

St. Mary's College and SolarCube LLC Research Partnership Wins Award for Innovation

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St. Mary's City, MD - July 26 2019 - This June, the solar energy startup company SolarCube LLC won a \$100,000 technology product development grant through the Maryland Industrial Partnerships Program. The funding will directly support the research and development work led by Troy Townsend, assistant professor of chemistry at St. Mary's College of Maryland, who is the principle inventor for technology that uses nanomaterials to allow photovoltaic solar modules to be manufactured using an affordable, inkjet-like printing process.

Townsend developed the base technology at the U.S. Naval Research Laboratory in 2014 and has proven the process with a working nanocrystal prototype and is on the company's advisory board. In June 2018, SolarCube LLC and the Naval Research Laboratory signed the license agreement for the lab's patented "spray deposition method for inorganic nanocrystal solar cells" technology. TechLink, the Department of Defense's national partnership intermediary, assisted SolarCube with development of the required commercialization plan and patent license application.

"Of all the renewable energy options, solar is the only one with enough potential to exceed even our future global power demand," Townsend said. "Solar power is a really nice financial benefit for homeowners. But not for everyone else. In order to make it more accessible, we need to drive the price way down and seamlessly integrate it into our everyday life."

Townsend's work on printed electronics involves undergraduate research at St. Mary's College. Student Bradley Moore '20, who works on printing the nanocrystal inks said, "If we do the layers correctly, it will make a solar panel that would be 40 times thinner than a human hair." Moore injects inks made of semiconducting and metallic nanocrystals into cartridges to print out 2D patterns onto arbitrary substrates to build electronics.

Moore works with fellow student Megan Waters '20, who is synthesizing the inks using air-free conditions. Waters, who has been synthesizing silver nanowires said, "Trying to figure out just the right concentrations and times of injection were definitely the most challenging and interesting parts of the synthesis."

Townsend said, "Undergraduate research is our pride and joy here at St. Mary's College. These projects would not be possible without our talented students. In the meantime, they are working on graduate level projects and publishing their work in journals and presenting at national conferences." Townsend was also co-director of the 2019 St. Mary's Undergraduate Research Fellowship which provided opportunities for students to work on mentored projects over the summer. Townsend's research group will continue to work with SolarCube LLC to develop printed solar cells. SolarCube LLC is located at the TechPort incubator in California, Maryland. Townsend plans to print a prototype solar module using the support of the MIPS award and consult with SolarCube LLC on ways to adapt the lab-scale process into industrial-scale printing-press manufacturing.

Townsend said, "Just like the printing press revolutionized the written word, rapid roll-to-roll printing of electronics is the next step."

Caption: Dr. Townsend in his laboratory in Goodpaster Hall (top) including a printed solar cell device panel (bottom left) and brown solar active perovskite ink used to print out text on a glass slide (bottom right) both prepared by research student Nick D'Antona '20.

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