

BNL CENTER TO HOUSE ADVANCED MICROSCOPES

BY DELTHIA RICKS

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Ground has been broken on a state-of-the-art research center at Brookhaven National Laboratory to house two advanced electron microscopes that will allow imaging of biological structures in unprecedented detail.

"We hope to have the microscopes installed in the new building in the early part of 2020," said Sean McSweeney, who will serve as director of the new Cryo-Electron Microscopy Center on Brookhaven's campus.

The new center and both microscopes are being financed by Empire State Development's Transformative Investment Program for \$15 million. The aim: provide an advanced research space ultimately allowing Brookhaven scientists, visiting U.S. researchers and others to broach novel scientific inquiries. Empire State Development is the state's chief economic development agency.

McSweeney, who is also director of the photon science division at Brookhaven, said he and his colleagues at the lab are excited about the research possibilities that await with two cryo-electron microscopes.

The devices are a breakthrough concept in microscopy because they generate exceptional details in images of biological structures, McSweeney said.

Electron microscopy, in general, is characterized by high magnification and resolution but differs fundamentally from standard microscopes because instead of light, accelerated electron beams are passed through specimens to generate an image. Electron microscopes have been used for decades.

Cryo-electron microscopy — cryo-EM — is a recent giant leap beyond other types of electron microscopes, allowing researchers to capture specimen images at supercold — cryogenic — temperatures, about minus 189 degrees Fahrenheit, and in some

instances, lower still.

"It's like taking snapshots, many thousands of images," McSweeney said of a process that allows scientists to reveal intimate three-dimensional details of biological structures such as proteins and protein complexes.

Proteins are the basic building blocks of all human tissues, and these infinitesimal structures are capable of spiraling, folding and refolding in countless ways. Understanding them at the atomic level, McSweeney said, can uncloak nature's deepest secrets about the states of health and disease.

Moreover, exploring biological structures under very frigid conditions allows atoms to remain intact as scientists eavesdrop on them via the device, McSweeney said.

"This is technology that has received a lot of recognition over the last several years," McSweeney said, noting that cryo-EM even aided a New York scientist who won a Nobel Prize.

Joachim Frank, a professor of biochemistry and molecular biophysics at Columbia University in Manhattan, shared the 2017 Nobel in chemistry with two other scientists for developing cryo-EM as a method of studying biological structures in high resolutions.

In past decades, researchers turned to X-ray crystallography to discern molecular structures. Cryo-EM facilitates the study of molecules that eluded the older science.

"Cryo-electron microscopy can significantly accelerate scientists' understanding of molecular structures and processes, leading to positive impacts in understanding disease and the discovery of new drugs," said Doon Gibbs, Brookhaven National Laboratory director.

Legislators see the new developments at Brookhaven as having an impact beyond the basic science.

"This state investment will support thousands of jobs and create a culture of innovation right here in Suffolk County," County Executive Steve Bellone said in a statement.

'Sister' dog helps

BY PATRICIA KITCHEN

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Earlier this year Lydia Toscano's parents granted her wish for a sister — a four-legged one — who shared a common trait.

Adopted as an infant, Lydia, now 7, got the word early on about her origins, said her mother, Sondra Toscano, a support magistrate in Nassau County Family Court. A dog lover herself with three earlier rescues in their Nassau home, Toscano knew her only child would appreciate that "she wasn't the only adopted person in the house."

In April, the two came across an entry on the website of Posh Pets Rescue, which runs the Long Beach animal shelter, for Venus, a 6-year-old Maltese-Yorkie mix rescued in January from a shuttered Missouri puppy mill.

"We fell in love. Her soulful eyes called out to us even through a photograph," Toscano wrote in a statement she submitted to the Petco Foundation's sixth annual Holiday Wishes campaign, which highlights stories of how adopted pets can change lives for the better. Their tale was one of 51

honored in the foundation's first round of funding, getting \$5,000 for the rescue and \$50 for the family to spend at the pet store.

Now, Posh Pets could get \$25,000 more if this Long Island love story is the top vote-getter in the foundation's People's Choice Award. Voting is open to the public through 1 p.m. Wednesday at petcofoundation.org/vote. Two \$10,000 and two \$5,000 grants are awarded to the rest of the top five. The results will be revealed before Christmas.

"She wanted to adopt a dog because she's adopted," Toscano said in an interview. "And she wanted a special connection with someone — or something."

Lydia and the shy, tentative Venus have gone on to become "two kindred spirits," Toscano wrote. Venus curls up next to Lydia in bed, and Lydia delights in singing her original songs, with lyrics such as:

"Venus, you are my heart. Venus, you put my heart back together when it is broken. You are so beautiful. I love you. I will never leave you."

Toscano said she submitted the story and video of the song to "spread the word that mira-

cles can happen." She would like there to be a nationwide program matching adopted children with adopted dogs.

The foundation has awarded \$755,000 in grants to the animal welfare organizations cited in those 51 stories. The first-place winner of the initial round was Annagrace Myers, 16, a survivor of the Parkland, Florida, school shooting, who got \$100,000 for a local shelter with her story of a dog helping her cope.

"It's truly inspiring reading story after story about how the love from an adopted pet changed so many lives in different ways," said Susanne Kogut, Petco Foundation president, in a release announcing the first round of winners last month. For the groups receiving grants, "it's like a visit from Santa Claus."

The \$5,000 grant is certainly welcome, said Linda Vetrano, Posh Pets' founder, who fostered Venus in her home and was there for the first meeting of Lydia and her soon-to-be adopted sister. Venus won their hearts over three other dogs there. When Vetrano found out Lydia was adopted, "the story just got nicer," she said.



Neremiah Johnson of Central Islip learns he has won a raffle Sunday so he can give a jacket to his 7-year-old daughter. Ferro Kuba Mangano Sklyar PC sponsored the \$30,000 gift giveaway.