

UCF's Low-Impact "Dirt" Technology Is A Safer, Cheaper Way To Clean Water



UCF's Bold & Gold patented biosorption activated media being applied. Photo courtesy of Environmental Conservation Solutions.

It may look like dirt and feel like dirt, but the Bold & Gold® (B&G) technology from the University of Central Florida (UCF) is far from "just dirt." B&G safely removes harmful nutrients and pathogens from our most valuable natural resource: water. The patented biosorption activated media filtration system is eco-friendly and inexpensive, unlike other types of water treatment systems that depend on the availability of land and regular maintenance.

Still, the process of patenting and commercializing the technology took some time and effort.

“ From a Tech Transfer standpoint, it was very interesting because what it essentially looked like in the first disclosure was: here's a recipe for dirt.

Andrea Adkins, an assistant director at UCF's Office of Technology Transfer.

“Trying to make the case at the university to spend resources on patenting dirt—mixtures of crumbled up tires, clay, coconut husks and sand—to filter water wasn’t actually an easy sell,” she said. “There were a few people who didn’t believe in it and didn’t think we were going to do anything with it, but this many years later, we not only got patents on the composition, the use of the composition, and the systems for using the compositions, but we have start-up companies licensing the technology.”

Fighting long-term threats to drinking water and the environment

It was a decade ago that Martin Wanielista, Ph.D., P.E. and Ni-Bin Chang, Ph.D., P.E., of UCF’s Stormwater Management Academy, recognized that nutrient pollution from stormwater runoff and wastewater threatened the quality of Florida’s waters. “Solving the problems of flood control and drainage were being done worldwide, but the water quality issue was being overlooked,” said Chang. “People weren’t seeing the issue—how nutrients affect water bodies on a long-term basis.”

The nutrients were nitrogen and phosphorus from pesticides, fertilizers, and human and industrial waste. Though plants use the nutrients for growth, excessive amounts can cause overgrowth, choking waterways, and depriving aquatic life of oxygen. The pollutants can also leach into Florida’s aquifers—critical sources of the state’s drinking water that lie just below the ground.

So the researchers sought to develop low-cost, eco-friendly technologies that worked passively, without machinery, to filter the polluted water. With funding from the Southwest Florida Water Management District and the Florida Department of Environmental Protection, they formulated and tested different mixtures of 10 non-toxic, natural and recycled materials. Their work led to a new media filtration system now known as Bold & Gold®, which removed not only the target nutrients but pathogens such as fecal coliform. The new system made the water recyclable—suitable for other uses such as lawn irrigation or for safely replenishing groundwater that is used to recharge Florida’s aquifers.

Chang says that B&G can remove as much as 90 percent of pollutants in water and can last as long as 20 years. It is also quite versatile, with different compositions designed for specific uses, such as greenroofs, septic systems, sewer systems, stormwater retention or detention ponds, silviculture, agriculture, geothermal discharge, and aquaculture.

Patenting and commercializing Bold & Gold®

UCF obtained eight patents and two trademarks for the B&G portfolio. After the patents were issued, Wanielista formed a start-up company called STE LLC and licensed the technology from the university. “This really is a success story that started with the opportunity and knowledge provided by the faculty and students,” said Wanielista. “Then carried forward by Andrea. Dr. Chang and Andrea deserve so much credit.”

In 2015, Wanielista sublicensed B&G to Environmental Conservation Solutions (ECS) of Apopka, Florida. ECS is the exclusive manufacturer of B&G media. ECS president, Chris Bogdan, said that the demand for B&G continues.

“When we started our licensing agreement, we sold 472 cubic yards of B&G. Then in 2018, we sold 11,300. So, our growth has been substantial over the last three years,” said Bogdan. According to Wanielista, B&G is used throughout

Florida by companies such as Wawa, Walgreens, several city and county agencies, the Florida Department of Transportation, and many private developers.

“Now we’re going to have an international company installing Bold & Gold in their stormwater systems,” said Adkins, referring to another sublicensee, Suntime Technologies® of Cocoa, Florida. Suntime was recently acquired by Oldcastle Infrastructure™, which will continue to sublicense B&G. Oldcastle Infrastructure is part of CRH, which operates in 32 countries and is the largest building materials company in North America.

“It’s an economic success, and it’s all the things in Tech Transfer that we’re looking for: sales, manufacturing, development, infrastructure,” said Adkins. “These are multi-million dollar companies that hire UCF engineers, local people, and their businesses. It’s been a big revenue generator for the Tech Transfer office, and we’re still a relatively small office in terms of our revenue-producing licenses.”

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