1890 Association of Research Directors (ARD). “Being able to present a poster about my research at a regional event was excellent preparation for graduate school,” she said.

She also worked with other researchers in the Kalavacharla laboratory and co-authored a peer-reviewed manuscript that was published in March 2012 in *BMC Plant Biology*.

Crampton received a bachelor of science degree in biology with a concentration in biotechnology in May 2011 with a 3.95 grade point average. That summer she was awarded the University of Delaware’s Bridge to the Doctorate (BD) graduate fellowship to pursue an advanced degree in biology. The BD fellowship is funded by NSF to promote the participation of underrepresented students (including women) in STEM disciplines.

Her current research focuses on antimicrobial resistance using Salmonella bacteria. She works under the supervision of Diane Herson, associate professor in the Department of Biological Sciences at UD.

Crampton is also involved in a collaborative project with Pennsylvania State University, where researchers are seeking ways to deal with a glut of used tires by grinding them up into crumb rubber and applying them as a soil amendment. However, tires are known to leach chemicals when exposed to an acidic environment, such as acid rain. Crampton is studying Salmonella as a model organism to discover the effects of the leached chemicals on bacterial growth.

“We want to know whether the leachate is an inhibitor of bacterial growth or whether it allows bacteria to propagate more freely. Either property could have serious consequences on the local environment,” said Crampton.

Crampton is currently pursuing the molecular biology and genetics track at UD and hopes to work in research and development for a pharmaceutical or biofuel company after obtaining her Ph.D.

“One thing led to another from Delaware Tech to my internship, and then from Del State to the University of Delaware,” she said. “I’m really grateful that EPSCoR has been there to help support me in reaching my goals, and I’d like to give back by encouraging other students to do the same and by contributing productively to our society.”

According to Kalavacharla, Crampton’s adviser at Delaware State and member of the Delaware EPSCoR leadership team, Crampton and other students like her might not have access to the pipeline of Delaware institutions without the relationships forged by EPSCoR.

“I’m really grateful that EPSCoR has been there to help support me in reaching my goals, and I’d like to give back by encouraging other students to do the same and by contributing productively to our society.”

“Thanks to EPSCoR, we all have much better knowledge about what opportunities exist at each of our institutions and can direct students accordingly,” he said. “The pipeline is alive and well in Delaware.”
Milford native Becky Godwin has taken the phrase “student becoming the teacher” to a literal level. The product of every phase of education in the Milford School District — from preschool to high school — has returned to her hometown to teach at her old institution, the Morris Early Childhood Center.

“I already knew so many people going into the job, and I knew so much about the school district and the school itself from going through its programs, that the adjustment period was really short,” Godwin said. “I’m so comfortable there, and feel so supported in my work.”

Godwin began her college career as an early childhood education major at the University of Delaware. In her sophomore year, she met Cynthia Paris, a professor in the College of Education and Human Development, who encouraged her to join the University’s Honors Program.

“The first step to becoming an Honors student was adding a research component to her child development class. She decided to conduct research on a topic she had always found intriguing — how do children think about their own thinking? I wanted to see how capable young children are of considering their own thoughts. I used case studies and one-on-one conversations to invite children to talk about their cognitive process,” explained Godwin. “I found that certain strategies worked more effectively at getting the children to talk about their thinking.”

This evolved into another project, investigating teacher strategies that could boost preschoolers’ awareness of their own thinking and identify possible benefits of this awareness. She found both her coursework and research to be interesting and inspiring.

During her senior year, Godwin chose to fulfill her student teaching requirement at Southern Delaware schools. This allowed her to live at home while gaining practical field experience in both the Milford and Cape Henlopen school districts. In addition to teaching full-time, she traveled to meet with her seminar class in Newark a few times a week.

“I had to focus a lot on scheduling, so that everything could be finished on time and ready for my student teaching classroom,” Godwin said. “It was a good lesson to learn, though, and the commute gave me some time to myself during such a busy semester.”

As a result of her dedicated efforts, Godwin graduated with honors in January with a perfect 4.0 grade point average in early childhood education. Not only that, she earned a number of other accolades at the University:

• University of Delaware Distinguished Scholars Award;
• Catherine Beiber Award for Academic Achievement and Leadership in Human Development and Family Studies;
• Phi Delta Kappa Award for Evidence and Promise of Excellence in Educational Research; and
• Lila C. Murphy Award for Women’s Equity and Leadership.

She is now back home in Sussex County working with special needs children as an itinerant specialist in the Milford School District. She works with preschoolers and kindergartners in multiple classrooms across the district, using each student’s Individualized Education Plans to help them reach their targeted level.

Her children need help across various domains, from math and reading to behavioral and emotional regulation, and the experience has given her the opportunity to delve more deeply into the realm of special education.

Godwin says her job in Milford complements her areas of research and is providing valuable experience if she decides to obtain a teaching position.

The passion she found for education at the University has only solidified since she graduated, she said. “Of course, some days are tiring and stressful, but I am grateful for the career that I have found. I wake up looking forward to the day and leave smiling every night,” Godwin said.

While her professional career is taking off, Godwin said she is also looking to further her academic career. She has continued to develop the research she began at the University and presented her work at the Making a Difference Conference for the Delaware Head Start Association and Delaware Association for the Education of Young Children in April.

“I’m hoping to help teachers around the state bring child awareness of thinking and ability into their own classrooms,” she said.
The product of every phase of education in the Milford School District—from preschool to high school—has returned to her hometown to teach at her old institution, the Morris Early Childhood Center.
The world is getting smaller for 5-year-olds in the Caesar Rodney School District. Students in other countries often learn world languages beginning in the early years. In order to prepare the state’s workforce for a global economy in the decades to come, Delaware Gov. Jack Markell has launched the World Language Initiative (WLI) program with the goal of students mastering another language before entering high school.

This school year, 100 kindergartners attending the J. Ralph McIlvaine Early Childhood Center in Magnolia, Del., entered the state’s only Chinese language immersion program. Kindergartners spend half their day learning literacy, math, science and social studies in Chinese and the other half in English speaking classes.

The program was successfully launched thanks to the efforts of several University of Delaware alumni and the support of UD’s Confucius Institute.

Kevin Fitzgerald, superintendent of the Caesar Rodney School District, whose district has embraced the concept of preparing students for a global economy by offering six languages in high school, jumped at the opportunity to provide kindergarten students with the advantage of learning Chinese. Fitzgerald earned his doctorate degree from UD’s College of Education and Human Development.

Sherry Kijowski, principal at McIlvaine Early Childhood Center, and assistant principal Brook Castillo, both UD graduates, were responsible for implementing the program at McIlvaine ECC.

“It is amazing to walk through the halls this year and hear 5-year-olds saying ‘ni hao’ (hello) and ‘xie xie’ (thank you),” said Kijowski. “We had 285 applicants for 100 slots in our school,
demonstrating that many parents recognize the benefits of knowing another language and deliberately choosing to enroll their children in our Mandarin Chinese program.”

Carrie Fang, program coordinator at the Confucius Institute — and a UD graduate as well — led the collaboration with McIlvaine ECC, helping to introduce Chinese language and culture to the community. They developed evening programs at the school to teach students and parents about Chinese characters, instruments and costumes, as well as holding programs on science, social studies and traditional festivals.

Since few teachers in Delaware are qualified to teach in Chinese, the Confucius Institute helped connect state officials with Hanban, a Chinese government agency that identifies teachers who want to work overseas for up to three years. Markell is so impressed by the success of the existing programs, he has committed to expanding the K-8 immersion program, with an annual investment of $1.9 million, designed to reach nearly 10,000 students by 2022.

In addition to the Chinese program at McIlvaine Early Childhood Center and a Spanish program at John M. Clayton Elementary School and Lewis Elementary School, seven elementary schools will begin offering the program for the 2013–14 school year.

“It is amazing to walk through the halls this year and hear 5-year-olds saying ‘ni hao’ (hello) and ‘xie xie’ (thank you).”

An Wei introduces kindergarten students to Mandarin Chinese.

PHOTOGRAPH BY KATHY ATKINSON
Surveying beachgoers about offshore energy production

UD research team finds support for wind turbines

By Adam Thomas

The University of Delaware’s Kent Messer leads a research team that is conducting two studies at the Delaware coast to determine how people would react to offshore energy production and how that could impact the state’s economy.

The first study was conducted at Cape Henlopen and Rehoboth Beach and involved students surveying beachgoers to see how open they were to the idea of offshore energy, specifically wind turbines and oil drilling platforms.

“The question was how close these turbines and platforms could come to shore before people would no longer want to visit Rehoboth Beach or Cape Henlopen that day,” said Messer, Unidel Howard Cosgrove Chair for the Environment in UD’s College of Agriculture and Natural Resources (CANR). “Would it negatively impact their experience to the point where they didn’t want to be there anymore?”

Using a computer simulation, passersby who participated in the survey, conducted last year, were given the option to have oil platforms or wind turbines, or both, off the coast of Delaware at various distances.

The idea behind the project was that if participants moved the objects closer to the beach, it would result in lower energy costs, especially with regard to wind turbines that lose efficiency the farther out to sea they are located, but the objects would also have a bigger impact on the coastal view.

Moving the objects away from the beach would result in higher energy costs but beach visitors would have a less obstructed view.

“If you go to the Gulf of Mexico, you see oil rigs off the coast. We don’t have them in the Atlantic but it could happen,” said Messer. “So we used virtual reality simulations, presenting pictures of the Delaware shore and imagining what these structures would look like at various distances.”

The researchers allowed people to indicate the distance at which structures could be placed offshore before they would no longer want to visit that area, choosing to go elsewhere instead.

Messer said that 500 people participated in one stage or another of the survey, with 148 completing the entire 30-minute survey.

The group’s findings indicated that people would be more open to viewing wind turbines off the coast than oil platforms, and that people were generally very open to the idea of having wind turbines at the beach if it resulted in lower energy costs. In fact, only about 30 percent of participants indicated that the presence of wind turbines would detract from their beach experience, while 60 percent indicated the same for oil platforms.
On average, research participants were willing to have the wind turbines just over 2.5 miles off shore before they would no longer have made their visit to the Delaware beaches. In comparison, Delaware beach visitation would have been affected by oil platforms if they were approximately 6 miles from the shore.

"An interesting result of this study is that visitors to Delaware’s beaches were comfortable with wind turbines at distances from shore that were significantly shorter than the current permitted area which is 13 miles from shore."

Computer-simulated images of oil platforms (left) and wind turbines (right) at distances of 3 miles, 1 mile and half a mile. On average, research participants were willing to have the wind turbines just over 2.5 miles off shore before they would no longer have made their visit to the Delaware beaches. In comparison, Delaware beach visitation would have been affected by oil platforms if they were approximately 6 miles from the shore.

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**Wind turbines and hotels**

The second study involves Messer, his faculty collaborators and his students trying to gauge how proximity to the UD wind turbine on the Hugh R. Sharp Campus in Lewes impacts a tourist’s willingness to stay at certain hotels in Southern Delaware.

Using the Cape May-Lewes Ferry as their “floating lab,” Messer and his students auctioned off lottery tickets to willing participants in which the participants could win a free stay at one of three Lewes area locations: UD’s Virden Center, the Hotel Blue and the Beacon Motel.

Messer explained that the three hotels currently sell hotel rooms either with a view of the UD wind turbine or without a view of the turbine. The goal of this study is to measure how willing people might be to pay to see the turbine (or to avoid seeing them) and, because the hotels are at different distances from the turbine, how proximity to the wind turbine impacts tourist behavior. Overall, about 57 percent of people showed no difference or a preference for a room with a view of the turbine. This number was higher for the more luxurious Hotel Blue than for the other two. The difference in bid amount between the rooms with and without the windmill views was about 11 percent for the Virden Center and the Beacon Motel, and 17 percent for Hotel Blue. These results suggest that some visitors are sensitive to viewing wind turbines and would prefer views without them.

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On average, Delaware beach visitation would have been affected by oil platforms if they were approximately 6 miles from the shore.
Express to success

Delaware Small Business and Technology Development Center helps Sussex County entrepreneurs launch dream business

BY LAURA GLEASON

Entrepreneurs Jean and Gary Marsiglia pinpointed Millsboro as the site for their new business because of the favorable demographics and projected growth for the area. But after being in business for less than one year, they found that they love the town for the people who live there. “We are extremely pleased with Millsboro and all of the people we have met here. We have a wonderful staff that we can trust, and all of our customers have been extremely nice and receptive to us and to our business,” said Jean Marsiglia.

Though their Castrol Premium Lube Express business is new, neither of the Marsiglias are newcomers to the automotive industry or to running a business. Before becoming a Maryland area developer for Precision Tune Auto Care, Gary Marsiglia had a successful career at General Motors and also ran his family’s automotive business.

Jean Marsiglia managed the office of her family’s heavy construction firm for several years and later joined Gary in the Precision Tune business, handling marketing, accounting and personnel, and completing six Precision Tune Auto Care courses to increase her knowledge of the automotive industry.

In nine years, the Marsiglias grew their Maryland Precision Tune area fivefold and purchased the area developer business and two service centers. After years of success, however, the business declined. “Car counts in the region dropped due to new vehicle purchase incentives, extended warranties, and better-built automobiles. The industry shifted from repair to maintenance,” said Gary Marsiglia. “At that time, I started to consider my options.”

Interested in a new business venture, he retired from Precision Tune. The Marsiglias sold their Maryland home and moved to South Bethany, where they own a second home. “We vacationed in Southern Delaware for many years and bought the home as a getaway, but we soon found that we were coming here much more than we thought we would,” Gary Marsiglia said. “We just loved the area and we knew that at some point, we would enjoy living here full-time,” added Jean.

The Marsiglias were excited to launch a new business but were uncertain of exactly which kind of business to start. For guidance, they turned to the Sussex County Small Business and Technology Development Center (SBTDC) in Georgetown.

A unit of the University of Delaware’s Office of Economic Innovation and Partnerships (OEIP), the Delaware SBTDC has offices in Newark and Dover as well, and is dedicated to strengthening Delaware’s economic base by providing high quality services that include management assistance, educational programs and resources to Delaware’s business community and entrepreneurs.

The Sussex County SBTDC director, Bill Pfaff, worked diligently with the Marsiglias throughout their business selection process. “We went to Bill with a number of different ideas before we decided on Castrol. Bill had a wealth of information about Sussex County, shared his ideas, and was a great sounding board for us,” Gary Marsiglia said.

As they pursued business opportunities, the Marsiglias were tapped by a long-time vendor to their previous businesses, the Castrol Oil Company, to launch Castrol Premium Lube Express Centers in Delaware and Maryland. With a 100-year-old global brand behind them and their extensive business and industry experience to guide them, the Marsiglias had found their match.

After settling on a business, the Marsiglias continued to work with the SBTDC for financing assistance. With guidance from Pfaff and support from WSFS Bank and the Delaware Economic Development Office, they secured a Small Business Administration 504 loan.

“The reason we get up every day and open our doors at the SBTDC is because of clients like Jean and Gary Marsiglia. With our assistance, they developed the business plan needed to secure the financing to build their dream,” said Pfaff.

The Marsiglias’ Castrol Premium Lube Express, a Delaware certified woman-owned business, opened in July 2012 and 60 percent of its clientele are women. “Women like it because it is super clean,” said Jean Marsiglia. “We also provide excellent customer service and believe in educating our customers in a respectful way. They know they can trust us.” With their business know-how and dedication to customer service, it is no surprise that the Marsiglia’s business is performing better than expected. “We serviced more than 4,000 vehicles in seven months,” said Gary. “That’s pretty impressive.”

Energized by their success, the Marsiglias plan to add Castrol Premium Lube Express locations in the region. With Delaware’s business friendly climate and support for small businesses, it is easy to understand why the Marsiglias have chosen to experience the rewards of entrepreneurship in the First State.
Beach enthusiasts, seafood lovers and anyone intrigued by the ocean can visit the University of Delaware’s Hugh R. Sharp Campus in Lewes on Coast Day to learn about the state’s beloved coastline.

To be held on Sunday, Oct. 6, the free, family-friendly festival features ship tours, cooking contests, critter touch tanks, interactive exhibits and more.

“Coast Day is educational, informative and fun,” said Nancy Targett, dean of the College of Earth, Ocean, and Environment and director of Delaware Sea Grant. “It is a great way to build understanding of the beaches and sea life we all enjoy, while also considering what we can do to protect the coast for future generations.”

This year’s theme, “Building Resilient Coastal Communities,” explores measures Delawareans can consider to keep the coast thriving.

Through informal talks and hands-on activities, Coast Day visitors can learn about topics such as hurricane preparedness, sea level rise and coastal planning.

A flume tank will demonstrate wave formations and storm conditions, and UD researchers will explain how they track environmental conditions to inform emergency response efforts.

Keeping with the “building” theme, new this year a special exhibit of ships made out of Legos will be on view in the Cannon Laboratory. Constructed by William S. McKinley Jr., the TEACH FLEET (Technology’s Effects And Contributions Highlighted For Learning Ecological Environmental Topics) display is the largest collection of Lego ships in the world.

The fleet includes numerous ship models of real-life seafaring vessels ranging from submarines to battleships and cargo ships. McKinley created the ships...
to educate students and the public about science, technology, engineering and careers related to marine and environmental science. The impressive ships are up to five feet long.

Other family-friendly activities include an event-wide treasure hunt for answers to questions about the environment and Coast Day exhibits. The dazzling Chemical Magic Show will display the wonders of marine chemistry as demonstrated by George Luther, Maxwell P. and Mildred H. Harrington Professor of Oceanography, and his graduate students. Children can also meet sea-dwelling animals such as horseshoe crabs and dogfish sharks at touch tanks.

Plenty of UD researchers will be on hand to explain what they do through hands-on displays, poster presentations and demonstrations in labs and outdoor tents. Wind energy, climate change, microbial scales, algal blooms, ocean sounds and crab ecology are just a few examples of the many topics covered.

Numerous exhibitors from various organizations will share information about their focus areas, from flycasting to a boat show and environmental advocacy. Everyone can enjoy live music, vendor displays and seafood favorites showcased by local chefs at the Crab Cake Cook-Off and the Seafood Chowder Challenge.

Coast Day is hosted by the UD College of Earth, Ocean, and Environment and Delaware Sea Grant. This year’s sponsors include DuPont Clear into the Future, UTEC Survey, WMDT-CW-3, Gamesa, Dover Rent-All, Port of Wilmington, Weston Solutions, Center for the Inland Bays, ERM, Partnership for the Delaware Estuary, Statoil, Survice Engineering, Brownfield Science & Technology, Envirotech Environmental Consulting and Water Resources Agency.
Coast Day features a variety of contests in conjunction with the celebration.

In 2012, Bonnie Robinson of Seaford took home first prize in the Crab Cake Cook-Off with her winning recipe "Bonnie's Delaware Crab Cakes." The recipe featured Japanese-style panko breadcrumbs for satisfying crunch, and the crab cakes were topped with a sweet and sour blend of hot sauce, honey, pickle relish, mayonnaise and spices.

Second place went to Denise Vansant of Rehoboth Beach and third to Joyce R. Sauter of Bridgeville.

Chef Eric Aber of Home Grown Café in Newark, Del., won the annual Chowder Challenge.

Also, the annual fifth grade essay contest was won by Sky Dunmyer, a student at Shields Elementary School in Lewes. Her essay took the point of view of a dolphin named Jeffrey.

Bonnie’s Delaware Crab Cakes
2012 Coast Day Winning Crab Cake Recipe by Bonnie Robinson | Seaford, Del.

Crab Cakes
- 2 pounds lump crab meat
- 3 eggs, beaten
- 1 tablespoon ground nutmeg
- 1 teaspoon sea salt
- 1 tablespoon white pepper
- 4 tablespoons mayonnaise
- 2 tablespoons parsley
- 1 tablespoon mustard
- 2 tablespoons Worcestershire sauce
- ½ cup liquid margarine
- 1 teaspoon baking powder
- ¼ teaspoon garlic powder
- 2 dashes of cayenne pepper
- 2 tablespoons Old Bay seasoning
- 2 cups Zesta crackers, crushed finely
- Mixture of ½ cup panko breadcrumbs and ½ cup Zesta crackers for coating crab cakes

Crab Cake Sauce:
- 2 cups mayonnaise
- 2-3 tablespoons hot sauce
- 2 teaspoons garlic powder
- 2 teaspoons white pepper
- 1 ½ tablespoons honey
- 2 tablespoons pickle relish
- ¼ to ½ cup of Puritan oil for frying

Mix ingredients together except for crab meat and crackers; add crab meat and crackers and mix well and lightly. Make into crab cakes and roll in mixture of ½ cup panko breadcrumbs and ½ cup Zesta crackers. Fry in Puritan oil. Mix crab cake sauce and refrigerate until ready for use.
‘Jeffrey the dolphin’

BY SKY DUNMYER

Hello, my name is Jeffrey. I come up to the surface to take a breath, then 8 to 10 minutes later, I do the same. But imagine if I could not take one of those breaths! The ocean provides 50 percent of the air we breathe from phytoplankton. That means if you take 8 breaths, 4 of them come from the ocean. Did I mention that I’m a bottlenose dolphin, an aquatic mammal? My relatives live all around the globe, but my habitat is the coastal waters of the Atlantic Ocean off the coast of Delaware.

My human friend Sky’s favorite place on the Delaware coast is Dewey Beach because the waves are perfect for her to boogie board. I love it because I get to watch people play all day. Dewey Beach is a great place to have fun — fishing, surfing, swimming, or just relaxing. Sky’s dog really loves to play on Dewey Beach and Sky always cleans up after him, which is important to help keep the beach and ocean clean.

I try to tell everybody I can about preserving the Delaware coast, my home. My relatives down in Florida experienced an oil spill last year and it was awful. I would hate for anything like that to happen in Delaware. One way you can help prevent oil spills from happening in the future is by voting to elect people that care about the ocean.

I’m worried about my home. My food population keeps getting smaller because of pollution and overfishing. Soon there will be no more fish for me to eat. But it doesn’t just matter to me, it is important to you humans, too. Fish is a source of protein for over a billion people. Responsible fishing will help.

I also am worried about the runoff from homes and farms. A lot of people put all sorts of fertilizer on their lawns and garden to make it look beautiful, but if you grow plants naturally, it might even turn out prettier! Do a few weeds really matter? So please use less chemicals and buy fruits and vegetables that are grown sustainably.

I hope you can help me preserve my habitat, and remember these are easy tasks that you can do. I promise you it’s for a good cause! Will you help Sky and me protect the ocean?

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#### ASSOCIATE IN ARTS PROGRAM
Administered through UD’s College of Arts and Sciences, the Associate in Arts Program is a two-year program in the liberal arts and leads to four-year degree opportunities. AAP is offered by UD in Southern Delaware on Delaware Technical Community College campuses in Dover and Georgetown.

**Dover**
- Contact: J. Richard Bacon, associate faculty director
- University of Delaware — Dover
- 100 Campus Drive
- Dover, DE 19904
- Telephone: 302-857-1214
- Fax: 302-857-1280
- Email: jrbacon@udel.edu

**Georgetown**
- Contact: J. Richard Bacon, associate faculty director
- University of Delaware — Georgetown
- Route 18, Jason Technology Center
- Georgetown, DE 19947
- Telephone: 302-855-1657
- Fax: 302-856-5654
- Email: jrbacon@udel.edu

**Newark Administrative Offices**
- Contact: Jack Bartley, faculty director
- Room 101, 77 East Main St.
- University of Delaware
- Newark, DE 19716-2705
- Telephone: 302-831-2473
- Fax: 302-831-4358
- Email: jbartley@udel.edu
- www.cas.udel.edu/associateinarts

#### COLLEGE OF AGRICULTURE AND NATURAL RESOURCES
The college has facilities at the Paradee Center in Dover and at the Carvel Research and Education Center and Lasher Laboratory in Georgetown.

- W. Charles, Sr., and Eleanor Clement Paradee Center (Dover)
- Home of Kent County Cooperative Extension
- 4-H Youth Development, Family and Consumer Sciences, Agriculture, Natural Resources, Master Gardeners
- Doug Crouse, director
- Telephone: 302-730-4000
- extension.udel.edu/kentcounty
- Elbert N. and Ann V. Carvel Research and Education Center (Georgetown)
- Home of Sussex County Cooperative Extension
- 4-H Youth Development, Family and Consumer Sciences, Debtor Education, Food Safety, Child Care Provider Education, Food and Nutrition, Agriculture, Natural Resources, Horticulture, Master Gardeners, Nutrient Management, Poultry, Weed Science, Vegetable Production, Community Development
- Mark Isaacs, director
- Telephone: 302-856-7303
- ag.udel.edu/rec
- Lasher Laboratory (Georgetown)
- Poultry diagnostic services
- Dan Bautista, director
- Phone: 302-856-1997
- ag.udel.edu/rec/lasher/index.html

#### COLLEGE OF EARTH, OCEAN, AND ENVIRONMENT
The college has facilities in Newark and at the Hugh R. Sharp Campus in Lewes, home of the Research Vessel Hugh R. Sharp.

- CEEO Hugh R. Sharp Campus, Lewes
- Classroom and research facilities
- Telephone: 302-645-4212
- www.ceeo.udel.edu

- Delaware Sea Grant College Program
- The University of Delaware was designated the nation’s ninth Sea Grant college in 1976. The program’s goal is to promote the wise use, conservation and management of marine and coastal resources.
- Telephone: 302-831-8083
- Email: ceeo@udel.edu
- www.deseagrant.org

#### COLLEGE OF ARTS AND SCIENCES
**In addition to the Associate in Arts Program, the college offers a variety of programs that serve Southern Delaware.**

- Institute for Public Administration
- IPA, a center within UD’s School of Public Policy and Administration, addresses the policy, planning and management needs of its partners.
- Contact: Jerome R. Lewis, director
- Telephone: 302-831-8971
- Email: jllewis@udel.edu

- Water Resources Agency
- A program unit of the IPA, the agency provides water resources planning and policy assistance.
- Contact: Gerald Kauffman, director
- Telephone: 302-831-4929
- Email: jerryk@udel.edu

#### COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT
The college offers several education-oriented programs in Southern Delaware, including the Delaware Academy for School Leadership and Alternative Routes to Certification.

- Delaware Academy for School Leadership/Southern Delaware
- Carter Partnership Building
- Seashore Highway
- Georgetown
- Jacquelyn O. Wilson, director
- Phone: 302-855-1621

- Graduate Education/Southern Delaware
- Carter Partnership Building
- Seashore Highway
- Georgetown
- Jacquelyn O. Wilson, director
- Phone: 302-855-1621

- Alternative Routes to Certification (ARTC)/Newark
- Contact: Frank Livoy
- Phone: 302-831-4598
- Email: livoy@udel.edu
- www.artc.udel.edu

- Alternative Routes to Certification (ARTC)/Georgetown
- Contact: Stephen Schwartz
- Phone: 302-855-1632
- Email: sschwart@udel.edu
- www.artc.udel.edu

- Delaware Transition to Teaching Partnership
- Contact: Rob Grey
- Email: rgrey@udel.edu
- Phone: 302-831-0212
- www.dt3p.udel.edu

- Associate in Arts in Elementary Teacher Education
- This is a two-year program that leads to a four-year degree designed for
University of Delaware Resources

Students interested in a degree in elementary teacher education. This is offered in Southern Delaware on the Delaware Technical Community College campus in Georgetown. Contact: Laurie Palmer Email: lpalmer@udel.edu

Student Teaching for Elementary Education Teacher Seniors
Students can complete their student teaching placements in Southern Delaware districts. Contact: Kathy Werrell Email: werrell@udel.edu

COLLEGE OF ENGINEERING
The college offers a variety of graduate courses in distance formats, with some programs available entirely through distance courses.

Graduate Certificate in Composite Materials
Contact: Kathy Werrell Telephone: 302-831-4863 Email: werrell@udel.edu www.engr.udel.edu/outreach/short-courses/composites-program/index.html

Master of Science in Electrical and Computer Engineering and Master of Engineering, Mechanical
Contact: Kathy Werrell Telephone: 302-831-4863 Email: werrell@udel.edu www.engr.udel.edu/outreach/distance_learning.html

COLLEGE OF HEALTH SCIENCES
www.udel.edu/chs

ALFRED LERNER COLLEGE OF BUSINESS AND ECONOMICS
www.learner.udel.edu

PROFESSIONAL AND CONTINUING STUDIES
Professional and Continuing Studies offers a wide variety of learning opportunities for residents of Southern Delaware, including online distance learning and lifelong learning programs through the Osher Lifelong Learning Institute at the University of Delaware in Dover and Lewes.

UD Online Distance Learning
Telephone: 1-866-820-0238 Email: continuing-ed@udel.edu www.pcs.udel.edu/udonline

Osher Lifelong Learning Institute, Dover
Modern Maturity Center 1121 Forrest Ave. Telephone: 302-734-1200, ext. 168 Email: LLL-dover@udel.edu www.lifelonglearning.udel.edu/dover

Osher Lifelong Learning Institute, Lewes
820A Savannah Rd. Telephone: 302-645-4111 Email: LLL-lewes@udel.edu www.lifelonglearning.udel.edu/lewes

OFFICE OF ECONOMIC INNOVATION AND PARTNERSHIPS
The Office of Economic Innovation and Partnerships (OEIP), is a University centered, state acknowledged, integrated organization with combined capabilities that enable it to participate effectively in all facets of economic development that occur at the interface of the academic, public and private sectors. OEIP has five operating units: partnership development, small business development, government contracting, technology transfer, and innovation/entrepreneurship. The Delaware Small Business and Technology Development Center (DSBTDC) is a unit of OEIP.

Delaware Small Business and Technology Development Center, Sussex County Center 103 West Pine St. Georgetown, DE 19947 Contact: William Pfaff Phone: 302-856-1555 Email: wpfaff@udel.edu www.dsbtdc.org www.udel.edu/oeip

CONFERENCE SERVICES
UD Conference Services offers a year-round conference facility, complete with overnight lodging, at the Virden Center on the Hugh R. Sharp Campus in Lewes.

Virden Center
Contact: Jay Taylor and Lisa Doak Phone: 302-645-4100 Email: hjtaylor@udel.edu, ldoak@udel.edu www.udel.edu/conferences/locations/lewes.html

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Phone: 302-831-2257 athletics-tix@udel.edu
Development
Phone: 302-831-2104 Toll free: 866-535-4504 www.udel.edu/giving/
University of Delaware Library
Phone: 302-831-2965 www.lib.udel.edu
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