

Microbubbles and Nanodroplets for Biomedical Ultrasound Applications: Design Principles and Methods

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ABSTRACT: Microbubbles and nanodroplets are used in biomedical ultrasound as contrast agents, molecular imaging probes and targeted drug delivery vehicles. This short course will provide an overview of the basic chemistry and physics of microbubbles relevant to these applications. The first part of the course will focus on practical tips to help you design and synthesize your own microbubbles and nanodroplets, including a review of current methods for loading targeting ligands and drugs onto the microbubble shell. The second half will review the basic physics of microbubble oscillations and phenomena related to imaging and drug delivery, including high-frame-rate optical and acoustical recordings from both in vitro and in vivo experiments.