The cell wall is an essential interface between a bacterium and its surroundings. This dynamic structure accommodates the basic cellular processes of growth and division while protecting against environmental and immune insults. Because it is essential for viability and is composed in part of molecules that are not present in host cells, the bacterial cell wall has been a particularly fruitful target for antibiotic development.

Both the remarkable biology and medical potential of the cell wall have inspired steady research on the topic for over half a century. Indeed, cell wall synthesis and remodeling are well described for model bacteria replicating in broth culture. However, the vast majority of species are unlikely to fit this paradigm neatly. Moreover, these processes have been primarily studied under defined conditions that may or may not recapitulate the natural environment.

Our research focuses on the cell wall of intracellular pathogens such as *Mycobacterium tuberculosis* and *Listeria monocytogenes*. The broad goals of the lab are (1) to determine the mechanisms by which these pathogens adapt their cell wall to the host environment and (2) to engineer the bacterial cell wall for basic and translational biomedical applications. To tackle these challenges, we draw from chemical biology, genetics, biochemistry and biophysics and develop new tools when appropriate.