

David Silberstein, Karen McDonald, Matt McNulty

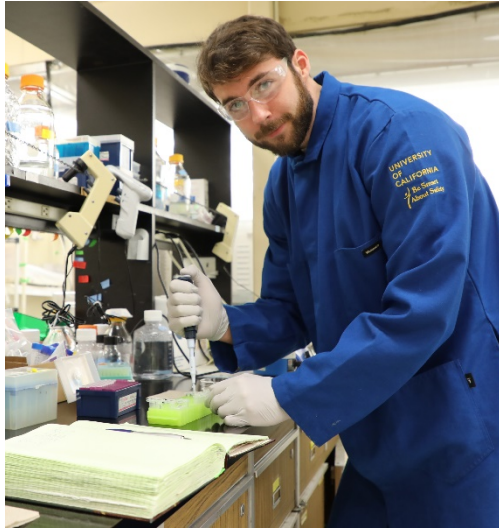
DEB Student Spotlight on Prof. Karen McDonald Lab

The UC Davis Designated Emphasis in Biotechnology (DEB) program would like to thank DEB faculty member, Prof. Karen McDonald (Chemical Engineering), and two of her DEB students, Matt McNulty and David Silberstein for graciously agreeing to a photo shoot in the McDonald-Nandi lab.

McDonald-Nandi Lab's Research Focus:

The McDonald-Nandi lab in Chemical Engineering at UC Davis is focused on synthetic biology in plants, including the development of novel plant viral expression systems, as well as bioprocess engineering technologies to produce and purify recombinant proteins (including human therapeutic proteins, bioscavengers for use as medical countermeasure protection agents biotreats, and biologics for space medicine) using whole plants, harvested plant tissues, or plant cells grown *in vitro* in bioreactors. The group has also developed and published techno-economic simulation models for a variety of plant-based biomanufacturing facilities. The goal of the research is to develop novel plant-based bioprocessing technologies with lower production costs, based on simpler methods that can be implemented in resource-limited environments and rapid enough to quickly respond to emerging and re-emerging infectious diseases and/or bioterrorist threats.

Matt McNulty's Bio/Research:



“I am a third year PhD candidate studying chemical engineering in the McDonald-Nandi lab. I explain my research to friends and family as similar to what you see Matt Damon do in the movie, The Martian -- growing potatoes on Mars. The key difference between Matt Damon's character and my lab is that we see plants like potato or lettuce not just as a source of food and oxygen, but also as a source of life-saving pharmaceuticals. Imagine if the potato you ate also supplied you with the medicine you needed to keep your bones from wearing down in microgravity. Viewing plants as a multi-use tool (think Swiss Army knife) is not just interesting, but essential for long-term human habitation in a severely limited resource environment like Mars. My research is

attempting to take my group's vision one step further by now exploring plants as a pharmaceutical purification platform, for plant-made medicines that need high purity for delivery through intravenous injection.”

“In addition to my research, I get a lot of fulfillment here at Davis volunteering with the grad student organization, ESTEME (Equity in STEM and Entrepreneurship). Teaching middle schoolers through ESTEME's STEM Squad program is a great buoy for me in the difficult weeks of research.”

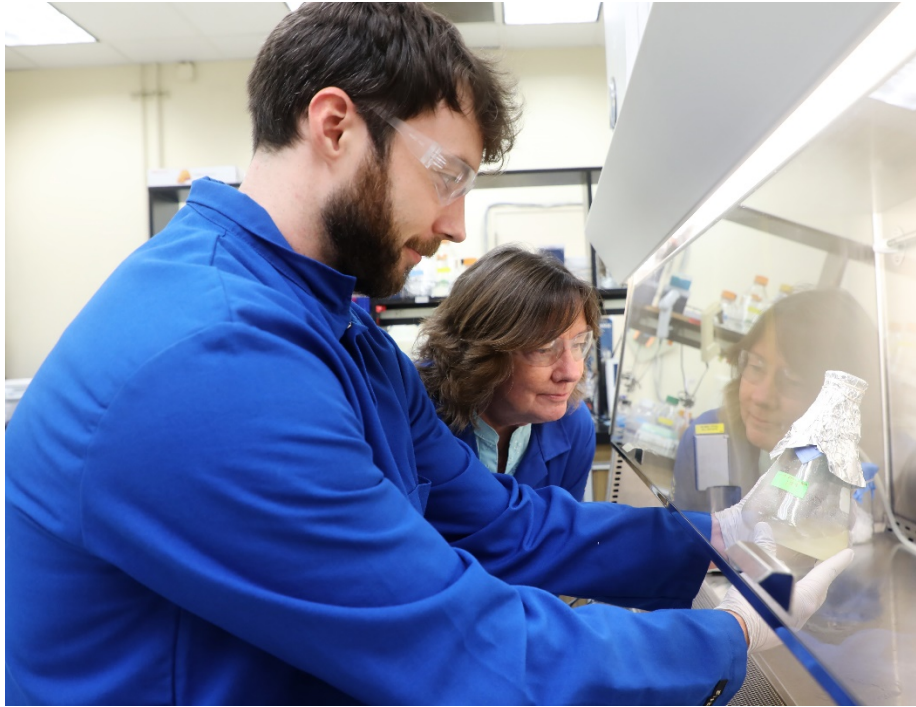
Read about David's research below.

David Silberstein's Bio/Research:

“I'm a fifth-year Chemical Engineering graduate student in the McDonald-Nandi research group. My work focuses on making a human protein to treat emphysema, alpha-1 antitrypsin. Like the rest of my group, I work with plants for my research, and there's a delightful irony in that I primarily use tobacco plants to produce a protein used for emphysema treatments. Alpha-1 antitrypsin has proven to be a challenging research subject, but provides a lot of insight into the ways that plants can be used for biopharmaceutical production and the challenges that are upcoming for the plant-made pharmaceutical industry.”



“I have been an active participant in my department's graduate student organization and the Biotech program, being an e-mentor for high school students at Sheldon Biotech Academy. In my spare time, I've also started some biotech projects of my own at home with a passionate interest in bread-making and homebrewing.”



Stay tuned for the next DEB student in the spotlight post!

If you are a DEB student and would like a photo shoot in your lab, feel free to contact me to set one up!

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