The structure and mechanical properties of networks of high aspect ratio nanoparticles.

Research supervisors: Profs. M.E. Möbius
Soft Matter Group

Scientific Background / Current Research

Nanoparticles can take many shapes and forms from spheres to high aspect ratio rods and platelets such as Carbon nanotubes and Graphene. These particles can be used as filler materials to enhance the mechanical properties of composites or used in suspensions to make ink and paint. The mechanical properties are directly related to the microscopic network structure the particles form, their stiffness and the interaction between them. While this type of problem has been extensively studied for spherical particles, much less is known in the case of high aspect ratio particles such as rods and platelets.

Project

This is a computational project with the goal to simulate disordered, stress bearing structures made of high aspect ratio particles. You will then analyse the mechanical and structural properties of these structures and their dependence on stiffness of the particles and their interactions.

Funding

Applicants should discuss funding with the Research Supervisor. They should apply for funding from the following sources: Irish Research Council (deadline 11 February, 2015), TCD PG Scholarship and School of Physics Studentship schemes. The successful candidate will perform the research in the Foams and Complexity group.

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More information / References