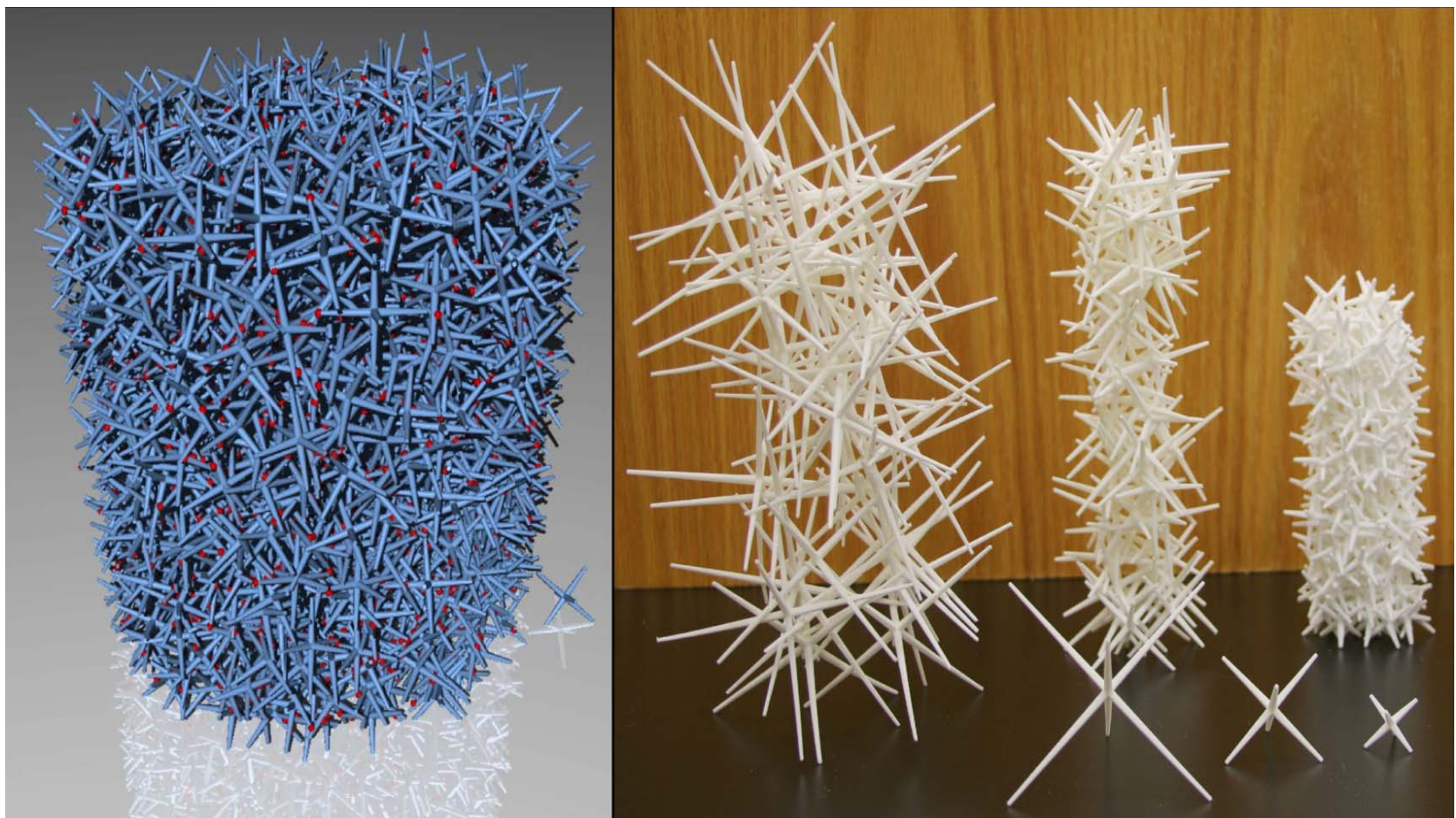


Structure of hexapod 3D packings: An experimental approach to understand the global stability from the local organization

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Aggregates of non-convex particles have shown to be much more stable than more classical convex ones. This fundamental specificity makes them good candidates to design new lightweight and reversible structures. These innovative materials, already observed in Nature (sponges, snow...), could be used at large scale for architectural or civil engineering purposes and at small scale for easy to assemble structures. However, even if it has been quantified macroscopically for different particle shapes, few is known about the fundamental reason of such a stability.

In this seminar I will present a novel experimental method to investigate the local structure of piles made of hexapod particles. This method is based on X-ray scanning and on an accurate homemade particle reconstruction algorithm. It permits to get the position and orientation of each particle as well as to detect their contact points. Measurement of the coordination numbers, statistics of the contact positions and local density evaluation for different packing configurations show a good agreement with the previous studies carried out at the global scale and permits to explain the main local mechanisms leading to stable structures.

