Matthew Monfeli

**Award:** Undergraduate Student Research; $3900.00

**Status:** Junior, Mechanical Engineering

**Advisor:** Richard Barker

**Research Topic:** Hydrogen Peroxide Flow System

**Abstract:** Plants grown on orbit seem to be experiencing oxidative stress. The gene expression response of the plants to this oxidative stress bears striking resemblance to their response towards dilute hydrogen peroxide (H2O2). Thus, one route towards developing plants better suited to the stresses of spaceflight begins with developing a way to reliably and consistently treat plants with hydrogen peroxide in a laboratory setting. The ROSwell Device embraces this challenge, using 3D-printed components, Arduino and Raspberry Pi microcontroller units, and a solenoid valve mounted on a frame of 80/20 aluminum. The final goal for this device is to construct a reliable method for testing and development of plants designed to grow in space, before sending them into orbit.

**Biography:** Hello there! My name is Matt Monfeli, and I am an undergraduate student studying  
 Biological Systems Engineering at UW-Madison. Space exploration has intrigued me for most of my life, and it is something that I hope to advance with my professional career. That intrigue led me to the Gilroy Lab here in Madison, where I do extracurricular research under Dr. Richard Barker. With the help of the Wisconsin Space Grant Consortium, I’ll be able to continue my research through the summer. Something that goes hand in hand with my love of science is my love of nature. In my spare time, I enjoy hiking, kayaking, rock climbing, and pretty much anything else that can be done outside. I am also an avid Crossfitter, and I love to cook. Being out in nature has really become a scientific experience for me, marveling at the complexity of a mountain range or even a simple rock. In general, I love exploring and understanding this amazing universe which we inhabit, and I hope to play an integral part in increasing our reach into the unknown throughout my life.

**Congressional District:** 2

**Congressional Representative:** Mark Pocan