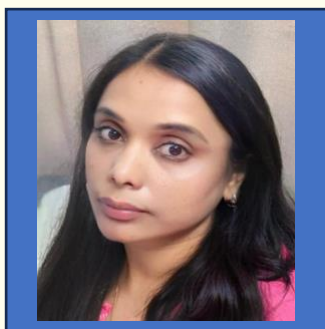


18 May 2026 at 2:30pm (BBS auditorium)

Engineering Smart Therapeutic Strategies Against Biofilm-Driven Antimicrobial Resistance

Dr. Vijayalakshmi Shankar

Vellore Institute of Technology, India



Biofilm-associated infections are a major driver of antimicrobial resistance (AMR), significantly limiting the effectiveness of conventional antibiotics. Within biofilms, microbial communities exhibit phenotypic heterogeneity, metabolic dormancy, and protective extracellular matrices that restrict drug penetration and promote tolerance. This talk presents an integrated, translational framework to address biofilm-driven AMR by combining microbiology, nanotechnology, and data-driven approaches by highlighting the potential of nanomaterial-enabled therapeutic platforms, including engineered nanoparticles for enhanced penetration, targeted delivery, and controlled release, as well as multifunctional systems capable of simultaneous biofilm disruption and antimicrobial action. In parallel, artificial intelligence (AI)-based modelling is explored to predict treatment response, optimize drug–nanomaterial combinations, and enable precision therapeutic design using multi-omics and phenotypic data.

Host: Pr Tina KAUSS, ARNA laboratory