



## Spear-heading a Cleantech Movement

The Sorbent Polymer Extraction and Remediation System (SPEARS) is a breakthrough environmental remediation technology that attracts and captures polychlorinated biphenyls (PCBs).

**NASA-Developed Environmental Remediation Technology Commercialized to Remove PCBs from Sediments and Soils**

Polychlorinated Biphenyls (PCBs) have been a pervasive problem in the environment for almost 100 years, since their development in 1929. PCBs are a group of manmade chemicals used in electrical equipment, hydraulic fluids, lubricants and plasticizers in paints. PCBs have been released into the environment through spills, leaks from equipment and improper disposal. PCBs were produced from 1929-1977 and utilized by every industrialized nation. As a result, PCBs are now the most widespread known contaminant on earth, as they do not degrade naturally, existing in virtually every major waterway where they poison wildlife, habitats, communities, and people. PCBs are the most widespread contaminants on earth, costing billions each year to remediate from contaminated

soil, sediment and groundwater.

The Agency of Toxic Substances and Disease Registry has linked PCB contamination to cancer in humans and other adverse health effects including severe acne, liver and digestive dysfunctions, learning disabilities, and mental development disorders.

In 1979, because of health effects associated with exposure, the Environmental Protection Agency banned the use of the chemicals in the United States, however PCBs are still widely used in developing nations around the world. The Stockholm Convention requires Parties to phase out the use of PCB in equipment by 2025 and ensure worldwide elimination of PCB by 2028. Though 83% of global PCB contamination remains to be eliminated.

Due to a lack of sustainable technologies to remediate PCBs in soil and sediment, Dr.

Jacqueline Quinn, a NASA environmental engineer focused on environmental chemistry research at the Kennedy Space Center, invented a better way to solve this problem. Current remediation methods are cost-prohibitive and destructive to the environment and pose significant threat to people and wildlife.

Dr. Quinn has done a great deal of research in developing methods for attracting and removing PCBs from surfaces coated with contaminated paints or caulks –like those she found on old launch structures and facilities. By combining this process with a submerging capability, she has developed a system for removing PCB's from sediments in contaminated marshes, lakes, and rivers.

The Sorbent Polymer Extraction and Remediation System (SPEARS) technology is comprised of a series of hollow plastic spikes, filled with a reagent that are placed in the bed of a body of water, where PCB's have been detected. The PCBs are attracted the plastic, causing them to migrate from the sediment, toward the spikes and into the reagent. Once the site-specific PCB levels are achieved, the spikes are removed and remediated on-site through a proprietary green destruction process that destroys the chemicals; also allowing the spikes and interior reagent to then be cleaned and reused- making the SPEARS technology versatile, inexpensive, and eco-friendly.

The SPEARS technology was introduced to the Rollins College-NASA Entrepreneurship Scholar Distinction program – engaging Rollins MBA students in researching NASA technologies as part of their studies. Sergie “Serg” Albino, a Rollins College alum, met Dr. Quinn in 2011 while he working on the RESOLVE Lunar Rover Project at NASA, and became interested in Dr. Quinn's work with the SPEARS technology. An engineer by training, Serg was naturally drawn towards the technology side of business development when he became an advisor to the students in the Rollins-NASA program. When the SPEARS technology was introduced to the Rollins-NASA program, it seemed like a natural fit for Serg. For the SPEARS-related effort, Serg led the students in a study focusing on sales/financial projections and marketing strategies for the SPEARS technology, while he concentrated on the manufacturing aspects of the SPEARS.

Based on the results of the research, Serg Albino and R. Ian Doromal founded ecoSPEARS and

attained the exclusive rights to manufacture and sell SPEARS in 2017. ecoSPEARS is an early stage clean technology company, envisioning a world where every human being has access to clean water, clean food, and clean air. The company's mission is to protect human health by ushering in the carbonless future of environmental cleanup. Albino and Doromal have since gone on to raise \$2.5 million in the company's seed round of funding, led by Kirenaga Partners, LLC, and



are soon entering their next round of capital raising to grow their team and operations.

The company has expanded upon the original NASA technology, adding two additional solutions to remove PCBs and other persistent organic pollutants from the earth, expanding their remediation medium to include sediment, soil and groundwater. The ecoSPEARS technologies utilize cost-effective and environmentally friendly solutions, which require far less energy, virtually no water, and produce fewer environmental disturbances reducing the total carbon footprint of the remediation efforts by up to 90%.