

Nanoscientist Ayesha Arefin has heart

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Student researcher helps construct bioethical artificial human organs

Although Bangladesh has made strides in recent decades, the war-torn and poverty stricken South Asian nation—with the world's second lowest percentage of female scientists—provides few opportunities for brilliant women. But in 2011, Los Alamos researcher Chris Detter discovered geneticist Ayesha Arefin's potential during a visit to her Bangladeshi scientific university.

Detter and colleague Lance Green played a pivotal role in helping Arefin come to Los Alamos to pursue research and a graduate degree—Arefin even lived with the Detters while she became accustomed to American customs and language. She's now pursuing a doctorate in nanoscience at the University of New Mexico while also continuing research at the Lab.

Nicknamed Tumpa, Arefin launched her Los Alamos career in the Lab's biosecurity division. Originally from Bangladesh's neighboring state of India, renowned toxicologist Rashi Iyer soon recruited Arefin to research optogenetics—manipulating genetics and engineering proteins to control neuron activity in living tissue—for prosthetic limb and artificial tissue development.

Nanoparticles, used in products ranging from sunscreens to solar panels, are proliferating so quickly that safety testing for potential health hazards can hardly keep up. Arefin and the rest of Iyer's team are developing novel methods to improve testing of toxins and diseases and support bioethics, including replacing prevalent animal-testing methods with trials in artificial organs.

The team is creating an artificial human lung to reveal the cellular mechanisms in chronic obstructive pulmonary disease—America's third most common cause of death—and support development of therapeutics. Arefin also researches neurological diseases and strokes.

Arefin's commitment to helping people extends beyond the Lab; back in Bangladesh, she volunteered to rehabilitate abused girls. Locally, she volunteers at an AIDS family support center. She someday hopes to establish an egalitarian school in her home country, where all children are welcomed and nurtured to learn math and science.

Humbly, she believes fortune and the support of others—not hard work—brought her success.

"I'm so grateful, and so joyous for the Lab; for the people and for the chance to make a difference," says Arefin, adding that many international researchers at Los Alamos, including Montenegro's Momo Vuyisich, helped her navigate life in a foreign country.

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