# International Conference on Micro Nano Fluidics

**(ICOM 2025)**

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**<u>Speaker/affiliation</u>:** Prof. Prosenjit Sen, Associate Professor, Centre for Nano Science and Engineering, Indian Institute of Science, Bangalore

**<u>Tentative topic of the invited talk</u>**

*Liquid Marbles on Oil Infused Surfaces*

**<u>Abstract of the invited talk</u>**

We introduced a novel capillary force-assisted cloaking technique using hydrophobic nano-microparticles and liquid-infused surfaces. In this innovative approach, the configuration, termed Liquid Marble on Oil-infused surfaces (LMOI), combines the unique properties of liquid marbles with oil-infused surfaces to achieve remarkable tunability in shell thickness and enhanced droplet stability. This technique enables uniform solid and liquid shell encapsulations with tunability in thickness (5-200 μm) for droplet volumes spanning over 4 orders of magnitudes. The tunable liquid encapsulation demonstrates a remarkable reduction in evaporation rates, up to 200 times, with wide tunability in lifetime (1.5 hrs to 12 days). The potential of capillary force-assisted cloaking goes far beyond droplet encapsulation alone. We have demonstrated its utility in single crystal growth for a diverse range of substances, including copper sulphate, Rochelle salt, sodium nitrate, and Lysozyme protein. The feasibility of employing this method for biological applications has been tested successfully, with human and yeast cells thriving in a hanging droplet configuration. Solid capsules, designed to respond to external stimuli such as temperature changes, offer yet another dimension of tunability.