TURI Grant Projects – Fiscal Year 2018

TURI grants support work by large and small businesses, academic researchers, municipalities, and community organizations. In Fiscal Year 2018, TURI is supporting a wide variety of projects to make Massachusetts a safer place to live and work.

Industry Grantees

- **Kettle Cuisine of Lynn**, a handcrafter of small batch, all natural soups for restaurants, foodservice operators and grocery retailers, aims to reduce the use of sodium hydroxide used for cleaning. The company will work with the UMass Lowell Food Safety Lab to find safer cleaning and sanitizing formulations or methods that are less hazardous than sodium hydroxide. If a safer substitute that works is found, the company could reduce the use of sodium hydroxide by 45,000 pounds per year.

- **OFS of Sturbridge**, a manufacturer of fiber optic solutions, will investigate integral recycling of hydrogen fluoride, a highly toxic chemical that is used for etching glass. The company aims to minimize worker exposure by implementing a closed-loop recycling process to reuse hydrogen fluoride, thereby reducing the handling and waste of the toxic chemical. Integral recycling also improves efficiency by maintaining a consistent acid etch rate and reducing production down time for bath recharging.

- **US Pack, Inc. of Leominster**, a leading contract manufacturer of custom liquid specialty products, will invest in capital equipment that will make clean up more efficient and produce more precise production batches. The 10-head pressure gravity filler will reduce the use of a variety of chemicals including acetone, ethylene glycol and methanol used in manufacturing automotive, industrial and household cleaning products. By upgrading its equipment, the company could reduce the use of toxic chemicals by over 19,000 pounds per year.

Small Business Grantees

- **Auto Collision Shop at Assabet Valley Technical High School of Marlboro** will purchase new equipment and water-based gun washing solution that will eliminate the use of hazardous solvents. Other auto body shops have proven that a water-based alternative is effective and less expensive. Instead of disposing used solvent as hazardous waste, the school can filter and reuse the water-based solution for many years. Students will benefit from a healthier work environment while learning about environmentally-friendly practices to take with them into their work places after they graduate.

- **Joseph Cleaners of Brockton** will use the grant to offset costs to purchase and install professional wet cleaning technology, a safer alternative that will replace the use of n-propyl bromide (nPB) and perchlorethylene (perc). Both solvents, listed as Higher Hazard Substances in Massachusetts,

have adverse effects on human health and the environment. Professional wet cleaning, a safer alternative, uses water and detergents in computer-controlled machines to clean the clothes and tensioning and pressing equipment to achieve exceptional quality results.

- **Walker's Gymnastics and Dance of Lowell** will purchase new foam cubes that do not contain flame retardants for two landing pits used in the gym. While the landing pits provide safe cushioned landing spots as gymnasts train on the equipment, standard foam cubes contain hazardous flame retardant chemicals that can cause health effects such as endocrine disruption, which is of significant concern to young children.

Academic Grantees

Open to all UMass faculty, the TURI Academic Grant program matches faculty with industry so that the research is applied to real-world challenges and performance requirements. This year's projects are led by the following UMass Lowell researchers:

- **Prof. Ram Nagarajan of the Department of Plastics Engineering is partnering with Bradford Industries of Lowell** to find and evaluate safer solvent blends to replace the use of the toxic solvent dimethylformamide (DMF). Using the Hansen Solubility Parameters in Practice (HSPiP) software tool, Prof. Nagarajan will narrow down possible alternatives that will meet Bradford's performance requirements for its textile coating applications.

- **Profs. Jayant Kumar of the Department of Physics and Ram Nagarajan of the Department of Plastics Engineering will partner with Mexichem Specialty Compounds of Leominster,** the largest supplier of PVC-based cable and wire products in Massachusetts. The research team will develop safer alternatives to antimony trioxide, a widely-used flame retardant that's listed as a probable carcinogen by IARC. This research leverages UMass Lowell's expertise in safer flame retardants to reduce, and eventually eliminate, the use of toxic flame retardants in wire and cable product lines in Massachusetts.

- **Assistant Prof. Hsi-Wu Wong of the Department of Chemical Engineering will partner with Waters Corporation of Milford** to identify safer solvents used in liquid chromatography equipment that identifies and quantifies chemical compounds in complex mixtures. The final solvent formulations will replace the harmful solvents currently in use including methanol, acetonitrile and tetrahydrofuran.

- **Assistant Prof. Christopher Hansen of the Department of Mechanical Engineering** will identify and investigate replacements for chlorinated solvents used in industrial applications. The research team will identify alternatives using an extensive database of solvents based on technical criteria and then verify the predicted performance at a lab-scale.

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Community Grantees

- **The Field Fund, Inc. of Martha's Vineyard** is working to preserve and maintain Martha's Vineyard's playing fields using an organic, systems-based approach rather than installing synthetic fields. By not installing synthetic fields, the Island community aims to preserve its natural landscapes, protect ponds, fragile habitats and single source aquifer, as well as protect young athletes from toxic exposures. To improve maintenance on natural grass playing fields, The Field Fund is purchasing an aerator. This is part of a larger effort to eliminate the use of synthetic fertilizers, pesticides and herbicides and develop an organic management plan for playing fields on Martha's Vineyard.

- **Silent Spring Institute of Newton** will partner with the Massachusetts Breast Cancer Coalition to reduce high school students' exposures to common carcinogens and endocrine-disrupting chemicals. The project team will visit 12 high school science classrooms to help students identify common toxic chemical exposures in their homes and adopt strategies that reduce these exposures. The team will do this through hands-on curriculum and Silent Spring's free mobile app Detox Me that guides users through more than 270 research-based recommendations for reducing exposures to common indoor pollutants. Students will also participate in a peer-to-peer mentoring program that connects them to youth who have participated in studies that measure chemical levels in the body and then took action to prevent toxic exposures.

- **Town of Williamstown** residents approved a non-binding resolution in May 2017 declaring the town a pollinator-friendly community. The resolution seeks to change residential and institutional landscaping practices by promoting ways to reduce the use of pesticides and herbicides that scientists believe are harming bee populations. The project team will host training programs for landscape professionals and home owners, conduct tours of pollinator-friendly gardens and work with local partners on educational opportunities for adults and children, including a video to be made by middle-school children.

- **Worcester Public Schools** is undertaking a significant new initiative to minimize the use of products containing asthmagens and hazardous chemicals in school buses and kitchens. The goal is to prevent transmission of pathogens, while maintaining a healthy environment for students and staff. The project team will convert school bus and kitchen sanitation practices and products to systems that are safer for human health and the environment. Working with manufacturers, the project team will pilot and evaluate safer cleaning and disinfection products, equipment and work practices for use on farm-to-table fresh produce and meats, kitchen surfaces and equipment and school buses.