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Fulbright Scholar José Miguel García Martín Fulfills Big Dreams on a Small Scale

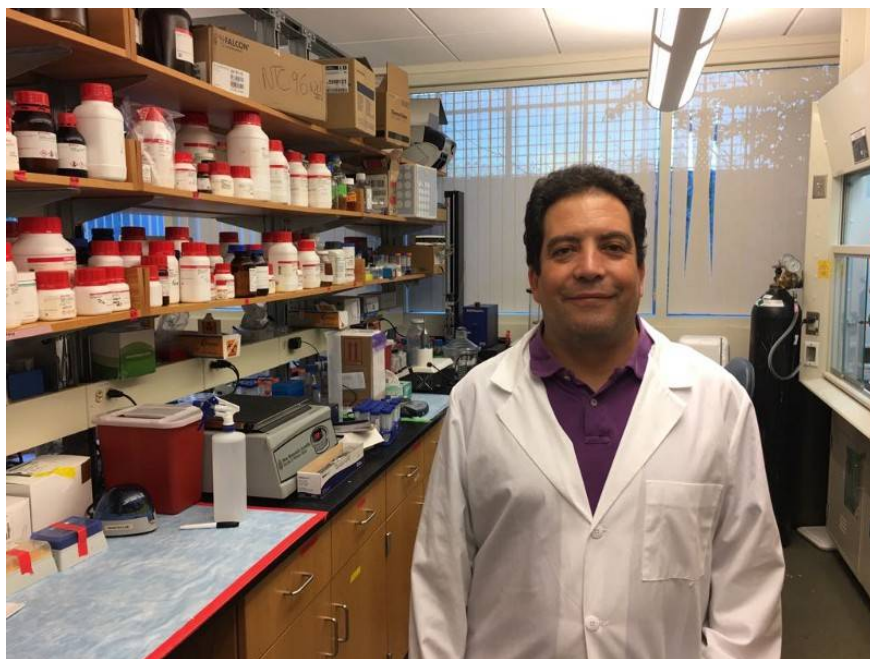


Photo courtesy of José Miguel García Martín

Interdisciplinary collaboration and global experiences are two of the key reasons that students are drawn to Northeastern University. Though José Miguel García Martín is not a Northeastern student, throughout the past few months, he has embodied both of those goals.

García Martín, a research scientist at the Institute of Micro and Nanotechnology at the Spanish Research Council in Madrid, Spain, spent three months in Northeastern Professor Thomas Webster's Nanomedicine Lab studying the antibacterial properties of nanostructured coatings.

Webster, who is also the department chair in Northeastern's chemical engineering department, has spent his prolific career exploring the possible applications of nanotechnology. Like García Martín, his primary interests lie in the biomedical field.

García Martín first discovered the potential for a collaboration with Webster when he visited Boston two years ago as an awardee for the IDEA2 Madrid program, which was designed to help aspiring biomedical researchers in Madrid share and develop their ideas. It was during this trip that he heard about Webster's lab and the goals he and Webster share. The next step was to apply for a Fulbright Scholarship so that he could further explore those goals.

“In nanotechnology, collaboration is essential,” García Martín said. “We have to face problems from different points of view. Searching for good people with complementary know-how is essential.”

Ultimately, García Martín hopes to use nanotechnology to develop orthopedic implants, which can be used to replace a damaged or missing joint in the body. Implants are an amazing tool in the medical field, but can often cause bacterial infection. Antibacterial resistance is therefore an essential component of the nanostructures that will eventually be used to make these implants.

While at Northeastern, García Martín's primary task was to test the antibacterial properties of the coatings that he has developed—more specifically, to test the effectiveness of those coatings against gram-negative bacteria.

Webster and García Martín use different techniques to develop nanorods, a physical form of nanomaterial: Webster uses chemical nanorods while García Martín uses physical nanorods. García Martín found that combining his own material with the nanorods being developed by Webster's team produced a highly successful result.

“The antibacterial behavior is enhanced when the two nanostructures are combined,” he said.

This is an exciting stride forward in García Martín's more than 20-year career. There is still a long process ahead before the nanostructures Webster and García Martín have developed can begin to be implanted in humans, but García Martín is confident that their low-cost approach can be successfully scaled up to mass production.

García Martín headed back to Madrid at the beginning of October, but plans to continue his collaboration with Webster's team by continuing to work with Webster's Ph.D. student David Medina, whom García Martín worked alongside throughout his months at Northeastern. García Martín will provide samples from Spain as researchers in

Webster's lab continue to explore the utility of nanostructures in making orthopedic implants, as well as possible other applications in cancer and regeneration research.

García Martín has always appreciated the process of scientific research, especially when it gives him the opportunity to collaborate with researchers around the world. He encourages aspiring scientists to pursue global experiences like the Fulbright Program.

"In the complicated world we're living in, it's good to see how other people live," he said.

García Martín also stresses the importance of scientific outreach, especially in a country like Spain, where he says much of the general public does not show an interest in science. For that reason, he has participated in a variety of outreach activities in Spain. This included a prize in an image contest in 2016, where he submitted an image that was captured through magnetic microscopy and demonstrates what García Martín refers to as "the beauty of the nanoworld."

García Martín enjoys every stage of scientific research: from the spread of ideas to the thrill of discovery to the value of sharing what he's learned with audiences both at home and abroad.

"I think we have to give back to the community and give them hope that we are using well the funds we are receiving," he said.

