Amber Schmit: Chemical & Biological Engineering
Mentor: Christine Foreman, Heidi Smith, Betsey Pitts -- Land Resources & Environmental Sciences, Center for Biofilm Engineering
Microbial isolates from Antarctica

On the surface of glaciers worldwide, there exist aquatic miniature ecosystems in holes in the ice, called cryoconites. Cryoconites form due to preferential melting around low-albedo aeolian particles; which proceed to sink below the surface until finally reaching their equilibrium depth in the ice. Organic windblown sediment collects at the bottom of these water-filled holes. In this sediment there exists a diverse microbial ecosystem that sustains itself despite the extreme environmental characteristics. My work involves the study of the microorganisms within cryoconites. These organisms were obtained from the McMurdo Dry Valleys of Antarctica, and brought back to Montana State University. Here, microbes were isolated on agar plates for further study. When grown on a plate, many of the microbes displayed unique colors of neon pinks, yellows, and oranges. Some of them even fluoresce in UV light. The next stage in learning about these organisms was a basic growth curve test on 48 of the isolates, followed by gram stain tests. Many of the microbes complete the lag, exponential growth, and stationary phases within a few days, while others will take nearly 2 weeks to complete these phases. Most of the isolates were found to be gram negative organisms. It has been found that these microorganisms, when subjected to freeze thaw cycles, overproduce extracellular polysaccharides and create a biofilm. Using the confocal scanning laser microscope, these isolates and their resulting biofilm structures have been imaged. Future studies will continue to focus on imaging these biofilms, as well as imaging the cryoconite granules and associated biofilms that exist on these granules.