

Various Biofabrication Strategies to Fabricate Multiscale Tissue Constructs

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In recent years, advanced biofabrication has become a promising solution in the field of biomedical engineering. Unlike conventional biomanufacturing, advanced biomanufacturing is grounded in groundbreaking discoveries in the fields of 3D additive manufacturing, synthetic and stem cell biology, computational modeling, micro and nanofabrication, biomaterials, tissue engineering, and regenerative medicine. This cutting-edge field presents an unprecedented opportunity to advance research, education, and innovation within the biomedical industry.

This presentation details ongoing research conducted by the Advanced Biofabrication Laboratory at the University of Calgary, focused on developing advanced biomanufacturing processes and systems that are cost-effective, flexible, and reliable. By leveraging stereolithography-based 3D bioprinting and high-throughput microfluidic cell-laden microgel fabrication, the laboratory is able to reliably produce stem cell organoids, highly intricate tissue constructs, and even entire organs, which can be utilized for disease study, drug discovery, and therapeutic treatments. The innovative technologies developed by the laboratory have the potential to revolutionize the field of biofabrication and biomanufacturing.