

nih record



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Gateway Center Boasts Montgomery County's First Green Roof

By Belle Waring

Some plants need a patch of ground plumped up by the gardener's hand, while their hardier cousins bloom in the wilderness where rainfall is scanty and winters are rough. These toughies sprout in mountainous rock, which serves as a microclimate: shallow roots settle in cracks that trap precious water; stones bank heat that extend



the growing season. For instance, "chicks & hens" and other succulents bloom in rocky soil with little moisture. With their affinity for rugged places, these beauties are welcome in eco-design; seven various patches now grace the NIH Gateway Center's new green roof.

"The benefits are multipurpose and

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"Chicks & hens" thrive in dry, rocky soil and beautify Gateway Center's green roof.

Testing the Future

STEP Forum Makes Robotic Medicine Come to Life

By Sarah Schmelling

It seemed more fantasy novel than symposium: a paralyzed woman moves a circle on a monitor using only her thoughts, a robot assists in surgery, a student practices an operation on a simulated person and medic-in-training treat soldiers in a virtual version of the streets of Baghdad.

"But this is not science fiction. This is happening," said Dr. John Donoghue, director of the Brain Science Program at Brown University, referring to just some of the technology described in a recent Staff Training in Extramural Programs forum here. Yet, his statement could be applied to all of the areas of research covered by the event titled, "Robotic Medicine: Dr. R2D2 Will See You Now."

We're at the beginning of a new age, Donoghue said. His area of interest, neural interface systems, is "something you're going to see grow immensely in the next decades...devices that interface with the nervous system and allow new ways of diagnosing and treating nervous



Dr. Paul Mittelstadt races bikes in his spare time.

NCI's Mittelstadt Is Maryland Cycling Champion

By Rich McManus

The last two weekends in June were kind to Dr. Paul Mittelstadt, a cancer researcher in Bldg. 37 who races bikes in his spare time. On June 24, he won the 50+ race at the Reston Town Center Grand Prix. Six days later he won the Maryland state championship for his age group in a 50-mile road race in Smithsburg, Md., near Hagerstown. And on May 20, he won the Leonardtown Criterium.

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Right:

Engineer Gary Cooper shows off the green roof to the audience, which includes visitors from other federal agencies. A green roof is a “reverse roof,” so waterproof materials go on the bottom.

Below:

Environmental compliance officer Capt. Ed Pfister originally came up with the idea to meet stormwater requirements with a vegetated roof.

Bottom:

Drainage points for stormwater overflow are precisely positioned. The 0.6-acre green roof accounts for 27 percent of runoff in a 9-acre space.



ROOF

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they are clear,” said Shah Saleh, project officer with the Office of Research Facilities Development and Operations (ORFDO) for the Gateway Center project, whose green roof helps prevent flooding while cleaning and cooling the runoff.

“This also helps protect flora and fauna,” he said. “It saves birds.” In addition, it provides the building with added insulation and beauty.

At a recent presentation in the Natcher Bldg., Saleh showed the audience how this sustainable feature works. With acknowledgments to his “right-hand man,” Gary Cooper, as well as to Capt. Edward Pfister of ORFDO’s Division of Environmental Protection, Saleh made his case.

Conventional roofs are hot and the steamy runoff is no friend to fish. A green roof resembles a basin filled with a medium that absorbs precipitation like a sponge. It then modulates the water temperature and keeps the water banked within, pending a cooler, cleaner, controlled release.

“Here’s the philosophy,” said Saleh. “Montgomery County has over 300,000 acres of undeveloped space—over 50 percent is still open farm land. But humans need highways, commercial areas, residences. These impervious areas are really against Mother Nature.”

“Water-impervious”—impenetrable—areas include roads, parking lots, driveways, sidewalks and rooftops. These surfaces interrupt the hydrologic cycle—that is, they alter how water naturally acts on Earth’s surface, in the soil and atmosphere. Uncontrolled runoff erodes the land and degrades the structure of streams and rivers while polluting the water itself. Since

changes in the watershed are cumulative, fish and wildlife suffer—and they are not alone.

“Even in clay, certain plants can grow,” said Saleh. “When there is heavy precipitation, water is stopped or slowed by plants. Once we strip land, we have impervious surfaces. As the water then rapidly gains momentum, floods can ensue.”

Engineer Cooper offered details to the audience, which included visitors from other federal agencies. A green roof is a “reverse roof,” he explained, which means the waterproof materials go on the bottom: first, a leak-proof layer that’s “asphaltic,” or tarry, topped with paper and a water retention barrier, a dimpled, geotechnical fabric. These materials protect the building structure. Drainage points for overflow are precisely positioned “because we don’t want water to be trapped forever.”

Atop that is a lightweight soil medium, such as “expanded coal or slag, shot with air, so it’s porous, like pumice,” said Cooper. “It holds a lot of water for the size of it. We put down a 4-inch layer, incorporated with mushroom mulch in a mix of 70 slag to 30 mulch.” This medium is very important, he noted, since it acts as an insulator and a barrier to absorb moisture. Result: “The plants are able to sustain themselves in hostile environments.”

The audience had questions: Would the roots get long enough to pass through the roof? No, said Cooper. They will get “root mat, which will make the roof very strong.” What if we get 2 feet of snow? “It’s very conservatively built,” said Saleh. What of maintenance? “Yes, we must weed now,” Saleh explained, but once the

plants mature they should spread to fill the space and become almost maintenance-free.

And whose idea was this in the first place? It was Pfister, one of NIH's environmental compliance officers, who came up with the idea to offset stormwater requirements with a vegetated roof. The Gateway Center design team was looking for ways to meet stormwater regulations and also comply with sustainability initiatives. The green roof was a welcome concept.

Pfister explained that, according to HHS initiatives on sustainability, new construction must optimize energy performance, protect and conserve water and reduce environmental impact. Additionally, NIH must account to the state of Maryland for "the previously pervious area"—in this case, where pine trees once stood. "We have had to find space to collect water and run-off in a very small space," he said. There was no room for stormwater ponds.

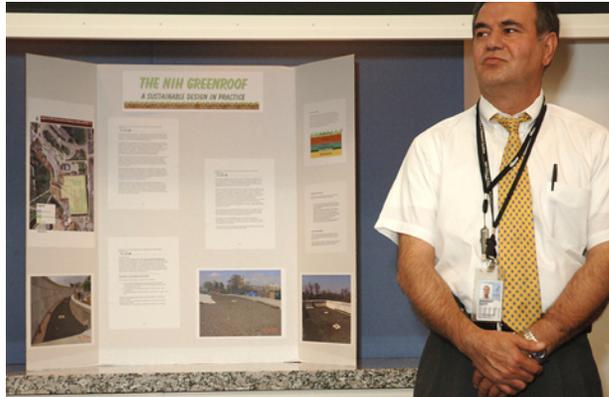
Of the 140,000-square-foot Gateway Center project, approximately 100,000-square-foot (2.29 acres) is new impervious surface. The green roof accounted for 27 percent (0.61 acres) of the stormwater runoff from the project site. The state then allowed NIH to "bank" the remaining stormwater debit under the NIH Master Stormwater Management Plan, Pfister said. This "debt" is to be repaid by future site improvements such as removal of parking lots or construction of the Stoney Creek Pond south of the National Library of Medicine.

The talks were followed by a field trip to the roof itself. The Gateway Center is set into a hillside, so as folks were led to the back of the building, they were standing level with the roof. The fresh plantings looked tidy, if modest, in their grids: "They will fill in," Cooper promised. The soil medium seemed like gravel, but each nugget was lightweight and pocked like a tiny moon.

"This is the first green roof in Montgomery County," said Saleh. "It really is a show-off."

Yes, it is more expensive than a conventional roof—about 40 percent more—but otherwise, 300-foot drainage tubes would have to have been installed underground, and that would not have been cheap since, as he pointed out, "You're standing on solid rock."

The green roof, in the long run, helps the bottom line. "And," said Saleh, "it helps Mother Nature."



Left:
Project Officer Shah Saleh explains the multi-purpose benefits of the green roof.

Below:
Fresh plantings of succulents, set out in grids, will soon fill in. Once they reach mature size, these hardy specimens need little maintenance.

PHOTOS: MIKE SPENCER

Some Green Roof Basics

Green roof applications are appropriate for residential, farm, industrial and office buildings. Depending on latitude, expected snow and rain load and building construction, additional reinforcement may or may not be necessary. Typically, a green roof consists of a thin layer of soil (2-3 inches) and a drainage layer, applied directly to a roofing membrane. For sloped roofs, baffles may be necessary to retain the soil.

Green roof plants are typically short perennials and succulents, including varieties of Sedum or Delosperma. These plants will quickly cover the soil and prevent erosion, retain rainwater and provide insulation and respirative cooling.

To summarize the benefits of green roofs:

- They are esthetically pleasing
- They act as a retention pond with calculated slow-release discharge
- They filter water by removing dust, grit and other impurities
- They cool the water before it releases into streams
- They help flora and fauna
- Once plants reach mature size, they require minimal maintenance.

