

BSSE PhD admissions | August 2021

Project title:

Elucidating the Bacterial behaviour and interaction under different pressure conditions by machine Learning

Advisors: Prof. Dipshikha CHakravortty (Microbiology & Cell Biology), Prof. Saptarshi Basu (Mechanical Engineering)

Brief writeup:

Bacterial kingdom came with special survival skills and one among them is their unique and sturdy cell wall consisting for multiple layers of peptidoglycan. The adverse conditions faced by the bacteria constitute a series of signalling mechanism which gives them a survival advantage and never allows a bacterial species to be completely wiped off. The most common and crucial change that the bacteria faces in the nature is pressure. How bacteria can modulate survival under certain pressure conditions will be looked at mechanistically. Controlled pressure perturbations are going to be created by customized techniques with varied amplitude and frequency. The bacterial response is going to be imaged and analyzed in Spatio-temporal space using machine learning and DMD techniques. The resultant flow and bacterial interaction will be quantified from first principles using a mixture of CFD and analytical techniques and image analyses. The casualty of perturbation with survivability will be correlated directly.