The idea that me and Matt talked about will in some way be related even if we work on different parts. I am not sure how exactly we will divide things, but we have a tentative idea. For this reason, as of now, there will be significant overlap in this document vs. the one Matt sends but I have a few different ideas.

The issue of microfibers is very serious and affects humans as well as our ecosystem. The food we eat, the water we drink, everything is impacted by humanity’s usage of synthetic fibers. These fibers can bind to flame retardants and pesticides to form complex small molecules. The two main types of fibers, chemically, are polyesters and polyamides.

My colleague Matt had an interesting idea. Why not use a compartment or area to hold the water that comes out of a washing machine? In this area, we could use some form of lactic acid bacteria to create an acidic environment. This acidic environment in warm water temperatures should assist in the hydrolysis of both polyamides and polyesters.

Once these compounds are broken into smaller substituents, we could attempt to scavenge the smaller pieces to store in our lactic acid bacteria. To scavenge, we must use genetic engineering to get a highly-specific ABC transporter into the microbe membrane. To know what type of solute protein we would need for this ABC transporter we can possibly utilize computational chemistry docking softwares to optimize the chemistry and structure of a potential solute protein.

Once the microfiber monomers are brought into lactic acid bacteria, we can add large pieces of pure zinc and let stir inside this compartment to bind with lactic acid bacteria. Finally, we can filter out the zinc particles (containing bound lactic acid bacteria) which have microfiber monomers inside.