***[Capstone Category]***

| **Project Name** | **Evaluating the capacity of *C. metallidurans* to reduce metal stress in plant hosts** |
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Advancements in industrial and agricultural sectors have rapidly increased the amount of heavy metal pollutants in the Earth’s environment. Many heavy metals are important in the essential mechanisms of plant growth in low concentrations, but if the necessary uptake of these ions is exceeded damaging effects will occur. Therefore, the remediation or removal of heavy metal pollutants from soil and groundwater is a crucial topic for research. There are also uses for this form of remediation in the future; if efforts are made to grow crops in a Lunar or Martian settlement, methods will need to be developed to work around the high metallic concentrations found in the local regolith.

*Cupriavidus metallidurans* is a bacterium known for its adaptation to withstand heavy metal stress. This species is known to be genetically related plant pathogens. We hypothesize that *C. metallidurans* can help alleviate heavy metal stress in plants exposed to toxic levels of chromate (CrO42-) and copper (Cu4-) because of its innate resistance to these stressors and its relationship to bacteria capable of interfacing with plants. Chromate and copper were chosen for this experiment because of *C. metallidurans*’ known resistance to these metals, the low concentration for these which is toxic to plants, and because both are present on the planet Mars and the moon. As stated previously, there are useful applications for heavy metal remediation currently on Earth, but the future implications of this research have been emphasized during the process of this project as the samples of *C. metallidurans* used come from a strain isolated on the International Space Station. Potential future avenues to explore for this topic would be the mechanism by which *C. metallidurans* reduces metal stress in plants or determining other heavy metals which this bacterium is effective against.

