PHYSICS COLLOQUIUM:
Reconfigurable Assembly of Nanoparticles in Smectic Films Confined at Curved Surfaces

Mohamed Amine Gharbi
Assistant Professor, Department of Physics
University of Massachusetts, Boston

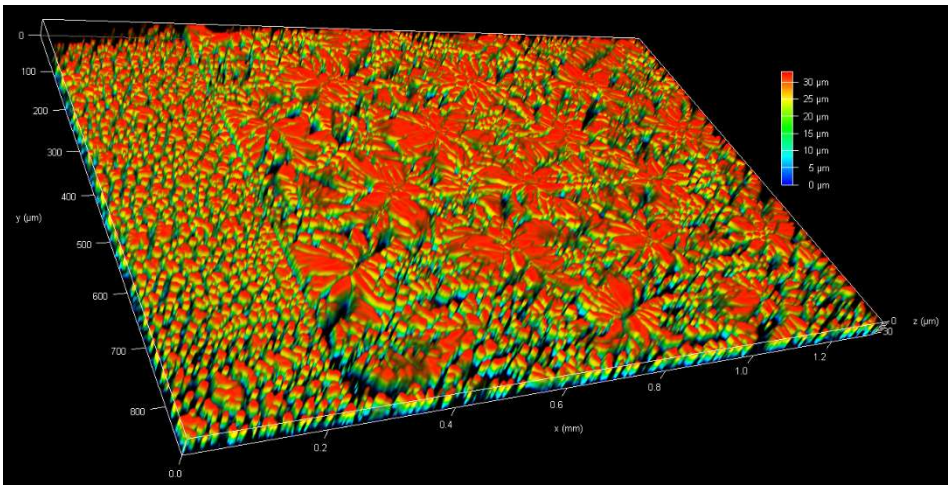
Date:
11/5/2021

Time:
10:30 AM-11:50 AM

Link:
Please contact snsgradstaff@ucmerced.edu for the zoom information.

About The Speaker:

Dr. Gharbi is an Assistant Professor in the Department of Physics at the University of Massachusetts Boston since January 2018. Before joining UMass Boston, he worked at Brandeis University (January 2017-December2017), McGill University (August 2014-December 2016), and the University of Pennsylvania (November 2011-July 2014) as a postdoctoral research fellow. He completed his Ph.D. in Physics of Soft Condensed Matter at the University of Montpellier in France (October 2011). The research projects in Gharbi's Lab focus on designing new devices based on the directed assembly of functional nanomaterials and biomaterials within complex fluids. In particular, he is interested in developing new procedures to create hybrid materials with tunable functionalities that can find relevance in various technological applications.



Abstract:

Liquid crystals have drawn interest in the past decade due to their ability to trap colloidal objects in topological defects and direct their assembly into specific patterns. They have also significantly impacted modern technologies, particularly optics, e.g., microlens arrays, soft lithography templates, and optically selective masks. This work studies the formation of defects in smectic A liquid crystal with hybrid texture at undulated and double undulated surfaces fabricated using 3D printers. We investigate the role of surface morphology on the organization of focal conic domains (FCDs) and demonstrate new methods for assembling them into new hierarchical structures. Then, we expand our work to illustrate the capabilities of these defects to spontaneously organize gold nanoparticles into reconfigurable patterns and discuss the parameters affecting them. Our work paves the way for creating new procedures to control the assembly of functional nanomaterials into tunable structures that may find relevance in energy technology.

For more information, contact : Daniel Beller
dbeller@ucmerced.edu