A Natural Solution for Eppley Pools

p. 12
In June 2012, a team of University of Maryland students figured out a way to run a campus power plant fueled by waste materials. Their exceptional work earned them the grand prize in the U.S. Department of Energy’s (DoE) 2011-12 Hydrogen Student Design Contest. The competition had attracted entries from 28 universities from nine countries.

This success followed the university winning the DoE’s 2011 Solar Decathalon — another elite competition. In this one a collaboration of over 200 students, faculty, staff and mentors designed a net-zero energy home that beat 20 other entries from around the world. These research efforts offer dramatic examples of the importance of climate change and interdisciplinary collaboration at Maryland and other major universities around the world.

Global challenges, such as climate change, remind us that we all share this planet and must respect its resources and each other, beginning now and starting here. Global problems are solved with local solutions, and we are reminded of the profound importance of transforming our community into models of sustainability. The University of Maryland is committed to becoming such a model.

At the institutional level, we are making steady progress toward meeting our promise of reaching carbon neutrality by 2050. We have an energy portfolio that includes wind and solar. Our new buildings meet Leadership in Energy and Environmental Design (LEED) standards. We have installed storm water control systems that protect the Chesapeake Bay watershed; recycling has become standard practice; and our support for alternative transportation has resulted in a record number of riders on Shuttle-UM.

While improving the efficiency of our current operations is fundamental to reducing our environmental impact, innovative technologies can provide new pathways to a more sustainable future. Sphagnum moss has become a natural water purifier at the Eppley Recreation Center pools. This has reduced chemical use, improved water quality and decreased maintenance costs. Innovative acts, both large and small, help us not only achieve our campus goals, but to sustain and conserve our planet.

Sustainability is not just in what we do, but how we learn as a campus community. This year, we launched a new sustainability minor. Developed through a collaborative effort by our students, staff and faculty, it received overwhelming support in its first semester.

The broad campus community contributes to our sustainability. Undergraduate students created the University Sustainability Fund in 2008 that supports diverse projects ranging from individual research efforts to improved building operations. The “Trash to Treasure” project, a recipient of the Fund, collects clothing and equipment left by students during move-out. At the end of May, several tons of usable goods were donated to charity instead of ending up in the landfill.

In a dramatic and award-winning act of social entrepreneurship, two students began the Food Recovery Network, a program that collects unused food from our dining halls each day and delivers it to homeless shelters. This kind of dedication has helped our campus achieve a reputation as one of the greenest in the nation, as noted by the Sierra Club, The Princeton Review and others.

When I took this position, I promised we would be relentless in our drive for impact, tackling the biggest challenges of our age, in the most innovative ways possible. Sustainability initiatives have been just that kind of rousing success. Only greater participation and innovation could make it better.

In the coming pages, you will read about amazing work going on at the University of Maryland. With your clever ideas and hard work, we will make our mark on the planet by leaving small footprints.

GO TERPS!

Sincerely,

Wallace D. Loh
President
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Features

Natural Aquatics:
Eppley Recreation Center pools introduce a moss treatment system

Campus Offices GO Green

Sustainability Spans the Curriculum

Recent Awards

- Princeton Review’s Green College Honor Roll
- Sierra Club’s Top 20 “Coolest Schools”
- Second Nature’s Climate Leadership Award
- Maryland Green Registry Leadership Award

Institutional Membership

- National Wildlife Federation
- American College & University Presidents Climate Commitment
- The Association For The Advancement Of Sustainability In Higher Education
- U.S. Green Building Council

Contact

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www.sustainability.umd.edu
Sustainability Fund Projects

Think green, get green! Students, faculty and staff have been awarded more than $290,000 in grants from the University Sustainability Fund over the past two years to implement sustainability projects on campus. For information on how to apply for a grant to put your own project into action, visit www.sustainabilityfund.umd.edu.

1. Stamp Composting
   $32,950

2. Eppley Wind Project
   $14,200

3. Maryland Educational Solar Array
   $30,000

4. Green Roof Research
   $12,410

5. Aquaponics Research
   $12,000

6. Trash to Treasure
   $10,000

7. Green Façade
   $9,500

8. Hydrate UMD
   $9,000

9. Rooftop Community Garden
   $11,900

10. Food Recovery Network
    $3,302

11. St. Mary’s Garden
    $2,051

12. St. Mary’s Garden
    $2,051

13. Public Health Garden
    $42,216

14. Guilford Bioretention System
    $9,000

15. Watershed Constructed Wetlands
    $4,500

16. “Youngest Terps Go Green” Education and Outreach
    $4,450

17. Peace and Friendship Garden Stormwater Project
    $5,000

18. Reclaimed/Recycled Costumes and Sets
    $1,500

19. Sustainable Energy Teaching and Innovation Lab
    $12,500
Sustainability at UMD is truly a community-wide effort. The following are just a few of the groups focused on creating a greener campus. See page 25 or visit www.sustainability.umd.edu to discover how you can get involved.
Sustainability Groups

1. Maryland Sustainability Engineering
2. Office of Sustainability
3. Chesapeake Project Faculty Fellows
4. Student Sustainability Committee of the Student Government Association
5. Facilities Management Campus Planning
6. Dining Services Sustainability Group
7. Food Recovery Network
8. Resident Life Sustainability Committee
9. Public Health Garden Club
10. Library Sustainability Committee
11. Green Office Reps
12. Rooftop Community Garden Club
13. Residence Hall Association Sustainability Committee
14. Student Affairs Sustainability Committee
15. St. Mary’s Garden Club
16. Facilities Management Recycling Unit
The university has dialed down carbon emissions and cranked up the innovation by developing large solar and wind power projects in College Park and across the region. These projects provide 24,000 megawatt-hours of clean power to the campus, enough to power more than 2,000 homes each year.

President Wallace Loh, College Park Mayor Andy Fellows and other local and state dignitaries unveiled 2,632 shiny new solar panels at the Severn Building in August 2011. The solar array—one of the largest in the region—provides electricity at a lower price than a conventional energy supplier. At the unveiling, Dr. Loh said the solar project demonstrates how the university “is committed to a clean energy future, to helping create new green jobs while we combat climate change.”

Electric Vehicles

Electric vehicles (EVs) are an attractive alternative for some commuters seeking to jump off the roller-coaster ride of gas prices. Transportation Services Director David Allen plugs in his all-electric Nissan Leaf at one of 15 new EV charging stations on campus. Ten charging stations are in visitor lots, open to the public, and include free parking and free charging. Parking fees for faculty, staff and student EV owners are discounted by 50 percent.

“Jan. 13, 2012. That was the last time I fueled up at a gas station. What a great feeling.”

David Allen
Transportation Services Director
Farther from home, renewable energy projects developed in part by the university are providing power to the College Park campus and other University System of Maryland (USM) institutions: the Roth Rock Wind Farm in Western Maryland (20 wind turbines), the Pinnacle Wind Farm in West Virginia (23 wind turbines), and a huge solar installation covering 100 acres at Mount St. Mary’s University in Maryland. The 12 USM institutions receive one-third of the output from each project. Campus buildings showcase a variety of other energy-saving efforts. Solar thermal panels produce 30 percent of the Diner’s hot water. Twenty photovoltaic panels provide clean energy to the Cole Student Activities Building. The Eppley Recreation Center has a vertical-axis wind turbine, thanks to mechanical engineering Professor Greg Jackson and Kim Eckert, assistant director of Campus Recreation Services.

The university’s fight against CO2 has even gone subterranean. In 2012, contractors installed geothermal systems at the new Shuttle-UM facility, University House and the Alpha Phi and Phi Sigma Sigma sorority houses. These systems use warmth trapped underground to heat buildings in the winter, then take heat out of buildings and put it back underground in the summer.

David Daily '12, a graduate student in systems engineering, says he appreciates the university’s commitment to renewable energy projects and creating opportunities for students to learn more about these technologies.

“I had the privilege of working hands-on with solar technology through the Solar Decathlon and the Maryland Educational Solar Array,” he said. “These formative experiences encouraged me to pursue a career dedicated to sustainability.”

Campus Carbon Footprint

The university is on track to meet its Climate Action Plan target of cutting greenhouse gas emissions from 2005 to 2012 by 15 percent. Energy conservation, renewable energy generation, alternative transportation, improved waste management strategies, and participation from the campus community will allow the university to make this milestone. The challenge lies ahead as the campus will try to achieve a 50 percent reduction in emissions by 2020 and eliminate its carbon footprint by 2050!
New Residence and Dining Halls Put Green Technology on the Menu

Oakland Hall and 251 North, the university’s new high-tech and super-green buildings, are proving popular among Maryland’s students.

Oakland Hall opened in Fall 2011 as the first new residence hall built at Maryland since New Leonardtown in 1982. The nine-floor building houses 700 students in two-bedroom suites. The building has earned LEED Gold certification, acknowledging its environmentally friendly features such as locally sourced building materials, motion-sensing lights in the lounges, and indoor bike parking.

“I definitely recommend getting a bike if you live in Oakland,” says junior chemical engineering major Boheng Ma. “I used the indoor bike storage room every day, and it was really good for keeping my bike secure and out of the rain.”

Andrew Van Der Stuyf, assistant director for the Department of Residential Facilities, which oversaw the design and construction of Oakland, says his team’s learning curve was “tremendous and inspiring.”

“We were all asking, ‘What else can we do to make the building not only more efficient, but more environmentally friendly?’” he says.

Students have flocked to Oakland, which had more requests for rooms than it had space for Fall 2012.

The dining hall across the street also draws crowds every night. The former Denton Dining Hall was renovated and reopened in Fall 2011 as 251 North, a LEED Silver building featuring a green roof and a trayless dining system that reduces food waste. More than 1,400 students dine there on the average weeknight.

“In addition to new menu items, like Fair Trade quinoa and Asian lettuce wraps, students seem to enjoy the renewed sense of community that this dining hall has created on campus,” says Dining Services director Colleen Wright-Riva.

That community is about to get bigger and greener: Prince Frederick Hall, which will also meet green building standards, is on track to open on Preinkert Drive in 2014.

Facilities Master Plan
If you think the campus is green now, the 2011-2030 Facilities Master Plan outlines an even greater commitment to sustainability. Recommendations focus on sustainable practices and environmental stewardship, landscape design and land use; and vehicular and pedestrian traffic. Among the biggest changes will be construction of the Purple Line, a light-rail connector from Bethesda to New Carrollton with three stops on or near campus. The plan fully communicates a vision for a modern, thriving research university, says Vice President for Administration and Finance Robert Specter. “We want to build a green campus that is an ‘academic park in the city,’ and a showcase of the University of Maryland’s commitment to leadership in sustainability practices and environmental stewardship.”
The Public Health Garden, sandwiched on a slope between the Eppley Recreation Center and the School of Public Health, grows a huge variety of vegetables and fruit, including broccoli, peas, melons and garlic. A small but vibrant space next to Language House in St. Mary’s Hall overflows with herbs and vegetables native to Asia, India and many other countries. And The Diner and the South Campus Dining Hall are home to garden boxes made from recycled pallets and brimming with tomatoes, lettuces, basil and more.

The Farmers Market at Maryland, which runs from May to November, provides a weekly opportunity for students, faculty and staff to purchase healthy foods, fresh from local farms. “During exams it’s all about Red Bull and 5-Hour Energy,” says Deborah Lakowicz-Dramby, sustainable agriculture student and founding student member of the Public Health Garden Club. “Just knowing that I will have a few hours in the garden to wind down and not think about school is a major benefit of the garden.”

More than 1,000 students, staff and faculty showed up for the opening day of the Farmers Market at Maryland in May 2012. Since then, a steady stream of Wednesday shoppers has made the campus market a lucrative stop for farmers. “The campus has really embraced us. Now this is one of the best markets we attend,” says vendor Brad McCleaf of McCleaf’s Orchard in Biglerville, Pa.

Barb Aiken, associate director for Campus Recreation Services and chair of the Wellness Coalition that launched the market, recognizes the importance of on-campus access: “The farmers market helps students learn how to make healthy food choices. Healthy foods fuel you to do the things you need to do.”

One of the first things engineering student Sam Alqasem did when he arrived at Maryland as a freshman was to find a garden. “I always liked gardening and I gardened at home with my family,” he says. Now, Alqasem volunteers twice a week at the St. Mary’s Garden. Volunteers get to share in the success, and challenges, of food production. “It is hard to get fresh foods on campus, but the garden provides something in almost every season, and the farmers market makes it easier to eat fresh on campus,” says Alqasem.

Local food also provides benefits to the environment. “Considering that the average food item travels about 1,500 miles to reach us,” says Sally DeLeon, project manager with the Office of Sustainability, “eating local can reduce air pollution and the global warming impact of our meals.”
Away with Waste:
Recycling Options
Ramp Up

Terps are saying goodbye to waste, helping the university toward its goal of diverting 75 percent of landfill material by the end of 2013.

TAKING OUT? GO OZZI!
Dining Services debuted reusable to-go containers in Spring 2012. Students pay an initial $5 fee for the Ozzi container, return it when dirty, and exchange it for a clean container. This option not only dramatically reduces waste, but can eventually save students money since they can avoid paying a 25-cent fee per disposable container.

ELECTRONICS RECYCLING BINS
Not sure how to recycle your old iPod? In 2012, Facilities Management began placing small electronic recycling bins in residence halls and other buildings around campus. These bins can also be used to recycle ink cartridges, cell phones, cameras and other handheld electronic items.
STAMP COMPOSTING
Patrons of the Adele H. Stamp Student Union can now deposit paper plates, napkins, leftover food and other organic waste into compost bins throughout the building. Following the three resident dining halls, Stamp is now the fourth building on campus with a compostable waste collection program.

FOOD RECOVERY NETWORK
Students Andrew Bresee, Mia Zavalij, Ben Simon and Evan Ponchick created the Food Recovery Network to collect and deliver unserved food from campus to shelters in Washington, D.C. With support from Dining Services, the volunteers started their collection efforts in 2010, expanded in 2011 to include football concessions at Byrd Stadium, and to the Stamp’s food services in 2012. The group has donated more than 30,000 meals and is launching network chapters at other campuses across the country.

TRASH TO TREASURE/MINDFUL MOVE-OUT
In May 2012, students donated thousands of items to charity during the end-of-year Trash to Treasure/Mindful Move-Out event. Many charitable organizations benefited from the program:

GOODWILL
Seven truckloads of clothing, shoes, blankets, dishes, books, small appliances such as fans, microwaves, coffee pots, vacuums, refrigerators and furnishings including chairs, mirrors, lamps, shelving units and side tables.

TERRAPIN TRADER
Five truckloads of electronics including TVs, microwaves and printers. Items were sold or recycled through its electronics scrap vendor at no cost to UMD.

ACE RECYCLING
Nearly three Dumpsters full of carpets that were separated by fiber type and reused to manufacture new materials.

CAPITAL AREA FOOD BANK
Six carts of nonperishable foods and paper products.

NEW TRASH, RECYCLING BINS
All across campus this year, Facilities Management and Residential Facilities have placed “All Together Now” blue bins that remind users that all recyclables can be commingled, and black “There Is No ‘Away’” trash bins that convey a less subtle message.
Swimming is one of the best ways to get a low-impact, cardio-intensive workout. So why are swimmers more likely to have asthma than other athletes? The problem may be in the water, and the solution may be in our hands.
hat chlorine odor you smell around the typical swimming pool isn’t what makes your nose wrinkle. Rather, it’s the byproducts of chlorination: trihalomethanes, haloacetic acids and chlorite. These Disinfectant By-Products (DBPs) are absorbed through the skin and can cause respiratory diseases.

Pool operators limit DBPs by adjusting concentrations of disinfectant in the water, but pools typically need a lot of chemicals to prevent the growth of biofilm, or microorganisms that grow on pool surfaces.

At Maryland’s Eppley Recreation Center, the staff used harsh chemicals and thousands of gallons of water and spent countless hours keeping the pools free of algae and biofilm.

“Biofilm was our biggest enemy,” says Kim Eckert, assistant director for North Campus Recreation Facilities. “Our pool filters were full of bacteria, algae and biofilm.”

Then the pool’s managers discovered moss.

**An Earthy Solution**

In September 2011, the two indoor pools at Eppley were among the first in the nation to start using sphagnum moss, commonly called peat moss, to treat water. Sphagnum moss is absorptive and extremely acidic, which makes it excellent for filtering biofilm and inhibiting the bacteria.

With a $64,718 grant from the University Sustainability Fund, Campus Recreation Services (CRS) installed a moss water treatment system on the Olympic-size 50-meter pool and the adjacent instructional pool. The system simply circulates pool water through chambers of moss and returns filtered water to the pool. CRS pool operators need only to fluff the moss in the middle of the month, replace the used moss with new moss at the end of the month, and add a bit of water treatment chemical to meet regulations.

The moss comes from New Zealand, where it regrows in three to five years after being harvested. It’s dried, condensed and shipped around the world. In the United States, sphagnum moss is available as PoolNaturally, a product of Creative Water Solutions.

**Environmental and Financial Savings**

The moss filters control the growth of biofilm so well that CRS staff members have dramatically reduced backwashing, the common pool practice of reversing the flow of water through the filters and sending the water to waste. The process requires massive amounts of fresh water to be filtered, chemically treated and heated as it is added to the pool. By reducing backwashing from twice a week to once every two weeks, CRS recorded a 78 percent reduction in water consumption over the first six months of operation. CRS expects to save nearly 1 million gallons of water and $46,000 each year.

Of course, the moss itself isn’t free. CRS spends $41,500 annually on moss, for a net annual savings of around $4,500. The payback was one of the reasons the University Sustainability Council supported the CRS proposal.
“This is exactly the sort of innovative, cost-saving project we hope to encourage with the University Sustainability Fund,” says Scott Lupin, the university’s director of sustainability.

The council awarded the grant on the condition that savings from the project would be applied to future greening initiatives at Eppley, and CRS followed through only a few months later. The two pools in the Outdoor Aquatic Center were retrofitted with moss filters in April 2012.

**Human Health Benefits**

In addition to financial savings, CRS is providing the campus with safer swimming pools, where DBPs have dropped by two-thirds. The water is clearer and less irritating to the skin and smells less of chlorine. The practice of super-chlorinating the pools has almost completely stopped, as has the use of some pool chemicals, including sodium bicarbonate, algaecides and clarifiers. Even the gas-fired pool heaters had to be turned down because they are now more efficient without the biofilm buildup.

“The water is strikingly clear, and there is no more accumulation of biofilm in the bulkheads, filters and equipment,” says Matt Quigley, CRS student pool operator. The lack of biofilm has reduced the amount of time CRS staff spends scrubbing the pools, allowing employees to focus on other tasks.

Eckert encourages other universities and pools to give moss a try. “We hope others learn from our experience.”
GO Green

The Green Office Program

Free, voluntary and self-guided

Open to all offices

Provides tools, posters, stickers, tips and support

Trains a member of your office who is keen to lead the way

Offices receive a framed certificate, acknowledgement on the Green Office Wall of Fame and certification logos that recognizes your GO status
The Department of Geographical Sciences is getting greener. Staff and faculty have made reusable coffee mugs the new norm. They’re cancelling junk mail. They’re calculating their carbon footprint.

Now the 11 offices in geographical sciences comprise the first entire academic department to participate in the Green Office program, a voluntary, self-guided initiative that promotes best environmental practices in the workplace and recognizes offices for taking steps to become green. Offices tackle a checklist of actions that include making double-sided copying and printing mandatory, powering down offices during university breaks and purchasing environmentally friendly office supplies.

Training is provided for a member of each office who wants to lead the way through three levels of certification: Bronze, Silver or Gold. Once certified, offices receive a framed certificate and a certification logo to publicly recognize their effort.

Since Fall 2011, the Green Office (GO) Program has grown to more than 100 participating offices, including offices of the Provost, the Vice President of Student Affairs and the Vice President of Administrative Affairs. Aynsley Toews, project manager in the Office of Sustainability, says the program challenges offices to be environmentally friendly.

“Any office on campus should find Bronze certification very attainable,” says Toews. “The Silver and Gold checklists become increasingly more challenging, but more rewarding too.”

Evan Ellicott, an assistant professor who spearheaded the effort in geographical sciences, says the biggest challenge is changing people’s perception of sustainability. He says of his office mates who weren’t initially on board: “It’s not that they’re not supportive, it’s that they’re hesitant to get involved.”

Christopher Justice, chair of the Department of Geographical Sciences, wants his to be the first academic department to earn Gold certification. Sustainability, he says, is “something we need to do together, that practicing what is taught in the geographical sciences department is a way to do something concrete about one of the bigger issues the world is dealing with.”

Justice says the Green Office program represents the first step in campus sustainability. “One brick at a time and we’ll make a building.”
SUSTAINABILITY SPANS THE CURRICULUM

Professors Collaborate to Green Their Courses

Associate Professor Jo Paoletti has students in her “Fashion and Consumer Culture in the U.S.” class explore the effects of clothing consumption. Associate Professor Renée Ater, right, asks her “History of American Art to 1876” students how 19th-century artists portrayed the country’s changing landscape. Associate Professor Amy E. Gardner and her graduate students in architecture question conventional wisdom about building construction and explore their role as environmental stewards.

Their courses are among more than 100 across the university, in disciplines as varied as theater, engineering and molecular genetics, that are putting a new and creative emphasis on sustainability. It’s the result of the Chesapeake Project, a program launched by the Office of Sustainability to encourage faculty members to integrate issues such as climate adaptation, environmental degradation and resource scarcity into their classes.

Since 2009, 98 UMD faculty members in all 12 colleges have integrated sustainability into their courses after taking a two-day workshop hosted by Office of Sustainability senior project manager Mark Stewart M.A. ’08. There, they learned about the environmental, social and economic dimensions of protecting the earth’s resources.

After attending the workshop, Paoletti added a unit on ethical consumption to her course to cover issues of textile production and processing, laundering/dry cleaning, and the impact of “fast fashion” retailers. “I think talking about sustainability in this context helps students think about the impact of not just the fashion industry but other industries, too,” she says.

Renée Ater, a Chesapeake Project faculty fellow, says some students seem to have an “a-ha” moment in her art history class. “They can see that artists were trying to promote a vision of the United States land as abundant, rich and diverse at the same time some of these artists were writing about how the land was rapidly changing, in a negative way, before their eyes,” Ater says. “I’m happy to see when my students realize we are facing some of the same issues today.”

The Chesapeake Project receives support from the Office of the Provost, the Center for Teaching Excellence and all of the deans. Bruce James, director of the Environmental Science and Policy program, helps facilitate the workshop and is encouraged by the broad support. “It’s an absolute pleasure working with faculty and administrators who are so passionate about curricular transformation,” he says.
Sustainability Advisors
Upperclassmen develop and teach an interactive lesson about sustainability and climate change and how they affect students, their studies and their career prospects through the Sustainability Advisors program. Since 2008, the advisors have presented the lesson to more than 4,000 first-year students in UNIV100, HONR100, College Park Scholars colloquia and other first-year seminar classes. The goal is to deliver the course to all freshmen and new transfer students to ensure they understand the fundamental issues of sustainability.

“Solving sustainability challenges requires holistic, interdisciplinary thinking. I want students to consider how oil supply disruptions in Iran could influence the price we pay for food in College Park,” says sustainability senior project manager Mark Stewart M.A. ’08. “The sustainability advisors’ lesson is designed to encourage students to learn more about sustainability and empower them to see that anyone, in any major, can contribute to creating a healthier, more just world.”

Environmental science and policy major Sarah Katz-Hyman ’13, a sustainability advisor, says the education goes both ways: “I connect to sustainability because I’m passionate about protecting animal habitats, so I learn a lot from talking with engineering and business majors who are interested in green buildings, sustainable economics and other topics I know little about.”

THE UNIVERSITY INTEGRATES SUSTAINABILITY INTO THE CURRICULUM IN OTHER WAYS:

1. Sustainability Studies Minor
In 2012, the University Senate and then-provost Ann Wylie approved the sustainability studies minor, open to students in all majors. To earn the minor, students must complete 15 credits including “Introduction to Sustainability” and at least one class in each of the following tracks: Science and Technology, Policy and Institutions, and Social and Human Dimensions. More than 100 undergraduates enrolled within weeks of its launch, and it is expected to become one of the most popular minors on campus.
Breakthroughs in Research

New Fuel Cells Go Beyond Hydrogen
Fuel cells generate three times more electricity than conventional generators, which means the technology could play a significant role in an energy-efficient future. The obstacle: a limited hydrogen supply is hampering efforts to deploy traditional fuel cells, which convert hydrogen into electricity. Professor Eric Wachsman, director of the University of Maryland Energy Research Center, and his team have spent years developing a solid-oxide fuel cell (SOFC) that can run off of gasoline, diesel and natural gas today, as well as biofuels and hydrogen when that infrastructure is in place.

Wachsman has developed a bi-layer electrolyte that is more than 100 times more conductive than the conventional zirconia-based electrolyte operating at the same temperature. When stacked, the cells should produce three kilowatts of electricity per kilogram of material, more than an internal combustion engine at approximately one-third the size.

“We don’t have to wait for hydrogen,” says Wachsman. “SOFCs represent a solution for everything that you can think of in terms of producing electricity and power today.”

High-tech Rain Gardens Help Clean Anacostia
Civil and environmental engineering Professor Allen Davis has created “low-impact development” technology to significantly reduce urban runoff polluting the Anacostia River watershed and the Chesapeake Bay.

With a nearly $600,000 grant from the National Fish and Wildlife Foundation and the Prince George’s County government, Davis’ team has constructed four bioretention rain gardens across campus. Plant roots and soil filter pollutants from runoff.

The gardens reduce phosphorus, nitrogen, sediment and the volume of runoff from the university into the Anacostia watershed, one of the rivers feeding the Chesapeake Bay. “The university already is recognized as one of the greenest in the nation, and with this project, we’ll be able to reduce our environmental impact even further,” says Davis.

Student Research Busts Bay’s Algal Blooms
Students in the Honors College’s Gemstone program have developed a local soil and crab shell-based compound called chitosan that sinks algal blooms and prevents them from growing further.

It has the potential to address a big problem in the Chesapeake Bay: In a bloom, high concentrations of algae create a toxic environment for living organisms by depleting the water of oxygen.

The students in Gemstone, a multi-disciplinary four-year research program for selected undergraduates, successfully used their new material to help restore underwater vegetation in some sections of the bay. Their work led to the expansion of this project by a faculty-led research team, which received an $880,000 grant to continue the students’ work.
New Research Groups

**Council on the Environment**
The university launched the Council on the Environment earlier this year to coordinate and oversee strategic efforts to place the University of Maryland at the forefront of environmental and earth system science. The council helps promote the unique strengths that distinguish the University of Maryland from its peers, and develop new partnerships with federal and state government agencies and laboratories, corporations and universities.

*The Council is chaired by Antonio Busalacchi, Professor of Atmospheric and Oceanic Science and Director of the Earth System Science Interdisciplinary Center.*

**The Program for Society and the Environment**
The Program for Society and the Environment began work in 2011 at the university to expand our understanding of the social component of environmentalism. Based in the College of Behavioral and Social Sciences, the program is grounded in the college’s strategic plan priority to “be a force in fostering greater understanding of human relations and the natural environment.”

*The Program is directed by Dana Fisher, Associate Professor of Sociology.*

**National Socio-Environmental Synthesis Center**
With a $27.5 million grant from the National Science Foundation, the University of Maryland launched the National Socio-Environmental Synthesis Center (SeSynC) in 2011 to address large-scale environmental issues such as clean water, sustainable food production and the interaction between human activity and ecosystems. It uses data and knowledge from biologists, economists, social scientists, policy experts to “synthesize” solutions to problems that have not been tackled through traditional disciplinary methods.

*Margaret Palmer, Executive Director of SESYNC, is a Professor of Entomology at the University of Maryland with a joint appointment at the University of Maryland Center for Environmental Science.*
A charming small town on the Eastern Shore recently became Maryland’s first certified sustainable municipality. Berlin, Md., achieved this honor through a new program of the university’s Environmental Finance Center, Sustainable Maryland Certified (SMC).

The program—which is free, voluntary and open to all 157 of Maryland’s municipalities—helps communities choose a direction for their greening efforts based on best practices in resource areas like water, energy, planning, health, food and economy.

Cities or towns that complete their chosen green actions are recognized through sustainability certification. As of September 2012, 25 municipalities, including College Park, had registered for the program, and four—Berlin, Chestertown, Mount Rainier and Rockville—had achieved certification.

“By actively working together with citizens, local environmental groups and the state, the town of Berlin seeks to be a leading community on the Eastern Shore in environmental responsibility,” says Mayor Gee Williams ’71. “We are most grateful that the efforts of our citizens are being recognized through this very special honor.”

The program was created with guidance from an executive committee of mayors, state agency representatives, environmental and economic development groups, businesses associated with green development, and the Maryland Municipal League.

“Sustainability is not something that can be done solely by the local government. It needs to be a partnership between the local citizens and the government,” says Lisbeth Fried, SMC program manager. “One of SMC’s successes is that it is getting people to engage in the dialogue of sustainability and include it in more of their decisions.”

Three graduate students from the Robert H. Smith School of Business worked with the cities of Greenbelt and College Park to evaluate current purchasing patterns and begin development of green purchasing policies. Their report, available at www.sustainablemaryland.com, establishes a model that other municipalities can use.
EWB Pumps Up Work of Burkina Faso Clinic

When Maryland’s chapter of Engineers Without Borders first visited Burkina Faso in 2009, students discovered that the lack of electricity meant babies in the small town of Dissin were being delivered by candlelight.

“For nurses, that meant waiting for people to carry fresh water from the well to the clinic,” says student project leader Steve Emling.

The students returned months later, working with community members to install solar-powered fluorescent lights in the maternity wards of four clinics. Over the last three years, the engineers in training have continued to provide sustainable solutions to urgent problems in local health care in Dissin.

Another EWB team returned in January 2012 to expand the solar powered lighting and construct a solar-powered water pumping, sanitation and distribution system at one of the clinics. Today, the town’s busiest medical facility has both clean water and good lighting.

Chapter President Kevin Fries ’13 says EWB is committed to implementing sustainable projects to benefit communities, but also to teaching those communities to be sustainable on their own.

“Yes, EWB can build a solar pumping station, but without teaching community members how to use or build it, that station will remain the only station in the community, and when it breaks no one will be able to fix it,” he says. “We like to integrate a common philosophy into all our projects: Give a man a fish, and he eats for a day. Teach a man to fish, and you have fed him for a lifetime.”
GET INVOLVED!

Are you inspired to get more involved with the transition to sustainability? Here are some suggestions:

**FACULTY, JOIN THE CHESAPEAKE PROJECT:**
www.chesapeakeproject.umd.edu

**STAFF, PARTICIPATE IN THE GREEN OFFICE PROGRAM:**
www.greenoffice.umd.edu
Victory Is in the House

*Students’ Efficient Home Wins International Contest*

Powered by the sun, teeming with edible vegetation and surrounded by wetlands that recycle water to be re-used on-site, the university’s “WaterShed” house took first place in the 2011 U.S. Department of Energy’s International Solar Decathlon.

The super low-impact house, which beat out 19 other competitors, was designed and built by a multidisciplinary team of 200 students, faculty and mentors.

“These students from diverse disciplines effectively formed a cohesive team to imagine, invent and make real the project we call WaterShed,” says the project’s principal investigator, Amy Gardner, associate professor of architecture. “Interdisciplinary problem-solving is the way forward toward a more sustainable future.”

WaterShed was inspired by the Chesapeake Bay. Its green roof reduces stormwater runoff, its integrated wetlands filter contaminants out of kitchen and bath water, and its patent-pending liquid desiccant waterfall controls humidity inside the house.

Everyone, give a gift to the **GREEN MARYLAND FUND** to help the university implement sustainability projects on campus. The fund supports the development of programs and projects that support and encourage a sustainability ethic and enhance sustainability performance at the University of Maryland. To make a donation, visit [www.greenfund.umd.edu](http://www.greenfund.umd.edu).

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**STUDENTS, GET INVOLVED WITH A SUSTAINABILITY-RELATED STUDENT GROUP:**
www.sustainability.umd.edu

**MEMBERS OF THE GREATER COMMUNITY, LEARN ABOUT HOW TO REDUCE ENVIRONMENTAL IMPACTS IN YOUR NEIGHBORHOOD:**
www.epa.gov/epahome/acting.htm

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