Statement of Research Achievements, if any, on which any award has already been Received by the Applicant.

I have recived National Bioscience Award for career Development 2017/2018. This Award was given to me for excellence in the area of microbial physiology. More specifically, My work for last several years have demonstrated that DosS and DosT relay signals to DosR for regulating transition into non-replicating persistence. Our work published in 2015 in Antioxidants and Redox Signaling demonstrated that sensor kinase SenX3 is a heme protein and functions with response regulator RegX3 for regulation resumption of growth in response to reoxygenation of hypoxic cultures. We further demonstrated that SenX3 mutant is attenuated for regrowth in response to oxygenation of hypoxic cultures (Antioxidants & redox signaling 2015, 22(7): 603-613). This study provides a plausible mechanism of oxygen-controlled reaction of TB disease in humans.

Further working on the phenotypic drug resistance we have also demosntrated that Mycobacterium forms surface adherent biofilms in response to intracellular thiol reductive stress induced by exposure to DTT. This study further demonstrated that cellulose is a an important structural component of Mycobacterial biofilms. It was further demonstrated that treatment of mycobacterial biofilms will cellulase disintegrates the mycobacterial biofilms and reinstate the drug tolerance (*Nature Communications* 2016, 7: 11392).

Besides these, my laboratory has also developed reporter strains of slow growing *Mycobacterium tuberculosis* and fast growing *Mycobacterium smegmatis* for measurement of NADH/NAD^+. Using this probe my laboratory has demonstrated considerable metabolic hetergeneity that may modulate differential drug tolerance observed in Mtb residing in macrophages (Frontiers in Cellular and Infection Microbiology. 6:145 doi: 10.3389/fcimb.2016.00145.).