

# IBS CINAP Seminar

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## **Inorganic-organic hybrid biomaterials for tissue engineering**

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Currently, there are no materials that can fulfill all the requirements for bone regeneration. An ideal material must withstand mechanical loads, stimulate osteoblast cells, form bone mineral, and biodegrade at a similar rate as the host tissue regenerates. Hybrids have two different components, inorganic and organic phases, forming a co-network through covalent bonds. This molecular level interaction allows hybrid materials to have control over their degradation rate, biocompatible surfaces, and mechanical properties. In previous studies, various polymer-silica hybrids were fabricated with well-defined polymers that have precise composition, architecture, and size. Pre-osteoblast cells were able to adhere on the hybrids and their ductile mechanical properties were promising for withstanding mechanical loads. Despite of the improvements, it is challenging to produce hybrids with controlled 3D porous structure which is essential for vascularization and passageways for cells. In this presentation, 3D printing of polymer-silica hybrids and their promising application in bone tissue engineering will be discussed.