IMPACT OF MICROGRAVITY ON THE TRANSCRIPTOME OF THE SYMBIOTIC BACTERIUM VIBRIO FISCHERI. A. A. Duscher, G. Casaburi, M. E. Bishop and J. S. Foster, University of Florida Space Life Science lab, Merritt Island, FL 32953; aduscher@ufl.edu, casaburi@ufl.edu, mary.elizabeth.bishop@gmail.com, jfoster@ufl.edu.

Microgravity is known to impact bacteria physiologically as well as induce changes in gene regulation and expression. Most studies on the effects of microgravity have focused on pathogenic bacteria, however, little is known about the impact of microgravity on beneficial bacteria. To address this issue we used the symbiosis between the bacterium *Vibrio fischeri* and the Hawaiian Bobtail squid, *Euprymna scolopes* as a model system. *V. fischeri* are bioluminescent bacteria that colonize the light organ of *E. scolopes* and induce developmental remodeling of the host. This squid-bacterial symbiosis is an ideal model system for microgravity studies as many of the bacterial communication molecules used by *V. fischeri* are also used by pathogens. This study focused on examining the impact of simulated microgravity on the transcriptome of wild-type *V. fischeri.* The microgravity environment was simulated using high-aspect ratio vessels (HARV). HARVs allow for the constant rotation that is perpendicular to the gravitational vector thus maintaining the cell cultures in a low shear suspension where the hydrodynamic forces offset gravitational settling. The *V. fischeri* cultures were exposed to microgravity conditions at two time points: 12 and 24 h. RNA from the cultures was extracted, high quality RNA was converted to cDNA, and then sequenced using the NextSeq Illumina platform. A comparative bioinformatics analysis was conducted using Rockhopper and identified several categories of genes differentially regulated in simulated microgravity conditions. Several stress related genes, including the general regulator or stress response, *rpoS,* and a superoxide dismutase, *sodB*, were significantly upregulated in microgravity conditions. Additionally, genes typically associated with the onset of *V. fischeri* colonization of the host squid, such as *ompU ,* were also upregulated. Some genes known to be associated with virulence in other bacterial species, such as the heatshock protein suppressor *dksA,* and the calcium-binding cytoxin *rtxA1*, were also upregulated in microgravity. Some genes associated with quorum sensing, such as *luxS* were also upregulated in simulated microgravity conditions. Together these transcriptome results will help improve our understanding of the impact that microgravity has on the transcriptome of beneficial microbes that typically associate with animal tissues.