

Accelerator company develops product to help wind turbines

19 September 2017, by David Gay

Sharks swimming deep in the ocean, geckos climbing up trees and wind turbines towering over West Texas don't have a lot in common. At least, not yet.

But the [startup](#) Flow Raider, one of the 2017-18 Texas Tech Accelerator companies through the Texas Tech University Innovation Hub at Research Park, is developing a product to help increase the efficiency of [wind turbines](#) in West Texas and throughout the world – and they're using sharks and geckos as their models.

Humberto Bocanegra, Chief Executive Officer of Flow Raider and a postdoctoral scholar in [mechanical engineering](#), said the startup is working on developing and testing a surface coating that helps control the [flow](#) around wind-turbine blades. This coating aims to increase efficiency and reduce maintenance costs for turbines as well as transport and military vehicles.

Bocanegra discussed potential collaborations with his colleague, Burak Aksak, Chief Technology Officer of Flow Raider and an assistant professor in the Department of Mechanical Engineering. Both Aksak and Bocanegra thought the coating was a perfect blend of their expertise.

"At the time, I had been working on gecko-inspired microfibrillar adhesives and had developed techniques to fabricate large-scale adhesive sheets," Aksak said. "To our surprise, we noticed that sharks use structures of similar dimensions and geometry to the synthetic sheets we produce and decided to carry out some preliminary testing. The success of the initial testing led us to work on this technology together over the past four years and helped us develop Flow Raider."

The coating has tiny pillars, which are very similar to structures that cover both gecko toe pads and shark fins. While the members of Flow Raider are still figuring out how the surface will work in the

product, the pillars modify the flow so the liquid is in contact with the body when coated with the surface.

Flow Raider presented its research in the [2017 Spark Conference](#), a two-day innovation conference that gave potential startups the opportunity to present their research and win money.

Bocanegra said presenting during the conference was a great experience because it was something members of the startup had not done before.

"We are used to giving presentations in specialized conferences, but this conference was oriented toward commercialization, so it was a challenge to make sure we were getting our message across without going deep into the technical details," Bocanegra said. "It also made us think about the research beyond the physics and find potential applications for it."

Through the conference, the startup won \$50,000 in funding. It also received \$25,000 from the Accelerator.

David Miller, a mentor within the Innovation Hub, heard about the startup when he began his role. Miller said he decided to mentor this startup after seeing the technology and interacting with the members of the team.

"There were a few factors that influenced my decision to mentor this startup," Miller said. "First, I believed their applications may have broad capabilities in the area of defense, renewable energy and a couple of other sectors as well. I also valued the early conversations with the team and found them to be willing to listen, to learn and to lead."

Bocanegra said Miller's contribution as Flow Raider's mentor has been critical to its success.

"All of our mentors have been extremely helpful and students.

have raised very important points about our plans and how to deal with some of our challenges,"

Bocanegra said. "David Miller has a lot of business experience, but, more importantly, he has a lot of experience with [startup companies](#). He has mentored many startups in the past and knows about the pitfalls that make these companies fail."

Miller said he thinks this startup could potentially be very important to the Lubbock community. If the startup is successful, many new jobs will be created.

Miller said Flow Raider has come a long way from its beginnings as an idea. Students can learn from Flow Raider's journey.

"They have come a long way by believing in their idea, creating a team and connecting with the Innovation Hub," Miller said. "Infrastructure and support like the Innovation Hub is providing is key to developing successful startups. We are fortunate to have the Innovation Hub in our community."

Since wind is one of the fastest growing realms in power generation in the United States, Bocanegra hopes this technology can help the local community.

Provided by Texas Tech University

"Increasing power production and reducing costs make wind power more affordable, which will then attract more investments and create more jobs for people in the local community," Bocanegra said.

Miller said it is unknown how successful Flow Raider will be in the future. The group will have to overcome obstacles that all startup companies encounter. But, Flow Raider has potential because of its promising technology.

Luciano Castillo, Chief Scientific Officer in Flow Raider and Kenninger Professor in Renewable Energy and Power Systems in the School of Mechanical Engineering at Purdue University, said the plan for Flow Raider going forward is to perform field testing of the product and building a partnership with the U.S. Department of Defense and the U.S. Navy.

Bocanegra knows great work is being done at Texas Tech but people are not always aware of it.

"We hope that through our startup we increase the visibility and encourage people to look to Texas Tech when looking for research and ideas to solve their technological challenges," Bocanegra said.

Aksak hopes students will be inspired by what Flow Raider is doing through the Innovation Hub and encourages entrepreneurial thinking among

APA citation: Accelerator company develops product to help wind turbines (2017, September 19)
retrieved 24 November 2020 from <https://phys.org/news/2017-09-company-product-turbines.html>

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